The influence of mood and attitudes towards eating on cognitive and autobiographical memory flexibility in female university students

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Highlights

- Participants with subclinical eating concerns manifest flexibility deficits
- Cognitive flexibility, as measured through set-shifting ability was predicted by bulimic traits
- Traits associated with bulimia also predicted autobiographical memory flexibility

The influence of mood and attitudes towards eating on cognitive and autobiographical memory flexibility in female university students

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Abstract

Cognitive flexibility, as measured through set-shifting ability, appears to be impaired in patients with eating disorders (EDs). Thus, it is important to determine if the switching deficit seen in clinical eating disorders generalizes to participants with a subclinical disordered eating. Another deficit manifested by clinical and subclinical disordered eating is the ability to retrieve specific autobiographical memories. It is possible that deficits in autobiographical memory retrieval extends to the ability to shift between retrieving specific versus general autobiographical memory information, a function important for problem –solving and emotion regulation. Therefore, the aims of the present study were to determine whether deficits in set-shifting are evident in a non-clinical sample of female university students with eating concerns, and whether inflexibility is also manifested in autobiographical memory retrieval. Sixty-nine female undergraduate students completed a measure of autobiographical memory flexibility, a set-shifting task (Brixton Spatial Anticipation Test) and measures of mood, ruminative thinking, and eating habits. After controlling for mood and rumination, bulimic traits predicted set-shifting ability and flexibility in autobiographical memory retrieval. Thus, flexibility deficits appear to manifest at the subclinical level, are evident in different domains, and appear to be related to bulimic traits, such as binge eating.

Key words: Autobiographical memory, executive functions, cognitive flexibility, bulimia, anorexia.

1. Introduction

Eating Disorders (EDs) are characterized by inflexible behaviors that facilitate weight loss, such as rigid calorie counting, frequent weighing, obsessive measuring of body parts, and persistent body fat checking (American Psychiatric Association, 2013). In addition, EDs are characterized by reduced cognitive flexibility, which has been defined as difficulties in shifting between tasks, operations or thoughts (Monsell, 1996) and has been shown to be reduced in individuals with Anorexia Nervosa (AN) (Tchanturia et al., 2002, Tchanturia et al., 2004; Steinglass et al., 2006), Bulimia Nervosa (BN) (Tchanturia et al., 2004; Roberts et al., 2010) and Binge Eating Disorders (BED) (Duchesne et al., 2010; Svaldi et al., 2010).

However, evidence that reduced cognitive flexibility is more pronounced in a particular ED subtype is inconsistent. Tchanturia et al. (2011) reported that individuals with AN exhibited poorer performance on the Wisconsin Card Sorting Task (WCST) and Brixton test than did patients with BN. On the other hand, Roberts et al. (2010) reported that patients with BN or the binge purging type of AN exhibited greater deficits in set-shifting than did patients with restricting form of AN. Other studies (e.g. Roberts et al., 2007) have reported no differences in the pattern of set-shifting deficits that are exhibited by patients with AN and BN.

One potential factor that could account for differences in set-shifting ability is low body weight due to restriction (Kingston et al., 1996). Zakzanis et al. (2010) found a negative correlation between body mass and set-shifting ability. However, a study by Roberts et al. (2010) showed that set-shifting deficits are more strongly associated with binge-purge behavior than restriction and were not related to body mass index (BMI). These findings argue against the influence of starvation on set--shifting in EDs. Giel et al. (2012) also found no correlation between BMI and set-shifting ability but showed that the presence of comorbid unipolar depression in AN patients was associated with impaired performance on all set-shifting tasks. Given the findings of Giel et al., (2012), depression was controlled in the present study.

An important question with respect to cognitive flexibility deficits and EDs is whether these effects extend to non-clinical samples. The lack of established research on non-clinical samples makes it difficult to investigate which cognitive impairments are causal or maintenance factors of an ED (Stice, 2001). To date, only one study, Bolton et al. (2014), has addressed this question and their findings revealed that concern about weight was associated with set-shifting costs on a modified version of the Wisconsin card sort task, but only in a fasting as opposed to non-fasting participants. Therefore, there is a need to extend the current knowledge concerning the link between eating attitudes and cognitive flexibility in non-clinical samples.

