Behavioral, emotional, and situational context of purging episodes in anorexia nervosa

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Abstract

Objective—The current study examined behavioral, emotional, and situational factors involved in purging among women with anorexia nervosa (AN).

Methods—Women with AN (*n*=118) completed a two-week ecological momentary assessment protocol involving daily reports of eating disorder behaviors, mood, and stressful events. Generalized estimating equations examined the likelihood and context of purging following eating episodes involving both overeating and loss of control (binge eating; BE); loss of control only (LOC); overeating only (OE); and neither loss of control nor overeating (non-pathological eating; NE).

Results—Relative to NE, purging was more likely to occur following BE, LOC, and OE (Wald chi-square=18.05; *p*<.001). BE was more strongly associated with subsequent purging than LOC but not OE; the latter two did not differ from one another. Negative affect predicted purging following NE (Wald chi-square=7.71; *p*=.005).

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Conclusion—Binge eating involving large amounts of food was the strongest predictor of purging in AN, which challenges the notion that loss of control is the most salient aspect of experiencing distress in bulimia nervosa and binge eating disorder. Parallel to findings from the binge eating literature, negative affect strongly predicted purging following non-pathological eating. Further research should clarify the function and triggers of purging in AN.

Keywords

Binge eating; loss of control; overeating; purging; compensatory behaviors; ecological momentary assessment; anorexia nervosa

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Compensatory behaviors are common in anorexia nervosa (AN) and are associated with adverse health outcomes.[1] These behaviors are generally preceded by increases in negative affect,[2] but other potential antecedents of purging in AN are unclear.

While binge eating involving large amount of foods and concomitant loss of control typically precedes purging, loss of control may be a more salient marker of distress than overeating.[3,4] Therefore, loss of control may be more strongly related to subsequent purging than overeating. Individuals with AN often engage in compensatory behaviors in the absence of binge eating,[5] yet purging in the absence of both loss of control *and* overeating in AN is poorly understood. We recently found that the occurrence of stressful events predicts an increase in negative affect, which is associated with bulimic behaviors,[6] but it is unclear whether such stressful events predict purging subsequent to non-pathological eating episodes in AN. Other behavioral antecedents that might be important predictors of purging in the absence of binge eating include body checking[7,8] and eating "forbidden" foods perceived to promote weight gain or dietary disinhibition.[9]

The primary aim of this study was to examine the extent to which purging is preceded by loss of control, overeating, or their co-occurrence. A secondary aim was to explore momentary predictors of purging in the absence of loss of control and/or overeating. We hypothesized that purging would be most strongly associated with eating episodes characterized by loss of control (with or without overeating), and that stressful events, body checking, eating a forbidden food, and negative affect would predict subsequent purging in the absence of loss of control and/or overeating.

METHODS

Participants

Eligible participants were females, aged 18 years or older, meeting Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV)[10] criteria for AN or sub-threshold AN[i]. Although 121 women participated in the study, the final analyses included 118 participants due to <50% EMA compliance rates for three participants whose data were excluded. Table 1 reports sample characteristics.

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[i]Sub-threshold AN required meeting all DSM-IV criteria for AN with the exception of: (1) having a body mass index (BMI; m/kg^2) between 17.6 and 18.5; or (2) having either amenorrhea or a disturbance in body image with an intense fear of fat.

Procedures

Institutional review board approval was obtained from three sites (Fargo, ND; Minneapolis, MN; Chicago, IL). Participants were recruited through clinical and community sources. After being screened by phone, participants attended two in-person visits to provide written informed consent and complete questionnaires, interviews, and a medical stability assessment. In addition, they were trained to use a handheld computer for the EMA protocol, including how to record mood, stressful events, and behavior for event-contingent (i.e., completed after any eating episodes or AN behaviors such as binge eating and purging), interval-contingent (i.e., nightly assessments completed before bed), and signal-contingent recordings (i.e., completed in response to six daily semi-random prompts by investigators occurring every 2–3 hours between 800–2200h).[11]

Participants completed a two-day practice period to increase familiarity with the protocol and minimize reactivity. They then completed EMA recordings for two weeks, during which time 2–3 visits were scheduled to upload recorded data and provide feedback on compliance and data quality. Participants received $100 per week of completed assessments, with a bonus of $50 for compliance rates 80% and responses within 45 minutes of random signals. Further details regarding the study protocol are provided elsewhere.[2]

Measures

Baseline Interviews—The Structured Clinical Interview for DSM-IV Axis-I Disorder, Patient Edition (SCID-I/P)[12] is a semi-structured interview that was administered by trained masters- or doctoral-level clinicians to assess AN diagnostic criteria.

EMA Measures—Participants reported on all eating episodes and related cognitions/ behaviors, including dichotomously rated loss of control ("I felt out of control" and/or "I felt driven or compelled to eat") and overeating ("I ate an amount of food that most people would consider excessive"). Endorsement of both overeating and loss of control was classified as binge eating to correspond with DSM criteria. Participants were trained in standard definitions of eating events by research staff, and personally-tailored examples were provided. Participants also reported body checking behaviors during eating episode recordings ("I made sure my thighs didn't touch" and "I checked my joints and bones for fat," which were combined for analytic purposes). Purging behaviors (i.e., vomiting and laxative use for weight control) were recorded at signal- and event-contingent recordings. Participant-defined eating a high risk food was recorded only at signal-contingent recordings.

