

# Impulsivity in Women With Eating Disorders: Problem of Response Inhibition, Planning, or Attention?

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## ABSTRACT

**Objective:** Impulsivity is generally believed to be more characteristic of individuals with “bulimic” than with “restrictive” eating disorders (EDs). However, studies have not exhaustively explored the association between EDs and various component dimensions of the impulsivity construct.

**Method:** We conducted a multidimensional assessment of impulsivity in 84 women with bulimia nervosa (BN), 37 with anorexia nervosa (AN: 19 “restricters” and 18 “bingers–purgers”), and 61 normal-control participants. To assess multiple components of impulsivity, participants completed a battery of self-report questionnaires and a performance test.

**Results:** Compared with normal-control participants, all ED groups showed attentional problems. However, only women suffering BN or AN-binge/purge subtype showed elevations on motoric forms of impulsivity, whereas women with BN were the only group to report tendencies toward reckless behavior.

**Conclusion:** These findings suggest that binge-eating behavior coincides with problems of response inhibition, whereas a risk-taking attitude may be a unique characteristic of individuals with BN. © 2006 by Wiley Periodicals, Inc.

**Keywords:** impulsivity; eating disorders; bulimia; behavioral impulsivity; recklessness

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## Introduction

Anorexia nervosa (AN), restricting subtype, has generally been associated with behavioral inhibition (or overregulation), whereas eating disorder (ED) variants characterized by binge eating and purging (i.e., bulimia nervosa [BN] and AN binge/purge subtype) have been linked, on average, to impulsivity and behavioral disinhibition.<sup>1–4</sup> Consistent with the preceding, various studies associate binge/purge syndromes with elevated impulsivity, compared with levels obtained in “restrictor” and/or normal-eater groups.<sup>1,5,6</sup>

Such findings support the general belief that individuals with “restrictor” or “binger/purger” ED subtypes differ as to tendencies toward behavioral over-

control or undercontrol.<sup>2,4</sup> However, given evidence that “impulsivity” is a multidimensional construct, implicating cognitive (planning), attentional, and behavioral components,<sup>7–9</sup> we considered it important to explore loadings of diverse “impulsivity” dimensions (measured using self-report and behavioral indices) across different ED subtypes. Based on previous findings,<sup>7,10–12</sup> we expected strongest “restrictor–binger” differences to emerge on measures tapping motoric components of impulsivity.

## Method

### Participants

With institutional research ethics board approval, we recruited 114 women with an active ED, through outpatient services at the Eating Disorders Program of the Douglas Hospital. Of these, 79 had BN, 17 had anorexia nervosa, binge/purge subtype (AN-BP), and 18 had anorexia nervosa, restricting subtype (AN-R), according to Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria<sup>13</sup> established using the Eating Disorders Examination (EDE) interview.<sup>14</sup>

### Comparison (Normal-Eater Control: NC)

Participants were recruited through ads posted in local newspapers and university bulletin boards. A total of

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59 women were recruited who were comparable in age to the clinical sample. Based on initial telephone screening and structured interviews (described below), control participants were determined not to have displayed a prior history of ED, or current major psychiatric or medical problems, use of psychoactive medications, or drug and alcohol abuse.

Across BN, AN-BP, AN-R, and NC groups, mean ( $\pm$  *SD*) ages were 25.04 ( $\pm$  6.42), 25.59 ( $\pm$  7.71), 24.56 ( $\pm$  10.21) and 24.32 ( $\pm$  6.19), respectively. There were no significant group differences ( $F_{(3, 169)} = 0.204$ , n.s.). Mean ( $\pm$  *SD*) body mass index (BMI) across BN, AN-BP, AN-R, and NC groups was 21.30 ( $\pm$  1.91), 16.66 ( $\pm$  1.67), 17.13 ( $\pm$  1.52), and 21.93 ( $\pm$  2.22), respectively. Analysis of variance (ANOVA) revealed a significant group difference ( $F_{(3, 169)} = 53.65$ ,  $p < .000$ ) with Student–Newman–Keuls tests showing the difference to exist, predictably, between anorexic groups, on the one hand, and bulimic and normal groups, on the other.

### Measures of Eating Disordered Symptoms

Eating-disorder symptoms were assessed using the EDE,<sup>14</sup> a structured interview assessing anorexic and bulimic symptoms. The interview has solid discriminant validity and internal consistency (Cronbach's alpha [ $\alpha$ ] ranging from 0.67 to 0.90)<sup>15</sup> and was conducted by trained raters with ongoing supervision, to ensure diagnostic consistency.

