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**Self-critical thinking and overgeneralisation in depression and eating disorders: An experimental study**

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### **Abstract**

**Background:** Self-critical thinking is common across psychological disorders. This study hypothesised that it may play an important role in 'overgeneralisation', the process of drawing general implications from an isolated negative experience.

**Aims:** To explore the impact of two experimental tasks designed to elicit self-critical thoughts on the endorsement of general negative self-views of clinical and nonclinical populations.

**Method:** Three groups (depression, eating disorders, and nonclinical controls), completed standardised questionnaires and the two tasks. Participants rated their self-critical thinking and general negative self-beliefs before and after each task.

**Results:** Following a failure experience, both clinical groups showed a greater increase in general negative self-views compared to controls, indicating greater overgeneralisation. Both habitual and increases in state self-critical thinking were associated with overgeneralisation while negative perfectionism was not. Overgeneralisation was more strongly associated with post-task reduced mood than self-criticism.

**Conclusions:** Self-critical thinking may be an important factor in the process of overgeneralisation, and the increase in general negative self-views may be particularly crucial for lowering of mood.

*Keywords:* Self-criticism; depression; eating disorders; overgeneral; perfectionism

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### Introduction

Self-critical thinking has been reported across a number of psychological conditions, including depression (Luyten et al., 2007), eating disorders (Fennig et al., 2008; Lehman & Rodin, 1989), social anxiety (Cox et al., 2000), and PTSD (Cox, MacPherson, Enns, & McWilliams, 2004). The impact self-criticism can have on clinical interventions is significant; it has been shown that people with high levels of self-criticism give lower ratings of the working alliance with their therapist (Whelton, Paulson, & Marusiak, 2007), show generally poorer treatment outcomes (Cox, Walker, Enns, & Karpinski, 2002; Dent & Teasdale, 1988; Marshall, Zuroff, McBride, & Bagby, 2008; Rector, Bagby, Segal, Joffe, & Levitt, 2000) and have greater risk of relapse (Mongrain & Leather, 2006). Furthermore, self-criticism has been shown to predict depression in a longitudinal study (Dunkley, Sanislow, Grilo, & McGlashan, 2009), and has been identified as a risk factor for suicide (O'Connor & Noyce, 2008).

Much of the extant literature has subsumed self-criticism under the umbrella of perfectionism using categories of 'self-oriented perfectionism' (Hewitt & Flett, 1991) or 'self-critical perfectionism' (Dunkley & Blankstein, 2000). The perfectionism literature tends to consider self-criticism as a stable personality variable or cognitive style, for example the model of Hewitt & Flett, (1991), which outlines three domains of perfectionism (self-oriented, other-oriented, and socially prescribed perfectionism), and suggests that self-criticism may stem from each of these. This approach does not readily allow for fluctuations in self-critical thinking, or acknowledge that 'nonperfectionists' can also be self-critical. Studies using failure feedback designs have shown that on average, most participants show a tendency to criticise their own performance following perceived task failure, regardless of the presence of a self-critical 'trait' (see Besser, Flett, & Hewitt, 2004; Stoeber, Hutchfield, & Wood, 2008; Wenzlaff & Grozier, 1988). This indicates that 'state' self-criticism is possible and

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may be common for all people in certain contexts, though it may be more marked among people with longstanding experience of self-criticism or clinical conditions.

More recent research has begun to examine the role of self-criticism in various clinical problems outside of the construct of perfectionism. For example Pinto-Gouveia and colleagues (2013) demonstrated that where someone experiences a shameful early life event that becomes central to their identity, this is associated with depression symptoms, but only given the presence of self-criticism. A similar mediating role for self-criticism has been shown in the relationship between childhood emotional abuse and both depression symptoms and body dissatisfaction in binge-eating disorder (Dunkley, Masheb, & Grilo, 2010).

Self-criticism is also a main component of the Interpersonal Theory of Depression put forward by Blatt and colleagues (see Blatt, 1974; Blatt & Zuroff, 1992), which suggests two main subtypes; anaclitic depression, characterised by feelings of loneliness and helplessness, and introjective depression, characterised by self-criticism and feelings of unworthiness and failure. Blatt and Zuroff (1992) noted that although 'self-critical individuals are vulnerable to experiences of dysphoria in the face of different negative events, it is less clear why they are vulnerable' (p.553). It remains true that the mechanism by which self-critical thinking may contribute to psychological problems is unclear, but one possible route is through the process of overgeneralisation. This is the process whereby specific negative appraisals of an event become magnified and applied more broadly across a range of situations or times, leading to people making global judgements about their characteristics or abilities. Beck's cognitive model of depression (Beck, Rush, Shaw and Emery, 1979) highlighted overgeneralisation from specific events to general negative judgements as a common cognitive bias in depression.