Another cognitive function influenced by disordered eating is autobiographical memory (Dalgleish et al., 2003; Ridout et al., 2015), which refers to the retrieval of personal memories about past experiences and events. According to Conway and Pleydell-Pearce (2000), autobiographical knowledge is stored hierarchically with information about general summaries of events referred to as categoric memories (e.g. 'I go running two or three times a week') being located higher in the hierarchy than specific, highly contextualized memories of past events (e.g. 'The last time I went for a run I injured my knee'). Although specific memories may be recalled spontaneously without a conscious search (referred to as direct access), many everyday tasks require a strategic search for detailed memories of specific events from one's past. This strategic retrieval mode (referred to as generative retrieval) is cognitively demanding and relies on executive processes. For example, the inhibition of categoric autobiographical information is necessary in order to access specific autobiographical memories (Conway and Pleydell-Pearce, 2000).

There is considerable evidence that, when requested to retrieve a specific memory of an event lasting less than one day, depressed individuals and those who have experienced significant trauma tend to retrieve fewer specific memories and a greater number of categoric memories relative to healthy controls (Williams et al., 2007; Kleim & Ehlers, 2008; Summer, Griffith & Mineka, 2010). The tendency to retrieve fewer specific memories has also been observed in patients with AN (Nandrino et al., 2006) and BN (Laberg and Andersson, 2004) as well as participants with subclinical disordered eating (Ridout et al., 2015). A possible explanation for the reduced autobiographical memory specificity (AMS) in EDs is functional avoidance (Williams et al., 2007). Individuals may strategically terminate the memory search at the categorical level in order to avoid accessing specific negative memories that contain greater sensory and emotional information than categoric memories (Williams et al, 2007). This is important because negative thoughts can trigger eating-related coping strategies (Lena et al., 2004). Another explanation for over-general memory associated with psychopathology is reduced executive functioning (Dalgleish et al., 2007).

A dimension of memory functioning that has not yet been examined in the context of disordered eating is the ability to flexibly retrieve autobiographical memories that vary in their required level of contextualization. Autobiographical memory flexibility is critical for functions such as social problem solving and emotion regulation (Hitchcock et al., 2016). To assess autobiographical memory flexibility, Dritschel et al. (2014) developed a novel variant of the Autobiographical Memory Test (AMT; Williams and Broadbent, 1986), the Alternating Instructions Autobiographical Memory Test (AMT-AI). The AMT-AI requires participants to alternate between retrieving specific and categoric memories in response to a series of word cues. Dritschel et al. (2014) found that the ability to flexibly retrieve autobiographical memories was significantly negatively associated with measures of negative

affect and rumination. Given that EDs are associated with impaired cognitive flexibility it is expected that disordered eating would also be associated with impaired flexibility on the AMT-AI. Furthermore, as similar cognitive and autobiographical memory deficits occur in the pathology of depression and EDs, it is plausible that the autobiographical memory inflexibility seen in a non-clinical sample in relation to negative affect may also be evident in participants with non-clinical concerns about eating and body shape and weight. It is important to develop our understanding of how autobiographical memory is affected by disordered eating because reduced memory specificity has been associated with the maintenance and development of an ED, and with changes in quality of life (Ridout et al., 2015).

1.1. Aims and Hypotheses

The aims of the current study were to determine if non-clinical concerns about eating, body-shape, and weight were related to deficits in cognitive flexibility and/or impaired autobiographical memory flexibility. To these ends, a non-clinical sample of female university students completed the AMT-AI (Dritschel et al., 2014), the Brixton spatial anticipation test (Burgess and Shallice, 1997), which is a measure of cognitive flexibility, and self-report measures of negative affect, rumination, and eating behavior[1]. This sample was chosen because female university students are particularly vulnerable to the development of EDs (Hoek 2006; Striegal-Moore and Bulik, 2007) due to the heightened peer pressure and high level of body dissatisfaction. It was expected that, after controlling for negative affect and rumination, cognitive flexibility, as measured through set-shifting abilities in the Brixton, would be significantly worse in participants with greater concerns about eating, body shape and weight. It was also predicted that, after controlling for negative affect and rumination, autobiographical memory flexibility would be reduced in participants with greater ED related concerns.

