

**The effects of evaluative stress on body dissatisfaction in binge eating disorder**  
(project no. 16-12)

**Authors**

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***Introduction***

Binge eating disorder (BED) is characterized by recurrent binge eating episodes in the absence of compensatory behavior. Contrary to the diagnostic criteria of anorexia nervosa and bulimia nervosa, overvaluation of shape or weight is not a diagnostic requirement for BED. However, a substantial number of studies using self-report questionnaires indicate that overvaluation of shape and weight is also existent in women with BED (e.g., Striegel-Moore et al., 1998; Wilfley et al., 2000). Furthermore, research highlights the importance of body dissatisfaction and overvaluation of shape and weight in the maintenance of BED (e.g., Masheb & Grilo, 2008; Stein et al., 2007). Therefore, there is a need for research identifying precursors of body-related pathology in BED in order to enhance the development of effective treatments.

***Objectives***

Stress is the most frequently reported trigger of binge eating in individuals with BED (e.g., Freeman & Gil, 2004; Rosenberg et al., 2013). To the best of our knowledge though, no study so far has tested the effects of stress on the experience of body dissatisfaction. Therefore, the aim of the present study was to investigate the role of socio-evaluative threat and uncontrollability in the experience of body dissatisfaction in BED.

***Methods***

A counterbalanced within-design was used to expose 37 women with BED and 40 weight-matched overweight controls (control group; CG) to the Trier Social Stress Test for Groups (TSST-G; von Dawans, Kirschbaum, & Heinrichs, 2011) and a specific non-stressful control condition (TSST-G-no stress) within one week of distance. The TSST-G is a standardized laboratory stress task (i.e., public speaking and mental arithmetic in front of a panel of two evaluators) in a group format that is a reliable and ecologically valid method for induction of socio-evaluative stress (Boesch et al., 2014; von Dawans et al., 2011). In addition, during the TSST-stress and the TSST-no stress, participants were exposed to a mirror and a no-mirror condition. Body dissatisfaction, self-reported stress as well as cortisol and alpha-amylase (sAA) functioned as dependent variables.

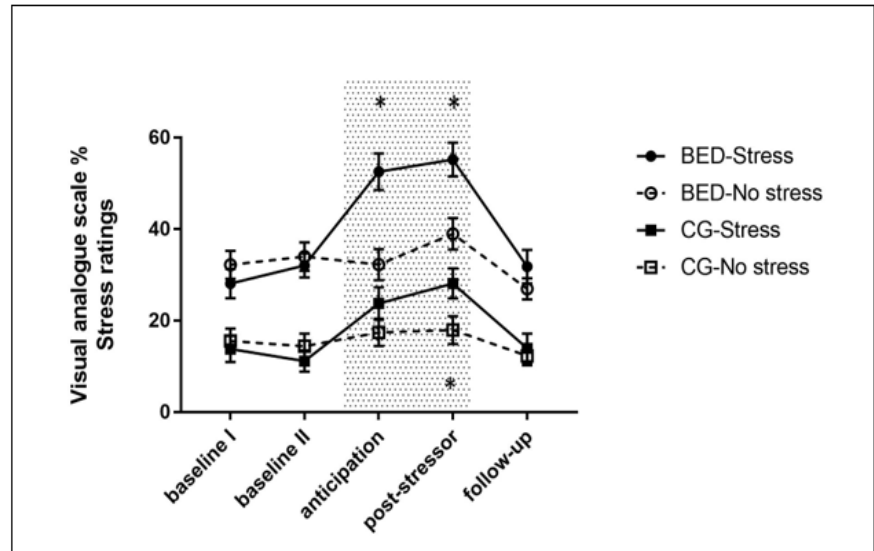
## Results

### Stress ratings

A four-factor repeated measures ANOVA (Group x TSST-G-condition x Mirror-condition x Time) on psychological stress yielded a significant main effect of Group, with higher stress ratings in patients with BED compared to the CG,  $F(1,64)=44.02$ ,  $p<.001$ ,  $\eta_p^2=.408$ .