### Measures of Impulsivity

Participants completed two paper-and-pencil measures. The first was the Barratt Impulsivity Scale-version 11 (BIS-11)<sup>16</sup> which measures (1) motoric impulsivity (or proneness to reckless actions), (2) cognitive/attention impulsivity (or inability to maintain focused attention, and (3) nonplanning impulsivity (or lack of concern for the future). The scale has good internal consistency, ranging from Cronbach's  $\alpha$  of .72 in a sample of substance abusers, to .82 for a sample of undergraduate students, to .83 for a sample of general psychiatric patients.<sup>17</sup> Finally, the BIS-11 has good discriminant validity.<sup>16</sup> The second measure used was the Stimulus Seeking subscale from the Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ),<sup>18</sup> which reflects tendencies to seek out novel experiences and stimuli. Livesley and colleagues<sup>18</sup> have found this subscale to be sensitive to impulsivity and Cluster B personality disorders. Reported coefficient  $\alpha$  for the subscales of the DAPP range from 0.83 to 0.94.<sup>19</sup>

Participants also underwent a behavioral test of response inhibition/disinhibition in the form of the Go/No-Go task.<sup>20</sup> The Go/No-Go is a computerized measure of impulsivity, on which participants must attempt to inhibit their responses in order to win small monetary

rewards or avoid losses. The validity of the measure is supported by findings showing that impulsive or aggressive participants (i.e. psychopaths, impulsive individuals) display more response disinhibition when compared with normal controls.<sup>21,22</sup> The Go/No-Go task requires participants to determine, by trial and error from a random set of numbers, which ones have been designated as “correct” or “incorrect”. Errors of commission (i.e., failures to inhibit responding), especially under conditions in which such errors are punished through financial losses, are believed to reflect inability to withhold action to avoid punishment. We therefore present results obtained under conditions in which omission and commission errors are punished.

Given a bilingual population, we used forward-and-back translation techniques to develop French versions of self-report questionnaires. Previous work with these scales has indicated the translations to be psychometrically equivalent to the original English versions [e.g.,<sup>23</sup>].

## Results

**Table 1** shows the results of one-way ANOVAs testing the differences between the participant groups on the Barratt Impulsivity Scale, the Stimulus Seeking scale, and the Go/No-Go test. Significant group differences emerged on all three of these measures.

On the Barratt Impulsivity Scale, Student–Newman–Keuls post hoc tests revealed Attention dimension scores of all eating-disordered groups (AN-R, AN-BP, and BN) to be significantly higher than those of the NC group. Scores of the patient groups did not differ from each other, however. In other words, cognitive impulsivity appears to have been characteristic of all eating-disordered groups. On the Motor Impulsiveness subscale, the scores of the binger groups (BN and AN-BP) were significantly higher than those of the normal-eater and the AN-R groups, with scores of the NC and AN-R groups not differing from each other. These results indicate that the binger groups were the more behaviorally impulsive. On the third BIS subscale, Nonplanning, Student–Newman–Keuls tests indicated the scores of the BN group to be significantly higher than were those of the AN-R and AN-BP groups, but not higher than scores of the normal eater group. Lastly, on the BIS total score, the scores of the BN group differed significantly from those of the NC and AN-R groups. Scores of the AN-BP group fell into an intermediate position, not significantly different from those of any of the other three groups.

On the Stimulus Seeking subscale of the DAPP, Student–Newman–Keuls post hoc tests indicated

**TABLE 1.** Mean scores and corresponding standard deviations on the Barratt Impulsivity Scale, on the “stimulus seeking” subscale of the Dimensional Assessment of Personality Pathology, and on commission and omission errors under the punishment condition of the Go/No-Go task<sup>†</sup>

Variable	BN (N = 79)		AN-BP (N = 17)		AN-R (N = 18)		NC (N = 59)		F (3, 169)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
BIS									
Attention dimension	2.54 <sup>b</sup>	.44	2.36 <sup>b</sup>	.48	2.35 <sup>b</sup>	.35	2.03 <sup>a</sup>	.39	16.24***
Motor dimension	2.54 <sup>b</sup>	.48	2.48 <sup>b</sup>	.45	2.16 <sup>a</sup>	.51	2.02 <sup>a</sup>	.35	17.12***
Nonplanning dimension	2.24 <sup>b</sup>	.44	1.97 <sup>a</sup>	.39	1.90 <sup>a</sup>	.29	2.09 <sup>a,b</sup>	.45	4.51**
Total BIS score	75.56 <sup>b</sup>	10.67	67.24 <sup>a,b</sup>	10.88	63.19 <sup>a</sup>	8.56	61.49 <sup>a</sup>	9.64	14.42***
DAPP	N = 76		N = 16		N = 18		N = 60		
Stimulus seeking <sup>◇</sup>	2.87 <sup>b</sup>	.87	2.85 <sup>b</sup>	.82	2.55 <sup>a,b</sup>	0.82	2.34 <sup>a</sup>	0.55	F (3, 166) = 6.126**
Go/No-Go	N = 65		N = 16		N = 18		N = 58		
Errors of commission (with punishment) <sup>†</sup>	10.98 <sup>a,b</sup>	11.43	14.75 <sup>b</sup>	12.16	6.22 <sup>a</sup>	9.08	5.74 <sup>a</sup>	8.34	F (3, 153) = 4.919***
Errors of omission (with punishment) <sup>‡</sup>	3.80	5.07	5.38	5.03	2.94	4.58	2.05	4.58	F (3, 153) = 2.520

