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## Somatic Symptoms and Binge Eating in Women's Daily Lives

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### Abstract

**Objective**—The present study aimed to determine whether the momentary severity of women's somatic symptoms was concurrently and prospectively associated with their engagement in binge eating in naturalistic settings.

**Method**—Thirty women ( $M_{age}=34.13$ ,  $SD=13.92$ ) who had engaged in binge eating at least once over the month prior to study entry completed a 14-day ecological momentary assessment (EMA) protocol. During each of the 14 days, participants received five semi-random surveys via text message that assessed momentary somatic symptom severity (i.e., headaches, stomachaches/pain, chest/heart pain, faintness/dizziness, shortness of breath, fatigue) and disordered eating behaviors. Generalized estimating equations were used to determine whether momentary somatic symptoms were concurrently and prospectively (i.e., by participants' next assessment) associated with the occurrence of binge eating behavior, while controlling for age and body mass index.

**Results**—At the within-person level, more severe stomachaches/pain, faintness/dizziness, shortness of breath, and fatigue were concurrently associated with an increased likelihood of engaging in binge eating. Further, at the between-person level, more severe stomachaches/pain, chest/heart pain, shortness of breath, and fatigue in general were associated with binge eating across the EMA protocol. Momentary stomachache/pain severity also prospectively predicted women's engagement in binge eating behavior at the next assessment.

**Conclusions**—The present results provide initial evidence that multiple somatic symptoms may serve as momentary correlates or proximal antecedents of binge eating behavior in women's daily

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Disclosures

Conflicts of Interest: The authors have no conflicts of interest to disclose

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lives. Somatic symptoms may consequently prove useful to target in eating disorder treatments, perhaps via interoceptive exposure interventions.

### Keywords

Eating Disorders; Binge Eating; Somatic Symptoms; Women's Health

Binge eating is prevalent among adult women and is a well-established correlate of multiple physical and mental health concerns, including somatic and psychosomatic symptoms (i.e., physical health concerns that are incited or exacerbated by psychosocial factors).<sup>1,2</sup> Indeed, individuals who frequently engage in binge eating commonly exhibit symptoms that have both psychogenic and physiological origins, such as gastrointestinal concerns (e.g., stomachaches or pains), chest and heart pain, headaches, faintness, shortness of breath, and fatigue.<sup>1,3-6</sup> Given that individuals may be more likely to report somatically-based versus disordered eating symptoms to healthcare providers,<sup>7</sup> enhancing the current understanding of the interplay between binge eating and somatic comorbidities may help improve current screening efforts for binge eating pathology and facilitate individuals' connection with treatment.

### Somatic Symptoms and Binge Eating

Existing research examining somatic symptoms and binge eating has largely focused on identifying how between-person differences in particular somatic symptoms are associated with binge eating pathology.<sup>1,3-6</sup> For example, in a large sample of Swedish individuals with lifetime binge eating disorder and healthy controls, those with binge eating disorder were more likely to report various neurologic (e.g., headaches, migraines), gastrointestinal, respiratory, and circulatory system concerns.<sup>6</sup> Although informative, little is known about somatic symptom-binge eating comorbidities beyond bivariate between-person associations of this nature. However, more generally, individuals with binge eating symptoms commonly exhibit interoceptive deficits,<sup>8-11</sup> or dysfunction in the ability to sense and process visceral bodily experiences and states such as pain, hunger, satiety, and heartbeat sensations.<sup>12</sup> Such difficulties in effectively connecting with internal experiences can translate to individuals' engagement in adverse health behaviors like binge eating as a means of experiential avoidance. This can serve as an impediment to adequate body regulation that is integral to maintaining health and well-being.<sup>9</sup>