2. Method

2.1. Participants

Sixty-nine female students from the University of St. Andrews, with ages ranging from eighteen to thirty (M = 22.25; SD = 2.12), volunteered to participate in the current study. The results of a power

[1] We did not assess Body Mass Index (BMI) as we were looking at eating concerns in a healthy cohort. Furthermore, previous work has shown no relationship between BMI and autobiographical memory in clinical and subclinical samples with disordered eating (Ball et al., 2010; Bomba et al., 2014; Laberg and Andersson, 2004). Similarly, Roberts et al. (2010) reported no relationship between BMI and set-shifting performance in patients with EDs, as did Giel et al. (2012).

calculation conducted using G*Power revealed that a sample size of 66 would be required to detect a medium effect size F^2=0.17 (calculated from Ridout et al., 2015) in a multiple regression with a total of 5 predictors (3 tested and 2 control) with a power of 0.80 and an alpha level of 0.05, which suggests that our study was adequately powered.

This study was approved by the University Teaching and Research Ethics Committee, of the University of St. Andrews.

2.2. Materials

2.2.1. *Eating Disorder Inventory 2 (EDI-2; Garner, 1991)*

The 23 items assess attitudes and behaviors relating to concerns about eating, weight and body image. The items are categorized into three subscales, namely "Drive for Thinness" (DFT), "Body Dissatisfaction" (BD) each consisting of seven items and "Bulimia" (B), consisting of nine items. Participants rate each item on a 6-point scale of whether the statements are applicable to their own attitudes, ranging from always (3-points) to never (0-points), with higher scores indicating greater negative eating attitudes and eating psychopathology (Ridout et al., 2015). This scale is a reliable measure of eating psychopathology in non-clinical (Nevonen et al., 2006) and samples of university students (Spressor et al., 2012). Reliability was confirmed in the current sample as Cronbach's α values were 0.93 for the total scale, 0.89, 0.913 and 0.776 for the DFT, BD and B subscales, respectively.

2.2.2. *Depression, Anxiety and Stress Scale (DASS-21; Lovibond and Lovibond, 1995)*

This measure is used to examine individuals' negative affect, over the previous week. It consists of 21 items that make up three subscales, each consisting of seven items, to assess psychological as well as physical features of depression (D-subscale), anxiety (A-subscale) and stress (S-subscale). Each statement is rated on applicability to their own mood, from "not at all" (0-points) to "always" (3-points). The higher the total and subscale scores, the greater the negative affect. It is a reliable (Anastasi, 1990) non-diagnostic tool to assess negative affect in non-clinical populations. Reliability was confirmed in the current sample as Cronbach's α values were 0.919 for the total scale, 0.825, 0.797 and 0.887 for the D, A and S subscales respectively.

2.2.3. *The Ruminative response scale (RRS; Nolen-Hoeksema and Davis, 1999)*

This questionnaire is made up of 22 items that describe thoughts that may arise while participants feel sad or depressed. The participant on a four-point scale from almost never (1-point) to almost always (4-points) rates each item and all scores are summated to provide an overall rumination score. Reliability was confirmed in the current sample as Cronbach's α value of 0.89 for the total scale.

2.2.4. Alternating Instruction Autobiographical memory test (AMT-AI; Dritschel et al., 2014)

The AMT-AI requires participants to recall either categoric or specific autobiographical memories to 24 cue words (8 positive, 8 negative and 8 neutral). All words were matched for frequency through the Medical Research Council Psycholinguistic DataBase as well as the Dictionary Affect in Language (Whissel, 2009). The instructions and cue words were presented on a University computer in the presence of the experimenter. The task consists of three conditions, the specific condition (AMT-S), which requires participants to recall six successive specific autobiographical memories, the categoric condition (AMT-C), where participants recall six successive categoric memories, and the alternating condition (AMT-AI), where participants alternate between retrieving specific and categoric autobiographical memories for 12 trials. On each trial, participants indicated that they had retrieved a memory by pressing the space bar on the computer and then wrote down the details of their memories on a response sheet. . After recording their memory, participants rated the pleasantness of the memory on a scale from 1 (unpleasant) to 5 (pleasant). Prior to the experimental trials, participants completed four practice trials, to verify that instructions were understood. To minimize the effect of order on the autobiographical memory flexibility, the three conditions were counterbalanced across participants.

