



The functional assessment of maladaptive behaviors: A preliminary evaluation of binge eating and purging among women

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ABSTRACT

This study applied a functional approach to the study of bingeing and purging behaviors. Based on a four-function theoretical model of bingeing and purging, it was hypothesized that these behaviors are performed because of their intrapersonally reinforcing (e.g., emotion regulation) and/or interpersonally reinforcing (e.g., help-seeking, attention-getting behavior) properties. Participants were 298 adult females who had engaged in bingeing or purging in the last 3 months and who provided data via an online survey of these behaviors. Confirmatory factor analyses revealed support for a four-function model of bingeing and purging in which people use these behaviors for intrapersonal reinforcement functions and also for interpersonal reinforcement. Understanding the functions of binge eating and purging has direct implications for assessment and treatment of these behaviors.

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1. Introduction

The purpose of this study is to better understand why people engage in the maladaptive behaviors seen in many psychiatric disorders. Most research over the past several decades has taken a syndromal approach in which maladaptive behaviors are conceptualized as signs or symptoms of some underlying disease process. An alternative approach is to consider the function of maladaptive behaviors. That is, what purposes they serve in their immediate environment. From a functional perspective, maladaptive behaviors are not necessarily manifestations of an underlying disease, but instead are goal-directed behaviors performed to obtain some desired end. Because behaviors may serve different functions for different individuals, the ability to assess the functions of behavior has important implications for clinical assessment and treatment.

These different approaches to understanding maladaptive behaviors can be reconciled by the acknowledgment that not all psychiatric disorders are best conceptualized from a functional perspective. For instance, alcohol/substance use, self-injury, and eating disorders may be best understood using a functional perspective, while schizophrenia, autism, and mental retardation may be best understood from a syndromal/disease perspective (McHugh, 1992). Moreover, regarding the former, it may also be that different maladaptive behaviors (e.g., alcohol/substance use, self-injury, bingeing, and purging) are maintained by similar behavioral functions. For instance, each of these

behaviors could function as a means of escaping a negative emotional state or influencing the behavior of others in some way.

Prior research typically has tested functional models of different forms of maladaptive behaviors with measures specific to one form of psychopathology, such as self-injury, eating disorders, or alcohol or substance use (e.g., Carr, 1977; Heatherton and Baumeister, 1991; Iwata et al., 1994; Cooper et al., 1995; Sherwood et al., 2000; Wilson and Hayes, 2000; Jackson et al., 2003; Nock and Prinstein, 2004; Thombs, 2006). Given the considerable overlap of these behavior problems (Welch and Fairburn, 1996; Paul et al., 2002; Nock et al., 2006), research in this area may advance more efficiently if there were a common method for studying the functions across these behaviors. Such an advance also would allow researchers and clinicians to examine whether these different behaviors serve similar functions. The purpose of this study was to develop a method for measuring the functions of maladaptive behaviors that could be used across behavior problems.

Following prior research on the psychological functions of self-injury (Nock and Prinstein, 2004), alcohol use (Cox and Klinger, 1988; Cooper et al., 1995), and unhealthy eating patterns (Jackson et al., 2003), we proposed that binge eating and purging would be maintained via either negative or positive reinforcement processes, and that the contingencies maintaining these behaviors would be either automatic (i.e., intrapersonal) or social (i.e., interpersonal). In this model, *automatic-negative reinforcement* (ANR) refers to a process in which behavior is maintained by the removal of a negative affective state. In contrast, *automatic-positive reinforcement* (APR) refers to a process in which behavior is maintained by the consequent occurrence of a desired internal state. Engaging in a behavior for *social-negative reinforcement* (SNR) refers to doing so to avoid interactions with others or other social tasks. In contrast, the *social-positive*

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reinforcement (SPR) function focuses on getting attention from others or to communicate information to another.

Prior theoretical models of bingeing and purging behaviors are consistent with the four-function model proposed here (Heatherton and Baumeister, 1991; Polivy and Herman, 1999). Heatherton and Baumeister (1991) have proposed that bingeing functions to escape from negative self-awareness. According to this theory, some people, especially those who maintain high standards for themselves, find it aversive to be aware of themselves and their shortcomings and so binge to avoid the negative feelings that may arise from this awareness (Heatherton et al., 1991; Heatherton et al., 1998). Interestingly, a similar escape function has been proposed to be the primary drive for suicidal behavior (Baumeister, 1990). Like in bingeing, this theory proposes that suicide functions as an escape from aversive self-awareness, further supporting the rationale for applying a functional model across different behavioral problems.