There was a significant three-way interaction of Group x TSST-G-condition x Time,

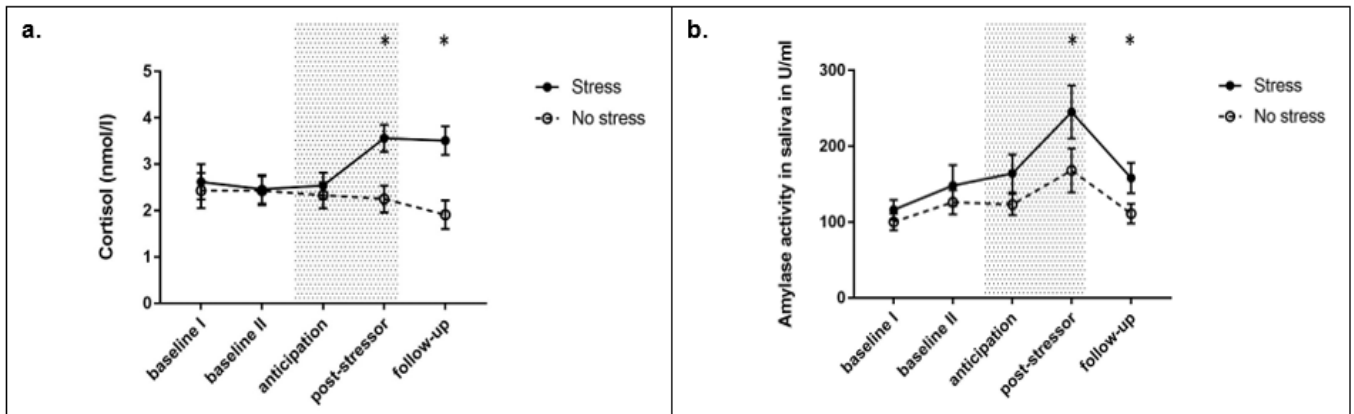
$F(5,60)=2.72$ ,  $p=.033$ ,  $\eta_p^2=.041$ . Follow-up paired  $t$ -tests indicated that the stress manipulation was successful in both study groups: psychological stress was significantly higher in the post-stressor phase of the stress compared to the no-stress condition,  $ps<.001$ . No differences were found at baseline and follow-up,  $ts<1.14$ . Only in the BED group, it was shown that stress ratings were already significantly increased in the anticipation phase of the TSST-G,  $p<.001$ . In the CG, no differences in stress ratings between the stress and no stress condition were found at this time point,  $t=1.82$  (Means [ $M_s$ ] and standard errors [ $SE_s$ ] are shown in Fig. 1).



**Fig. 1:** Stress ratings in the binge eating disorder (BED) group and control group (CG) in the stress and no stress condition at baseline, in the anticipation phase, after the stressor and at follow-up. The shaded area represents the stressor phase. The star indicates statistical significance ( $p<.050$ ).

### Cortisol and alpha-amylase

The analysis of cortisol and sAA revealed a significant interaction of TSST-G condition x Time,  $F_s>2.94$ ,  $p<.040$ ,  $\eta_p^2>.067$ . Follow-up paired  $t$ -tests showed that there was no cortisol or sAA difference at baseline between the TSST-G conditions,  $ts<.85$ . In the post-stressor and follow up phase cortisol and sAA were significantly higher in the stress compared to the no-stress condition in both groups,  $ps<.010$  ( $M_s$  and  $SE_s$  are shown in Fig. 2).