Note: BIS = Barratt Impulsivity Scale; DAPP = Dimensional Assessment of Personality Pathology Questionnaire.

\* $p \leq .05$ . \*\* $p \leq .01$ . \*\*\* $p \leq .001$ .

<sup>◇</sup> Only a subset of participants (N = 170) completed the DAPP questionnaire.

<sup>†</sup> Results of ANOVAs comparing scores across groups are shown.

<sup>‡</sup> Only a subset of participants (N = 157) completed the Go/No-Go computer task.

<sup>a,b</sup> Superscripts indicate results from Student–Newman–Keuls post hoc tests. Means with different letters in their superscripts differ from each other at the  $\geq .05$  level.

the binger groups (BN and AN-BP) to have significantly higher scores than did the NC group. Finally, according to mean Commission Errors in the punishment condition of the Go/No-Go computer task (thought to be maximally sensitive to problems of response inhibition), BN and AN-BP participants both showed tendencies toward more error than did AN-R and NC participants. This difference reached statistical significance in the AN-BP group alone. No comparable group differences were obtained on Omission Errors.

## Conclusion

In this study, we assessed whether individuals with bulimia-spectrum EDs would show higher loadings than restricters and non-eating disordered individuals on measures of cognitive and behavioral dimensions of impulsivity. We discuss results obtained on each of our measures in turn: On the Attention subscale of the BIS, all three patient groups scored significantly higher than did non-eating disordered controls, suggesting that individuals with EDs display attentional impairments. Such effects could reflect known cognitive sequelae of nutritional distress.<sup>24,25</sup>

In contrast, on the Motoric subscale of the BIS, the binger groups (BN and AN-BP) tended to score higher than did the restricter and control groups. The binger groups also scored significantly higher

than the control group, but not the restricter group, on the Stimulus Seeking subscale of the DAPP. In addition, on the Go/No-Go computer task, binger groups (BN and AN-BP) displayed a tendency to score higher than the restricter and control groups, although this difference was statistically significant only in the AN-BP group. As such, there appeared to have been a tendency for “bingers” to display greater response disinhibition and to emit more impulsive behaviors, whereas “restricters” tended to resemble the control group. In this respect, our findings are consistent with previous results linking binge eating behavior with behavioral impulsivity.<sup>10–12</sup>

On the nonplanning dimension of the BIS, we obtained yet a third pattern of results. The tendency toward nonplanning (or to act recklessly) seemed to be characteristic only of individuals with BN, with individuals diagnosed with AN-BP, AN-R displaying lesser nonplanning tendencies. Low scores of the AN-BP group on the nonplanning dimension contrast with elevated motoric impulsivity (evinced by results on the Go/No-Go and the BIS Motor subscale), and suggest that the AN-BP group may be characterized by a balance between motoric impulsivity and cautiousness. The lower scores of the AN-BP and AN-R groups on the nonplanning dimension of the BIS point to a greater level of cautiousness displayed by the two groups even when compared with the non-eating disordered group. Taking results obtained in our other “binger” group (i.e., BN) into account, we are led to

conclude that binge eating is associated with behavioral (or motoric) forms of impulsivity, but not necessarily with cognitive forms, characterized by reckless or risk-taking attitudes.

One might argue that our selection of “control” participants based on absence of overt axis I pathology may result in a “supernormal” group, enhancing the possibility of finding clinical and non-clinical differences. Although this concern is legitimate, it is counterbalanced by an issue that we gave priority, which was to ensure an absence of marked psychopathology among control-group participants.

The present results emphasize the extent to which impulsivity needs to be conceptualized as a multidimensional construct, associated with other behavioral patterns (e.g., eating disorders) in only nuanced (rather than global) ways. Like the findings of Wonderlich et al.,<sup>10</sup> our findings indicate that eating pathology aligns itself only with certain components of impulsivity and also emphasize the point that bulimic eating-disorder variants co-occur especially often with motoric forms of impulse dyscontrol.

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