Several studies support this model by showing that people often report high negative mood before the occurrence of binge episodes (Davis et al., 1985; Davis et al., 1988; Lingswiler et al., 1989; Powell and Thelen, 1996; Telch and Agras, 1996; Agras and Telch, 1998) and decreases in negative mood following binge eating (Kaye et al., 1986).

Others have suggested that negative mood may actually increase immediately following binge episodes (Hilbert and Tuschen-Caffier, 2007) but then decrease following compensatory behaviors (i.e., purging) (Lynch et al., 2000; Smyth et al., 2007).

Additional work provides support for the other three functions outlined in the four-function model described above. For instance, dissociation often precedes binge-eating episodes (Lyubomirsky et al., 2001; Engelberg et al., 2007), suggesting that binge eating may function as APR in an attempt to ground oneself via feeling generation. However, in this case, binge eating may also occur as an attempt to relieve the distress caused by dissociation, a perspective that corresponds more closely to ANR. Furthermore, although the link between bingeing and purging and social influence is less clear, research has highlighted the overlap between bulimia and social anxiety (Grabhorn et al., 2005; McLean et al., 2007). Thus, binge eating may serve an SNR function if working to avoid others in the context of this anxiety. An evolutionary perspective has suggested bulimia may be the result of competition for mates (Faer et al., 2005), which represents an SPR function. In this theory, high body dissatisfaction and drive for thinness contribute to bulimic symptoms which function to improve this body dissatisfaction and increase attraction from potential mates.

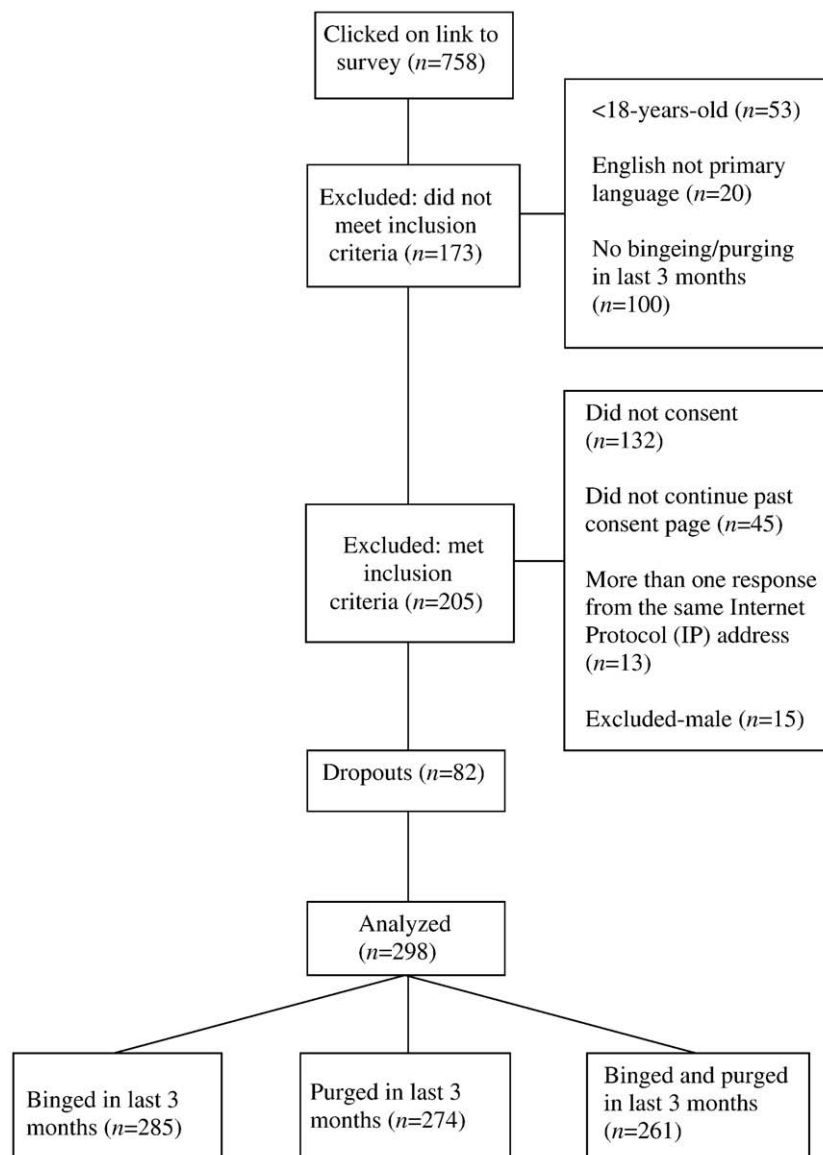


Fig. 1. Flow diagram of participant inclusion.