Momentary negative affect was measured at all recordings using an abbreviated Positive and Negative Affect Schedule-Expanded Form (PANAS-X).[13] Each item (e.g., nervous, disgusted) was rated on a five-point scale from "Not at all" to "Extremely."

During signal-contingent recordings, participants reported on stressful events that occurred since the last recording. This included 15 interpersonal events (e.g., argued with spouse/ lover) from the Daily Stress Inventory (DSI),[14] and seven clinically relevant eating disorder-related events (e.g., ate with others).

Statistical Analysis

Generalized estimating equations (GEE) based on a binary logistic model were conducted in SPSS 18.0 to compare self-reported binge eating (BE), loss of control-only (LOC), overeating-only (OE), and non-pathological eating (NE) episodes on their relation with purging reported at the same EMA recording, or within one hour following the eating episode, to ensure that eating behavior and purging were part of the same episode. Four separate GEE models were also fit to examine the independent contributions of Time 1 (most recent time-point preceding a given purging episode) body checking, eating a high risk food, number of reported stressful events, and negative affect on Time 2 purging following NE, controlling for Time 1 purging.

RESULTS

Descriptive Characteristics

We examined 5,640 eating events across signal-, event-, and interval-contingent recordings, including 367 self-reported BE episodes (6.5%); 537 LOC episodes (9.5%); 152 OE episodes (2.7%); and 4,584 NE episodes (81.3%). These episodes were associated with purging on 5.8% of occasions [(i.e., n=325 purging episodes reported simultaneously or within one hour following the eating episode, which represents 65% of all reported purging episodes (n=503)].

Predictors of purging

Overall, the model predicting purging based on eating episode type was significant (Wald chi-square=69.37; p<.001). Self-reported BE was associated with a higher likelihood of subsequent purging relative to LOC and NE (ps .004), but not OE (p=.18). LOC and OE each were associated with a higher likelihood of purging relative to NE (ps .002) but did not differ from one another (p=.23).

A total of 112 purging episodes (34.5% of all purging episodes) were reported following NE. Time 1 negative affect was the only significant predictor of Time 2 purging following NE (Wald chi-square=7.71; p=.005). Time 1 high risk food consumption trended towards but did not reach significance (Wald chi-square=3.32; p=.068); Time 1 body checking (p=.56) and stressful events (p=.68) were both non-significant.

DISCUSSION

This study aimed to understand how purging relates to different aspects of dysregulated eating, and to identify predictors of purging in the absence of dysregulated eating. Binge eating (i.e., concurrent loss of control and overeating) was the strongest predictor of purging, and loss of control (without overeating) and overeating (without loss of control) each were associated with a higher likelihood of purging than non-pathological eating. Nevertheless, approximately one-third of purging episodes were reported in the absence of dysregulated eating, consistent with previous findings that purging in AN is relatively common following "normal" eating.[5] Negative affect was the only significant longitudinal predictor of purging following normal eating.

Our finding that self-reported BE most strongly predicted purging is somewhat inconsistent with our hypothesis that loss of control, irrespective of episode size, would be associated with purging, given evidence suggesting that loss of control is the most salient feature of binge eating.[4] However, previous research has not included participants with AN, and taken together, these results suggest that the experience of binge eating may differ among diagnostic subgroups of eating disorders. Specifically, the subjective perception that one has consumed an "excessive" amount of food may be particularly important in AN.

Our results complement research documenting negative affect as an antecedent to binge eating[15] by further extending this finding to purging (in the absence of loss of control and/or overeating), and suggest that purging in AN may serve to regulate negative affect[2,8] in a similar way as binge eating.[16,17] Alternatively, purging may simply delay the experience of negative mood. For example, animal research suggests that purging reduces the release of the neurotransmitter acetylcholine,[18] which is associated with aversive states (e.g., drug withdrawal[19]).

Study strengths include the large sample and the use of EMA to identify prospective predictors of purging in the natural environment. Limitations include the subjectivity inherent in self-report assessment of constructs such as loss of control and overeating (although there is relatively good convergence between self- and investigator-defined binge eating in women with AN[20]); the inability to assess the full range of compensatory behaviors (e.g., fasting) due to low base rates; and the exclusively female and largely Caucasian sample.

In summary, both loss of control and overeating appear to be important determinants of purging in AN. Furthermore, purging in the absence of dysregulated eating is relatively common, and it may help to alleviate negative affect in a similar way as binge eating. Clinicians should carefully assess the role and function of purging in AN to enhance the relevance of intervention strategies for this refractory disorder.

Acknowledgments

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Table 1

Sample characteristics, M±SD unless otherwise indicated

Variable		Statistic
Age, years		25.3±8.4
Body mass index (kg/m^2)		17.2±1.0
Race/ethnicity, % (*n*)	Caucasian	96.6 (114)
	African-American	1.7 (2)
	Other	1.7 (2)
Relationship status, % (*n*)	Married or cohabitating	18.6 (22)
	Single	81.4 (96)
Highest level of education completed, % (*n*)	Less than high school	3.4 (4)
	High school	55.1 (65)
	College	32.2 (38)
	Graduate school	5.9 (7)
	Other	3.4 (4)
Diagnostic subtype, % (*n*)	Restricting	61.9 (73)
	Binge/purge	38.1 (45)