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The effect of dysphoria on the relationship between autobiographical memories and the self

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## **Abstract**

Two experiments investigated the bi-directional relationship between episodic autobiographical memories (ABMs) and semantic self-images in dysphoric and nondysphoric individuals. Participants in Experiment 1 generated positive and negative “I am” statements, which were then used to cue specific ABMs. Nondysphoric participants generated similar numbers of ABMs to positive and negative cues, suggesting both positive and negative self-images are supported by clusters of specific ABMs. The same was observed in dysphoric participants, but phenomenological ratings showed that they rated positive ABMs as less vivid, and negative ABMs more central to their life story, than the nondysphoric group. Participants in Experiment 2 retrieved positive or negative ABMs and then generated “I am” self-statements. Retrieving positive ABMs increased the positivity of self-statements in the nondysphoric but not the dysphoric group. These findings suggest the interaction between ABMs and self-images functions to promote a positive view of the self, but this is disrupted in dysphoria.

Keywords: Autobiographical memory, self-images, positivity bias, self-enhancement, dysphoria

Autobiographical memory (ABM) constitutes the memory system containing “facts and events that have been interpreted and integrated into a consistent story about one’s self” (Buckner & Fivush, 1998, p. 407). Conway and colleagues (Conway & Pleydell-Pearce, 2000; Conway, Singer and Tagini, 2004) theorise that ABMs are constructed within a self-memory system (SMS), whereby detailed recollections of specific events (*episodic ABMs*) interact with goals and plans (*working self*), as well as semantic knowledge about our life story and semantic self-images about ‘who we are’ with respect to traits, roles and beliefs (*conceptual self*). For example, an individual’s self-image as a student may be supported by episodic ABMs of an inspirational lecturer, which in turn may reinforce the goal of achieving a good grade in an upcoming exam. Episodic ABMs vary in phenomenological qualities, such as vividness, coherence, and valence. These details allow us to mentally relive past events (Tulving, 1983) and can be used to guide behaviour. For example, the sensory detail of memories allows us to determine their source (e.g., real versus imagined events) (Johnson & Raye, 1981) while the emotionality of memories helps maintain emotional equilibrium (Öner & Gülgöz, 2018).

The bi-directional relationship between episodic ABMs and semantic self-images is evidenced by research using modifications of the Twenty Statements Test (Kuhn & McPartland, 1954), which assesses the nature/fluency of an individual’s self-image through generation of ‘I am’ self-statements (e.g. ‘I am a student’, ‘I am kind’). For instance, Rathbone, Moulin and Conway (2008) asked participants to generate self-statements. Then, using these self-statements as cues, the participants generated episodic ABMs exemplifying that part of their identity. These memories clustered around the perceived age at which the self-image emerged, suggesting that the creation of a new self-image is embedded within the encoding of associated ABMs. Subsequent research has shown that highly organised clusters of episodic ABMs support both positive and negative aspects of identity (Rathbone & Steel,

2015) as well as both current and future-oriented self-images (Chessell, Rathbone, Souchay, Charlesworth & Moulin, 2014). Thus, these studies evidence that salient self-images guide the retrieval of episodic ABMs. However, according to the SMS, the converse is also true; the retrieval of episodic ABMs guides which semantic self-images become accessible. In support of this, Charlesworth, Allen, Havelka and Moulin (2016) found that participants who recalled episodic ABMs, compared to those who wrote about a control topic (e.g. the solar system), generated significantly more 'I am' statements in a subsequent self-statement fluency task. This suggests that episodic ABM retrieval increases access to semantic self-concept knowledge.

Research has shown that the interaction between episodic ABM and the conceptual self is important for psychological well-being because, together, these two facets of the SMS serve a self-enhancement function. For instance, Wilson and Ross (2003) argued that individuals are biased towards a positive self-view, which is supported by the retrieval of positively-valenced episodic ABMs. Furthermore, the retrieval of positive ABMs has been shown to improve mood (e.g., Parrott & Sabini, 1990). More recently, Rathbone, Holmes, Murphy and Ellis (2015) suggested that the positive effect of episodic ABMs on psychological well-being may be mediated by semantic self-images, which form part of the conceptual self. Given the roles that episodic ABMs and semantic self-images play in maintaining psychological wellbeing, it is logical to argue that these facets of the SMS could be disrupted by psychological distress, such as the experience of depressive symptomatology. The aims of the current experiments were to investigate the bidirectional nature of the interaction between episodic ABMs and semantic self-images and to establish whether this relationship is compromised in individuals experiencing elevated levels of depressive symptomatology.

The effects of depression on ABM have been widely documented. In a recent review, Dalgleish and Werner-Seidler (2014) argued that there are four key disturbances to ABM associated with depression. Firstly, depressed individuals exhibit overgeneral memory, which is characterised by difficulties in retrieving episodic ABMs (e.g. *watching Toy Story 4 at the cinema with my family*), instead demonstrating a tendency towards retrieval of categories of events (e.g. *watching movies with my family*). Depressed individuals also show both a bias towards negative information, and impoverished access/experience of positive information, within ABM. In relation to the latter, when depressed individuals describe positive episodic ABMs they differ in their phenomenological qualities compared with similar memories produced by non-depressed individuals, such as being less vivid and using less field perspective. Finally, ABM is also disrupted in depression by ruminative thought processes, whereby individuals engage in repetitive self-focused thinking regarding symptoms of distress and their potential causes and consequences.

