J. Behav. Ther. & Exp. Psychiat. 45 (2014) 260–266

Contents lists available at ScienceDirect

Journal of Behavior Therapy and Experimental Psychiatry

journal homepage: www.elsevier.com/locate/jbtep

Executive dysfunction and autobiographical memory retrieval in recovered depressed women

Anneke D.M. Haddad*, Catherine J. Harmer, J.Mark G. Williams

Department of Psychiatry, University of Oxford, Warneford Hospital, Oxford OX3 7JX, United Kingdom

ARTICLE INFO

Article history:
Received 8 January 2013
Received in revised form
4 December 2013
Accepted 9 December 2013

Keywords:
Depression
Recovered depressed
Autobiographical memory
Executive dysfunction
Female

ABSTRACT

Background and objectives: Depressed individuals have difficulty remembering specific autobiographical events. These deficits often persist after recovery of mood symptoms, but the mechanisms underlying impaired memory specificity in recovered depressed individuals remain unclear. Here, we sought to examine whether performance on two cognitive measures might be related to deficits in autobiographical memory retrieval in individuals with a history of depression.
Methods: Twenty-four recovered depressed women (12 with more than one previous episode) and 24 never depressed women completed two cognitive measures (Digit Span and a Number Generation Task) and tests of autobiographical memory recall.
Results: Overall, the recovered depressed women did not show deficits in autobiographical retrieval. However, those with more than one previous episode had impaired retrieval of categorical autobiographical memories. Moreover, depression history moderated the relationship between Digit Span and retrieval of categoric autobiographical memories such that within the whole recovered depressed group (but not the never depressed group), those with lower Digit Span also had poorer retrieval of categorical autobiographical memories.
Limitations: Our sample size was small and included only women. Moreover, order effects may have been a significant factor.
Conclusions: These findings support the notion that working memory is an important factor in impairing autobiographical memory in those who have recovered from depression, but suggest a complex relationship with autobiographical recall.

1. Introduction

Depressed individuals have difficulties remembering specific autobiographical events. Whereas non-depressed people can describe single events that occurred at a particular time and place (e.g., 'I was happy at my party last month'), depressed patients tend to describe repeated events (e.g., 'I'm happy every year on my birthday' – for a review, see Williams et al., 2007). In depression, this overgenerality is associated with deficits in important cognitive abilities – including reduced future specificity and poor social problem solving – and with delayed recovery from mood disturbances (e.g., Brittlebank, Scott, Williams, & Ferrier, 1993; Hermans, Vandromme, et al., 2008; Sumner, Griffith, & Mineka, 2010). Autobiographical memory specificity (AMS) deficits may continue after depressive symptoms have resolved (e.g., Mackinger, Pachinger, Leibetseder, & Fartacek, 2000; Nandrino, Pezard, Poste, Reveillere, & Beaune, 2002; Spinhoven et al., 2006), although there have been several failures to replicate this (Barnhofer, Crane, Spinhoven, & Williams, 2007; Wessel, Meeren, Peeters, Arntz, & Merckelbach, 2001; Williams, Barnhofer, Crane, & Beck, 2005). Moreover, in euthymic individuals, poor AMS may indicate vulnerability to future depression (Gibbs & Rude, 2004; Mackinger, Loschin, & Leibetseder, 2000; but see also Spinhoven et al., 2006). However, the cognitive mechanisms underlying reduced AMS remain unclear. Understanding these mechanisms could help improve interventions targeting depression and vulnerability to depression.

Several cognitive mechanisms have been suggested for AMS deficits, including functional avoidance and rumination (e.g., Williams, 2006). Here we focus on a third proposed mechanism: executive dysfunction (Dalgleish et al., 2007; Yanes, Roberts, & Carlos, 2008).

* Corresponding author. Present address: Department of Experimental Psychology, University of Oxford, South Parks Road, Oxford OX1 3UD, United Kingdom. Tel.: +44 1865 271 349.
E-mail address: anneke.haddad@psy.ox.ac.uk (A.D.M. Haddad).

0005-7916
http://dx.doi.org/10.1016/j.jbtep.2013.12.001

Depression is associated with a range of executive deficits; such deficits may persist after recovery (Biringer et al., 2005; Kessing, 1998; Paelecke-Habermann, Pohl, & Leplow, 2005; Preiss et al., 2009). AMS, as assessed using the Autobiographical Memory Test (AMT), requires recall of specific autobiographical memories in response to cues. Satisfying the task requirements places considerable demands on various "executive" skills: to set verification criteria and hold them in working memory, to compare candidate memories with criteria, and to inhibit inappropriate responses. Poor AMT scores in depressed or recovered depressed individuals may thus be a direct consequence of deficits in executive capacity, broadly conceived.

