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## Facets of Impulsivity and Compulsivity in Women with Anorexia Nervosa

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### Abstract

This study sought to investigate independent associations of impulsivity and compulsivity with eating disorders (ED) symptoms. Women (N = 81) with full or subthreshold DSM-IV anorexia nervosa (AN) completed a semi-structured interview and self-report questionnaires. Multiple regression analyses were conducted using ED symptoms as dependent variables and facets of impulsivity and compulsivity as predictor variables (controlling for body mass index and AN diagnostic subtype). For impulsivity facets, lack of perseverance was uniquely associated with eating concern, shape concern, and restraint, whereas negative urgency was uniquely associated with eating concern and frequency of loss of control eating; neither sensation seeking nor lack of premeditation was uniquely associated with any ED variables. Compulsivity was uniquely associated with restraint, eating concern, and weight concern. Results support independent associations of impulsivity and compulsivity with ED symptoms in adults with AN, suggesting potential utility in addressing both impulsive and compulsive processes in treatment.

### Keywords

eating pathology; personality; impulsiveness; compulsiveness; urgency

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Although a number of personality variables have been examined in anorexia nervosa (AN; Cassin & von Ranson, 2005; Farstad, McGeown, & von Ranson, 2016; Rotella, Fioravanti, & Ricca, 2016), impulsivity and compulsivity have received particularly extensive attention (see reviews by Collier & Treasure, 2004; Godier & Park, 2014, 2015; Wildes & Marcus, 2013). Impulsivity and compulsivity have traditionally been conceptualized as representing opposite poles on a singular personality dimension (Berlin & Hollander, 2014), which has been proposed to map onto the spectrum of eating disorder (ED) psychopathology (e.g., Collier & Treasure, 2004). However, although impulsivity and compulsivity may be related, more recent theoretical and empirical research has conceptualized these constructs as existing on separate continuums, allowing for co-occurrence within an individual and within a given form of psychopathology (Grant & Kim, 2014; Robbins, Gillan, Smith, de Wit, & Ersche, 2012).

These constructs are of particular relevance given that certain ED symptoms in AN have been viewed as driven and compelled (e.g., restriction, exercise), while others have been viewed as more impulsive (e.g., binge eating). Of note, these constructs may have relevance to both diagnostic subtypes of AN (i.e., restricting and binge eating/purging) given that (a) driven and compelled behaviors are typically present in both and (b) the multifaceted and dimensional nature of impulsivity (e.g., Whiteside & Lynam, 2001; Whiteside et al., 2005) allows for the possibility that both high and low dispositional tendencies for impulsivity are associated with certain ED behavior patterns. As such, there is utility in understanding differential contributions of impulsivity and compulsivity to ED symptoms in AN, both in terms of addressing their theoretical role in onset/maintenance, as well as potentially informing relevant treatment targets.

Studies using a variety of measures have investigated impulsivity and compulsivity in relation to ED symptoms in non-clinical and clinical ED samples (e.g., Butler & Montgomery, 2005; Claes, Vandereycken, & Vertommen, 2005; Engel et al., 2005; Favaro & Santonastaso, 1998; Hoffman et al., 2012). For instance, in a non-clinical sample of adult women, Black and Mildred (2014) found that a personality-based compulsivity measure and certain dimensions of a multi-faceted impulsivity measure were associated with a broad measure of disordered eating. With regard to clinical ED samples, Engel and colleagues (2005) utilized factor analytically-derived impulsivity and compulsivity measures in a sample of adults with bulimia nervosa (BN). The authors found that those who were high in both impulsivity and compulsivity scored highest on personality pathology and various ED symptoms (e.g., restraint, eating concern). Additionally, Claes, Vandereycken, and Vertommen (2002) found significant group differences for certain impulsive and compulsive features between ED patients versus controls, as well as across ED diagnoses.