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In support of this, student cohort studies have shown that participants with an unconstructive, self-critical style of thinking tend to overgeneralise and judge themselves more negatively following negative outcomes, compared to more constructive, less critical thinkers (Epstein, 1992), and that overgeneralisation is the strongest predictor of depression when compared to self-criticism and high standards (Carver & Ganellen, 1983). There has been less experimental research into the process of overgeneralisation from the effect of a specific event to a general self-belief. One exception is a study by Wenzlaff and Grozier (1988) in which students were given predetermined failure feedback about a task purporting to assess social perceptiveness. Depressed participants, unlike non-depressed participants, subsequently reported lower estimates of their *general* proficiency. It is possible that self-critical thinking was elicited by the task and resulted in such overgeneralisations, but self-critical thinking was not assessed directly. An experimental study by Rimes and Watkins (2005) also found that analytical self-focused thinking increased ratings of the self as worthless and incompetent in depressed but not healthy participants; however, their paradigm was designed to elicit analytic self-focused cognition in general rather than self-criticism specifically.

The aim of the present study was to investigate the relationship between self-criticism and overgeneralisation, and to compare this across two clinical disorders where self-criticism is common: depression and eating disorders. Tasks designed to elicit self-critical thoughts were used to investigate the following hypotheses:

1. *Changes following Failure Experience*: Following task-related failure, it was hypothesised that the two clinical groups would report more self-critical thinking and greater overgeneralisation (increased endorsement of general negative self-views) compared to controls, and that there will be no significant difference between the clinical groups.

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2. *Predicting Overgeneralisation:* Self-critical thinking would be a significant predictor of overgeneralisation after each task, and it would show a stronger association with overgeneralisation compared to negative perfectionism.
3. *Predicting Increased Low Mood:* Self-critical thinking and overgeneralisation would both be associated with increases in low mood after each task but overgeneralisation would show the stronger association.
4. *Changes Specific to Eating Disorders:* Compared to the other two groups, the eating disorder group would show significantly more body/appearance-related self-critical thinking and overgeneralisation after a task focusing on body image.

### Method

#### Participants

The study recruited 78 adults across three groups: current major depressive disorder (n=26), a current eating disorder (n=26), and no current or historical psychological disorders (n=26). A sample size calculation (using  $\beta=0.8$  and  $\alpha=0.05$ ) based on the effect size calculated from Wenzlaff and Grozier (1988), indicated 10 participants per group would be required to detect a small effect for the first hypothesis. Given the further planned analyses we sought the larger group sizes above. Participants in the two clinical groups were recruited from local mental health services, where eligible participants were approached initially by a member of their clinical team. Additionally, study information and advertising material was distributed to local voluntary and charitable organisations, public buildings, and relevant online forums. Participants in the third (control) group were recruited from university student and staff populations and local advertisement. Exclusion criteria were high levels of risk (identified by

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clinician), or difficulties with written/spoken English. Participants were reimbursed for their time using vouchers or, where relevant, course credit.

### **Design**

The study used a group (depression, eating disorder, nonclinical control) by time (before and after each task) between and within-participant design to compare the impact of two tasks across the three groups, with overgeneralisation as the main dependent variable.

### **Materials**

#### **Diagnostic Interview.**

The Mini International Neuropsychiatric Interview (MINI; Version 6.0.0; Sheehan et al., 1998) is a brief structured interview protocol with good reliability and validity (Lecrubier et al., 1997) that screens for the presence of major Axis I psychiatric disorders, as outlined in DSM-IV and ICD-10.

#### **Questionnaire measures.**

The following standardised measures were used:

- Habit Index of Negative Thinking (HINT; Verplanken, Friborg, Wang, Trafimow, & Woolf, 2007). A measure of habitual self-critical thinking as a cognitive process, the HINT has good psychometric properties (Verplanken et al., 2007) and internal consistency; Cronbach's alpha in this study was 0.97.
- Frost Multidimensional Perfectionism Scale (MPS; Frost, Marten, Lahart, & Rosenblate, 1990). Analyses used the total of the following subscales: Concern over Mistakes, Doubting of Actions, Parental Expectations, and Parental Criticism, which have been shown to represent the negative

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aspects of perfectionism (see Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Cronbach's alpha was 0.94.

- Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a widely used and validated brief measure of depression symptoms (see Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). Cronbach's alpha was 0.93.
- Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008). A general measure of self-reported eating disorder symptoms, the present study used the global scale of the EDE-Q, which averages the four subscales of Restraint, Eating Concern, Weight Concern, and Shape Concern. Cronbach's alpha was 0.96.

Participants also completed brief demographic questions and questions regarding current or previous treatments for mental health difficulties.

### **Visual analogue scales: General negative self-views, self-criticism, and mood.**

Based on those used in Wenzlaff & Grozier (1988) and Rimes & Watkins (2005), these visual analogue scales have been shown to be sensitive to change in experimental studies. To capture the process of overgeneralisation, Rimes and Watkins (2005) used four items taken from the devaluation scale of the Depressed States Checklist (Teasdale & Cox, 2001): competent, acceptable to others, worthless, unlovable. These items (first two reverse-scored) were averaged to form a composite indicator of general negative self-views (see Rimes & Watkins, 2005). The change in scores on the composite measure of general negative self-views before and after each of the tasks was computed to produce a single variable of overgeneralisation (i.e. post-task minus pre-task ratings). To capture changes in mood and self-criticism participants rated the following items: low in mood, self-

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critical, and self-critical about my body or appearance; all items were rated on 0 (not at all) to 100 (extremely) scale. Participants rated how they were feeling at the time of completion, apart from the two self-criticism scales, where they were asked to consider the past five minutes.

### **Verbal Ability Task.**

This task was adapted from the 'Remote Associates Task' (Mednick, 1962). Three 'clue' words are given (e.g. "teacher", "primary", "learning"), and the task is to produce a fourth word that can be combined with all the clues, either by making a compound phrase or semantic association (e.g. "school"). These can vary in difficulty, and a difficult version of the task has been used in previous research in perfectionism as a trigger for self-critical thinking (Schneider, Gerstenberg, Altstotter-Gleich, Zureck, & Schmitt, 2012). Twenty difficult and twenty easy items were selected following piloting that demonstrated that no participants were able to successfully answer all of the difficult items in the time available, that the difficult items were effective in eliciting self-critical thoughts, and that the easy items were effective in reducing these.

Participants were given instructions and an example set of clue words and their solution. They were given three minutes to complete the difficult items. Following this they completed the easy items, for which they were allowed five minutes. No performance feedback was provided, therefore participants' evaluations of performance and failure experiences were self-generated.

### **Body Image Task.**

Adapted from tasks described in Shafran, Lee, Payne, and Fairburn (2007) and Forbes, Adams-Curtis, Rade, and Jaberg (2001), this task was designed to trigger self-critical thinking related to comparisons of the self with people in the images

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shown. Advertisements featuring idealised male and female images were selected from popular men's and women's magazines, which were piloted to select 10 male and 10 female images that showed the strongest negative impact on viewers' own self-image. Additionally, two further advertisements not featuring people were added to each set to disguise the nature of the task.

Participants were asked to view each image for five seconds, then provide ratings on a 5-point Likert scale (1=Strongly Agree, 5=Strongly Disagree) for the following statements: 'the style of this image appeals to me'; 'this image would catch my eye if I was flipping through a magazine'; 'it is clear what this image is trying to promote'; and 'this is a memorable image'. These instructions were designed to hide the purpose of the task while ensuring participants fully viewed and engaged with each image.

### **Procedure**

The study was approved by the UK National Research Ethics Committee (Study Reference 13/WA/0158). Potential participants were provided with an information sheet and the opportunity to ask questions. Suitability for the study was assessed via telephone using the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) to assess diagnoses and determine their group allocation if appropriate.

Eligible volunteers were sent a consent form and questionnaire pack to complete at home. The researcher then met with participants to undertake the experimental tasks. This meeting followed the structure below:

1. Information about the experimental session
2. Completion of visual analogue scales (VAS) – time A
3. Verbal Ability Task – part 1 (difficult; 'failure experience')

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4. VAS – time B
5. Verbal Ability Task – part 2 (easy)
6. VAS – time C
7. Body Image Task
8. VAS – time D
9. Full debrief, including optional relaxation exercise for participant wellbeing

Task order was not counterbalanced as although there was a method for negating the effects of the failure experience in the Verbal Ability Task (i.e. the second part in which participants experience success at the task), there was no such method available for the Body Image Task.

