



Examination of body checking, body image dissatisfaction, and negative affect using Ecological momentary assessment



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ABSTRACT

Research has shown that non-clinical women, particularly those with high body concern, engage in frequent body checking behaviors. The purpose of this study was to use ecological momentary assessment (EMA) to examine the frequency and correlates of body checking behavior, including its association with body image dissatisfaction and negative affect, in non-clinical women with high body concern. Undergraduate female participants with high body concern ($n = 22$) were assessed five times per day for five days via text messages sent to their smart phones. During each assessment, participants reported the number of times they engaged in eight different body checking behaviors and their current level of negative affect and body dissatisfaction. After aggregation, a total of 3064 body checking behaviors were reported by the sample during the five-day period. All participants reported engaging in body checking at least once per day, with a mean of 27.85 checking behaviors per day. Hierarchical Linear Modeling revealed that body checking significantly predicted both body dissatisfaction and negative affect. These results provide preliminary support for the cognitive behavioral theory of eating disorders, suggesting that as women engage in more frequent body checking behaviors, they also experience higher levels of body dissatisfaction and negative affect.

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1. Introduction

Body checking has been defined as any behavior intended to gain information about one's size, weight, shape, or appearance (Walker & Murray, 2012), such as weighing oneself, comparing one's body to others, or examining oneself in a reflective surface (Reas, Whisenhunt, Netemeyer, & Williamson, 2002). Body checking is generally quite brief (i.e., lasting less than 2 min) and occurs numerous times throughout the day (Walker & Murray, 2012).

Repeated checking of disliked body parts may cause excessive vigilance and result in the belief that certain parts of the body are too large. This may precipitate increased checking, negative affect, and body dissatisfaction, forming a harmful cycle that may result in disordered eating behaviors (Fairburn, Shafran, & Cooper, 1999). While body checking research has primarily been conducted with samples of women with anorexia nervosa, research has shown that the behavior occurs among non-clinical women, particularly those with high levels of shape and weight concerns (Farrell, Shafran, & Fairburn, 2004; Leahey, Crowther, & Ciesla, 2011).

Findings from several studies using non-clinical populations have underscored the fluctuating, yet potentially significant, effects of body

checking on body dissatisfaction and self-critical thoughts (Shafran, Lee, Payne, & Fairburn, 2007; Walker, Murray, Lavender, & Anderson, 2012). Due to its changeable nature and short-lived effects, it may be beneficial to examine body checking among women with high body concern using a repeated measures design in a naturalistic setting, such as ecological momentary assessment (EMA). EMA is a sampling method in which participants are repeatedly assessed in their natural environments over a period of time, often via cell phone or handheld device.

Few studies have conducted experimental manipulations or observations of body checking in a naturalistic setting, and the majority that have focused on clinical populations and one or two types of checking behaviors (Engel et al., 2013; Haedt-Matt & Keel, 2011; Lavender et al., 2013). Even fewer naturalistic studies have examined body checking in non-clinical women. Naturalistic studies are needed to provide insight into a range of body checking behaviors and the relationship between body checking, negative affect, and body dissatisfaction among non-clinical women with high body concern.

The purpose of the present study was to examine the frequency and correlates of repeated body checking behavior over time using EMA. First, this study aimed to obtain an ecologically valid assessment of the most reported body checking behaviors among non-clinical women with high body concern in a naturalistic setting. Second, this study examined the associations between multiple common body checking behaviors, body dissatisfaction, and negative affect. It was

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hypothesized that higher frequencies of body checking behavior would predict higher levels of body image dissatisfaction and negative affect.

2. Method

2.1. Participants

A total of 204 undergraduate women from introductory psychology courses at a Midwestern university were screened online for high body concern. Women with high body concern and access to a smartphone were invited to participate in the EMA portion of the study ($n = 68$). A total of 23 participants consented to participate, with 22 completing the entire study. The participants had a mean age of 19.09 years ($SD = 2.59$), and 78% ($n = 18$) identified themselves as White, 8% ($n = 2$) as Asian, 4% ($n = 1$) as Black, and 4% ($n = 1$) as Hispanic. Participants received course credit for participation. Additionally, as an incentive for compliance, participants who completed at least 80% of the EMA questionnaires (86% of participants) received a \$10 gift card.