Notably, there is evidence of differential relationships of impulsivity and compulsivity with various ED behaviors. For example, in an adult BN sample, Favaro and Santonastaso (1998) found that self-induced vomiting was related to compulsivity, whereas laxative use was related to impulsivity. Further, utilizing data from two large AN samples, Hoffman and colleagues (2012) found that greater impulsivity and obsessive-compulsive symptoms were associated with purging, but not binge eating. Taken together, existing findings thus support

the relevance of both impulsivity and compulsivity in EDs, but the degree to which these constructs are uniquely associated with various ED symptoms in AN remains unclear.

## Current Study

The current study sought to expand on the existing literature in several ways. First, consistent with recent conceptualizations of impulsivity as a multifaceted construct (Whiteside & Lynam, 2001; Whiteside et al., 2005), and evidence suggesting that these facets differentially relate to ED symptoms (Fischer, Smith, & Cyders, 2008), this study examined four dimensions of impulsivity: negative urgency, (lack of) premeditation, (lack of) perseverance, and sensation seeking. Second, in contrast to much previous research that assessed compulsivity from a behavioral or diagnostic symptom perspective (i.e., obsessive-compulsive characteristics), the current study assessed compulsivity from a dispositional (i.e., trait-based) perspective. This represented a more comprehensive approach, and also provided for consistency in the way the impulsivity and compulsivity constructs were conceptualized. Third, this study addressed a broad range of ED symptoms that may differentially relate to impulsive and compulsive processes. Prior published studies utilizing these data have addressed other personality and affect constructs in relation to ED symptoms (e.g., Lavender et al., 2013; 2016), and one study examined a specific impulsivity facet (i.e., negative urgency) in relation to naturalistic experiences of affect and ED behaviors (Culbert et al., 2016). However, this is the first study to utilize these data in examining dispositional tendencies for multiple facets of impulsivity and compulsivity in relation to a range of ED symptoms.

Given prior evidence suggesting the particular relevance of negative urgency to bulimic symptoms (e.g., Fischer et al., 2008), it was hypothesized that this impulsivity facet would be uniquely associated with eating concern and loss of control (LOC) eating. Further, in light of the driven and compelled nature of food- and body image-related concerns and preoccupations in AN (e.g., Godier & Park, 2014; Mazure, Halmi, Sunday, Romano, & Einhorn, 1994), it was hypothesized that compulsivity would be uniquely associated with restraint, eating concern, weight concern, and shape concern. Due to the limited existing literature in this area, no further hypotheses were made.

## Method

### Participants

Eligibility criteria required that participants be female, at least 18 years of age, and meet criteria for full-threshold AN (defined by DSM-IV; APA, 1994) or subthreshold AN (defined by meeting all DSM-IV criteria for AN except body mass index [BMI] of 17.6 to 18.5 kg/m<sup>2</sup> or absence of amenorrhea or the cognitive features of AN). A total of 118 participants completed the study; however, the impulsivity measure was added after the study commenced and was only administered to a subsample. Thus, data were available for 81 participants (46% full and 54% subthreshold AN; 69% restricting type and 31% binge eating/purging type) who completed the impulsivity and compulsivity measures. The sample had a mean age of 25.2±8.7 years and a mean BMI of 17.1±1.1 kg/m<sup>2</sup>, and most participants

were Caucasian (97.5%). Characteristics of this subset are similar to those of the full study sample (see Engel et al., 2013).

## Procedure

Participants were recruited at three sites in the Midwestern United States from various clinical (e.g., ED treatment centers) and community (e.g., flyers) sources. Those who expressed interest and met preliminary eligibility criteria during a phone screen were invited to an informational meeting, followed by two assessment visits to complete laboratory tests, a physical examination, interviews, and questionnaires. Participants subsequently completed an ecological momentary assessment protocol (data not included here). This study was approved by Institutional Review Boards at each site.

## Measures

**Structured Clinical Interview for DSM-IV Axis I Disorders, Patient Edition (SCID-I/P; First, Spitzer, Gibbon, & Williams, 1995).**—The SCID-I/P is a semi-structured interview that was used to assess AN diagnostic criteria. SCID interviews were recorded and a second independent assessor rated current ED diagnoses in a random sample of 25% of the interviews. Interrater reliability (based upon a kappa coefficient) was .93 for current AN diagnosis.