Depressed individuals also exhibit biases in their conceptual self. Stable negative self-images (e.g. 'I am a failure') play an important role in the maintenance of depression (Beck, 1967), whilst vulnerability to depression is associated with lower levels of complexity in cognitive representations of the self (Linville, 1987). Additionally, depressed individuals exhibit self-discrepancies between their actual self, the self they feel they ought to be, and their ideal self (Higgins, 1989). However, whilst we know that both episodic ABMs and semantic self-images are disrupted by depression, little is known about how depression impacts the interaction between these two facets of the SMS. It is feasible that a disrupted self-image, such as a negative view of the self, may be a function of disruptions in the accessibility or phenomenological experience of the episodic ABMs that support positive aspects of identity. Furthermore, biases and conflicts within self-concept may also disrupt the accessibility and phenomenology of the episodic ABMs that support one's self-concept.

In summary, the relationship between episodic ABMs and semantic self-images is believed to contribute to the self-enhancement function of ABM, which is important for psychological wellbeing. What is not clear is whether this relationship is implicated in psychological distress. The two experiments presented here investigated whether the interaction between episodic ABM and semantic self-images serves a self-enhancement function, as indicated by phenomenological ratings of the vividness, valence, and centrality to life story of the episodic ABMs, and whether this relationship operates differently in dysphoric individuals. Experiment 1 asked participants to generate positive and negative self-images, which were then used as cues in an episodic ABM fluency task. Conversely, Experiment 2 explored the effect of positive and negative episodic ABM recall on the accessibility and nature of semantic self-images.

### **Experiment 1**

Studies have demonstrated how episodic ABMs cluster around salient self-images, thus supporting one's conceptual understanding of one's identity (e.g. Chessell et al, 2014; Rathbone et al, 2008; Rathbone & Moulin, 2014; Rathbone & Steel, 2015). However, only one study has differentiated between positive and negative aspects of self-image. Rathbone and Steel (2015) found that, in healthy adults, both positive and negative self-images are supported by organised sets of episodic ABMs that cluster around the time of self-image formation. However, this study did not examine the phenomenological characteristics of episodic ABMs. If ABM operates to promote a positive view of identity, one would expect positive self-images to be supported by episodic ABMs that are considered more central to one's life story and are richer in phenomenological experience (e.g. vividness).

Investigating how positive and negative self-images are supported by episodic ABMs feeds directly into cognitive models of both wellbeing and distress. There is a clear self-enhancement benefit for highly accessible and organised sets of episodic ABMs to support

and ground positive aspects of identity. In contrast, highly accessible episodic ABMs that support negative aspects of identity could be central in maintaining the negative self-images characteristic of depression (Beck, 1967). Therefore, one may expect individuals experiencing depression to have reduced access to memories supporting positive self-images, but increased access to memories supporting negative self-images.

Experiment 1 investigated how positive and negative self-images are supported by episodic ABMs and whether these relationships are affected by elevated depressive symptomatology. Participants were asked to generate positive and negative self-images, which were then used as cues in an episodic ABM fluency task. Consistent with the methodology of Rathbone and Moulin (2014), who suggested that serial position of self-statements could reflect their relative importance, we used the first and fifth self-statements as cues. The episodic ABMs were also rated for their phenomenological qualities. In line with the theorised self-enhancement function of ABM, it was hypothesised that non-dysphoric participants would generate episodic ABMs to support both positive and negative self-statements, but that they would rate the memories supporting positive statements as more vivid and central their life story than those supporting negative self-statements. It was also hypothesised that the self-enhancement function of ABM would be disrupted by elevated levels of depressive symptomatology, whereby dysphoric participants generate more episodic ABMs to support negative self-statements than positive self-statements. Furthermore, it was predicted that dysphoric participants would rate the memories supporting negative statements as more vivid and central to their life story than those supporting positive self-statements.

## **Method**

**Participants.** 64 undergraduates (39 female) were recruited in exchange for course credit, and were split into two mood groups; dysphoric and non-dysphoric. Email pre-screening asked potential participants to complete the Center for Epidemiological Studies Depression

scale – Revised (CESD-R; Eaton, Muntaner, Smith, Tien & Ybarra, 2004) and answer a single question regarding current/past treatment for depression/anxiety (never, current, past). Those who had never received treatment for anxiety/depression and had a CESD-Style score <16 were invited to participate as part of a potential non-dysphoric group. Those who scored  $\geq 16$ , with no exclusion on the grounds of treatment for mood problems, were invited to participate as part of a potential dysphoric group.

The cut-off of a CESD-Style score  $\geq 16$  being indicative of mild depression is based on the recommendation of the inventory's authors; however, to ensure a clear separation between the two mood groups we recruited a slightly larger sample of non-dysphoric participants with the intention of creating more equal sample sizes by removing those experiencing dysphoric symptoms close to the cut-off (i.e. 14,15). However, as CESD-Style scores within the non-dysphoric sample were all  $\leq 11$ , the decision was made to retain all 37 participants (24 female, Age:  $\bar{X} = 20.11$ ,  $SD = 2.59$ , CESD-Style Score:  $\bar{X} = 5.37$   $SD = 3.22$ ). 27 participants formed the dysphoric group, with CESD-Style scores ranging from 16-41 (15 female, Age:  $\bar{X} = 19.67$ ,  $SD = 1.57$ , CESD-Style Score:  $\bar{X} = 24.11$   $SD = 8.48$ ). Independent samples t-tests established that the groups differed significantly in CESD-Style score,  $t(61) = 12.27$ ,  $p < .001$ , but did not differ significantly in age,  $t(60) = 1.04$ ,  $p = .30$ . Chi-square analysis revealed no significant difference in gender ratio between the groups,  $\chi^2(1, N = 62) = .51$ ,  $p = .60$ . Sample sizes were based on our previous research (Anderson & Evans, 2015) showing that groups of 25-30 were sufficient to detect differences between dysphoric and non-dysphoric participants across a range of phenomenological ratings. A priori power analysis indicated that samples of 27 and 37 participants are sufficient to achieve power ( $1 - \beta$  err prob) = .79 to observe group differences with  $\alpha = .05$  for a medium-to-large effect size  $f = .35$ .

