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Body checking in non-clinical women:

Experimental evidence of a specific impact on fear of uncontrollable weight gain

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Abstract

Objective: Body checking is used widely among clinical and non-clinical individuals. It is suggested to be a safety behavior, reducing anxiety initially but potentially enhancing eating and shape concerns in the longer term. However, there is little causal evidence of those negative effects. This experimental study tests the potential negative impact of body checking.

Methods: Fifty non-clinical women took part in a study of the effects of body checking in naturalistic settings. Each checked their wrist size every 15 minutes for eight hours on one day, then did not check the next day (order randomized). The impact on eating cognitions and body dissatisfaction was measured at the end of each day, and levels of change in those characteristics were also associated with eating pathology levels.

Results: Body checking did not result in more negative general eating attitudes or body dissatisfaction, but did result in a significant increase in a specific cognition that is hypothesised to be relevant to eating pathology – the fear of uncontrollable weight gain following eating. This impact was greater among those women with more negative existing eating attitudes.

Discussion: These findings add to the small experimental evidence base, demonstrating negative causal links between body checking and eating pathology. The findings need to be extended to clinical groups, but support the use of existing cognitive-behavioral methods to reduce body checking behavior.

Key words:

Body checking; body image; eating pathology; fear of uncontrollable weight gain

Body checking in non-clinical women:

Experimental evidence of a specific impact on fear of uncontrollable weight gain

The reasons for the onset of negative body image appear to differ across individuals, with multiple potential causal factors (e.g., media influences, teasing, physical changes). In contrast, there is clearer evidence about the factors that maintain that negative body image. Those maintenance factors include negative body schemata (Williamson, White, Crowe & Stewart, 2004), overvaluation of body image as an indicator of self-worth (Fairburn, 2008), and more immediate beliefs (e.g., "whatever I eat, my weight will go up out of control" – Waller & Mountford, 2015). However, as well as these beliefs, there is a set of body-related safety behaviors that maintain negative body image. Those behaviors include body avoidance, body comparison, and body checking (Reas, Whisenhunt, Netemeyer & Williamson, 2002; Rosen, 1997; Rosen, Srebnik, Saltzberg & Wendt, 1991; Thompson, 1992). Each is hypothesised to serve the short-term function of reducing anxiety and distress in the immediate term, but to worsen body image and eating-related cognitions over time.

Of these body-related behaviors, body checking is particularly worthy of attention, as its effects have not been widely tested or elaborated. It can consist of many different behaviors (e.g., pinching flesh, using weighing scales, using different clothes to identify size changes, repeated use of mirrors), each of which is likely to magnify body imperfections (Fairburn, Shafran & Cooper, 1999). It is strongly associated with negative body image and mood, in both correlational and causal studies (Kraus, Lindenberg, Zeeck, Kosfelder & Vocks, 2015; Shafran, Lee, Payne & Fairburn, 2007). Body checking is also likely to be associated with a wider range of negative eating attitudes – particularly the fear of uncontrollable weight gain that arises from not undertaking the more objective method of weighing to determine any bodily changes (Waller & Mountford, 2015). However, the stronger causal evidence comes from studies conducted over brief time periods in laboratory settings. For example, Shafran et al. (2007) asked women to check their bodies in a mirror critically or non-critically for 30 minutes. They showed that those who examined themselves

critically ('high body checking condition') became more dissatisfied with their bodies after the checking, relative to those who made neutral appraisals. In contrast, the Kraus et al. (2015) study showed that body checking was associated with more negative mood. Though Kraus et al. used a more ecologically valid approach, they did not use an experimental design. There is a need for ecologically valid evidence of the effects of body checking on body image, conducted in real life settings over more extended periods. It will also be necessary to determine whether those with more unhealthy eating attitudes are more vulnerable to any negative effects of body checking.

This study aimed to determine whether body checking has detrimental effects on body dissatisfaction and eating pathology, using an experimental design in a naturalistic context. It is predicted that body checking will result in more negative eating attitudes (including the key belief regarding uncontrollable weight gain), and higher levels of body dissatisfaction (hypothesis 1). It is also predicted that this effect will be greater among those individuals with more pathological eating attitudes and those who have a stronger trait level of body checking (hypothesis 2).

Method

Ethical approval

The study was approved by the Department of Psychology Research Ethics Committee, University of Sheffield, UK.