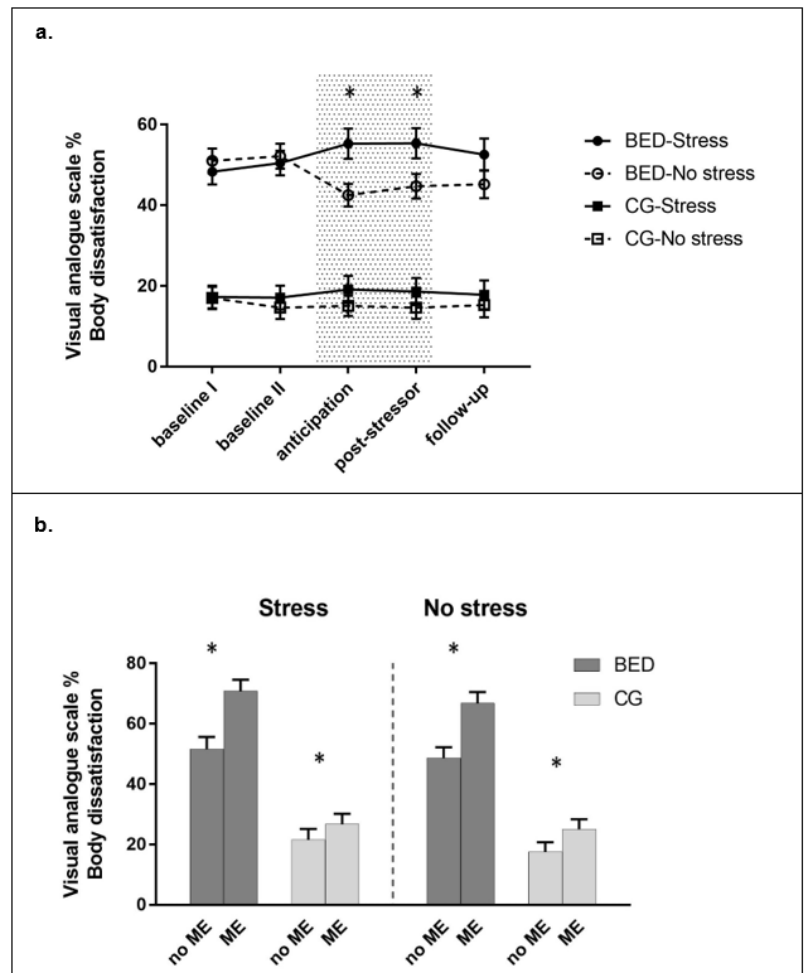


**Fig. 2:** Cortisol (Figure 2a) and alpha-amylase (Figure 2b) in the stress and no stress condition in all participants at baseline, in the anticipation phase, after the stressor and at follow-up. The shaded area represents the stressor phase. The star indicates statistical significance ( $p < .050$ ).

### Body dissatisfaction

A four-factor repeated measures ANOVA (Group x TSST-G-condition x Mirror-condition x Time) on body dissatisfaction yielded a significant main effect of Group, with state body dissatisfaction being significantly higher in the BED group compared to the CG,  $F(1,61)=75.29$ ,  $p < .001$ ,  $\eta_p^2 = .552$ .

There was a significant three-way interaction of Group x TSST-G-condition x Time,  $F(5,57)=2.73$ ,  $p = .037$ ,  $\eta_p^2 = .043$ . Follow-up paired  $t$ -tests revealed that in the BED group, body dissatisfaction was significantly higher in the anticipation and post-stressor phase of the stress compared to the no-stress condition,  $ps < .004$ . whereas no significant differences were found at baseline and follow-up,  $ts < .73$ . In the CG, body dissatisfaction did not differ significantly between the



**Fig. 3:** Body dissatisfaction in the binge eating disorder (BED) group and control group (CG) in the stress and no stress condition. Figure 3a. shows data at baseline, in the anticipation phase, after the stressor and at follow-up. The star indicates statistical significance ( $p < .050$ ). Figure 3b shows data after the no-mirror condition (no ME) and after the mirror exposure (ME).

stress and no-stress condition at any time point,  $t_s < 1.85$  ( $M_s$  and  $SE_s$  are shown in Fig. 2a).

The ANOVA further revealed a significant three-way interaction of Group x Mirror-condition x Time,  $F(2,60)=12.12$ ,  $p < .001$ ,  $\eta_p^2 = .166$ . Follow-up paired  $t$ -tests showed that body dissatisfaction was significantly higher after participants looked in the mirror compared to the no-mirror condition in both study groups,  $p_s < .001$ . However, the increase of body dissatisfaction in response to mirror confrontation was significantly higher in the BED group compared to the CG,  $p = .001$  ( $M_s$  and  $SE_s$  of the data on Mirror-condition are shown in Fig. 2b).

### **Conclusions**

Results suggest that women with BED display a high vulnerability to feelings of stress, with overall greater stress ratings and an earlier psychological stress response than overweight women without BED. In the present study, no group differences were found regarding markers of biological stress.

In line with the main hypothesis, we found that stress exacerbated body dissatisfaction in females with BED but not overweight women without BED. This finding was independent from activation of patients' appearance schema using mirror exposure. Psychosocial stress may be an important maintenance factor for body image problems in BED.

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