**Eating Disorder Examination (EDE; Fairburn & Cooper, 1993).**—The EDE is a semi-structured interview that provides four subscale scores (restraint, eating concern, shape concern, weight concern) and ED behavior frequencies. Given the theoretical relationship between impulsivity and LOC, independent of amount of food consumed, frequencies of objective and subjective binge eating episodes were summed to create an LOC eating frequency variable. EDE interviews were recorded and 25% were rated by a second independent assessor, resulting in interrater reliabilities (based upon intraclass correlations coefficients) ranging from .89 (shape concern) to 1.0 (restraint).

**UPPS Impulsive Behavior Scale-Revised (UPPS-R; Whiteside & Lyman, 2001).**—The UPPS-R is a 45-item self-report questionnaire that assesses four facets of impulsivity: Negative urgency (12 items; e.g., “When I am upset I often act without thinking”), (lack of) premeditation (11 items; e.g., “I like to stop and think things over before I do them”), (lack of) perseverance (10 items; e.g., “I tend to give up easily”), and sensation seeking (12 items; e.g., “I generally seek new and exciting experiences and sensations”). Items are rated on a 4-point scale ranging from (1) agree strongly to (4) disagree strongly. Relevant items are reverse scored such that higher scores reflect greater impulsivity.

**Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ; Livesley & Jackson, 2009).**—The DAPP-BQ a 290-item self-report measure that contains 18 scales assessing traits of personality pathology. Items are rated on a 5-point scale ranging from (1) very unlike me to (5) very like me. Scale scores are reported as *T*-scores, with a mean of 50 and a standard deviation of 10. The Compulsivity subscale (16 items; e.g., “I like to do things very methodically”) was used in this study.

## Analyses

Multiple regression analyses were used to examine the unique associations of the four facets of impulsivity and compulsivity with the four EDE subscales and EDE LOC eating frequency. Given their established relevance to ED symptom severity, both BMI and AN diagnostic subtype were included as covariates.

## Results

Table 1 presents descriptive statistics and intercorrelations. Because an initial examination of variable distributions revealed that LOC eating frequency was positively skewed, this variable was square root transformed prior to analysis.

Multiple regression results are presented in Table 2. Of note, AN diagnostic subtype was significant in most analyses, indicating a tendency for greater severity in the binge eating/purging type; BMI was uniquely positively associated with shape concern, and uniquely negatively associated with LOC eating frequency. In the first regression, compulsivity and lack of perseverance were both found to be uniquely and positively associated with restraint. Similarly, in the model predicting eating concern, both compulsivity and lack of perseverance were uniquely and positively predictive, although negative urgency also emerged as a unique predictor. Findings for weight concern and shape concern diverged. Compulsivity was a significant predictor for weight concern, but there was only a trend for this variable in the shape concern analysis. Further, lack of perseverance was significantly associated with shape concern, but not weight concern. Finally, only negative urgency was found to be uniquely associated with LOC eating frequency.

## Discussion

This study examined unique associations of impulsivity facets and compulsivity with a variety of ED symptoms in women with AN. Findings were mostly consistent with the hypotheses. Specifically, as expected, negative urgency was uniquely associated with both eating concern and LOC eating frequency, whereas compulsivity was associated with restraint, eating concern, and weight concern, but did not reach statistical significance for shape concern. Results further indicated that lack of perseverance was uniquely associated with restraint, eating concern, and shape concern. Neither sensation seeking nor lack of premeditation was uniquely associated with any of the ED variables.