## **Materials.**



**Centre for Epidemiological Studies Depression Scale-Revised (CESD-R).** The CESD-R (Eaton et al., 2004) is a 20-item self-report inventory designed to measure depressive symptomology in the general population. Participants rate how frequently they experience each symptom using 5-point Likert scales ranging from ‘*not at all*’ to ‘*every day for two weeks*’. Responses on the CESD-R can be scored in two ways. A CESD-R score can be created, whereby responses are scored 0-4, with a potential maximum score of 80. However, the original version of the CES-D (Radloff, 1977) used a 4-point Likert scale, with a maximum score of 60; therefore, in order to be able to make the original and revised inventory comparable, the CESD-R can also be scored to create a CESD-Style score. This can be achieved by assigning a score of 3 to responses within the highest two points of the scale on the CESD-R, which then provides scores ranging from 0-60. The current experiment used the CESD-Style scoring procedure, which allowed the cut-off of 16+ to be used to determine group membership. This cut-off was recommended by Radloff as indicative of mild depression and remains the most consistently used cut-off within the literature.

**Positive I Am Statement Task (P-IAM).** Participants were asked to write ten ‘*I am*’ statements representing positive semantic self-images. These were defined as ‘*positive aspects about yourself that describe important and stable features of your identity and who you are*’. Participants were given five minutes to complete the task.

**Negative I Am Statement Task (N-IAM).** This was identical to the P-IAM, except participants listed statements representing negative semantic self-images (i.e. ‘*negative aspects about yourself...*’).

**Self-Statement Ratings.** Participants were asked to read the self-statements generated in the P-IAM and N-IAM tasks and rate each statement’s valence on 7 point likert scales (‘*in terms of your personal identity, how positive or negative do you consider this attribute to be*’ -3 = *very negative*, 3 = *very positive*) and importance in defining their identity (‘*how*

*important is this attribute in defining your identity?* 1 = not important at all, 7 = extremely important).

**Episodic ABM Fluency Task.** Following Rathbone and Moulin (2014), the first and fifth self-statements produced within the P-IAM and N-IAM tasks were used as retrieval cues to assess episodic ABM fluency. The order of self-statement cues was counterbalanced such that half the participants were first cued with the first self-statement produced, whilst the other half were first cued with the fifth self-statement. For each cue, participants were given two minutes to write ‘*as many memories of times in your life where you have felt the self-statement was a significant part of your identity*’. Participants were instructed to provide a short title (few words to one sentence) for each, ensuring that each represented a separate event. If participants stopped writing before the two minutes had ended, they were prompted to continue. If a participant failed to generate five self-statements then their first and final self-statements were used as retrieval cues.

**Episodic ABM Ratings.** The phenomenological qualities of the ABMs produced during the fluency task were assessed on three dimensions; vividness (*‘In my mind this event is...’*: -3 = ‘cloudy and imageless’ to +3 = ‘as clear and vivid as if I were experiencing it now’), emotional valence (*‘the event was...’*: -3 = ‘extremely negative’ to +3 = ‘extremely positive’), and centrality to their life story (*‘this event is central to my life story’*: -3 = ‘totally disagree’ to +3 = ‘totally agree’).

**Positive mood induction.** Participants were asked to read a list of positive statements (e.g. *‘I feel happy’*) taken from Velten’s (1986) mood induction procedure. Participants were instructed to spend five minutes thinking about how the statements applied to them.

**Jigsaw task.** A 150-piece computerised jigsaw was used as a 15-minute distractor task.

**Design.** Using a mixed design, the first part of the study explored the effect of self-statement task (P-IAM vs. N-IAM) and mood group (dysphoric vs. non-dysphoric) on fluency, valence and importance of self-statements. The second part examined the effect of valence (positive vs. negative) and serial position (1<sup>st</sup> vs. 5<sup>th</sup>) of self-statement cues, alongside mood group (dysphoric vs. non-dysphoric), on subsequent episodic ABM fluency and the phenomenological qualities of these memories (memory valence, vividness and centrality to life story).

**Procedure.** Participants were tested in groups (maximum 5) at individual workstations in a laboratory setting. Participants were told that the experiment explored the relationship between memory and self-concept. After providing informed consent, participants completed the CESD-R to confirm mood group membership. Participants were then assigned to one of two presentation orders. In presentation order one, participants completed the P-IAM, followed by the respective Episodic ABM Fluency Task, the Self-Statement Rating Task and the Episodic ABM Rating Task. The jigsaw task was used as a fifteen-minute distractor before participants completed the N-IAM, followed by the respective Episodic ABM Fluency Task, the Self-Statement Rating Task and the Episodic ABM Rating Task. Finally, the positive mood induction was administered to avoid residual effects of contemplating negative aspects of identity. In presentation order two, participants completed all tasks relating to the N-IAM followed by the positive mood induction. Participants were then given the fifteen-minute jigsaw task before completing all tasks related to the P-IAM. The experiment lasted approximately one hour.