Autobiographical memory flexibility was measured by the proportion of correct memories in the AMT-AI condition. This means that the memory correctly corresponded to the instruction of memory type to be retrieved. Two independent raters classified all memories as being either specific or categoric, and the inter-rater reliability was 92%. A failure to report a memory was treated as an omission and that trial was excluded from the analyses.

2.2.5. Brixton spatial anticipation test (Brixton) (Burgess and Shallice, 1997)

This task assesses spatial set-shifting ability and consists of 56 trials. In each trial, the participant is presented with 5 X 2 grid of circles. In each grid, one circle is colored blue. The participant is asked to predict the new location of the blue circle in the next grid, by determining the rule that decides the sequence of change. The rule changes 9 times. The total number of errors is then converted into scaled scores which are an indication of set-shifting ability, so that the lower the number of errors, the better the set-shifting ability (Lounes et al., 2011).

2.2.6. *Response manipulation task (adapted by Nolen-Hoeksema and Morrow, 1993)*

It consists of 20 distracting neutral or positive stimuli that allows participants to focus their attention and think about the different stimuli. It aimed to distract from any residual negative feelings that may have arisen through the questionnaires or autobiographical memory task, and has previously been shown to be effective in reducing low mood or depressed mood (Nolen-Hoeksema and Morrow, 1993).

2.3. Procedure

The three self-report questionnaires, namely EDI-2, DASS-21 and RRS were counterbalanced in order to minimize potential influence of the impact of these on the AMT. These were then followed by the AMT, Brixton and the Response Manipulation task. All aspects of the procedure were completed in one session, in a laboratory at the University of St. Andrews, in the presence of the experimenter (LM).

3. Results

The mean and range for scores on the DASS, the EDI-II and its subscales are shown in Table 1. One-sample t-tests were used to compare the EDI-II scores of the current sample to published norms for healthy participants (Garner, 1991) and results revealed that *drive for thinness* scores in the current sample did not differ significantly from the published norm (5.5); t (68) = 0.86, $p > 0.06$. However, *bulimia* scores in the current sample were significantly higher than the published mean (1.2); t (68) = 2.1, $p < 0.05$ and *body dissatisfaction* scores were significantly lower than the published mean (12.2) for healthy participants, t (68) = 4.5, $p < 0.001$.

Insert Table 1 about here

3.1. Set-shifting and autobiographical memory flexibility

A Spearman's correlation revealed that the number of correct responses on the AMT-AI was positively related to the scaled anticipation score on the Brixton test, but this relationship was not significant, r_s (68) = 0.13, $p > 0.05$.

3.2. Eating-related psychopathology and cognitive flexibility

Hierarchical regression, with negative affect (DASS-21 score) entered at the first step, rumination (RRS score) entered at the second step, and the three ED-related subscales of the EDI entered together in a stepwise manner at the final step was performed to determine whether, after controlling for negative affect and rumination, eating attitudes predicted cognitive flexibility (Brixton Test scores). Negative affect (model 1) predicted a significant amount of the variance (6.9%) in cognitive flexibility; $R^2 = 0.069$, F (1,66) = 4.91, $p < 0.05$. Negative affect entered as a significant predictor, $\beta = -0.29$, $p < 0.05$. The inclusion of rumination (model 2) accounted for an additional 0.4% ($R^2\Delta = 0.005$) of variance; $R^2 = 0.073$, F (2,65) = 2.57, $p > 0.05$, and neither of the variables entered as significant predictors. The inclusion of the eating disorder-related subscales in the final model accounted for an additional 9.5% of variance; $R^2\Delta = 0.95$, $R^2 = 0.168$, F (3,64) = 4.317, $p < 0.01$, with bulimia entering as the only significant predictor of cognitive flexibility; $\beta = -0.32$, $p < 0.01$ (see Figure 1).