Design

The study used a mixed within/between subjects experimental design to address hypothesis 1. The body checking condition (present/absent) was the within-subject factor, while the between-subject variable was the order of conditions (body checking first vs body checking second). The dependent variables were body dissatisfaction (Body Satisfaction Scale) and current eating pathology, including fear of uncontrollable weight gain (ED-15). The second hypothesis was tested using a correlational design, testing the association between the level of experimentally-induced change in the state variables (body

dissatisfaction, eating cognitions, fear of uncontrollable weight gain) and trait levels of body checking (Body Checking Questionnaire) and eating pathology (Eating Disorders Examination-Questionnaire).

Participants

Sample size analysis (G* Power 3 – Faul, Erdfelder, Lang & Buchner, 2007) was used to determine the necessary number of participants, based on hypothesis 1. Effect size assumptions (effect size = 0.4) were based on a previous study on body image interventions in nonclinical populations (Robinson, 2013). Assuming a two-tailed significance of .05 and that effect size of 0.4, the required sample size for this analysis would be 40 to yield a power of 0.8. Increasing the required power to 0.9 would indicate a necessary sample of 52.

The initial pool of participants consisted of 76 women (≥ 18 years). All were either students or staff at a UK University. However, 17 were excluded due to reporting a current or past eating disorder, and another nine were excluded due to not completing the full set of questionnaires at the appropriate times. Thus, a total of 50 participants were included in data analysis. As demographic questions were not mandatory, data on age and BMI were collected for 33 participants only. They had a mean age of 35.8 years (*SD* = 15.19; range = 19-72). Their mean BMI was 24.8 (*SD* = 4.93).

Procedure

Participants were contacted initially by an email call, and those who were interested and who gave informed consent completed two baseline measures of trait eating disorders and body checking (see below). They also completed demographic detail, including height, weight, age, and any history of an eating disorder. Those participants who were not excluded (on the grounds outlined above) continued to the experimental stage, which consisted of two conditions. They completed the two conditions over two consecutive days, avoiding weekends. The order of the two was randomised to reduce the risk of order effects (19 were randomly allocated to the 'body checking first condition', and 31 to the 'no body checking first condition'), and order was tested as a potential factor.

On one day, they were asked to body check ('body checking day'), using a common

method that is identified in clinical and non-clinical settings – wrapping their finger and thumb around the opposite wrist to measure its size in order to determine whether they have become bigger or not (Reas et al., 2002). This task was chosen because participants could carry it out unobtrusively. They were asked to do this every 15 minutes for eight hours, starting from when they got up. If they missed a time point, they were instructed to continue as normal from the next time point. At the end of the day, the participants completed the state measures of body dissatisfaction, eating attitudes and fear of uncontrollable weight gain. On the other day ('no body checking day'), they were asked not to body check for a similar period of time, and completed the same set of state measures at the comparable time point.

Measures

All measures were completed online, using Qualtrics software. At the start of the study, participants gave informed consent, answered the demographic measures, and completed two baseline measures – the Eating Disorders Examination Questionnaire and the Body Checking questionnaire. Following each of the two experimental days, they completed the Body Satisfaction Scale and the ED-15, a minimum of two hours after completing the experimental manipulation. E-mails were sent reminding participants to complete the questionnaires.

Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008). The EDE-Q is a 28-item measure of eating disorder psychopathology, based on the Eating Disorder Examination interview (Cooper & Fairburn, 1987). Higher scores indicate more disordered eating. It has four attitudinal subscales: restriction, weight concerns, shape concerns, and eating concerns, which were considered in this study along with the total scale. The EDE-Q has good reliability and validity (e.g., Mond, Hay, Rodgers, Owen & Beumont, 2004).

Body Checking Questionnaire (BCQ; Reas et al., 2002). The BCQ is a 23-item measure of body checking behaviors. Higher scores indicate greater frequency of checking behaviors. Total scores reliably indicate levels of body checking in non-clinical populations.

The BCQ has adequate reliability and validity (Reas et al., 2002).

Participants were randomly allocated to either the 'body checking first' condition or the 'no body checking first' condition and received instructions the evening prior to each day of participation (see experimental manipulation) accordingly via e-mail.

Body Satisfaction Scale (BSS; Slade, Dewey, Newton, Brodie & Kiemie, 1990). The BSS is a 16-item measure of body dissatisfaction. Each item relates to one part of the body, and has the same stem (e.g., 'Please note how satisfied you are with [your] chest/head'), and is framed in the present tense to reflect state rather than trait satisfaction. Waller & Barnes (2002) have shown that BSS scores are responsive to experimental manipulation, supporting its use as a state measure. The BSS has two subscales: head satisfaction and body satisfaction. Higher scores indicate greater body dissatisfaction. It has acceptable reliability and validity in nonclinical populations (Slade et al., 1990).