## **Results**

**Self-statements.** Mean values (and standard deviations) for self-statement fluency and self-statement ratings, as a function of self-statement task and mood group, are displayed in Table 1. To assess whether scores on any of these variables differed as a result of self-

statement task and/or mood group, three separate 2 (self-statement task: P-IAM vs N-IAM) x 2 (mood group: dysphoric vs. non-dysphoric) mixed ANOVAs were performed. Significant interaction effects were followed up with pairwise comparisons using SPSS-adjusted family-wise Bonferroni corrections.

With respect to self-statement fluency, the main effect of self-statement task bordered on significance,  $F(1, 62) = 3.76, p = .057, \eta^2 = .06$ , with participants generating more positive, compared to negative, self-statements. Whilst there was no main effect of mood group,  $F < 1$ , there was a significant interaction,  $F(1, 62) = 10.87, p = .002, \eta^2 = .15$ . Pairwise comparisons show that non-dysphoric participants generated significantly more positive, compared to negative, self-statements ( $p < .001$ ); however, dysphoric participants evidenced no significant difference in the number of positive and negative self-statements produced ( $p = .38$ ).

With respect to self-statement valence ratings, there was a significant main effect of self-statement task,  $F(1, 62) = 1418.49, p < .001, \eta^2 = .96$ , showing that self-statements produced in the P-IAM, compared to the N-IAM, were rated as more positive. There was also a significant main effect of mood group,  $F(1,62) = 10.99, p = .002, \eta^2 = .15$ , whereby dysphoric, compared to non-dysphoric, participants rated their self-statements less positively. The interaction was not significant,  $F < 1$ .

The ANOVA assessing self-statement importance ratings revealed a significant main effect of self-statement task,  $F(1,62) = 69.30, p < .001, \eta^2 = .53$ . Statements produced in the P-IAM, compared to N-IAM, were considered more important for identity definition. Although there was no main effect of mood group,  $F(1,62) = 2.47, p = .12, \eta^2 = .04$ , a significant interaction emerged,  $F(1,62) = 20.32, p < .001, \eta^2 = .25$ . Pairwise comparisons revealed that both dysphoric and non-dysphoric participants rated positive statements as more important than negative statements in defining their identity (dysphoric:  $p = .02$ ; non-

dysphoric;  $p < .001$ ). However, dysphoric, compared to non-dysphoric, participants rated their positive self-images less important ( $p = .03$ ), and negative self-statements as more important ( $p < .001$ ), in defining their identity.

***Episodic ABM Fluency & Phenomenology.*** Self-statements in the 1<sup>st</sup> vs. 5<sup>th</sup> serial positions were used as recall cues. Four non-dysphoric participants did not produce five self-statements in both the P-IAM and N-IAM tasks and were excluded from these analyses. The mean number of memories produced, and the mean phenomenological characteristic ratings (vividness, memory valence, centrality to life story), as a function of cue valence (positive vs. negative), cue serial position (1<sup>st</sup> vs. 5<sup>th</sup>) and mood group (dysphoric vs. non-dysphoric) are displayed in Table 2. Each of the four dependent variables was analysed separately using 2x2x2 mixed ANOVAs with repeated measures on the first two factors. Significant interaction effects were followed up with pairwise comparisons using SPSS-adjusted family-wise Bonferroni corrections.

No significant effects emerged for the number of memories produced, all  $F_s \leq 1.38$ ,  $p_s \geq .25$ ,  $\eta^2_s \leq .02$ . The ANOVA examining memory valence revealed a significant main effect of cue valence,  $F(1,58) = 197.27$ ,  $p < .001$ ,  $\eta^2 = .77$ , with memories supporting positive, compared to negative, self-statements rated as more positive. No other effects were significant,  $F_s \leq 2.32$ ,  $p_s \geq .13$ ,  $\eta^2_s \leq .04$ .

No significant main effects emerged from the ANOVA examining vividness ratings,  $F_s \leq 2.89$ ,  $p_s \geq .09$ ,  $\eta^2_s \leq .05$ . However, a significant interaction emerged between cue valence and mood group,  $F(1,58) = 5.93$ ,  $p = .02$ ,  $\eta^2 = .09$ . Pairwise comparisons revealed that dysphoric, compared to non-dysphoric, participants rated the episodic memories supporting positive self-statements as significantly less vivid ( $p = .008$ ). There was no difference between mood groups in vividness ratings of memories supporting negative self-statements ( $p = .91$ ). The dysphoric group showed no difference in their vividness ratings of

memories to support positive versus negative self-statements ( $p = .62$ ). Non-dysphoric participants, on the other hand, rated memories supporting positive self-statements significantly more vivid than memories supporting negative self-statements ( $p = .003$ ). No other interaction effects were significant,  $F_s \leq 1.03$ ,  $p_s \geq .32$ ,  $\eta^2_s \leq .02$ .