Insert Figure 1 about here

3.3. Eating-related psychopathology and autobiographical memory flexibility

Hierarchical regression, with negative affect entered at the first step, rumination entered at the second step, and the three ED-related subscales of the EDI entered together in a stepwise manner at the final step, was performed to determine whether, after controlling for negative affect and rumination, eating attitudes predicted the percentage of correct responses on the alternative instructions version of the AMT. Negative affect (model 1) predicted a non-significant amount of variance (2.5%) in autobiographical memory flexibility; $R^2 = 0.025$, F(1,66) = 1.666, $p > 0.05$. The inclusion of rumination (model 2) accounted for an addition 1.2% of the variance; $R^2 = 0.037$, (F (2,65) = 1.238, $p > 0.05$. However, inclusion of the eating disorder-related subscales of the EDI explained a further 6.5% of the variance ($R^2\Delta = 0.065$), $R^2 = 0.102$; F (3,64) = 2.421, $p = 0.07$, with bulimia score entering as the only significant predictor; $\beta = -0.26$, $p < 0.05$ (see Figure 2).

Insert Figure 2 about here

Discussion

The present study investigated whether subclinical levels of disordered eating would predict cognitive flexibility (indexed by the Brixton task) and autobiographical flexibility (indexed by the AMT-AI). As predicted, set-shifting ability in both domains was predicted by scores on the EDI-II, even after

controlling for rumination and negative affect. When examining the EDI-II subscales, only scores on the *bulimia* subscale and not *body dissatisfaction* or *drive for thinness* subscales, were significantly predictive of cognitive and autobiographical memory flexibility. Neither negative affect nor rumination significantly predicted set-shifting abilities on these measures. This lack of predictability is inconsistent with previous findings (Gotlib and Joormann, 2010; Rawal et al., 2011) and may be due to the narrow range of DASS-21 and RRS scores in our healthy student population.

Our finding that bulimic symptoms predicted poorer set-shifting is consistent with previous findings in clinical samples such as BN Tchanturia et al. (2004) and Roberts et al. (2010) and Binge Eating Disorder (BED; Duchesne et al., 2010; Svaldi et al., 2010). Further Roberts et al (2010) argue that bulimic or binge-eating symptoms may be the key factor in explaining impaired set shifting in patients with AN. reported impaired flexibility in patients with BN. Our data also add to the literature suggesting non-clinical samples with elevated eating concerns can exhibit difficulties with set shifting. For example, deficits in cognitive flexibility (indexed by the WCST) (Koven and Senbonmatus, 2013) have also been identified in non-clinical samples with orthorexic tendencies, where there is a tendency towards perfectionism, need for control (Fidan et al., 2010), as well as a sense of achievement when maintaining a diet (Bratman and Knight, 2000). Taken together these data suggesr that set-shifting difficulties in non-clinical participants may be associated with negative eating attitudes and behaviors and might even be a contributory factor for the development of EDs.

Our findings that *body dissatisfaction* and *drive for thinness* were not related to set shifting are inconsistent with studies reporting reduced cognitive flexibility in patients with Anorexia Nervosa across a range of cognitive flexibility measures including the Trail Making Task (Tchanturia et al., 2004), the Wisconsin Card Sorting Task (WCST) and the Brixton task (Tchanturia et al., 2011). The common explanation for the difficulties in cognitive shifting was the high levels of restraint and starvation. Set-shifting deficits have also been found in healthy participants who had been fasting and reported elevated concerns about their weight (Bolton et al., 2014).

However, other research challenges this restriction explanation. First, cognitive shifting deficits have been found in recovered anorexics who are not experiencing starvation (Tchanturia et al., 2002; 2004). Second, Roberts, et al. (2007) reported no differences in the pattern of set shifting deficits exhibited by patients with AN and BN. Thirdly, Roberts et al. (2010) found the most pronounced set-shifting difficulties occurred in anorexic patients with co-morbid bulimia nervosa as well as no evidence of a relationship between BMI and cognitive flexibility. Thus, although we did not have the BMIs of our current sample it is unlikely that our results were due to low body mass. The inconsistent findings between different disorders and different subclinical samples suggest that different mechanisms may underpin the shifting deficits in clinical and subclinical disordered eating.