Most broadly, the current findings support the conceptualization of impulsivity and compulsivity as processes that may independently contribute to psychopathology. This is particularly relevant to understanding EDs, which are characterized by a variety of symptoms that have traditionally been viewed as more impulsive or compulsive in nature (e.g., Fischer et al., 2008; Godier & Park, 2014). Although certain findings (e.g., unique association of compulsivity with restraint) are consistent with such characterizations, impulsivity facets were also found to be associated with ED symptoms that might be considered more compulsive in nature (e.g., shape concerns, restraint). Additionally, these findings contrast somewhat with those of Hoffman and colleagues (2012), who found that impulsivity and compulsivity were not related to binge eating. However, this difference may

be due to the current study focusing on LOC eating more broadly, versus only objective binge eating as was the case in Hoffman et al.

Results of the current study can also be contrasted to findings from research on bulimic symptoms. For instance, Fischer and colleagues (2008) conducted a meta-analytic review of associations between impulsivity facets and bulimic symptoms. Consistent with the unique associations of negative urgency with eating concern and LOC eating found here, the meta-analysis reported that negative urgency had the largest effect size in relation to bulimic symptoms. In contrast, sensation seeking had the second largest effect size in the meta-analysis, whereas this facet was not uniquely associated with any symptoms in the current study. Further, the unique associations of lack of perseverance with multiple ED symptoms in this study contrasts with the meta-analysis, in which this facet had the lowest effect size in relation to bulimic symptoms. However, the meta-analysis included a number of studies with nonclinical samples, thus the discrepant findings could be due to differences in ED presentations (i.e., AN versus BN) or overall ED symptom severity. Consistent with the significant contribution of both impulsivity and compulsivity to restraint and eating concern in this study, Engel et al. (2005) found that individuals with BN who were high in both impulsivity and compulsivity demonstrated the highest restraint and eating concern scores. Additionally, groups characterized by high compulsivity demonstrated greater weight concern scores than those low in compulsivity, consistent with the unique association between compulsivity and weight concern found here. However, Engel et al. observed a similar pattern for shape concern, whereas there was only a trend for an association between compulsivity and shape concern in this investigation.

Several limitations should be noted. First, the cross-sectional nature of the study precludes determinations of causality. Impulsive and compulsive dispositions may be pre-existing and contribute to the onset of ED psychopathology, may develop (or worsen) during the progression of the illness (including with weight loss), or both. Additional research using prospective and longitudinal designs to address compulsivity and impulsivity across the course of illness is needed. Further, we retained a standard level for determining significance across the several regressions that were conducted, thus these findings will need to be replicated to ensure that they do not reflect type one errors. Regarding measurement, the factor structure of the EDE has been questioned (see Berg et al., 2012), thus future studies using other ED measures are recommended. Additionally, only self-report measures were used to assess the predictor variables; research using behavioral and neurocognitive measures of related constructs (e.g., inhibitory control, persistence) would be useful. Finally, there were also sample-related limitations. Specifically, the modest sample size may have limited the ability to establish significance for smaller effects and did not allow for examination of interactions. There also is a possibility of sample bias given that only a subset of participants completed the impulsivity measure, and the generalizability to other ED populations and to those with more severe AN presentations (as the average BMI of this sample was consistent with a mild presentation) is unclear.

## Conclusion

The present findings contribute to the existing literature by providing data regarding the complex role of impulsivity and compulsivity in AN. In particular, the results suggest that associations vary depending on the specific facets and ED symptoms under investigation. Unique associations of both compulsivity and certain impulsivity facets with several ED symptoms were found, highlighting the importance of considering both impulsive and compulsive processes in women with AN. Although these results are preliminary and based on cross-sectional data, there may be utility in thoroughly assessing impulsivity and compulsivity among patients with AN to provide potentially useful guidance on targeting these constructs in treatment.