### **Data Analysis**

Data were analysed using SPSS version 20. One participant from the depression group was excluded from analyses of the verbal ability task due to misunderstanding the instructions. Missing questionnaire data were replaced with the mean score given for items in the same subscale. Overgeneralisation scores for the verbal ability task were found to be positively skewed, therefore a square root transformation (including a constant to remove negative values) was performed to realign scores with the normal distribution prior to analysis.

## **Results**

### **Demographics of Sample**

One-way ANOVA and chi-square analyses were used as appropriate to compare demographic information for the three groups, with response options combined where required to ensure sufficient cell counts. The groups did not differ with respect to ethnicity ( $\chi^2= 1.9, p= .538$  [Fisher's Exact Probability Test]), years of education ( $\chi^2= 2.9, p= .238$ ), marital status ( $\chi^2= .1, p= .956$ ), or financial status ( $\chi^2= 6.7,$

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$p = .151$ ). The mean age of the depression group ( $M=45$ ,  $SD= 13$ ) was higher than that of the eating disorder ( $M= 28$ ,  $SD= 7$ ) and control ( $M= 26$ ,  $SD= 12$ ) groups:  $F(2,75)= 20.7$ ,  $p<.001$ , and there was a greater proportion of female participants in the depression (81%) and eating disorder (100%) groups compared to controls (51%):  $\chi^2= 16.4$ ,  $p<.001$ . As might be expected, the proportion of participants not currently employed or studying was higher in the depression (50%) and eating disorder (50%) groups compared to controls (8%):  $\chi^2= 14.0$ ,  $p= .001$ . There was no difference between the depression (65%) and eating disorder (54%) groups regarding the proportion currently taking psychiatric medication:  $\chi^2= .3$ ,  $p= .572$ .

### **Clinical Characteristics of Sample**

One-way ANOVA analyses with Tukey HSD post-hoc tests indicated that both the depression ( $M= 35$ ,  $SD= 9$ ) and eating disorder ( $M= 31$ ,  $SD= 10$ ) groups showed significantly greater depression symptoms, as measured by the CES-D, compared to the control group ( $M= 11$ ,  $SD= 7$ ):  $F(2,75)= 53.5$ ,  $p<.001$ . On the EDE-Q, scores for the eating disorder group ( $M= 4.20$ ,  $SD= 0.98$ ) were significantly greater than the depression group ( $M= 2.54$ ,  $SD= 1.38$ ), which in turn were greater than the control group ( $M= 1.11$ ,  $SD= 0.97$ ):  $F(2,75)= 49.5$ ,  $p<.001$ . Participants in the two clinical groups met diagnostic criteria for various psychiatric conditions, which are shown in Table 1.

[TABLE 1 ABOUT HERE]

### **Task Manipulation Checks: Changes in self-critical thinking**

To check whether participants attempted and solved fewer of the hard than the easy puzzles as intended, 3 (group) by 2 (difficulty) ANOVAs were conducted. A significant main effect of difficulty was found for both the number of puzzles attempted (Wilks' Lambda= .11,  $F(1, 74)= 628.0$ ,  $p<.001$ ) and the number correctly

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solved (Wilks' Lambda= .10,  $F(1, 74)= 708.6$ ,  $p<.001$ ). On average, participants attempted fewer hard puzzles ( $M=4.8$ ,  $SD=3.9$ ) than easy puzzles ( $M=16.3$ ,  $SD=3.4$ ), and correctly solved fewer hard puzzles ( $M=2.2$ ,  $SD=1.7$ ) than easy puzzles ( $M=13.9$ ,  $SD=4.2$ ). There was no main effect of group for the number of puzzles attempted ( $F(2, 74)= 2.0$ ,  $p=.144$ ) or solved ( $F(2, 74)= 0.4$ ,  $p=.646$ ), and no difficulty by group interaction for puzzles attempted ( $F(2, 74)= 0.4$ ,  $p=.662$ ) or solved ( $F(2, 74)= 0.8$ ,  $p=.449$ ). This indicated that between-group differences would be attributable to perceived performance rather than actual performance.