Our finding that bulimic symptoms predicted autobiographical memory flexibility, even after controlling for negative affect and rumination, is important and novel because autobiographical memory flexibility is argued to be important for emotion regulation and problem-solving (Hitchcock et al., 2016). For example, one way of overcoming negative mood arising from the retrieval of a global negative memory (e.g., I am always a failure) is to think about a specific positive memory (e.g. I successfully passed my driving test). This specific memory breaks the cycle of global negative thinking. Consistent with this notion, Dingemanns et al. (2015) reported that individuals with binge eating disorder who exhibited set-shifting difficulties reported greater negative affect in response to a mood challenge than did patients with intact cognitive flexibility. These links may be even more pronounced if autobiographical memory flexibility were examined in future studies.

Our finding that bulimic symptoms predicted autobiographical memory flexibility is comparable to the relationships between negative affect, ruminative thinking, and autobiographical memory flexibility that were observed by Dritschel et al. (2014). However, it is notable that neither of these factors were associated with memory flexibility in the current study, probably because there was a narrow range of scores on the DASS and RRS. The observed link between disordered eating and autobiographical memory flexibility in our current non-clinical sample is somewhat consistent with previous studies reporting associations between autobiographical memory specificity and disordered eating in non-clinical participants (Ridout et al., 2015). However, in previous work it was *drive for thinness* and not *bulimic symptoms* that were related to reduced memory specificity. This might reflect the fact that the *drive for thinness* and *body dissatisfaction* scores of the current sample did not differ from published norms for healthy participants. However, as discussed above, bulimic or binge eating symptoms appear to be critical for set-shifting deficits in EDs. Therefore, it is not surprising that the same symptoms would appear to relate to deficits in memory flexibility.

A possible explanation for the *bulimia* subscale being most predictive of set-shifting abilities and autobiographical memory flexibility may be that binge eating is a coping strategy commonly employed to deal with stress in university samples. Stress eating or comfort eating is a common reaction to high levels of stress (Ganley, 1989) and common in patients with BN (Casper et al., 1992; Vitousekand Manke, 1994; Bulik et al., 1995; Pryorand Wiederman, 1996). *Table 1* reveals that the levels of stress, as measured through the S-subscale of the DASS-21, were higher than scores on the D- or A-subscale. These high levels of stress may predispose students to comfort eat, eat in solitude, or even binge eat as a means of coping. Therefore, as bulimic traits are very prevalent in female university students (Kugu et al., 2006; Fairburn and Belgin, 1990) it is more likely that they would manifest set-shifting and autobiographical memory flexibility difficulties.

The results of the present study thus support the hypothesis that impaired cognitive flexibility is present prior to the onset of an ED and is manifested in different domains (set-shifting and autobiographical memory flexibility). The inflexibility seen in dieters or those with concerns about eating and body shape may indeed encourage negative thoughts about themselves, which in turn may trigger eating related behaviors such as rigid calorie counting, binging and purging to counteract these negative thoughts and emotions (Ghaderi, 2003). These disordered eating related behaviors, may in the short term improve affect, but as a long-term strategy are maladaptive. Furthermore, it would seem likely that the negative impact of bulimic symptoms on autobiographical memory flexibility is likely to impair emotion regulation, which would also encourage the reliance on maladaptive emotion regulation strategies (e.g. comfort eating), ultimately leading to a vicious cycle of disordered eating (Heffner and Eifert, 2004).

3.4. Limitations

One limitation is that the spread of EDI-II scores was not large and a number of scores were at the lower end of the scale. It would be useful to see how the results generalize to samples of clinically disordered eating. Further, the use of a university sample meant that scores on the Brixton were also more restricted due to their high level of functioning. Another limitation is that we did not obtain any BMI measurements. However, we do not feel that restraint could account for our results as our sample scored lower on the body dissatisfaction subscale than the control sample in the original study on the EDI - I scale (Garner et al., 1991).

3.5. Conclusions

Our study has suggested that impaired cognitive and autobiographical memory flexibility are associated with bulimic traits in a non-clinical female university cohort. Our findings therefore suggest that training cognitive and autobiographical inflexibilities may be important even in subclinical populations. Our data also suggest that it is important to examine non-clinical populations as they could provide insight into mechanisms underpinning eating pathology before the onset of clinical ED. Our data further highlight that more research needs to examine how the neuropsychological traits associated with BN and AN differ in order to develop more effective treatment interventions

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Figure legends

Figure 1. Partial regression plot showing the relationship between bulimia scores and cognitive flexibility after controlling for negative affect and rumination.