Of note, although between-person research consistently suggests that interoceptive processes are skewed among individuals with eating disorders characterized by binge eating,<sup>8-11</sup> the nature of these dysfunctions is equivocal. For example, some research suggests that individuals with binge eating pathology exhibit hypersensitivity and others hyposensitivity to certain interoceptive signals.<sup>9</sup> This equivocality poses different implications for individuals' responses to their internal bodily signals. Hypersensitive or exaggerated responses to internal sensations can lead to subsequent binge eating wherein, for example, internal signals of depleted energy that are sensed by the body (e.g., fatigue, faintness, hunger) promote behaviors such as binge eating that are designed to address these cues and are maintained over time via reinforcement-based processes.<sup>11,13</sup> In contrast, hyposensitive

or blunted responses to interoceptive signals, such as stomachaches/pain or satiety, can propagate subsequent binge eating via the body's inability to signal the significance of these somatic cues and, in turn, preventing individuals' engagement in this adverse health behavior.<sup>13</sup>

## Ecological Momentary Assessment (EMA)

Existing between-person findings on interoceptive processes can be extended and the evidence-base's equivocality potentially clarified by examining whether various somatic symptoms serve as momentary correlates or proximal triggers of binge eating behavior. EMA is a particularly well-suited methodology that can aid in determining how somatic symptom-binge eating patterns manifest in individuals' daily lives. To date, however, between-person cross-sectional and, to a lesser degree, traditional longitudinal methods have strictly been used to examine somatic symptom and binge eating associations.<sup>1,3-6</sup> These two methods provide limited information about the *functionality* of these associations and are subjected to retrospective recall bias that can decrease the validity of ensuing results.<sup>15</sup> In contrast, EMA permits the examination of psycho-behavioral factors in individuals' daily lives via brief repeated assessments. Given this, EMA minimizes the influence of recall bias inherent within cross-sectional survey research, increases ecological validity, and enables the examination of novel research questions that address the temporal sequencing of psycho-behavioral factors in naturalistic settings.<sup>15</sup>

Although no existing research has examined naturalistic associations between somatic symptoms and binge eating behavior, a growing body of research has used EMA to examine how internal bodily signals such as affect and hunger are associated with binge eating.<sup>16-18</sup> Regarding the latter, meta-analytic evidence suggests that individuals' hunger levels are generally lower prior to binge eating episodes when compared to normative eating episodes.<sup>18</sup> This finding aligns with between-person cross-sectional research that suggests that individuals who engage in binge eating exhibit *hyposensitive* interoceptive responses to somatic cues.<sup>13,14</sup> However, it remains unknown whether this result generalizes from internal hunger sensations to somatic symptoms and whether there are variations in these associations as a function of somatic symptom type.

## Study Purpose

To extend the existing evidence-base on between-person associations between somatic symptoms and binge eating, the present study used EMA to examine momentary associations between somatic symptoms and binge eating among women with elevated binge eating severity. Specifically, the present study aims to determine whether the severity of women's headaches, stomachaches/pain, chest/heart pain, faintness/dizziness, shortness of breath, and/or fatigue at a given timepoint are independently associated with their engagement in binge eating behavior (1) concurrently (i.e., at that time) and (2) prospectively (i.e., by their next assessment).

## Method

### Participants and Procedures

Institutional review board approval was obtained from the participating institution, and all study procedures were performed in accordance with the ethical standards set forth in the 1964 Declaration of Helsinki and its later amendments (<https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/>). Prospective respondents were recruited through clinical and community sites and were initially screened via phone or during in-person visits to determine whether they met initial study criteria (e.g., women, able to read and speak English, binge eating symptoms). Individuals who met initial inclusion criteria subsequently completed an in-person study visit, wherein they provided written informed consent to participate in the present study and then completed clinical interviews that were administered by trained master's level assessors to determine whether they were eligible to participate. Specifically, the Eating Disorder Examination (EDE),<sup>19</sup> a semi-structured clinical interview, was used to determine whether prospective respondents had engaged in at least one objective binge eating episode (i.e., overeating plus concurrent loss of control over eating) in the past month. Those who did not were excluded from the present study, as were individuals who: (1) were unable to read or speak English; (2) exhibited current psychosis, which was assessed with the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders-IV (SCID-IV<sup>20</sup>); (3) met criteria for a current manic episode, which was assessed with the SCID-IV; (4) reported imminent suicidality on the Suicide Behavior Questionnaire-Revised<sup>21</sup>; (5) were medically unstable at the time of assessment (e.g., unstable vital signs and blood pressure ratings); (6) exhibited symptoms that were indicative of a severe substance use disorder within the past year via the SCID-IV; (7) exhibited severe cognitive impairment or intellectual disability; (8) were currently pregnant or breastfeeding; (9) were currently participating in or had undergone an inpatient or partial hospitalization program within the four weeks prior to study entry; (10) had changes in their eating disorder treatment within the past four weeks.