ED-15 (Tatham, Turner, Mountford, Tritt, Dyas & Waller, 2015)**.** The ED-15 was designed to be reactive to changes in eating pathology over a shorter time period than the EDE-Q and other measures. The original version included items that address: weight/shape concerns, eating concerns, and a single item that measures fear of uncontrollable weight gain when one eats (this last item loads equally on both of the other scales, so is not included in either of them). Higher scores indicate greater disordered eating pathology. The ED-15 has strong reliability and validity in nonclinical populations (Tatham et al., 2015).

Data analysis

SPSS (v.21) was used in all analyses. Initially, independent t-tests were used to determine any difference across conditions (checking first/second) on baseline eating and body checking variables. Thereafter, a series of two-way ANOVAs were used to test hypothesis 1, with order as a between-subject variable, checking/not checking as a within subject variable, and the BSS and ED-15 scores as dependent variables. Finally, to test the second hypothesis, correlations (Pearson's *r*) were calculated between the trait measures (EDE-Q and BCQ scores) and change scores on the state measures (BSS and ED-15). Change scores were calculated for the BSS and ED-15 scales by subtracting the scores

from the no-checking day from those on the checking day. Thus, a higher change score indicates that the checking condition is linked with greater pathology than the no-checking condition.

Results

Participant characteristics

Participants' characteristics are presented in Table 1, comparing those individuals who completed the two tasks in different orders. Overall, scores on the BCQ and EDE-Q were similar to those established for nonclinical populations (Fairburn, 2008; Reas et al., 2002). Independent sample *t*-tests indicated that there were no significant group differences in terms of age, BMI and BCQ, but those in the 'body checking first' condition had higher EDE-Q scores. As no order effects were found for the dependent variables (see Table 2), this group difference is unlikely to have influenced the results.

Insert Table 1 about here

Impact of body checking on body image and eating cognitions (hypothesis 1)

Initial analyses (two-way ANOVA) showed no main or interaction effects involving order ($F < 3.6$, $P > .10$ in all cases), indicating that the order of conditions was not related to any other findings. Therefore, the analyses were repeated with only the main effect of task (checking/no checking). Table 2 shows the participants' mean pre- and post-checking scores on the BSS and the ED-15, and the results of the ANOVAs used to test the effect of task[1].

Insert Table 2 about here

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[1] The full version of Table 2, showing order effects, is available from the corresponding author.

There were no significant main effects of Task (body checking) on BSS scores or on the ED-15 weight/shape concerns or eating concerns scales. However, there was a significant main effect of body checking on fear of uncontrollable weight gain ($P < .01$). After body checking, participants reported significantly more fear of uncontrollable weight gain compared to when they did not body check. The effect size was moderate-large (*partial eta-squared* = 0.129), demonstrating that this effect of body checking was substantial.

To summarise, these findings indicate that body checking behavior in a naturalistic setting results in elevation of a specific eating disorder cognition – fear of uncontrollable weight gain. There is no general effect of such behavior on body dissatisfaction or general disordered eating attitudes.

Association of trait levels of disordered eating pathology with the impact of body checking (hypothesis 2)

Table 3 shows the associations (Pearson's *r*) between individuals' initial EDE-Q scores and changes across conditions in responses on measures of body dissatisfaction (BSS) and eating pathology (ED-15). To avoid the risk of Type 1 errors, an alpha of $P < .01$ was adopted.

Insert Table 3 about here

There was a specific pattern of associations – between higher EDE-Q scores (shape concerns, eating concerns and total score) and a higher level of fear of uncontrollable weight gain following checking (rather than not checking). Therefore, it can be concluded that body checking has a greater negative effect on individuals with a higher trait level of disordered eating attitudes (particularly shape and eating concerns), making them likely to experience greater fear of uncontrollable weight gain. Trait body checking had no such association, and there were no significant associations with change in body satisfaction.

Discussion

This experimental study has considered the impact of body checking on body dissatisfaction and eating pathology. Considering the first hypothesis, by the end of the time period (eight hours), body checking in a naturalistic setting had no impact on either body satisfaction or general eating attitudes. However, it resulted in elevation of a specific cognition that is central to eating disorders – fear of uncontrollable weight gain following eating. The second hypothesis was also supported with regard to that specific cognition – those with more pathological baseline eating attitudes showed the greatest response to body checking, resulting in greater fear of uncontrollable weight gain.