EDI-B = bulimia subscale of the Eating Disorders Inventory

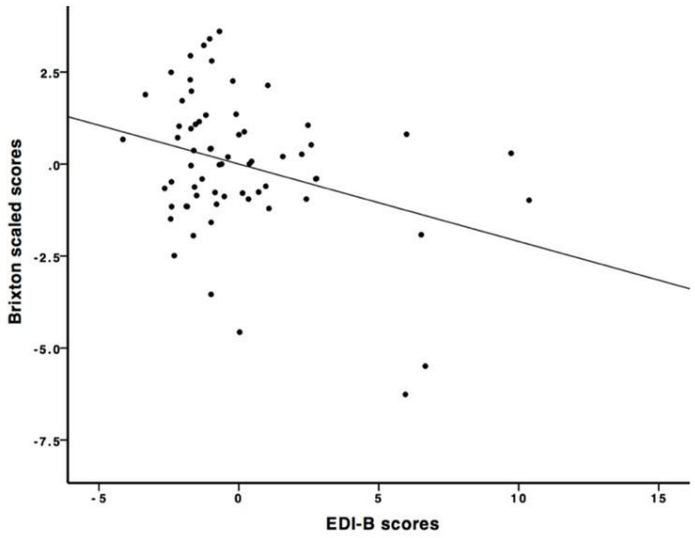
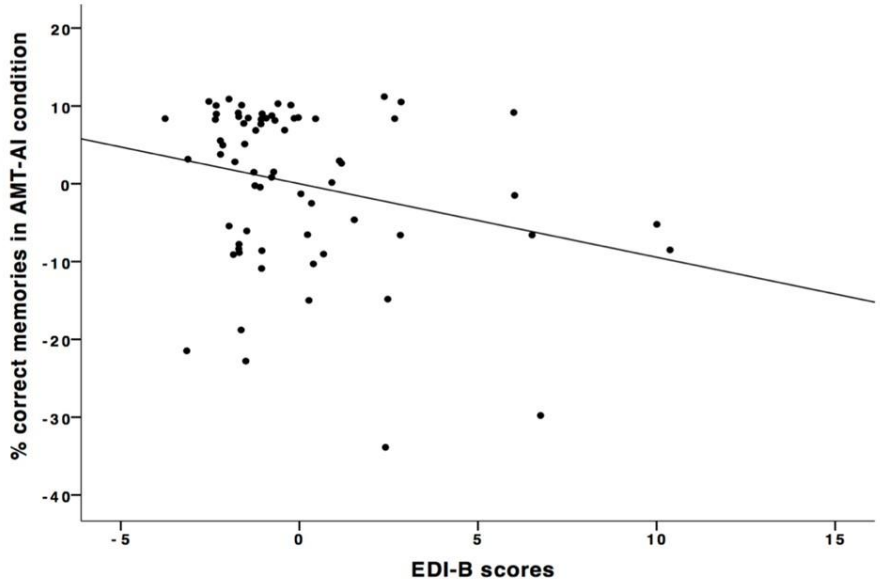


Figure 2. Partial regression plot showing the relationship between bulimia scores and the percentage of correct responses on the AMT-AI after controlling for negative affect and rumination.



EDI-B= bulimia subscale of the Eating Disorders Inventory

AMT-AI = Alternating instructions version of the autobiographical memory test

***Table 1*. Descriptive statistics for the EDI-2, DASS, RRS and Brixton Spatial Anticipation task.**

	Mean	Standard Deviation	Range
EDI-2 total	15.275	13.72	0-60
EDI: Bulimia	1.913	2.929	0-14
EDI: Body Dissatisfaction	8.522	6.831	0-27
EDI: Drive for Thinness	4.841	6.108	0-21
DASS-total	14.145	10.034	0-56
D-subscale	4.391	3.457	0-17
A-subscale	3.348	3.593	0-20
S-subscale	6.435	4.552	0-19
RRS total score	50.522	12.247	27-56
Brixton Spatial Anticipation score	7.116	2.019	1-9