Individuals who met the inclusion and none of the exclusion criteria subsequently completed self-report questionnaires and received training on the EMA protocol used in the present study. This in-person training consisted of participants receiving definitions of eating disorder behaviors that they would be asked to report on during the EMA period and completing a test EMA survey to ensure that they understood how to do so. The Real Time Assessment In the Natural Environment (RETAIN; [retaine.org](http://retaine.org)) system was used to deploy the EMA surveys. Participants received five semi-random text messages each day for 14 consecutive days that were delivered to their mobile phones. The text messages were sent within five pre-determined timeframes that began in the morning and continued through the evening, and varied around five anchor points at 9 AM, 12 PM, 3 PM, 6 PM, and 9 PM. Within each text message, participants were sent a link that they used to complete the EMA surveys. Each survey remained active for one hour after they were sent, at which time participants were no longer able to access them to prevent the backlogging of EMA reports. Further, a trained research assistant called participants halfway through the EMA protocol to remind them about study compliance and address any questions. Respondents received \$110

for completing the in-person clinical interviews and assessments, as well as \$2 per each survey that they completed during the EMA protocol.

Participants included 30 women who were 34.13 years ( $SD=13.92$ ; Range=19–62), on average, and exhibited a mean body mass index of 34.13 kg/m<sup>2</sup> ( $SD=9.47$ ; Range=18.43–57.83). Most participants identified as White (93%). The majority of respondents met diagnostic criteria for an eating disorder via the Eating Disorder Diagnostic Scale for the DSM-5.<sup>22</sup> Specifically, via this self-report measure, approximately half met criteria for bulimia nervosa ( $n=14$ , 46.7%), followed by binge eating disorder ( $n=6$ , 20.0%), low frequency binge eating disorder ( $n=1$ , 3.3%), night eating syndrome ( $n=1$ , 3.3%), and anorexia nervosa ( $n=1$ , 3.3%). The remaining respondents did not meet diagnostic criteria for an eating disorder ( $n=6$ , 20.0%) or had missing data ( $n=1$ , 3.3%).

## Measures

An overview of and the timeline in which the assessments were administered is reported in Table 1. Measures that were used in the present analyses are described in more depth below.

**Demographics**—Participants' ages and objectively measured height and weight, which were used to calculate BMI, were obtained during the in-person study visit. Both variables were controlled for in all statistical analyses to partial out their influences in the associations of interest.

**Somatic symptoms**—Participants were asked to indicate the extent to which they experienced the following symptoms since their last recording: (1) headaches; (2) stomachache/pain; (3) chest/heart pain; (4) faintness/dizziness; (5) shortness of breath; and (6) fatigue. Participants were able to select all symptoms that applied during that timeframe and rated these items on a 5-point response scale ranging from 1 (*not at all*) to 5 (*extreme*). These six symptoms are consistent with somatic symptoms assessed in validated measures (e.g., Patient Health Questionnaire 15-Item Somatic Symptom Severity Scale<sup>23</sup>), and have been frequently assessed in cross-sectional studies with individuals with elevated binge eating pathology and/or elevated BMIs.<sup>1,4–6</sup>

**Binge eating**—Binge eating was assessed via a single-item question in which participants reported on whether they engaged in binge eating since their last recording (i.e., consumed a large amount of food, given the circumstances, coupled with feeling as though they lost control over their eating at that time). Response options were dichotomous: 0=no, 1=yes.