2.2. Baseline measures

2.2.1. Demographic questionnaire

The demographic questionnaire assessed self-reported age, year in school, race/ethnicity, height, and weight.

2.2.2. Trait body dissatisfaction

The BSQ (Cooper, Taylor, Cooper, & Fairburn, 1987) is a 34-item self-report measure of trait body dissatisfaction. The BSQ was administered to screen for participants with high body concern. The cutoff score for “high body concern” used for initial screening of participants was 109, which was derived from the original development and validation study in which the “high body concern” group obtained a mean score of 109 on the BSQ (Cooper et al., 1987). In the current sample, Cronbach's alpha was .97.

2.3. EMA measures

2.3.1. Body checking behaviors

Participants were asked to report the number of times they engaged in specific body checking behaviors since they were last contacted. Eight frequently reported body checking behaviors were chosen: (1) weighing oneself; (2) feeling thighs for fatness; (3) sucking in stomach; (4) feeling/pinching stomach to measure fatness; (5) comparing one's body to others (6) checking body size in a reflective surface; (7) checking for fat jiggling; and (8) checking to see if thighs spread while sitting down.

2.3.2. State body dissatisfaction

Participants were asked to indicate how they feel “right now, at this very moment” about various aspects of their body image using the Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). Lower scores on the BISS indicate higher body dissatisfaction. In the current sample, Cronbach's alpha was $\alpha = .84$.

2.3.3. Negative affect

The Positive and Negative Affect Schedule – Expanded Form (PANAS-X; Watson & Clark, 1994) is a 60-item self-report inventory intended to measure various emotions with higher scores indicated greater negative affect. For the present study, only the General Negative Affect subscale was used. In the current sample, Cronbach's alpha was $\alpha = 0.89$.

2.4. Procedure

This study was approved by the Institutional Review Board of a large Midwestern university. Participants completed the demographic

questionnaire and BSQ via the external survey website, Qualtrics during the prescreening prior to the EMA portion of the study.

The EMA portion of the study consisted of one practice day and five experimental days in which participants were contacted five times per day via text messages sent to their cell phones. The messages were sent at randomly selected times throughout the day between the hours of 9:00 AM and 10:00 PM, but were constrained to be at least 120 min apart. Each text message contained a hyperlink to an online questionnaire via Qualtrics. If the participant did not submit the questionnaire within 30 min of receiving the text, a reminder text message was sent. During the practice day, participants were sent a questionnaire similar in length and question-type to the experimental questionnaire but with content unrelated to the present study. For the experimental days, participants were sent the questionnaire that included body checking frequency questions, the BISS, and the General Negative Affect subscale of the PANAS-X. The chosen time period of the five experimental days was modeled after similar EMA studies involving body checking and eating disorder assessment (Heron & Smyth, 2012; Ridolfi, Myers, Crowther, & Ciesla, 2011).

3. Results

3.1. Descriptive and compliance statistics

The 22 participants in the EMA portion of the study obtained a mean score of 138.00 ($SD = 17.30$) on the BSQ and a mean BMI of 26.70 ($SD = 5.50$). Across all participants, a total of 550 survey text messages were sent. The overall compliance rate during the 5-day EMA protocol was 89%.

Results indicated that 100% of participants reported engaging in at least one instance of body checking during the five-day period of assessment. After aggregation, a total of 3064 checking behaviors were reported by the sample. The total number of checking behaviors reported over the course of the study per participant ranged from 26 to 457, with a mean of 139.27 ($SD = 101.00$) over the 5-day period (27.85 per day). See Table 1 for an aggregate breakdown of each checking behavior type.

3.2. Multilevel Analyses

Hierarchical Linear Modeling (HLM; Bryk & Raudenbush, 1992) was the primary method of analysis used to investigate the relationship between body checking, body dissatisfaction, and negative affect. Level 2 consisted of 22 individuals, and Level 1 consisted of a total of 482 time points. The data yielded an Intraclass Correlation Coefficient (ICC) of 0.45, which indicated that 45% of the total variability is related to between group variability. Bryk and Raudenbush (1992) suggest that HLM is appropriate when the ICC is greater than 0.10.

Table 1

Aggregate breakdown of reported body checking frequencies over 5-day study period.