The analysis of centrality to life story ratings revealed a significant main effect of cue valence,  $F(1,58) = 18.72$ ,  $p < .001$ ,  $\eta^2 = .24$ , with memories supporting positive, compared to negative, self-statements rated as more central to the life story. There were no significant main effects of mood group,  $F < 1$ , or serial position,  $F(1,58) = 1.68$ ,  $p = 2.0$ ,  $\eta^2 = .03$ . There was, however, a significant interaction between self-statement valence and mood group,  $F(1,58) = 8.24$ ,  $p = .01$ ,  $\eta^2 = .12$ . Pairwise comparisons revealed that dysphoric participants believed the memories supporting positive versus negative self-statements were equally central to their life story ( $p = .33$ ). Conversely, non-dysphoric participants rated memories supporting positive, compared to negative, self-statements as significantly more central to their life story ( $p < .001$ ). No other significant interactions were found,  $F_s \leq 3.25$ ,  $p_s \geq .08$ ,  $\eta^2_s \leq .05$ .

## **Discussion**

Experiment 1 investigated the accessibility of episodic ABMs that support positive and negative semantic self-images. As hypothesised, positive and negative self-images were supported by similarly fluent clusters of episodic ABMs in non-dysphoric participants. However, contrary to hypotheses, the dysphoric participants demonstrated the same pattern as their non-dysphoric counterparts. Taken together, these findings suggest that, irrespective of depressive symptomatology, both positive and negative self-images are supported and reinforced by highly accessible sets of episodic ABMs.

Differences between dysphoric and non-dysphoric participants did emerge, however, in the centrality to life story and phenomenological ratings of episodic ABMs. In non-

dysphoric individuals, the memories supporting positive, compared to negative, self-images were recalled more vividly and were considered more central to the life story. These findings support the idea of a self-enhancement function of ABM (Wilson & Ross, 2001; 2003) such that memories reinforcing positive self-images are remembered in detail and are more deeply integrated into the life story. It is possible that the reduced vividness of positive memories reported by the dysphoric participants is a function of an overgeneral retrieval style. Due to the brevity of responses provided in the episodic ABM fluency task, it was not possible to independently rate the memories for specificity. However, future research could ask participants to rate specificity, alongside vividness, of memories to establish if this is the case.

Furthermore, the current findings suggest that this self-enhancement function of ABM is disrupted in dysphoric individuals, for whom there were no differences in the vividness or centrality to life story ratings for memories supporting positive and negative self-images.

Although the present study did not explicitly aim to investigate the accessibility of positive and negative self-images, participants' performance in the P-IAM and N-IAM tasks produced some interesting findings. Non-dysphoric individuals accessed significantly more positive, compared to negative, self-images. This is consistent with previous findings that individuals exhibit a bias to generate positive information about themselves for the purposes of self-enhancement (e.g., Baumeister, 1998; Sedikides & Gregg, 2008). In contrast, the dysphoric individuals did not differ in the number of positive and negative self-images produced. This provides further evidence that the self-enhancement function seen in healthy individuals is disrupted by dysphoria. Arguably, many characteristics hold both benefits and drawbacks, e.g. perfectionism. In healthy individuals, the self-enhancement bias might serve to promote the positive nature of these ambiguous traits leading. Furthermore, it may serve to make the N-IAM a more cognitively demanding task, whereby an individual has to override

the bias towards generating positive information in order to interpret some of these more ambiguous traits in a negative frame. However, in dysphoria, the disruption to the self-enhancement bias makes it easier to interpret these ambiguous traits negatively, thus we see a more even balance between the generation of positive and negative self-images. These ideas suggest a potential avenue for future investigation. Additionally, the self-images produced by the dysphoric, compared to non-dysphoric, participants were rated as less positive. They also rated their positive self-images as less important and their negative self-images as more important in defining their identity compared to the non-dysphoric group. Arguably, these biases in positivity and importance of self-images in dysphoric individuals are likely to act to maintain a negative view of the self (Beck, 1967).

## **Experiment 2**

According to the SMS, the relationship between episodic ABMs and semantic self-images is bi-directional. The salience of self-images impacts the accessibility of memories supporting that self-image and, conversely, the recall of episodic ABMs affects the semantic self-images that become salient. Research by Charlesworth et al (2016) supported this notion; participants who recalled episodic ABMs, compared to those who completed a control task, produced more semantic self-images in a subsequent self-statement fluency task. However, participants were instructed to recall events that elicited nostalgia, thus one could argue that the episodic ABMs recalled were likely to be positive in nature. It is therefore unclear whether only positive ABM recall leads to increased access to self-concept knowledge. Furthermore, the self-enhancement function of ABM suggests that by recalling positive, rather than negative, ABMs, an individual is able to make positive self-images more salient. However, to date, no research has explored whether the recall of positive and negative episodic ABMs differentially affects the accessibility, nature, and judgements of semantic



self-images. This forms the overarching aim of Experiment 2. It also explored how these effects differ between dysphoric and non-dysphoric individuals.

Experiment 2 asked participants to recall positive or negative episodic ABMs before completing a self-statement fluency task. Self-statements were then rated for emotional valence and importance to identity. For non-dysphoric participants, it was hypothesised that positive, compared with negative, episodic recall would result in the subsequent production of more semantic self-images and that these self-images would be more positive and important to one's identity. In contrast, we hypothesized that these patterns would not be observed in the dysphoric participants. It was also hypothesised that dysphoric, compared to non-dysphoric, individuals would generate significantly fewer self-statements following positive, compared to negative, recall.