## Statistical Analyses

All data analyses were conducted using SPSS version 24. First, descriptive statistics were computed. Next, separate general estimating equations (GEEs) were run to determine whether the six somatic symptoms (i.e., headaches, stomachaches/pain, chest/heart pain, faintness/dizziness, shortness of breath, fatigue) were associated with binge eating. All models controlled for age and BMI. To account for dependency stemming from the nested data structure, the autoregressive (AR1) serial autocorrelation correction was used.<sup>24</sup> Further, given the dichotomous nature of the binge eating outcome variable, the GEEs

employed binary logistic functions with logit links. Concurrent associations between the six somatic symptoms and binge eating behavior were examined. In addition, time-lagged variables (i.e.,  $t-1$ ) were calculated for within-day somatic symptom covariates to assess associations between these indices and individuals' endorsement of binge eating behavior at their next EMA prompt. Participants' first and final assessments each day of the EMA period were not lagged to either the previous day's or the next day's assessments to avoid incorporating bias into the models that would arise from the extended timeframe (i.e., during sleeping hours). All time-lagged and non-time-lagged somatic symptom covariates were partitioned into grand-mean centered between-person effects and person-mean centered within-person effects. Participants served as the unit of analysis at Level 2 and the EMA observations were the unit of analysis at Level 1. Missing data were managed via full information maximum likelihood estimation. Given that this is the first study to examine associations between somatic symptoms and binge eating in daily life, and the study's consequently exploratory nature, an alpha of .05 was accepted.

## Results

There were 1,558 EMA recordings across the 14-day assessment period. On average, participants responded to 51.93 prompts ( $SD=13.49$ ; range=16–70) and compliance, defined as individuals' average number of completed prompts divided by the total number of possible prompts, was good (78.3%). At baseline, the average number of objective binge eating episodes reported in the past 28 days via the EDE interview was 12.27 ( $SD=13.78$ ; Range=1–76). Participants endorsed binge eating during 13.7% (213 episodes) of the survey prompts. The number of EMA recordings completed was unrelated to demographic variables. Further, across ratings, participants' somatic symptom severity was generally low, with the average headache pain severity rating being 1.69 ( $SD=1.08$ ), as well as 1.60 ( $SD=1.01$ ) for stomachaches/pains, 1.08 ( $SD=0.35$ ) for chest/heart pains, 1.31 ( $SD=0.71$ ) for faintness/dizziness, 1.16 ( $SD=0.55$ ) for shortness of breath, and 2.48 ( $SD=1.41$ ) for fatigue.

Tables 2 and 3 present the concurrent and prospective (i.e., time-lagged) models for somatic symptom and binge eating associations, respectively. Regarding the concurrent results, significant within- and between-person effects were found for associations between experiencing stomachaches/pain, shortness of breath, and fatigue relative to binge eating. That is, at times over the hours following participants' previous assessments when they reported more severe stomachaches/pains, shortness of breath, and fatigue than their averages, they were more likely to concurrently report binge eating episodes. Further, participants who generally experienced more extreme stomachaches/pains, shortness of breath, and fatigue than others engaged in more binge eating behavior throughout the EMA protocol. In addition, a significant within- but not between-person effect was found for faintness/dizziness and a between- but not within-person effect was found for chest/heart pain severity as correlates of concurrent binge eating behavior. More specifically, at times when participants indicated that they experienced higher levels of faintness/dizziness than they normally did, they were more likely to report having engaged in binge eating and, further, participants who generally experienced more severe chest/heart pain than others were more likely to engage in binge eating across assessments.



Regarding the time-lagged analyses, which examined associations between individuals' somatic symptoms at a given assessment and their reports of binge eating at their next assessment, significant within- and between-person effects were found for stomachache/pain severity. In particular, at times when participants experienced more severe stomachaches/pain than they normally did, they were more likely to engage in binge eating by their next survey prompt. Further, participants who generally experienced more severe stomachaches/pains than others were more likely to engage in binge eating by their next assessments across the EMA protocol. Significant time-lagged, between-person effects were also found for chest/heart pain severity and shortness of breath, such that participants who typically experienced more severe chest/heart pain and shortness of breath than others were more likely to binge eat by their next assessments across the EMA protocol. All concurrent and prospective associations between headache severity and binge eating were not significant.