To assess the effectiveness of the tasks in eliciting self-critical thoughts, paired t-tests were calculated comparing participants' ratings of the extent of self-critical thinking experienced over the past five minutes at times A and B (verbal ability task), and also at times C and D (body image task). Mean ratings of self-critical thinking increased from 41.4 ( $SD=26.1$ ) at time A to 65.3 ( $SD=29.0$ ) at time B:  $t(76)= -8.6$ ,  $p<.001$ , indicating the failure experience was effective in eliciting self-critical thoughts. The decrease in ratings from time B ( $M=65.3$ ,  $SD=29.0$ ) to time C ( $M=50.0$ ,  $SD=27.9$ ) was also significant:  $t(76)= 7.7$ ,  $p<.001$ , indicating the easy puzzles were effective in reducing self-critical thinking. A one-way ANOVA of the change in self-critical thinking from time B to time C showed there were no differences between groups:  $F(2,74)= .004$ ,  $p=.996$ . The body image task led to a significant increase in body/appearance-related self-critical thinking from mean ratings of 30.4 ( $SD=28.1$ ) at time C to 46.0 ( $SD=32.5$ ) at time D:  $t(77)= -5.8$ ,  $p<.001$ , but no change in the general self-critical thinking VAS:  $t(77)= .4$ ,  $p=.667$ . This suggested that each task produced specific changes in self-criticism and that any effects observed in the latter task were not simply a carry-over effect.

### **Changes in mood and general negative self-views after each task**

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Paired t-tests comparing pre- and post-task VAS scores indicated that the verbal ability task was associated with significant increases in low mood and overgeneralisation, but that the body image task was not (see Table 2).

[TABLE 2 ABOUT HERE]

### Testing of Study Hypotheses

#### Hypothesis 1: Changes following Failure Experience.

A mixed ANOVA using a within-subjects factor of time (before vs. after the failure experience), and a between-subjects factor of group (Depression vs. Eating Disorder vs. Control) was conducted using self-criticism ratings. This showed a significant main effect of time,  $F(1,74)= 79.126$ ,  $p<.001$ , partial  $\eta^2= .517$ , and group,  $F(2,74)= 28.347$ ,  $p<.001$ , partial  $\eta^2= .434$ , and a significant interaction effect,  $F(2,74)= 3.135$ ,  $p=.049$ , partial  $\eta^2= .078$ . Post-hoc pairwise comparisons (with Bonferroni correction) indicated that both clinical groups showed a greater increase in self-critical thinking compared to the control group ( $p$ 's<.001), and that there was no difference between the clinical groups ( $p=.447$ ). Group means across the four timepoints for self-critical thinking and other VAS are presented in Figure 1.

[FIGURE 1 ABOUT HERE]

The equivalent analysis for overgeneralisation also revealed a significant main effect of time,  $F(1,74)= 60.572$ ,  $p<.001$ , partial  $\eta^2= .450$ , group,  $F(2,74)= 41.827$ ,  $p<.001$ , partial  $\eta^2= .531$ , and a significant interaction effect,  $F(2,74)= 5.516$ ,  $p=.006$ , partial  $\eta^2= .130$ . Again, both clinical groups showed a greater increase in self-critical thinking compared to the control group ( $p$ 's<.001), and there was no difference between the clinical groups ( $p=.929$ ).

### **Hypothesis 2: Predicting Overgeneralisation.**

Correlational and multiple regression analyses were undertaken to investigate the relationship between self-critical thinking and overgeneralisation. The change in self-criticism ratings following the verbal ability task (time B minus time A) was significantly correlated with overgeneralisation (increase in general negative self-views): ( $r=.494, p<.001$ ). As shown in Table 3, habitual self-criticism as measured by the HINT was also significantly correlated with overgeneralisation ( $r=.252, p=.027$ ), though MPS Negative Perfectionism ( $r=.120, p=.300$ ), and CES-D ( $r=.111, p=.335$ ) scores were not. To compare their relative contributions, habitual self-criticism and task-related increases in self-criticism were entered into a multiple regression analysis. The overall model was significant:  $F(2,76) = 13.872, p<.001$ , Adjusted  $R^2=.253$ , but only task-related increases in self-criticism was a significant predictor ( $Beta= .464, p<.001$ ).