The association between body checking and eating pathology is already established (Reas et al., 2002), though causality has been less well understood due to a greater reliance on correlational designs. This experimental study has considered women's responses to less intensive body checking over a longer period of time than existing studies (Shafran et al., 2007). Shafran et al. showed that the effect of brief body checking is an immediate increase in body dissatisfaction. In contrast, this study has shown more extended body checking is associated with an elevated fear of uncontrollable weight gain following eating (Waller & Mountford, 2015). Furthermore, that cognitive impact is more marked among those who have more pathological eating and shape concerns, demonstrating that such women are more vulnerable to the effects of body checking. This association might relate to the symptom-maintaining nature of body checking, where those with more severe shape concerns were more vulnerable to the effects of short-term checking. The present findings cannot be compared directly with those of Kraus et al. (2015), as those authors used a non-experimental approach and measured impact on mood. However, Kraus et al.'s results do indicate the value of considering mood as an outcome variable in future studies of the impact of body checking.

It is important to note that the study has aspects that potentially limit the interpretability of the findings – particularly the possibility of experimental demand characteristics (the use of a single active condition) and the fact that only one of the

dependent variables was responsive to the experimental manipulation, and these should be addressed in future research in this field. This line of experimentation needs to be extended, so that differences in time frames and intensity of body checking, the behaviors used and the relevant outcomes are compared and controlled for and their impact understood. In particular, the findings need to be extended to males and to the eating-disordered population. An additional important point is that this study did not use a measurement check to assess compliance (whether the participants reliably checked their body every 15 minutes), and verification is needed in future work as to the extent of compliance with the experimental conditions. For example, future studies might record the number of body checks that were actually carried out by the participants, or might use reminder alarms to trigger those behaviors. These findings appear to support the negative impact of body checking (Kraus et al., 2015; Shafran et al., 2007), demonstrating that this safety behavior results in the worsening of a core fear in eating disorders (Mountford & Waller, 2015). However, an alternative interpretation is that it is not the behavior of body checking that triggers the fear of uncontrollable weight gain, but that it is the activation of related body-checking cognitions (Mountford, Haase & Waller, 2006) that results in that fear being exacerbated. These alternative interpretations could be tested experimentally by asking participants to either think about or carry out body checking behaviors.

If these findings develop into a reliable picture of body checking having negative effects, the clinical implications are clear - body checking should be addressed in order to reduce its maintaining and worsening impact on eating pathology and body image. Existing clinical guidance recommends that behavioral experiments should be used specifically to reduce the individual's reliance on body checking, teaching the individual that checking results in negative outcomes (Waller, Cordery, Corstorphine, Hinrichsen, Lawson, Mountford & Russell, 2007). However, it is also possible that exposure-based methods could play a role in reducing the use of checking to reduce the short-term anxiety, and that psychoeducation and cognitive restructuring could be used to change the individual's beliefs about the value of checking behaviors.

Authors' declaration of interest

The authors have no interests to declare.

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Table 1

Group characteristics (mean and standard deviation) for age, BMI, body checking (BCQ) and eating pathology (EDE-Q) across conditions (n = 50, except for age and BMI where n = 33).

Task	Body checking first		Body checking second		t-test	
Variable	*M*	*(SD)*	*M*	*(SD)*	*t*	*P*
Age	34.64	(14.20)	36.32	(15.96)	0.30	NS
BMI	25.70	(4.33)	24.34	(5.23)	0.75	NS
BCQ	51.05	(14.88)	46.55	(13.13)	1.12	NS
EDE-Q	2.62	(1.16)	1.69	(0.83)	3.30	.002

Table 2

Body dissatisfaction (BSS) and eating pathology (ED-15) following body checking vs non-checking

		Task		**ANOVA**	
Measure		No body checking	Body checking	*F*	*P*
BSS Head	*M*	21.6	21.3	0.38	NS
	(SD)	(8.75)	(9.28)		
BSS Body	*M*	26.8	26.6	0.09	NS
	(SD)	(9.89)	(10.2)		
ED-15 Weight/shape	*M*	2.63	2.80	2.23	NS
concerns	*(SD)*	(1.57)	(1.64)		
ED-15 Eating	*M*	2.77	2.68	0.61	NS
concerns	*(SD)*	(1.29)	(1.27)		
ED-15 Uncontrollable	*M*	2.62	3.02	7.26	.01
weight gain	*(SD)*	(1.82)	(2.04)		

Table 3

Correlation coefficients (Pearson's *r*) between trait eating attitudes and change in eating cognitions and body satisfaction after body checking (*N* = 50).

Change in response	EDE-Q Restraint	EDE-Q Shape	EDE-Q Weight	EDE-Q Eating	EDE-Q Total
BSS					
Head	-.01	-.05	-.08	.02	-.04
Body	.05	.13	.08	.06	.10
ED-15					
Weight/shape concerns	.14	.18	.08	.33	.21
Eating concerns	-.04	.17	.15	-.04	.09
Uncontrollable weight gain	.30	.38**	.28	.37**	.41**