## Discussion

Although existing between-person research has consistently found that various somatic symptoms are associated with elevated binge eating severity,<sup>1,3-6</sup> no prior studies have examined whether these symptoms serve as concurrent correlates or proximal antecedents of binge eating behavior when assessed in ecologically valid settings. To address this research gap, the present study was the first to use EMA to examine whether women's somatic symptom severity (headaches, stomachaches/pain, chest/heart pain, faintness/dizziness, shortness of breath, fatigue) at a given moment was independently associated with their engagement in binge eating behavior assessed both concurrently and prospectively (i.e., by their next assessment). The present results indicated that, at the within-person level, more severe gastrointestinal and pulmonary somatic symptoms, alongside signs of depleted energy (faintness/dizziness, fatigue), were concurrently associated with a greater likelihood of engaging in binge eating and that, at the between-person level, an increased severity of most of these symptoms plus chest/heart pain were concurrently associated with a higher probability of binge eating across assessments. Further, intraindividual differences in stomachache/pain severity were also prospectively associated with women's increased likelihood of engaging in binge eating. Considered together, these results provide initial evidence that visceral sensations that span across various domains of bodily functioning may serve as concurrent correlates or proximal antecedents of binge eating and prove useful to target in existing eating disorder treatments.

### Hypersensitive Responses to Somatic Symptoms

That experiencing more severe somatic symptoms was generally associated with an increased likelihood of concurrent binge eating in the present study aligns with existing between-person research demonstrating that individuals who engage in binge eating may exhibit *hypersensitive* responses to interoceptive signals.<sup>9,13</sup> The present within-person findings extend this literature by suggesting that *at times* when women with elevated binge eating severity experience more severe gastrointestinal and pulmonary symptoms, as well as internal cues related to depleted energy (faintness/dizziness, fatigue), than they typically do, they are more vulnerable to engaging in binge eating behavior at that time. Notably, given that the parameters for these concurrent within-person somatic symptom-binge eating

associations were generally comparable in size, there appears to be little differentiation in the strength of these associations as a function of somatic symptom type. Consequently, the assessed symptoms appear to be similarly impactful.

That within-person differences in concurrent associations between most somatic symptoms and binge eating did not generally differ as a function of somatic symptom type may reflect a negative attribution style that women with elevated binge eating severity have in response to interoceptive signals in general or serve as a marker of emotion dysregulation that commonly manifests in this population.<sup>25</sup> Binge eating may consequently serve as a form of experiential avoidance, wherein women engage in this behavior in an attempt to distance themselves from and quell these adversely perceived internal cues and, instead, experience rewarding and reinforcing effects that are associated with binge eating in the short-term.<sup>9,13</sup> Previous between-person neuropsychological research has supported this perspective by demonstrating how internal signs of depleted energy (e.g., faintness/dizziness, fatigue) relate to elevated binge eating pathology, and the present findings extend this work by showing that similar processes occur *across* somatic symptoms not strictly related to diminished energy reserves at the momentary level of analysis. This prior research centers on the concept of positive alliesthesia,<sup>26</sup> which suggests that hypersensitive responses to indications of low energy incite visceral-behavioral responses that help the body achieve a state of homeostasis and maintain health. Individuals' motivation to consume food increases during times when their energy is low due, in part, to the rewarding properties associated with such consumption. In those vulnerable to binge eating, the motivational salience of food heightens via reinforcement-based processes and, in turn, increases individuals' susceptibility to eating beyond their energy needs at a given moment.<sup>11</sup> As an important extension of the present study, it will prove useful for future research to merge this prior evidence with the current findings via multi-modal assessment. Specifically, such work should examine whether objective differences in neural activity in cortical areas associated with reward, motivation, interoception, and impulsivity moderate momentary associations between self-reported somatic symptoms and binge eating behavior that are assessed in daily life.