Behavior type	Reported frequency	Number of participants ^a	Percentage of participants endorsed
Weighed self	40	$n = 7$	32%
Felt thighs for fatness	150	$n = 16$	73%
Sucked in stomach	692	$n = 20$	91%
Felt/pinched stomach	325	$n = 20$	91%
Compared body to others	700	$n = 22$	100%
Checked body in reflective surface	782	$n = 22$	100%
Checked for fat jiggling	173	$n = 14$	64%
Checked if thighs spread	202	$n = 21$	95%

^a Number of participants endorsing a specific body checking behavior at least one time.

3.3. Final model and hypothesis analyses

In the present analyses, time and individual were considered random factors. The final model included one Level 1 predictor: body checking frequency. Two models were run to test the hypothesis, one for each outcome variable: body dissatisfaction and negative affect.

The hypothesis that higher frequencies of reported body checking would predict higher body dissatisfaction was supported. Results revealed that frequency of checking behaviors significantly predicted body dissatisfaction, $b = -.15$, $t(21) = -2.61$, $p = .02$. The hypothesis that higher frequencies of reported body checking would predict higher negative affect was also supported, $b = .16$, $t(21) = 16.54$, $p < .001$.

Analyses revealed that, for state body dissatisfaction, body checking explained 4.21% of the variance at Level 1 (i.e. the variance between times within each individual), and negligible variance at Level 2 (i.e. between each individual). With respect to negative affect, body checking explained 6.08% of the variance at Level 1 and 31.95% of the variance at Level 2. These results suggest an individual's momentary body checking behavior is a better predictor for negative affect than state body dissatisfaction across assessment times within the same individual. Furthermore, body checking frequency *between* individuals (i.e., Level 2) appears to be a more accurate predictor for individual negative affect.

4. Discussion

The current study sought to examine body checking, body image dissatisfaction, and negative affect in a naturalistic setting among non-clinical women with high body concern. The results of this study indicated that non-clinical women engage in a high number of body checking behaviors throughout the day. The most reported behaviors were those that could be performed in a number of settings (e.g., comparing self to others; examining self in a reflective surface).

The hypothesis that higher checking frequency would predict higher state body dissatisfaction and negative affect was supported. These findings further substantiate the proposal that body checking may contribute to the maintenance of weight and shape concerns (Fairburn et al., 1999). Although this theory was originally directed toward clinical populations, results from the current study indicate that the theory may be generalized to non-clinical women as well, particularly those with high body concern.

4.1. Limitations

The primary limitation for this study involved the small, homogeneous sample size. Although significant results were found, the sample lacked ethnic and weight status diversity, which may have resulted in smaller effect sizes for the present study. For example, participants may have experienced high trait body dissatisfaction at all times, regardless of checking frequency, resulting in limited variability in their state body dissatisfaction. Future research should include more diverse samples in order to provide insight on the frequency and correlates of body checking for different types of individuals.

Another possible limitation for this study may be reactivity to repeated assessment. Although Heron and Smyth (2012) found that engaging in repeated body-related assessments over time did not produce a reactivity on post-test body-related measures, other studies have found that an EMA design may cause reactivity to target variables (Ridolfi et al., 2011). Results for the present study indicated that body checking frequency significantly decreased over time, $b = -0.14$, $t(21) = -3.37$, $p = .001$. This finding could be explained by the phenomenon of reactivity to self-monitoring, which is a common intervention technique in cognitive behavioral therapy intended to reduce the frequency of unwanted behaviors (Barlow, 2008).

4.2. Clinical implications and future directions

This study provided an ecologically valid assessment of a range of body checking behaviors among non-clinical women, which has typically only been collected retrospectively. The results from this study are consistent with the cognitive behavioral model of anorexia nervosa as proposed by Fairburn et al. (1999), and suggest that the model may also generalize to non-clinical women. These findings suggest that body checking may be an important target in intervention and prevention strategies for non-clinical women with high body concern, an at-risk group for developing an eating disorder (Striegel-Moore & Bulik, 2007).