## **Method**

**Participants.** One hundred and eleven (91 Female) undergraduates were recruited in exchange for course credit. Participants were assigned to dysphoric versus non-dysphoric groups using the criteria applied in Experiment 1, with allocation to either the positive or negative recall task randomised within each mood group. In order to ensure consistency with Experiment 1, in which the non-dysphoric group had CESD-Style scores  $\leq 11$ , participants with CESD-Style scores in the range 12-15 were excluded from analyses. This left 53 non-dysphoric participants, of whom 26 completed the positive recall task (24 female, Age:  $\bar{X} = 21.04$ ,  $SD = 3.36$ , CESD-Style Score:  $\bar{X} = 5.23$ ,  $SD = 3.51$ ) and 27 completed the negative recall task (22 female, Age:  $\bar{X} = 20.63$ ,  $SD = 3.72$ , CESD-Style Score:  $\bar{X} = 6.67$   $SD = 2.92$ ). Of the 47 dysphoric participants, 24 completed the positive recall task (19 female, Age:  $\bar{X} = 20.29$ ,  $SD = 2.82$ , CESD-Style Score:  $\bar{X} = 21.13$   $SD = 6.79$ ) and 23 completed the negative recall task (18 female, Age:  $\bar{X} = 19.57$ ,  $SD = 1.67$ , CESD-Style Score:  $\bar{X} = 23.10$   $SD = 7.63$ ). A priori power analysis indicated that the sample sizes are sufficient to achieve power (1-

$\beta$  err prob) = .83 to detect group differences with  $\alpha = .05$  for a medium-to-large effect size  $f = .35$ .

Two separate 2 (recall valence: positive vs. negative) x 2 (mood group: dysphoric vs. non-dysphoric) mixed ANOVA assessed whether the four conditions differed with respect to age and CESD-Style scores. Analyses revealed no significant differences in participants' age across recall valence and mood group, all  $F_s(1,96) \geq 2.21$ ,  $p_s \geq .14$ . With respect to CESD-Style scores, there was a main effect of mood group,  $F(1,96) = 259.40$ ,  $p = .00$ ,  $\eta^2 = .73$ , with dysphoric participants having significantly higher CESD-Style scores than non-dysphoric participants. The main effect of recall valence and the interaction were not significant,  $F_s < 1$ . Chi square analyses revealed no significant difference in gender ratio between the four conditions,  $\chi^2(1, N = 100) = 2.26$ ,  $p = .52$ .

### **Materials.**

***Centre for Epidemiological Studies Depression Scale-Revised (CESD-R)***. This is described in Experiment 1.

***Episodic ABM Recall Task***. Participants completed either a positive or negative episodic ABM recall task. Participants were given five minutes to write a brief description of three specific (happened on one particular day) personally relevant events that were either positive or negative depending on the experimental condition. They were told to '*think about events where you felt particularly happy/sad on a particular day*' and to provide as much detail as possible. Participants were instructed to stop writing after five minutes. If a participant stopped writing prior to this the experimenter prompted them to continue. We tried to ensure that all participants were retrieving specific memories, pertaining to one particular day in the past and containing episodic detail, within this task. Therefore, we limited retrieval to three memories as research has demonstrated that specificity often declines over repeated trials (Kashdan, Roberts & Carlos, 2006). Furthermore, to serve as a

manipulation check, we coded all memories as specific (lasting less than one day) or non-specific (repeated events, single events lasting longer than one day, or personal semantic information) using procedures outlined by Williams and Broadbent (1986). 10% of memories were second coded, by a postgraduate researcher who was blind to the purpose of the study, with 100% inter-rater reliability.

***I AM Fluency Task.*** The accessibility of semantic self-images was assessed using the *I AM Fluency Task* (Charlesworth et al, 2016). Participants generated as many 'I am' self-statements, describing '*important and stable features*' of their identity, as they could in one minute. The total number of self-statements generated was used as a measure of self-image accessibility.

***Self-Statement Ratings.*** After completing the *I AM Fluency Task*, participants were asked to read through each self-statement and rate, using 7-point likert scales, their valence ("*In terms of your personal identity, how positive or negative do you consider this attribute to be?*" -3 = very negative, 3 = very positive ) and importance to identity ("*In terms of your identity, how important is this attribute in defining your identity?*" 1 = not important at all, 7 = extremely important). Mean ratings of self-statement valence and importance were calculated across all statements.

***Design.*** A 2x2 between-subjects design investigated whether mood group (dysphoric vs. non-dysphoric) and recall valence (positive vs. negative) affected the accessibility of semantic self-images, measured by the number of self-statements generated, and the perceived valence and importance to identity of these self-statements.

***Procedure.*** Participants were told that the study investigated the relationship between ABM and self-concept. After providing informed consent, they completed the CESD-R to confirm mood group membership. The *Autobiographical Memory Recall Task* (positive or

negative), the *I AM Fluency Task* and the *Self Statement Ratings* were administered in turn. The experiment lasted approximately 30 minutes and the researcher was present at all times.

## Results

**Memory Specificity.** The proportion of specific memories approached ceiling for all participants (non-dysphoric positive recall:  $\bar{X} = 0.97$ ,  $SD = 0.12$ , non-dysphoric negative recall:  $\bar{X} = 0.99$ ,  $SD = 0.07$ , dysphoric positive recall:  $\bar{X} = 0.98$ ,  $SD = 0.08$ , dysphoric negative recall:  $\bar{X} = 1.00$ ,  $SD = 0.00$ ). A 2 (recall valence: positive vs. negative) x 2 (mood group: dysphoric vs. non-dysphoric) between-subjects ANOVA found no significant differences, all  $F_s(1, 96) \leq 1.70$ ,  $p_s \geq .20$ ,  $\eta^2_s \leq .02$ .