### **Gastrointestinal and Cardiovascular Somatic Symptoms**

Elevated stomachache/pain severity was the only within-person effect that was prospectively associated with an increased risk of binge eating at a subsequent timepoint. This suggests that, when compared to other somatic symptoms, experiencing adverse gastrointestinal sensations at a given time may uphold a particularly harmful and enduring role in promoting subsequent binge eating. It is unclear why this somatic symptom, in particular, appears to subsist. Given that the stomach may be more centrally implicated in body image than somatic sensations in other body areas (e.g., headaches, fatigue), it is possible that experiencing elevated gastrointestinal pain may simultaneously heighten women's awareness of their stomachs at large and, in turn, propagate an increase in negative body image and negative affect. Considering that negative body image and negative affect serve as disordered eating behavior triggers,<sup>16,27</sup> these psychologically-based concerns may consequently account for or otherwise influence the present prospective associations between elevated stomachache/pain severity and binge eating behavior. Thus, these

constructs warrant assessment as mediators and/or moderators of these associations in future research.

A strength of EMA includes the method's ability to permit the separation of within- and between-person effects.<sup>15,24</sup> This helps determine whether associations among psycho-behavioral factors exist *at times when* individuals experience higher levels of various symptoms than they typically do and/or reflect differences in *aggregate levels* of symptoms that vary between participants. In this regard, it is noteworthy that the between-, but not within-, person association between elevated chest/heart pain severity and an increased likelihood of binge eating was significant and larger than all other assessed concurrent and prospective somatic symptom-binge eating associations. These findings align with prior between-person research that found that various circulatory system diseases associated with chest/heart pain exhibit some of the strongest associations with binge eating symptoms.<sup>1,5,6</sup> It is plausible that the present findings similarly reflect individual differences in cardiac-based somatic morbidities that are associated with elevated binge eating behavior. Indeed, as within-person differences in chest/heart pain severity were *not* also associated with concurrent binge eating in the present study, this symptom does not appear to serve as a concurrent correlate or a prospective antecedent of binge eating and, instead, appears to reflect trait-level interindividual differences. Future research that controls for cardiac-based somatic morbidities is needed to determine whether this factor accounts for the observed chest/heart pain-binge eating associations.

### Clinical Implications

The present findings can help inform existing eating disorder treatments focused on decreasing individuals' binge eating symptoms. Specifically, the present findings suggest that women's experiences of various somatic symptoms are associated with hypersensitive interoceptive responses that are concurrently and, for stomachache/pain severity, prospectively linked to binge eating behavior. Incorporating interoceptive exposure interventions and interventions that more broadly target emotion dysregulation into existing treatment protocols can help encourage individuals to identify and sit with adversely perceived internal cues of this nature, rather than attempt to temporarily quell them by engaging in binge eating.<sup>28</sup> Given that stomachache/pain severity was shown to exhibit a precipitating role in inciting this behavior, addressing adversely perceived internal signals in the stomach area may serve as a particularly important somatic symptom to target. In session, this may include directing individuals' attention to stomach pains and tight clothing, associated thoughts, feelings, and sensations that arise, and urges to engage in avoidance strategies (e.g., binge eating) as an (ineffective) means of lessening the sensations in the short-term.<sup>28</sup> Psychoeducation on the role of neural plasticity following the normalization of individuals' eating patterns in creating new brain pathways that promote effective, rather than over-active, responses to somatic symptoms can also serve as a viable adjunctive treatment component.

### Limitations

Although strengths of the current study include the use of EMA with women with elevated binge eating pathology, certain limitations warrant mention. First, the present sample was all