Finally, it appears that the study itself served as a type of intervention, as checking frequency significantly decreased over time. It is possible that merely becoming aware of checking behaviors and their subsequent effect on body image and mood steered participants to decrease this behavior over time. While the current study may have acted as an unintentional intervention, future research should specifically utilize Ecological Momentary Interventions (EMI). As cell phones with internet capabilities become increasingly common, ecologically based assessments and intervention programs have the potential to be widely used by individuals that would not otherwise have access to psychological services.

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Contributors

Emily Stefano, Danae Hudson, and Brooke Whisenhunt designed the study and wrote the study protocol. Erin Buchanan and Emily Stefano conducted the statistical analyses. Emily Stefano and Janet Latner wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

References

- Barlow, D. H. (2008). *Clinical handbook of psychological disorders: A step-by-step treatment manual* (4th ed.). New York, NY: The Guilford Press.
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models in social and behavioral research: Applications and data analysis methods*. Newbury Park, CA: Sage Publications.
- Cash, T. F., Fleming, E. C., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: The development and validation of the body image states scale. *Eating Disorders, 10*, 103–113.
- Cooper, P. J., Taylor, M. J., Cooper, Z., & Fairburn, C. G. (1987). The development and validation of the body shape questionnaire. *International Journal of Eating Disorders, 6*, 485–494.
- Engel, S. G., Wonderlich, S. A., Crosby, R. D., Mitchell, J. E., Crow, S., Peterson, C. B., ... Gordon, K. H. (2013). The role of affect in the maintenance of anorexia nervosa: Evidence from a naturalistic assessment of momentary behaviors and emotion. *Journal of Abnormal Psychology, 122*, 709–719.
- Fairburn, C. G., Shafran, R., & Cooper, Z. (1999). A cognitive behavioural theory of anorexia nervosa. *Behaviour Research and Therapy, 37*, 1–13.
- Farrell, C., Shafran, R., & Fairburn, C. G. (2004). Mirror cognitions and behaviours in people concerned about their body shape. *Behavioural and Cognitive Psychotherapy, 32*, 225–229.
- Haedt-Matt, A. A., & Keel, P. K. (2011). Revisiting the affect regulation model of binge eating: A meta-analysis of studies using ecological momentary assessment. *Psychological Bulletin, 137*, 660–681.
- Heron, K. E., & Smyth, J. M. (2012). Is intensive measurement of body image reactive? A two-study evaluation using ecological momentary assessment suggests not. *Body Image, 10*, 35–44.
- Lavender, J. M., Wonderlich, S. A., Crosby, R. D., Engel, S. G., Mitchell, J. E., Crow, S., ... Grange, D. L. (2013). A naturalistic examination of body checking and dietary restriction in women with anorexia nervosa. *Behaviour Research and Therapy, 51*, 507–511.
- Leahey, T. M., Crowther, J. H., & Ciesla, J. A. (2011). An ecological momentary assessment of the effects of weight and shape social comparisons on women with eating pathology, high body dissatisfaction, and low body dissatisfaction. *Behaviour Therapy, 42*, 197–210.
- Reas, D. L., Whisenhunt, B. L., Netemeyer, R., & Williamson, D. A. (2002). Development of the body checking questionnaire: A self-report measure of body checking behaviors. *International Journal of Eating Disorders, 31*, 324–333.

- Ridolfi, D. R., Myers, T. A., Crowther, J. H., & Ciesla, J. A. (2011). Do appearance focused cognitive distortions moderate the relationship between social comparisons to peers and media images and body image disturbances? *Sex Roles, 65*, 491–505.
- Shafran, R., Lee, M., Payne, E., & Fairburn, C. G. (2007). An experimental analysis of body checking. *Behaviour Research and Therapy, 45*, 113–121.
- Striegel-Moore, R. H., & Bulik, C. M. (2007). Risk factors for eating disorders. *American Psychologist, 62*, 181–198.
- Walker, D. C., & Murray, A. D. (2012). Body image behaviors: Checking, fixing, and avoiding. In T. Cash (Ed.), *Encyclopedia of Body Image and Human Appearance*. San Diego: Academic Press.
- Walker, D. C., Murray, A. D., Lavender, J. M., & Anderson, D. A. (2012). The direct effects of manipulating body checking in men. *Body Image, 9*, 462–468.
- Watson, D., & Clark, L. A. (1994). The PANAS-X: Manual for the positive and negative affect schedule — expanded form. Unpublished manuscript, University of Iowa.