The purpose of the current study is to expand earlier work on the functions of self-injury (Nock and Prinstein, 2004), eating behaviors (Jackson et al., 2003), and alcohol abuse (Cox and Klinger, 1988; Cooper et al., 1995) by developing a measure that can be used to study the functions of any behavioral problem. We hypothesized that binge eating and purging would fit well into the four-function model used previously to characterize other maladaptive behaviors. Based on prior work on bulimia nervosa (BN), we also hypothesized that people would report using the behaviors for ANR more than any other function.

2. Method

2.1. Participants

Potential participants were directed to the study website via advertisements on online search pages, eating disorder recovery websites, and other online bulletin boards. Participants self-identified whether they met the inclusion criteria (over 18 years of age, spoke English as their primary language, and had engaged in bingeing or purging behavior in the last three months) and provided informed consent. In total, 758 people initiated participation in this Internet-based survey study. A total of 298 female participants were included in the final analyses (see Fig. 1 for flowchart of sample composition). Of these participants, 285 participants reported having binged, 274 reported purging, and 261 endorsed having both binged and purged. Because modification indices for the confirmation factor analyses (CFA) could not be generated where there were any missing data, 20 subjects were removed from the bingeing analysis and 26 from the purging analysis for missing data on the Functional Assessment of Maladaptive Behaviors (FAMB), which left 265 and 248 subjects in the bingeing and purging analyses respectively. All procedures and measures were approved by the Harvard University Committee on the Use of Human Subjects and written permission was obtained for the use of each measure. Demographic characteristics of the 298 participants are presented in Tables 1 and 2.

2.2. Design and procedures

Data were obtained via a survey administered over the Internet using SurveyMonkey, an online survey design program (<http://www.surveymonkey.com>), and posted at the URL: <http://www.eatingdisordersurvey.com>. Participants first completed three brief screening questions to ensure they met the inclusion criteria, then provided informed consent, and then completed the assessments.

2.3. Assessment

2.3.1. Psychiatric disorders

Psychiatric disorders were assessed to determine the extent of eating disorder pathology that met diagnostic criteria and also to examine comorbidity of other

Table 1
Participant characteristics.

Variable	Mean (S.D.)	Range	N	Percentage of sample
Participant age	26.25 (8.75)	18–65	297 ^a	
Participant ethnicity				
Caucasian			252	84.6
Hispanic			15	5.0
Mixed ethnicity/other			11	3.7
African American			10	3.4
Asian/Pacific Islander			7	2.3
Not reported			3	1.0
Participant marital status				
Never married			186	62.4
Married or living as though married			91	30.5
Divorced			14	4.7
Separated			3	1.0
Widowed			2	0.7
Not reported			2	0.7
Psychiatric diagnoses				
Somatic disorder			156	52.3
Major depressive disorder			149	50.0
Bulimia nervosa			136	45.6
Generalized anxiety disorder			116	38.9
Alcohol abuse			100	33.6
Panic disorder			84	28.2
Binge eating disorder			27	9.1

^a One participant did not report her age.

Table 2
Additional participant characteristics.

Variable	N	Percentage of sample
Highest level of education		
<12th grade	18	6.0
High school graduate	38	12.8
Some college	105	35.1
Completed 2-year college	13	4.4
Completed 4-year college	67	22.5
Part graduate or professional school	26	8.7
Completed graduate degree	30	10.1
Not reported	1	0.3
Employment status		
Regularly employed	138	46.3
Sporadically employed	24	8.1
Student	97	32.6
Unemployed	27	9.1
Disabled	10	3.4
Not reported	2	0.7
Approximate household income		
\$0–20,000	53	17.8
\$21,000–\$40,000	58	19.5
\$41,000–\$60,000	50	16.8
\$61,000–\$80,000	29	9.7
\$81,000–\$100,000	18	6.0
>\$100,000	38	12.8
Not reported	52	17.4

psychiatric disorders. For this purpose we used the PRIME-MD Patient Health Questionnaire (PHQ; Spitzer et al., 1999). The PHQ is a brief self-report diagnostic instrument designed to be used in primary care settings that probes for the presence of bulimia nervosa, binge eating disorder, somatic disorder, major depression, panic disorder, generalized anxiety disorder, and alcohol abuse. This measure was chosen as it is one of the few entirely self-report diagnostic instruments for psychiatric disorders. The PHQ has shown good agreement between diagnoses made with the measure and those made by independent mental health professionals ($K=0.65$, overall accuracy = 85%, sensitivity = 75%, specificity = 90%, Spitzer et al., 1999). One study has also shown adequate convergent and divergent validity for binge-eating disorder specifically (Gruzca et al., 2007).