[TABLE 3 ABOUT HERE]

On the body image task, changes in body/appearance-related self-criticism (time D minus time C) significantly correlated with overgeneralisation ( $r=.304, p=.007$ ). Scores on the HINT ( $r=-.054, p=.638$ ), MPS Negative Perfectionism ( $r=-.043, p=.712$ ), and CES-D ( $r=.019, p=.867$ ) were not significantly correlated with overgeneralisation.

### **Hypothesis 3: Predicting Increased Low Mood.**

Correlation analyses indicated that after the verbal ability task, increases in low mood were significantly associated with overgeneralisation ( $r=.524, p<.001$ ) and increases in self-criticism ( $r=.377, p=.001$ ). A multiple regression including overgeneralisation

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and change in self-criticism (time A to time B) showed that overgeneralisation was the only significant predictor of change in low mood ratings (time A to time B):  $\beta = .446$ ,  $p < .001$ , in a significant overall model:  $F(2,76) = 15.312$ ,  $p < .001$ , Adjusted  $R^2 = .274$ .

After the body image task, increases in low mood were significantly correlated with overgeneralisation ( $r = .523$ ,  $p < .001$ ) but not with increases in body/appearance-related self-criticism ( $r = .099$ ,  $p = .390$ ).

### **Hypothesis 4: Changes Specific to Eating Disorders.**

A mixed ANOVA using a within-subjects factor of time (before vs. after the failure body image task), and a between-subjects factor of group was conducted using body/appearance-related self-criticism ratings. This showed a significant main effect of time,  $F(1,75) = 33.522$ ,  $p < .001$ , partial  $\eta^2 = .309$ , and group,  $F(2,75) = 9.461$ ,  $p < .001$ , partial  $\eta^2 = .201$ , but a nonsignificant interaction effect,  $F(2,75) = 0.950$ ,  $p = .391$ , partial  $\eta^2 = .025$ , indicating the increase in self-criticism following the task did not differ significantly between the groups.

For overgeneralisation following the body image task, the main effect of time was nonsignificant,  $F(1,75) = 0.803$ ,  $p = .373$ , partial  $\eta^2 = .011$ , suggesting these did not change following the task. There was a significant main effect of group,  $F(2,75) = 32.648$ ,  $p < .001$ , partial  $\eta^2 = .465$ , but not the time by group interaction,  $F(2,75) = 0.098$ ,  $p = .907$ , partial  $\eta^2 = .003$ .<sup>1</sup>

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<sup>1</sup> It is possible that the lack of significant group by time interaction effects described under hypotheses 1 and 4 was due to the rate of comorbid depression in the eating disorder group. A mixed three (group: depression only ( $n = 26$ ); eating disorder only ( $n = 14$ ); eating disorder with depression ( $n = 12$ )) by two (time) ANOVA showed nonsignificant group by time interaction effect for self-criticism,  $F(2,48) = 1.472$ ,  $p = .240$ , partial  $\eta^2 = .058$  and overgeneralisation,  $F(2,48) = 0.327$ ,  $p = .723$ , partial  $\eta^2 = .013$ , following the failure experience,

### Discussion

In line with expectations, participants in the depression and eating disorder groups showed significantly greater increases in self-criticism and greater overgeneralisation (increases in endorsement of general negative self-views) following a verbal ability failure task compared to controls. This suggests a tendency towards overgeneralisation in both depression and eating disorders. The finding of overgeneralisation after specific failure experiences is consistent with related work in this area (e.g. Wenzlaff & Grozier 1988) and Beck's suggestion that overgeneralisation is a feature of amplified mood states (Beck et al., 1979). To the authors' knowledge, this is also the first experimental demonstration of overgeneralisation following failure experiences among participants with eating disorders.

Self-critical thinking in both habitual, and state, forms was significantly associated with the extent of overgeneralisation following failure experience on the verbal ability task, with the latter being the stronger predictor of the two. This finding questions the tendency in the literature to conceptualise self-criticism as purely a stable construct of personality. The second hypothesis was therefore supported and provides evidence for a possible role for self-critical thinking within the overgeneralisation process. By contrast, MPS Negative perfectionism was not significantly associated with overgeneralisation on the verbal ability task, and this is consistent with previous evidence suggesting self-criticism is not only a key component in the association

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indicating no difference between the groups in their response to this task. Similarly, the group by time interaction effects were nonsignificant for body/appearance-related self-criticism,  $F(2,49)= 0.573$ ,  $p=.568$ , partial  $\eta^2= .023$ , and global negative self-views,  $F(2,49)= 0.586$ ,  $p=.560$ , partial  $\eta^2= .023$ , following the body image task. This suggests that it is unlikely that the 'eating disorder with depression' subgroup was masking any underlying differences between the depression and eating disorder groups.