In support of this account, several studies have found correlations between executive dysfunction and AMT scores (Dalgleish et al., 2007; Raes et al., 2006). Moreover, increasing the executive demands of the AMT or adding a cognitive load reduces AMS (Dalgleish et al., 2007; Williams et al., 2006). Finally, one study reversed the instructions of the standard AMT: Instead of requiring specific events, the task now required *categories* of events (Dalgleish et al., 2007, Study 8). Categoric responses represent errors on the standard AMT but correct responses on the reversed AMT. If depressive symptoms impair AMS *per se*, more depressed individuals would be more general, regardless of task instructions. However, if depressive symptoms impair the ability to fulfil task requirements, more depressed individuals would make more errors and thus would have poor *generality* on the reversed test. Consistent with the latter prediction, those with higher Beck Depression Inventory (BDI-II) scores gave more *specific* responses on the reversed test – consistent with the executive dysfunction explanation for autobiographical retrieval problems. Notably, in a separate study (Dalgleish, Rolfe, Golden, Dunn, & Barnard, 2008), use of the reversed AMT in a trauma-exposed sample resulted in the opposite pattern – that is, increased distress was correlated with reduced specificity even on the reversed test, suggesting a different mechanism underlying AMS deficits in depressed and trauma-exposed populations.

Dalgleish et al.s' (2007) participants were selected to have a range of BDI-II scores rather than on the basis of current or previous depression diagnosis. It remains unclear whether executive dysfunction can explain AMS deficits in recovered depressed individuals. As noted earlier, several studies have found persistent executive deficits in recovered depressed participants, but these have not assessed memory specificity. Moreover, most studies of persistent AMS deficits have not examined executive difficulties, though one study found that, amongst previously depressed individuals, better AMS correlated with better immediate and delayed recall (Spinhoven et al., 2006). However, executive measures were unrelated to memory specificity. Critically, this study did not describe how recovered depressed participants' executive capacity compared to that of controls. Moreover, some studies have found impaired executive abilities in those with recurrent, but not single, previous episodes (Kessing, 1998; Paelecke-Habermann et al., 2005). This is noteworthy in light of evidence for possible differences in AMS between single episode and recurrent patients, assessed when euthymic (Nandrino et al., 2002; Spinhoven et al., 2006), and suggests that the relationship between AMS and executive dysfunction in euthymic individuals with recurrent previous depression is worth examining further.

Here we sought to replicate and extend previous work by investigating autobiographical memory deficits in recovered depressed individuals. We tested euthymic previously depressed participants and never depressed controls on two measures of cognitive capacity, Digit Span and Number Generation Task, as well as on the standard and reversed AMT (Dalgleish et al., 2007). We hypothesized that, compared to the controls, the recovered depressed group would (a) have worse scores on the Digit Span and Number Generation Task; (b) produce fewer correctly specific memories on the AMT; and (c) produce fewer correctly categoric memories on the AMT-Reversed. We also predicted that the Digit Span and Number Generation Task would be correlated with the measures of autobiographical memory recall (both specific and categoric). A secondary aim was to examine whether those with recurrent previous depression show more exaggerated deficits on these measures.

2. Materials and method

2.1. Participants

Twenty-four recovered depressed but currently euthymic participants and 24 healthy controls participants were recruited from the local community. Only women were included because the recovered depressed participants took part in a further study (which has been reported separately, Haddad, Williams, McTavish, & Harmer, 2009) which sought to capitalize on women's increased sensitivity to effects of acute tryptophan depletion. All participants spoke English fluently.

On the basis of the Structured Clinical Interview for DSM-IV (SCID), recovered depressed participants met diagnostic criteria for at least one previous Major Depressive Episode, had not met criteria in the past six months, and did not meet criteria for any other past or current Axis I disorder. Recovered depressed participants had taken no antidepressant medication for at least three months and were not currently receiving psychotherapy. A recurrently depressed subgroup of 12 participants had more than one previous episode of depression. Controls had no current or past Axis I disorders and were not taking psychoactive medications or receiving psychotherapy.

All participants gave written informed consent and received £20 for their participation. The study was approved by the local Research Ethics Committee.

2.2. Measures

2.2.1. Beck Depression Inventory

The BDI-II (Beck, Steer, & Brown, 1996) was used to assess presence and severity of depressive symptoms over the previous two weeks.

2.2.2. Number Generation Task

Two versions of the Number Generation Task (Dalgleish et al., 2007) were used (A and B, each used with approximately half the participants); pilot testing showed no significant differences between versions. Participants were required to generate numbers that satisfied a set of constraints which were presented once verbally (e.g., "Please give me a sequence of five numbers between 499 and 101" or "Please give me a sequence of four numbers between 202 and 598"). Three practice questions were given (with feedback). Participants were informed that questions would be read only once. Errors were summed across types (numbers not in sequence, numbers outside the upper or lower bounds, incorrect number of numbers (e.g., giving five numbers, 101 through to 105, when asked for four numbers), incorrect number of digits (e.g., giving a seven digit number when asked for a six digit number)). Multiple instances of the same error type within the same sequence (e.g., giving six numbers when asked for four numbers, or giving two numbers below the lower bound) were counted as a single infringement of one constraint (Barnard, Scott, & May, 2001).

2.2.3. Digit Span

Forward Digit Span was assessed by reading a list of digits at a rate of approximately one per second and asking the participant to recall them immediately in order. Initial lists were four digits long;