2.3.2. Bulimia symptoms

The Bulimia Test (BULIT, Smith and Thelen, 1984) was used to obtain a more thorough measure of the severity of eating disordered symptoms. The BULIT is a 32-item self-report measure used to assess bulimia symptom severity. A score of 102 or higher is typically used to distinguish individuals with bulimia from those without a disorder (Smith and Thelen, 1984). This measure has been shown to be a good predictor of a diagnosis of BN and is correlated with the Binge Scale of the Eating Attitudes Test (EAT, Garner and Garfinkel, 1979), another measure of bulimic symptoms, indicating good construct validity. Internal consistency reliability as measured by Cronbach's alpha for the current study was 0.91.

2.3.3. Functional Assessment of Maladaptive Behaviors

The FAMB was designed for use in this study to assess the functions of bingeing and purging behaviors. Rather than create an entirely new measure, we chose to adapt and expand an existing measure of the functions of self-injury called the Functional Assessment of Self-Mutilations (FASM, Lloyd-Richardson et al., 1997). We took this approach because there already are extensive experimental (e.g., Iwata et al., 1994) and self-report (e.g., Brown et al., 2002; Nock and Prinstein, 2004; Lloyd-Richardson et al., 2007) data supporting the four functions of this behavior and because the reliability and validity of the FASM have been reported in multiple studies. Our goal was to distinguish the FAMB from the FASM and other existing measures of the functions of maladaptive behavior in two distinct ways: (1) the FAMB would be designed in a way that would allow it to be used for a wide range of behavior problems, and (2) the FAMB would provide a comprehensive and balanced measurement of each of the four proposed functions (whereas earlier measures such as the FASM focus most items on the social functions and only a few on the automatic, despite the higher rate of endorsement of automatic functions).

In developing the FAMB, some of the items were adapted from the FASM, while other items were generated from interviews with people diagnosed with bulimia as well as with clinicians who were experts in working with those with BN and other eating disorders. In an initial measure development phase, 20 participants meeting criteria for BN were recruited via posted and online advertisements and invited to our laboratory for individual interviews, during which they responded to open-ended questions and an initial version of the FAMB. These interviews suggested that the four-factor model was appropriate for use with this sample. However, participants also reported using bingeing and purging behaviors for purposes of control (i.e., "To assert

control over myself," "I purge when I need to get control of a situation"). As such, a fifth function of "control" was added. This was kept as a separate fifth function because a need for control can be seen as potentially fitting under any of the four other functions, depending on the context of the situation. Additionally, this function is also consistent with previous research suggesting that those with eating disorders look for control in certain areas of their lives (Crowther and Sherwood, 1997). There were 26 items in the final version of the scale. Eight of these items were taken directly from the FASM, five were based on and modified slightly from items in the FASM, and 13 were newly generated for the FAMB. Respondents were asked to indicate how often they binge for the following reasons, and then indicate on a 4-point Likert scale their response from 0 being "Never" to 3 being "Often" to the 26 different items/reasons. Subsequently, respondents were asked to follow the same procedure for purging and to respond similarly to the same list of items.

2.4. Data analysis

Descriptive statistics were used to examine the diagnoses and clinical characteristics of the sample and the frequency of endorsement of each self-reported reason for bingeing and purging. Several different data-analytic procedures were then used to evaluate the proposed functional model. First, each of the items on the FAMB was assigned to one of the four functions based on previous work using the FASM (Nock and Prinstein, 2004, 2005) and author consensus. Because our goal was to test a specific, theoretically derived model, we evaluated the structural validity of the model by submitting the items for bingeing and purging to CFA using AMOS 7.0 (Arbuckle, 2006) with SPSS (SPSS Inc., 2003). The final model was evaluated using several standard measures of goodness of fit, including a non-significant χ^2 , incremental fit index (IFI) ≥ 0.90 , comparative fit index (CFI) ≥ 0.90 , root-mean-square error of approximation (RMSEA) ≤ 0.08 , and $\chi^2/df \leq 3$ (Carmines and McIver, 1981; Browne and Cudeck, 1993; Arbuckle, 2006). Second, we tested the internal reliability of each subscale using Cronbach's alpha. Third, we used descriptive statistics to compare the rate of endorsement of each of the four functions within bingeing and purging.