**Self-image accessibility & ratings.** Self-image accessibility was measured using the total number of self-statements generated. Mean values, alongside mean self-statement valence and importance ratings, are displayed in Table 3.

The total number of self-statements was analysed using a 2 (recall valence: positive vs. negative) x 2 (mood group: dysphoric vs. non-dysphoric) between-subjects ANOVA. Analysis revealed a significant main effect of mood group,  $F(1, 96) = 10.02$ ,  $p = .002$ ,  $\eta^2 = .10$ , whereby dysphoric, compared to non-dysphoric, participants produced significantly fewer self-statements describing their personal identity. Neither the main effect of recall valence,  $F < 1$ , nor the interaction,  $F(1, 96) = 2.19$ ,  $p = .14$ ,  $\eta^2 = .02$ , were significant.

Two further 2x2 between-subjects ANOVAs examined whether recall valence and mood group affected participants' perceived importance and valence of the self-statements. With respect to perceived importance, the analysis revealed no significant effect of recall valence,  $F(1, 96) = 1.41$ ,  $p = .24$ ,  $\eta^2 = .01$ , but there was a significant main effect of mood group,  $F(1, 96) = 9.25$ ,  $p = .003$ ,  $\eta^2 = .09$ . Dysphoric, compared to non-dysphoric, participants rated their self-statements as significantly less important in defining their identity. The interaction was not significant,  $F < 1$ . Perceived valence of self-statements

showed no significant main effect of recall valence,  $F(1, 96) = 2.12, p = .15, \eta^2 = .02$ , but there was a significant main effect of mood group,  $F(1, 96) = 10.66, p = .002, \eta^2 = .10$ . Dysphoric, compared to non-dysphoric, participants rated their self-statements as significantly less positive. A significant interaction also emerged,  $F(1, 96) = 5.15, p = .03, \eta^2 = .05$ . This interaction was investigated with pairwise comparisons using SPSS-adjusted family-wise Bonferroni corrections. They revealed that non-dysphoric participants rated their self-statements as significantly more positive following the retrieval of positive, compared to negative, episodic ABMs ( $p = .008$ ). In contrast, there was no significant difference in the self-statement valence ratings for dysphoric participants following positive or negative episodic ABM recall ( $p = .58$ ).

## **Discussion**

Experiment 2 explored the effect of recalling positive or negative episodic ABMs on the accessibility of semantic self-images and whether this differs as a result of elevated depressive symptomatology. In line with the self-enhancement function of ABM, it was hypothesised that, for non-dysphoric participants, recollecting positive, compared with negative, episodic ABMs would lead to the production of more semantic self-images in the subsequent self-statement fluency task, and that these self-images would be more positive and important to one's identity. With respect to number of self-statements, and their perceived importance, these hypotheses were not supported. Recall valence did not differentially affect either variable. Findings for perceived valence of self-statements were, however, in line with the self-enhancement function of ABM (Ross & Wilson, 2003; Wilson & Ross, 2000; 2001; 2003). Self-images were rated as significantly more positive following positive, compared to negative, ABM recall; this suggests that positive ABM recall promotes a positive view of identity by making positive self-images highly accessible and salient.

It was also hypothesised that the dysphoric participants would show a different pattern of findings compared to their non-dysphoric counterparts. Firstly, it was hypothesised that they would generate significantly fewer self-statements following positive, compared to negative, recall. However, dysphoric individuals generated significantly fewer self-statements overall. There are a number of potential explanations for this finding. Firstly, whilst non-dysphoric individuals benefit from using episodic ABM recall to help access semantic self-images, this process may be disrupted in dysphoria. Alternatively, dysphoric individuals may experience difficulty accessing stored semantic self-images, possibly due to impairments in retrieval processes or disruptions in how self-images are stored or organised. However, as the study did not include additional measures of fluency, we cannot draw firm conclusions regarding the role of retrieval processes. The reduced accessibility may have been the result of other factors such as the slower cognitive processing associated with depression (Den Hartog, Derix, Van Bommel, Kremer & Jolles, 2003; McDermott & Ebmeier, 2009). Alternatively, the finding may reflect lower levels of self-complexity in the dysphoric group (see Linville, 1987).

Additionally, it was hypothesized that the dysphoric, compared with non-dysphoric, participants might show a different pattern in the valence and importance to identity of self-statements following positive, compared with negative, recall. Dysphoric participants did, in general, rate all their self-statements as less important in defining their identity. This supports the idea that dysphoric participants might experience difficulties accessing important semantic self-images, resulting in less clear representations of the self. Furthermore, the self-enhancement function seen in the non-dysphoric participants was disrupted in dysphoria. Non-dysphoric participants rated their semantic self-images as significantly more positive following positive, compared to negative, episodic ABM recall. However, for dysphoric

participants, recalling positive, compared to negative, events did not affect the valence of subsequent self-images.

It is unclear why the dysphoric group did not benefit from positive recall. There were no differences in the specificity of memories recalled between the two mood groups. One possibility is that the positive memories retrieved by non-dysphoric participants were more positive than those retrieved by the dysphoric participants. This would be consistent with research showing that, compared to non-depressed participants, depressed participants recall positive memories that are less vivid (Werner-Seidler & Moulds, 2011) and recall positive self-defining memories that are less emotionally-intense (Werner-Seidler & Moulds, 2012). Depressed individuals are also less likely to recall positive memories from a field perspective as opposed to an observer perspective, suggesting they may fail to attribute positive memories to their current self (Lemogne et al., 2006). The null effect of positive recall on the valence of self-images in the dysphoric group could be further investigated by collecting phenomenological ratings for the retrieved memories, including valence, vividness and field/observer perspective.