female and most participants identified as White. Future research with a more gender and racially diverse sample is needed to increase the generalizability of our findings. Second, although EMA studies commonly use single-item questions to examine disordered eating behaviors and correlates of such<sup>16</sup> as a means of decreasing participant burden owing to the heightened frequency of EMA reports, the use of a single-item variable to assess individuals' binge eating behavior in the present study may not have fully captured this construct when compared to multi-item measures. Further, the concurrent models attest to participants' reported somatic symptoms and binge eating behavior over the hours since their last assessment. Consequently, the temporal ordering of these symptom experiences is unclear (i.e., somatic→binge eating, binge eating→somatic). Future research using event-contingent reports and that which examines whether binge eating prospectively predicts somatic symptom severity could help clarify the directionality of these associations. In addition, the present study included 30 participants. Although the use of repeated sampling increased our power to test the present study aims, this is a relatively small between-persons sample size and these findings should be replicated with a larger sample. In addition, although all participants needed to report recent objective binge eating to be included in the present study, there was some variation in participants' ED symptom patterning. Consequently, future research with a larger sample is needed to examine whether ED diagnostic differences influences the assessed somatic symptom-binge eating associations. Finally, although the six assessed somatic symptoms have been consistently shown to adversely impact individuals with binge eating pathology,<sup>1,4-6</sup> it would be informative for future studies to examine the momentary impact of additional gastrointestinal symptoms beyond stomachaches/pain alone (e.g., bloating, diarrhea) on women's binge eating.

## Conclusions

The present study was the first to use EMA to examine whether women's somatic symptoms (headaches, stomachaches/pain, chest/heart pain, faintness/dizziness, shortness of breath, fatigue) at a given moment were independently associated with their engagement in binge eating behavior both concurrently and prospectively (i.e., by their next assessment). The present results indicated that more severe experiences of all assessed somatic symptoms apart from headache severity were concurrently associated with an increased likelihood of engaging in binge eating behavior at the within- and/or between-person levels. Intraindividual differences in stomachache/pain severity were also prospectively associated with women's increased likelihood of engaging in binge eating. The present results provide initial evidence that multiple visceral sensations may serve as momentary correlates or proximal antecedents of binge eating and prove useful to target in existing eating disorder treatments.

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### Highlights

- Naturalistic somatic symptom-binge eating associations were assessed via EMA.
- Within-person stomach pain, faintness, short breath, and fatigue effects were found.
- Elevated stomach pain severity prospectively predicted binge eating.

**Table 1**

## Assessment Schedule of Measures Used in the Present Analyses

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Measures Used to Determine Study Eligibility

- The Eating Disorder Examination
- The Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders-IV
- The Suicide Behavior Questionnaire-Revised
- Single-item questions assessing participants' English language abilities, medical stability, cognitive impairment, current pregnancy or breast-feeding statuses, and mental health treatment history

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Baseline Measures

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- Demographic characteristics
- Anthropometric data

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Ecological Momentary Assessment Measures

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- Patient Health Questionnaire 15-Item Somatic Symptom Severity Scale<sup>a</sup>
- Binge eating behavior adapted from established eating pathology measures

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Note.

<sup>a</sup>An adapted version of the full scale was used during the ecological momentary assessment portion of the study.



**Table 2**

## Concurrent Associations Between Somatic Symptoms and Binge Eating Behavior

	Within-Person Effects			Between-Person Effects		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Headache severity	.099	.064	.12	.323	.269	.23
Stomachache/pain severity	.414	.086	< .001	.583	.209	.005
Chest/heart pain severity	.206	.194	.29	2.312	.746	.002
Faintness/dizziness severity	.271	.113	.016	.215	.363	.55
Shortness of breath severity	.393	.114	.001	.730	.330	.027
Fatigue severity	.267	.067	< .001	.479	.189	.011

*Note.* All models controlled for age and body mass index.

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**Table 3**

Time-Lagged Associations Between Somatic Symptoms and Binge Eating Behavior

	Within-Person Effects			Between-Person Effects		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Headache severity	-.022	.062	.73	.260	.321	.42
Stomachache/pain severity	.198	.080	.014	.590	.197	.003
Chest/heart pain severity	-.069	.170	.69	2.120	.937	.024
Faintness/dizziness severity	.040	.076	.60	-.066	.494	.89
Shortness of breath severity	.191	.160	.24	.825	.226	< .001
Fatigue severity	-.044	.059	.45	.330	.224	.14

*Note.* All models controlled for age and body mass index.

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