3. Results

3.1. Preliminary analyses

The mean BULIT score for the sample was 113.35 (S.D. = 22.07; median = 114.00; range = 44–154). A one-sample *t*-test showed that the mean score for this sample is significantly higher than the clinical cut-off score of 102, $t(278) = 8.59$, $P < 0.001$, and the majority of participants (69.5%) scored above this cut-off. Moreover, 45.6% of the sample met criteria for BN, and an additional 9.1% for binge-eating disorder, based on their responses to the PRIME-MD PHQ. Of those participants reporting having purged, 76.8% used self-induced vomiting, 56.7% used food restriction or fasting, 47.3% used excessive exercise, and 30.2% used laxatives. Additional diagnoses endorsed by the sample are presented in Table 1. Eighty-one percent of the sample met criteria for at least one other psychiatric diagnosis and the mean number of comorbid diagnoses other than an eating disorder was 2.03 (S.D. = 1.50; median = 2.0; range = 0–5).

3.2. Functions of bingeing

3.2.1. CFA

We first tested the hypothesized four-function model, which showed an acceptable degree of fit with the data (see Table 3). To determine whether the four-function model provides the best fit with the data, we also tested models with one (i.e., all items loaded onto one factor), two (i.e., automatic and social reinforcement), three (i.e., ANR, APR, and social reinforcement; and, automatic, SNR, and SPR), and five (i.e., ANR, APR, SNR, SPR, and control) factors. When testing models with fewer than five factors, we ran analyses both with control items loaded on the automatic-positive factor as well as with the control items deleted. Chi-square difference tests revealed that all models fit significantly better when control items were removed and that the four-function model was a significantly better fit than the other models (see Table 3 for all fit statistics). Thus, in the final model, four functions were retained—automatic-negative, automatic-positive, social-negative, and social-positive reinforcement, while control items were removed.

Table 3
Fit statistics for bingeing^a.

	CFI	IFI	RMSEA	CMIN/df	Chi square	df
<i>Control items loaded on AP factor (where there are fewer than five factors)</i>						
1 Factor	0.50	0.51	0.18	9.66	2887.41	299
2 Factors (Auto. and Soc.)	0.70	0.70	0.14	6.30	1877.90	298
3 Factors						
AN, AP, Soc.	0.74	0.75	0.13	5.50	1627.79	296
Auto., SN, SP	0.75	0.75	0.13	5.48	1622.60	296
4 Factors	0.79	0.79	0.12	4.71	1380.58	293
5 Factors	0.84	0.84	0.10	3.88	1121.35	289
<i>Control items deleted</i>						
1 Factor	0.55	0.55	0.19	10.22	2135.29	209
2 Factors	0.76	0.76	0.14	5.95	1236.66	208
3 Factors						
AN, AP, Soc.	0.78	0.78	0.13	5.62	1157.75	206
Auto., SN, SP	0.82	0.82	0.12	4.74	977.14	206
4 Factors ^b	0.84	0.84	0.11	4.40	892.98	203

Notes: CFI = Comparative Fit Index; IFI = Incremental Fit Index; RMSEA = Root Mean Square Error of Approximation; CMIN = Chi Square Minimum Fit Function; df = degrees of freedom; Auto. = Automatic; Soc. = Social; AN = Automatic-Negative; AP = Automatic-Positive; SN = Social-Negative; SP = Social-Positive.

^a Error terms were not allowed to correlate in these preliminary analyses.

^b Best fitting model.

The FAMB contains several pairs of items that are similar in content (e.g., item 10 = "To communicate to others how badly you feel inside," and item 7 = "To let others know how desperate you were feeling.") It was expected that such items would share nonrandom error variance given the similarities in content. To account for this, we allowed for correlated residuals between several such items as suggested by model modification tests. This was only done where modification tests suggested it was appropriate, where it made theoretical sense, and where this was true both for bingeing and for purging. Thus, in the final model, although the chi-square value was still statistically significant, $\chi^2(196, N = 265) = 546.23$, $P < 0.001$, the other fit statistics suggested the model was a good fit with the data, IFI = 0.92, CFI = 0.92, RMSEA = 0.08 (90% confidence interval = 0.07–0.09), and $\chi^2/df = 2.79$. All items loaded significantly on the proposed factors, and the resulting factor loadings are presented in Table 4. Model modification tests revealed that no cross-loadings would significantly improve the model fit.

3.2.2. Reliability and correlations among functions

Cronbach's alpha coefficients for each subscale ranged from 0.75 to 0.93 (Table 5), indicating high internal consistency reliability.¹ All subscales were significantly correlated, with the magnitude of these correlations ($r_s = 0.37$ – 0.67) suggesting the four functions are related but distinct (i.e., not redundant) constructs (Table 5).