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between perfectionism and depressive symptoms (Gilbert et al., 2006), but is also important, in comparison to negative perfectionism, in the relationship between overgeneralisation and mood state.

Increases in both self-criticism and overgeneralisation were associated with increases in low mood following failure experiences on the verbal ability task. When both self-critical thinking and overgeneralisation were entered into a regression model, only the latter significantly predicted increases in low mood. The primacy of relationship found between overgeneralisation and mood state is consistent with previous research (Carver & Ganellen, 1983) and suggests a mechanism where self-criticism affects mood via overgeneralisation. However, as the three factors were measured at the same point in time, i.e. after each task, this conclusion must be interpreted with caution.

Contrary to the fourth hypothesis there was no difference in body/appearance-related self-criticism between the clinical groups following a task thought to be more relevant to the concerns of people with an eating disorder. The task was successful in eliciting an overall increase in appearance-related self-critical thinking but the increase in the clinical groups was not significantly larger than for controls, and this did not have an impact on overgeneralisation. It is possible that modifying the task may result in a greater differential effect between clinical and healthy individuals. This could include asking questions relating directly to one's own appearance in comparison to the images being viewed, which are more likely to activate body-related global beliefs. Such questions had not been included in the present study as it was anticipated that this would make the true purpose of the task (eliciting self-criticism) too obvious.

The present findings suggest that self-critical and overgeneralisation processes occur similarly across people with depression and eating disorders, and that these

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processes seem to represent an exaggerated form of those occurring in people without current mental health difficulties. The lack of differences between the two clinical groups provides tentative support for the idea that it may be useful to consider these processes from a transdiagnostic perspective; whereas in the past these processes, particularly overgeneralisation, have been examined predominantly in depression. Caution is required because the present eating disorder group showed relatively high levels of secondary depressive symptomatology. However, analyses comparing this subgroup to those in the eating disorder group without depression, and the depression group indicated there were no differences between them in response to the experimental tasks, though these findings are limited due to the subgroup sample sizes.

Other limitations of the study include some demographic group differences, and the reliance on self-report approaches, though this is to an extent unavoidable due to the internal nature of self-critical thinking. It was not possible to counterbalance the order of the two tasks, as no method was available to counteract the effect of the body image task had it been presented first. Lastly, it is noted that the conceptualisation and measurement of the overgeneralisation process is not straightforward; the present study used the increase in general negative self-views in response to a negative experience as an index of this process following Rimes and Watkins (2005), but other methodologies would be possible and would merit further exploration. For example, participants could be asked to rate their perceived likelihood of failing other unrelated tasks.

Although these results suggest that self-criticism and overgeneralisation may be key elements in the endorsement of general negative self-beliefs, and that these in turn are associated with low mood, it remains an open question how best to intervene with this process. Future research could examine the clinical effectiveness of

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targeting the self-critical thinking, the overgeneralisation process, or the general negative self-views directly. The current findings could be taken to suggest that the treatment of self-criticism may improve mood by reducing overgeneralisation, though further work would be required to investigate this.

This study has demonstrated that following a failure experience, both clinical and nonclinical populations show a significant increase in self-critical thinking; however, compared to healthy individuals, participants with depression or eating disorders showed greater overgeneralisation, i.e. an increase in general negative self-views. Both habitual and state increases in self-criticism were associated with the extent of overgeneralisation, and overgeneralisation in turn was associated with increases in low mood. These results provide evidence that self-criticism and overgeneralisation may be important components in the processing and emotional impact of negative experiences.

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### **Conflicts of Interest**

The authors have no conflicts of interest with respect to this publication.

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### **Ethical Standards**

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, and its most recent revision.

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Table 1.