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**Table 1.** Descriptive Statistics and Intercorrelations for Primary Predictor Variables and Dependent Variables

	1	2	3	4	5	6	7	8	9	10
1. Restraint	-									
2. Eating Concern	.62***	-								
3. Shape Concern	.51***	.56***	-							
4. Weight Concern	.52***	.55***	.77***	-						
5. LOC Eating	.28*	.40***	.19	.13	-					
6. Negative Urgency	.28*	.43***	.28*	.23**	.32**	-				
7. Sensation Seeking	-.22*	-.11	-.14	-.10	-.06	-.01	-			
8. Lack of Perseverance	.28*	.26*	.26*	.16	.26*	.52***	-.10	-		
9. Lack of Premeditation	-.07	-.06	.05	.06	.05	.43**	.22	.55***	-	
10. Compulsivity	.12	.17	.04	.14	-.12	-.18	-.10	-.62***	-.55***	-
Mean	2.49	2.00	2.91	2.82	6.09	2.47	2.46	2.04	1.90	52.88
SD	1.61	1.32	1.58	1.61	9.53	0.64	0.69	0.61	0.49	11.34
Cronbach's $\alpha$	.72	.62	.85	.77	-	.89	.88	.88	.86	.93

Note. LOC = Loss of Control; LOC eating reflects the combined frequency of objective and subjective binge eating episodes, and the raw (untransformed) descriptives are presented for this variable.

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$

**Table 2.**

## Regression Analyses Predicting Eating Disorder Symptom Variables

	<i>Total R<sup>2</sup> / R<sup>2</sup></i>	<i>t</i>	<i>β</i>	<i>p</i>
<b>Restraint</b>	.37 / .22			
Diagnostic Subtype		3.22	.31	<b>.002</b>
Body Mass Index		1.51	.15	.136
Negative Urgency		1.33	.16	.187
Sensation Seeking		-0.99	-.10	.324
Lack of Perseverance		2.87	.42	<b>.005</b>
Lack of Premeditation		-1.52	-.20	.133
Compulsivity		2.77	.37	<b>.007</b>
<b>Eating Concern</b>	.39 / .31			
Diagnostic Subtype		2.19	.21	<b>.032</b>
Body Mass Index		0.67	.06	.504
Negative Urgency		3.19	.37	<b>.002</b>
Sensation Seeking		0.29	.03	.772
Lack of Perseverance		2.66	.39	<b>.010</b>
Lack of Premeditation		-1.94	-.25	.056
Compulsivity		2.97	.39	<b>.004</b>
<b>Shape Concern</b>	.24 / .15			
Diagnostic Subtype		1.29	.14	.202
Body Mass Index		2.44	.26	<b>.017</b>
Negative Urgency		1.32	.17	.191
Sensation Seeking		-0.68	-.07	.498
Lack of Perseverance		2.07	.34	<b>.042</b>
Lack of Premeditation		-0.80	-.12	.424
Compulsivity		1.89	.27	.063
<b>Weight Concern</b>	.21 / .12			
Diagnostic Subtype		2.03	.22	<b>.046</b>
Body Mass Index		1.55	.17	.126
Negative Urgency		0.88	.12	.382
Sensation Seeking		-0.54	-.06	.591
Lack of Perseverance		1.36	.23	.178
Lack of Premeditation		0.37	.05	.713
Compulsivity		2.60	.39	<b>.011</b>
<b>Loss of Control Eating</b>	.36 / .07			
Diagnostic Subtype		4.43	.44	<b>&lt;.001</b>
Body Mass Index		-2.02	-.20	<b>.048</b>
Negative Urgency		2.13	.25	<b>.036</b>
Sensation Seeking		0.20	.02	.840
Lack of Perseverance		0.43	.07	.667
Lack of Premeditation		-0.87	-.11	.388

	<i>Total R<sup>2</sup> / R<sup>2</sup></i>	<i>t</i>	<i>β</i>	<i>p</i>
Compulsivity		-0.47	-.06	.638

*Note.* Loss of Control Eating reflects the combined frequency of objective and subjective binge eating episodes. Diagnostic subtype was coded as: restricting type = 0, binge eating/purging type = 1. Results of each analysis are reported for the full model (i.e., inclusion of all covariates and predictor variables). Based on a hierarchical approach, the reported  $R^2$  values reflect the unique contribution of the impulsivity and compulsivity predictor variables above and beyond the covariates.

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