3.2.3. Endorsement of specific reasons and overall functions for bingeing

The rate of endorsement of each individual reason is presented in Table 4. An item was considered endorsed if it was rated a 2 ("sometimes") or 3 ("often"). This is admittedly an arbitrary cut off; however, it is notable that using a more stringent threshold of 3 ("often") provides a similar pattern of results, with merely smaller percentages of "endorsement" of each item. The percentages of participants endorsing ANR functions of their bingeing behaviors ranged from 40.4% to 83.0%, while the percentages of respondents endorsing any of the social reinforcement functions ranged only from 7.1% to 18.1%. Consistent with our hypotheses, bingeing was endorsed much more often for ANR than for any other function. This was followed by APR, then SNR, and finally SPR was endorsed the least (Table 5).

¹ Calculation of Cronbach's alpha assumes linearity and uncorrelated error terms (Zimmerman et al., 1993). As error terms were allowed to correlate for items that were similar in content, alpha values in the current study may be artificially inflated.

Table 4
Confirmatory factor analysis and rate of reported reasons for binge eating.

Item	ANR	APR	SNR	SPR	% of participants endorsing item sometimes or often (N = 265)
8. To escape/avoid/stop bad feelings	0.84				71.7
6. To relieve anxiety	0.82				74.0
23. To prevent bad feelings	0.78				50.5
24. To cope with/relieve stress	0.82				74.3
1. To reduce feelings of anger, sadness, loneliness, anxiety, etc.	0.74				83.0
15. To slow down racing thoughts	0.65				40.4
18. To feel relaxed		0.61			45.0
19. To feel something at all		0.56			43.4
13. To ground yourself/return from a dissociative state		0.56			28.7
3. To give yourself something to do when you are alone		0.49			72.9
21. To give yourself something to do when you are bored		0.46			60.4
20. To avoid being with other people			0.71		31.0
5. To avoid having to do something unpleasant that you don't want to do			0.80		40.8
11. To avoid school, work, or other activities			0.80		29.4
12. To get other people to understand or notice you				0.92	9.4
14. To get attention			0.95		7.2
25. To receive more attention from family and friends			0.93		7.1
26. To get your parents to understand or notice you			0.83		7.5
10. To communicate to others how badly you feel inside			0.77		16.6
7. To let others know how desperate you were feeling			0.75		17.0
17. To feel special			0.75		10.2
2. To get a reaction from someone even if it's negative			0.57		18.1

Notes: ANR=Automatic-Negative Reinforcement; APR=Automatic-Positive Reinforcement; SNR=Social-Negative Reinforcement; SPR=Social-Positive Reinforcement.

3.3. Functions of purging

3.3.1. CFA

The results of the factor analysis for the reasons for purging indicated an adequate fit for the exact same four-function model as binge eating (see Table 6). We tested the same additional models for purging as before with one, two, three, and five factors to determine if these models provided a better fit. Similar to the previous analysis, chi-square difference tests revealed that all models without the control items fit better than those with the control items included on the APR factor. Similarly, the four-function model without the control items fit the data better than any of the other models (see Table 6 for all fit statistics). In the final four-function model, where residuals were allowed to correlate, like the previous model, the chi-square value was statistically significant, $\chi^2(196, N = 248) = 457.88, P < 0.001$, but other fit statistics suggest a good fit of the same model for purging, $IFI = 0.94, CFI = 0.94, RMSEA = 0.07$ (90% confidence interval = 0.07–0.08), and $\chi^2/df = 2.34$. Also, like the model for bingeing, all items loaded significantly on the

Table 5
Alpha coefficients, item mean, S.D., item median, and zero-order correlations for the four-function subscales for bingeing.

Subscale	α	M	S.D.	Median	Correlations			
					1	2	3	4
1. Automatic-negative reinforcement	0.90	1.82	0.91	2.00	--			
2. Automatic-positive reinforcement	0.75	1.43	0.82	1.40	0.67	--		
3. Social-negative reinforcement	0.81	0.98	0.96	0.67	0.58	0.60	--	
4. Social-positive reinforcement	0.93	0.39	0.67	0.13	0.37	0.49	0.52	--

Table 6
Fit statistics for purging^a.