*Percentages of Participants in Each Clinical Group Who Met MINI Screening Criteria for Psychiatric Conditions*

Diagnostic Category	Percentage of Group meeting criteria	
	Depression (n=26)	Eating Disorder (n=26)
Depression	100	46
Eating Disorder	0	100 (62%AN; 23%BN; 15%ED-NOS)
Agoraphobia without panic disorder	31	38
Obsessive Compulsive Disorder	19	19
Social phobia	15	27
Post-traumatic Stress Disorder	23	8
Alcohol dependence	27	0
Generalised Anxiety Disorder	4	4
Panic disorder with agoraphobia	4	12
Panic disorder without agoraphobia	8	8
Bipolar disorder	0	1
Any comorbid psychiatric condition	77	81

*Note.* AN = Anorexia Nervosa; BN = Bulimia Nervosa; ED-NOS = Eating Disorder Not Otherwise Specified.

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Table 2.

*Ratings of Low Mood and General Negative Self-Views Before and After Each Task*

	<b>Before:</b> Mean (SD)	<b>After:</b> Mean (SD)	<b>Test statistic</b>
<b>Failure Induction</b>			
Low mood	47.8 (24.9)	54.6 (26.3)	$t(76) = -2.8, p = .006$
General negative self-views	42.7 (20.9)	54.0 (25.7)	$t(76) = -7.3, p < .001$
<b>Body Image Task</b>			
Low mood	48.3 (24.9)	46.6 (24.2)	$t(77) = .9, p = .355$
General negative self-views	43.7 (22.2)	42.9 (22.1)	$t(77) = .9, p = .367$

*Note.* SD = Standard Deviation

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Table 3.

*Correlations between Overgeneralisation, Self-Criticism, Negative Perfectionism, and Mood in Relation to the Verbal Ability Task.*

Variable	Correlation with Overgeneralisation (time A to time B)
Change in self-criticism VAS ratings A to B	.494**
HINT	.252*
MPS Negative Perfectionism	.120
CES-D	.111

Note. VAS = visual analogue scale; HINT = Habit index of negative thinking; MPS = Multidimensional perfectionism scale; CES-D = Centre for Epidemiological Studies Depression Scale.

\* $p < .05$ ; \*\* $p < .001$

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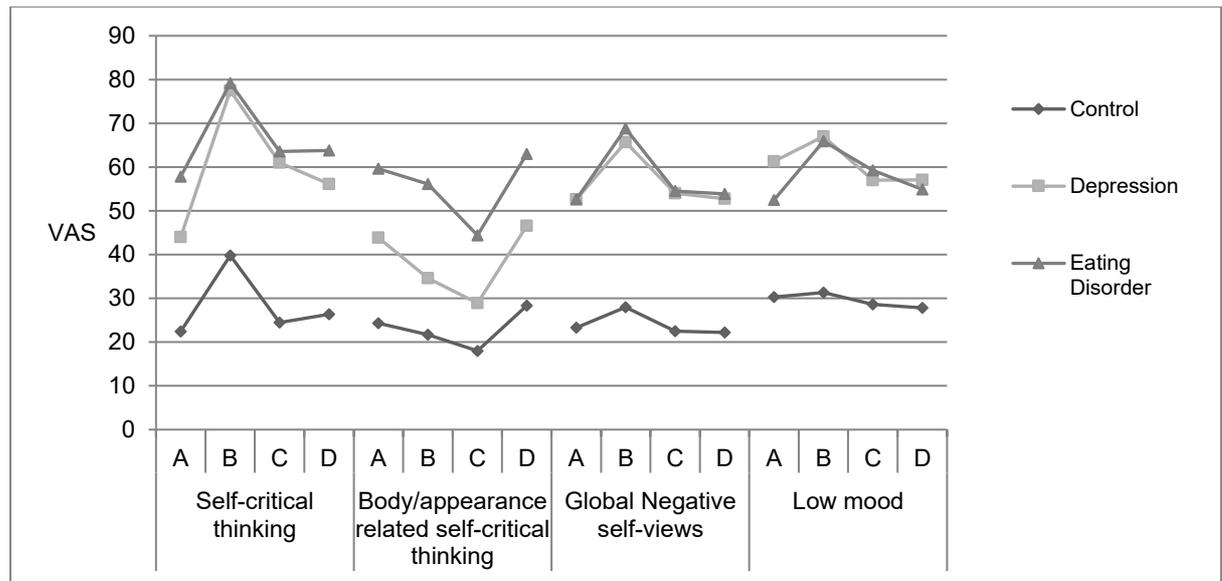


Figure 1. Mean Visual Analogue Scale (VAS) scores (0-100) by group, across the four measurement points: A (baseline), B (post hard word puzzles), C (post easy word puzzles), and D (post body image task).