### **General Discussion**

According to the SMS model of ABM (Conway & Pleydell-Pearce, 2000), the relationship between episodic ABMs and semantic self-images, which form a key component of the conceptual self, is bi-directional. Salient semantic self-images are supported by highly organised sets of episodic ABMs. Conversely, the recall of episodic ABM increases the accessibility of semantic self-images, which determines which aspects of the conceptual self become salient (Conway, 2005). Although the dynamics of this relationship have received increased empirical attention (e.g., Berntsen et al., 2011; Conway, 2005; Rathbone et al., 2008; Ross & Wilson, 2003), limited work has explored the relationship between positive and negative aspects of the conceptual self and positive and negative episodic ABMs. This gap in

the literature is particularly pertinent given the proposal that positive and negative episodic ABMs may serve different functions (Rasmussen & Berntsen, 2009). Thus, it is feasible that they might interact differently with the conceptual self.

Experiment 1 found no difference in the number of accessible episodic ABMs to support positive and negative semantic self-images.. Experiment 2 demonstrated that the number of accessible semantic self-images did not differ following the recall of positive, compared to negative, episodic ABMs. Together, these findings support the bi-directional relationship between episodic ABMs and the conceptual self; they suggest that ABM functions to ground both positive and negative self-concept knowledge, whilst both positive and negative episodic recall function to provide access to self-concept knowledge.

Across the two experiments, evidence for a self-enhancement function of ABM emerged for non-dysphoric participants. Experiment 1 found that episodic memories supporting positive aspects of identity are remembered in greater detail and are more integrated within one's life story, whereas those supporting negative aspects of identity are less sensorially detailed and less well integrated into the life story. Furthermore, Experiment 2 found that positive ABM recall functions to promote a positive view of identity, by making positive self-concept knowledge highly accessible and salient.

Furthermore, this self-enhancement process appeared to be disrupted by the presence of depressive symptomatology. Experiment 1 suggested that these disruptions were not in the accessibility of the memories supporting self-concept knowledge, but rather in the phenomenological qualities of those memories. Episodic ABMs supporting positive aspects of identity were less vivid for dysphoric, compared with non-dysphoric, participants. Additionally, whilst non-dysphoric participants rated the episodic memories supporting positive, compared to negative, self-images as significantly more central to their life story, dysphoric participants showed no difference in life story ratings between memories



supporting positive versus negative self-images. Dysphoric, compared to non-dysphoric, participants also rated episodic memories supporting negative aspects of identity as more central to the life story. Experiment 2 also found that, for dysphoric participants, recalling positive, compared to negative, episodic memories did not lead to the generation of more positive self-images in the way it did for the non-dysphoric participants. Taken together, these findings suggest that the natural bias to see oneself in a positive light is disrupted in dysphoria and this disruption maintains and perpetuates a negative view of the self.

A possible limitation of the current studies is that we did not investigate changes in participants' mood and/or ruminative mindset as a function of our experimental manipulations, and whether this varied between the dysphoric and non-dysphoric participants. For example, the retrieval of negative ABMs may have lowered mood and/or triggered ruminative thought processes to a greater degree for the dysphoric than for the non-dysphoric participants, leading to the generation of more negative self-images by the dysphoric group. Conversely, the generation of positive ABMs may have raised mood to a greater degree for the non-dysphoric participants. Therefore, future research needs to establish whether changes in state mood and ruminative thought processes disrupt the self-enhancement function served by the interaction between episodic ABMs and semantic self-images.

Future research should also investigate whether the current findings extend to individuals meeting formal diagnostic criteria for Major Depressive Disorder. Unfortunately, in the current studies we did not ascertain whether participants met criteria for, or had received, a formal diagnosis. However, the range of scores on the CESD-R suggest that whilst some might have met criteria for diagnosis, the majority probably did not. Arguably, individuals who are experiencing symptoms of the severity to receive a diagnosis are likely to experience stronger memories biases and a more negative self-concept, which may lead to

further differences in the relationship between episodic ABM and the conceptual self. Furthermore, at present it is not clear whether biases in the relationship between episodic ABM and the conceptual self serve as a vulnerability factor for, or exist as a result of, depressive symptomatology; this requires further investigation.

The current research explored the relationship between episodic ABMs and current self-concept knowledge. Future research might explore the functional role of episodic ABMs in supporting what Neisser (1988) termed the extended self, which includes knowledge of remembered past selves and imagined possible future selves. It is also feasible that an individual's ability to generate episodic simulations of future events, which is thought to rely on the same core network as episodic memory retrieval (Addis, Wong & Schacter, 2007), may become critical as an individual attempts to construct semantic self-images pertaining to their future self. The notion of a future self is particularly pertinent within the context of depression as research has shown that depression is associated with difficulties with future cognitions, such as simulating positive future events (Dickson & Bates, 2006; Williams, Ellis, Tyers, Healy, Rose & Macleod, 1996).

Notwithstanding these limitations, the current studies provide novel support for an interactive relationship between episodic ABMs and the conceptual self. The findings also support the notion that ABM functions for the purposes of self-enhancement by promoting a positive view of the self. Furthermore, this self-enhancement function is disrupted in individuals experiencing high levels of depressive symptomatology. These disruptions in the ability to utilise episodic ABM to maintain a positive view of the self may act to maintain the negative view of the self evidenced in individuals experiencing depression.

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