	CFI	IFI	RMSEA	CMIN/df	Chi square	df
<i>Control items loaded on AP factor (where there are fewer than five factors)</i>						
1 Factor	0.51	0.51	0.19	9.71	2902.92	299
2 Factors (Auto. and Soc.)	0.74	0.74	0.14	5.58	1662.51	298
3 Factors						
AN, AP, Soc.	0.77	0.77	0.13	5.07	1501.63	296
Auto., SN, SP	0.80	0.81	0.12	4.51	1333.53	296
4 Factors	0.83	0.83	0.11	4.01	1175.64	293
5 Factors	0.89	0.89	0.09	3.03	874.18	289
<i>Control items deleted</i>						
1 Factor	0.51	0.52	0.20	11.28	2356.77	209
2 Factors	0.78	0.78	0.14	5.68	1181.13	208
3 Factors						
AN, AP, Soc.	0.81	0.81	0.13	5.13	1057.22	206
Auto., SN, SP	0.85	0.86	0.11	4.11	847.02	206
4 Factors ^b	0.89	0.89	0.10	3.34	678.59	203

Notes: CFI = Comparative Fit Index; IFI = Incremental Fit Index; RMSEA = Root Mean Square Error of Approximation; CMIN = Chi Square Minimum Fit Function; df = degrees of freedom; Auto. = Automatic; Soc. = Social; AN = Automatic-Negative; AP = Automatic-Positive; SN = Social-Negative; SP = Social-Positive.

^a Error terms were not allowed to correlate in these preliminary analyses.
^b Best fitting model.

proposed factors, and model modification tests revealed that no cross-loadings would significantly improve the model fit. Thus, each item loaded only on the proposed factor and the results support a four-function model of purging. Factor loadings are listed in Table 7.

Table 7
Confirmatory factor analysis and rate of reported reasons for purging.

Item	ANR	APR	SNR	SPR	% of participants endorsing item sometimes or often (N = 248)
6. To relieve anxiety	0.90				77.9
24. To cope with/relieve stress	0.91				74.2
8. To escape/avoid/stop bad feelings	0.86				71.3
23. To prevent bad feelings	0.83				72.2
1. To reduce feelings of anger, sadness, loneliness, anxiety, etc.	0.82				78.3
15. To slow down racing thoughts	0.70				49.2
19. To feel something at all		0.77			44.7
18. To feel relaxed		0.77			56.5
3. To give yourself something to do when you are alone		0.69			46.4
13. To ground yourself/return from a dissociative state		0.65			39.1
21. To give yourself something to do when you are bored		0.69			36.3
20. To avoid being with other people			0.84		27.0
5. To avoid having to do something unpleasant that you don't want to do			0.82		33.5
11. To avoid school, work, or other activities			0.84		23.0
12. To get other people to understand or notice you				0.95	16.6
25. To receive more attention from family and friends				0.91	12.9
14. To get attention				0.88	13.8
10. To communicate to others how badly you feel inside				0.82	19.8
7. To let others know how desperate you were feeling				0.80	21.0
2. To get a reaction from someone even if it's negative				0.78	21.8
26. To get your parents to understand or notice you				0.77	8.8
17. To feel special				0.73	23.0

Notes: ANR = Automatic-Negative Reinforcement; APR = Automatic-Positive Reinforcement; SNR = Social-Negative Reinforcement; SPR = Social-Positive Reinforcement.

Table 8

Alpha coefficients, item mean, S.D., item median, and zero-order correlations for the four function subscales for purging.

Subscale	α	<i>M</i>	S.D.	Median	Correlations			
					1	2	3	4
1. Automatic-negative reinforcement	0.92	2.01	0.98	2.33	--			
2. Automatic-positive reinforcement	0.84	1.23	0.98	1.20	0.72	--		
3. Social-negative reinforcement	0.86	0.82	1.02	0.33	0.53	0.69	--	
4. Social-positive reinforcement	0.94	0.54	0.83	0.13	0.34	0.46	0.47	--

3.3.2. Reliability analyses and correlations among functions

Cronbach's alpha coefficients for each of the subscales for purging ranged from 0.84 to 0.94, suggesting high internal consistency reliability (Table 8). As for bingeing, all subscales were significantly correlated (Table 8).

3.3.3. Level of endorsement of specific reasons and overall functions for purging

Similar to the bingeing results, participants who purged endorsed the ANR items to a considerably higher degree than the social reinforcement items (Table 7). Participants reported purging most often for purposes of (in order): ANR, APR, SNR, and SPR.

4. Discussion

The results suggest that a four-function model, similar to that found to be useful with more direct forms of self-injurious behaviors (Nock and Prinstein, 2004, 2005), substance abuse (Cox and Klinger, 1988; Cooper et al., 1995), and psychological reasons for unhealthy eating (Jackson et al., 2003) may also help to explain pathological eating behaviors. Consistent with the functions reportedly served by these other maladaptive behaviors, people report engaging in bingeing and purging to regulate their emotional state (both to decrease negative emotion and to increase positive emotion) and to communicate with others (both to get help from others as well as to escape from social interactions). The fact that the reported reasons for bingeing and purging converge on a similar four-function model as other behaviors (i.e., self-injury, alcohol use, and unhealthy eating) lends further support to the use of such a trans-diagnostic functional model.

The functional model supported in this study has implications for understanding and treating these behaviors. This model suggests that people do not engage in bingeing or purging for any one reason, but instead do so in the service of several different functions, and treatment may be most effective if it appropriately targets these functions in each individual case. For example, a person who binges to escape negative emotions (ANR) may benefit most from learning skills for better emotion regulation and distress tolerance, while an individual who binges to avoid social interactions (SNR) may benefit more from work on exposure to social situations.

Several existing treatments have components that map directly onto the four functions hypothesized in our model. For instance, dialectical behavior therapy (DBT, Linehan, 1993a,b), includes modules aimed at teaching people to regulate distressing affect and to develop interpersonal effectiveness skills. These modules are designed to help people develop more adaptive methods of serving these functions. This treatment was initially developed to treat suicidal and nonsuicidal self-injury (Linehan, 1993a,b), but has been successfully adapted for those with substance use disorders (Linehan et al., 1999), as well as BN (Safer et al., 2000, 2001; Chen et al., 2008) and binge-eating disorder (BED, Telch, 1997; Telch et al., 2000, 2001; Chen et al., 2008). Similarly, acceptance and commitment therapy (ACT) is based on the idea that maladaptive behaviors function as a way of avoiding emotional experience (Hayes et al., 1996; Hayes et al.,

1999) and these concepts have also been applied to the treatment of eating disorders (see Wilson, 1996, 2004). The success of these same treatment modules with the very behaviors shown to serve similar functions provides additional support to the idea that the proposed functional model may operate trans-diagnostically. It will be important for future treatment studies to include pretreatment measures of the functions served by the maladaptive behavior being targeted and to test the usefulness of tailoring treatment to match the identified function in each individual case.

Several limitations should be borne in mind when interpreting these results. First, although the four-factor model was the best fit with the data among the models tested, the fit indices suggested a better fitting model is possible. There also was some overlap between our four-factor and five-factor models. We chose to focus on the 4-factor model because chi-square difference tests revealed it was a significantly better fit over the other models tested. However, there may be additional functions of bingeing and purging our model does not capture. Furthermore, we focused on the consequences of these behaviors with limited attention to their antecedents. Future work should examine both the antecedents (e.g., over-evaluation of weight and shape, the breaking of dietary restraint) and broader consequences of these behaviors.

Second, we used a self-report method to evaluate the functions of bingeing and purging behaviors. Although this allowed us to gather data on the functions of these behaviors over a wide range of settings, the use of this method introduces potential biases (e.g., social desirability) and inaccuracies (e.g., distortions of retrospective recall). Prior research has highlighted the fact that people are often limited in the extent to which they can accurately report on the factors influencing their behaviors (e.g., Nisbett and Wilson, 1977). Future research should use performance-based methods and prospective research designs in examining the functional model proposed.

Third, there are limitations in the use of the Internet for data collection, including creating a self-selected sample; reaching only those who use and have access to the Internet; the high rate of drop-out; and the inability to confirm the identity of the participants (e.g., people can take on alternative identities and report false information or respond to the study multiple times posing as a different person) (Skitka and Sargis, 2006). These limitations notwithstanding, preliminary work has suggested that information collected over the Internet satisfactorily replicates that collected in the laboratory (Nosek et al., 2002; Riva et al., 2003).

Fourth, although our sample was of sufficient size to conduct a confirmatory factor analysis (Mundfrom et al., 2005), we did not replicate the model in an independent sample. Furthermore, the sample size is relatively low for the number of iterative comparisons made and factor structures tested. Subsequent studies must examine the convergent and divergent validity of the FAMB, such as by testing its association with measures of emotion regulation, interpersonal relationships, and psychopathology.

In summary, this study introduces a new measure of the functions of maladaptive behavior and in doing so provides preliminary information about the functions of binge eating and purging in adult females. The FAMB was developed to provide a measure that can be used to assess the multiple functions served by a wide range of maladaptive behaviors. Future research is required to test the validity of this measure for assessing the functions of other maladaptive behaviors, and ultimately to investigate the usefulness of this approach for improving the understanding, assessment, and treatment of behavior problems more generally.

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