Effect of Goal Discrepancy Rumination on Overgeneral Memory

Submitted by Laura Lanning, to the University of Exeter as a thesis for the degree of Doctor of Clinical Psychology, November 2015

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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: ………………………………………………………………………..
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LITERATURE REVIEW

Are Self-discrepancies Associated with Overgeneral Memory? A Systematic Review

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Target Journal: Memory (see Appendix B for instructions for authors)
Word Count: 3983 words (excluding abstract, table of contents, list of figures, references, footnotes, appendices)

Submitted in partial fulfillment of requirements for the Doctorate Degree in Clinical Psychology, University of Exeter
Abstract

Background: The tendency to recall overgeneral memories (OGM) when cued to recall specific ones is characteristic of depression. A greater understanding of the cognitive processes underlying OGM may contribute towards more clinically effective assessment, prevention and treatment of depression (Moore & Zoellner, 2007). Self-coherence maintenance has been implicated as a process underlying OGM (Conway, 2005).

Objectives: The purpose of this review was to determine whether self-discrepancies are associated with OGM.

Method: A search of 10 databases was conducted: Embase, PsychINFO, Web of Science®, Current Contents Connect®, MEDLINE®, BIOSIS Citation Index SM, Chinese Science Citation DatabaseSM, PsychARTICLES, Journals@OVID and Your Journals@OVID. The critique was guided by two checklists: the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE: Vandenbroucke et al., 2007; von Elm et al., 2007) and Consolidated Standards of Reporting Trials (CONSORT: Moher et al., 2009, 2010).

Results: Fourteen studies across 10 papers were identified in the review. Methodological variation made between-paper comparisons difficult. Additionally, small, predominantly female samples were used, limiting generalisability.

Conclusions: Evidence for a positive association between self-discrepancies and OGM was generally consistent amongst currently depressed and previously depressed individuals and non-clinical samples at the within- and between-person level. This association was stronger amongst clinical
populations at the between-person level. Findings offer support for the self-maintenance coherence hypothesis of OGM as suggested by Conway and Pleydell-Pearce (2000), which is a normative model of autobiographical memory (AM) retrieval. Findings suggest that OGM may represent an extreme form of normal AM functioning amongst previously depressed (PD) and currently depressed (CD) individuals. Further research testing this theoretical assumption is required before clinical interventions can be informed.

*Keywords: Autobiographical memory, depression, overgeneral memory, self-discrepancy.*
**Introduction**

Autobiographical memory (AM) has been defined as memory for personally experienced past events that contributes to individuals' sense of self and ability to pursue goals (Nelson & Fivush, 2004; Williams et al., 2007). The tendency for currently depressed (CD) and previously depressed (PD) individuals to recall overly generalised AMs when asked to retrieve specific ones has been termed “overgeneral memory” (OGM; Williams et al., 2007). For example, in response to the cue word “happy” a specific AM might be “Last Monday morning when I had a picnic in the sunshine with my best friend”. An OGM response might instead be “I never feel happy”. OGM has been theorised to result from cognitive processes operating when autobiographical remembering may threaten self-coherence (Conway, 2005). This review investigated whether discrepancies that threaten self-coherence are associated with OGM.

**The Self and Goals**

The meaning of the term “self” is commonly thought to be synonymous with identity and to refer to enduring yet dynamic representations about oneself including beliefs, memories and goals (James, 1890; Swann & Bosson, 2010). The term “self-regulation” refers to how individuals control and direct their behaviour in relation to the setting and attainment of goals (Bandura, 1977, 1986; Kanfer, 1970; Locke, 1968). Goals can be defined as desired future self-states which motivate individuals to reduce perceived discrepancies between these and the current self-state (Austin & Vancouver, 1996; Duval & Wicklund, 1972; Carver & Scheier, 1982, 1998). Within Higgins’s (1987) self-discrepancy theory “self-guides” are consistent with the
concept of goals. Self-guides include representations of future as well as current, “actual”, self-states. The “ideal self” represents beliefs about aspirations and hopes and the “ought self” about obligations and responsibilities. Discrepancies between actual-ideal (A-I) self-guides, have been found to result in depressive symptoms including failure, disappointment and shame and discrepancies between actual-ought (A-O) self-guides to result in guilt and anxiety (Higgins, Klein, & Strauman, 1985; Higgins, Strauman, & Klein, 1986). Carver, Lawrence and Scheier (1999) later proposed the “feared self”, suggesting that discrepancies between actual-feared (A-F) self-guides are a better predictor of guilt and anxiety than discrepancies between A-O self-guides, which, they proposed, only become relevant when avoidant motives are low. Similar theories include Markus and Nurius’s (1986) notion of “possible selves” which represents ideas about what individuals could become whereby discrepancies between current and desired future selves have been found to motivate approach and discrepancies between current and feared future selves to motivate avoidance (Oyserman, Bybee, Terry, & Hart-Johnson, 2004).

**Autobiographical Memory**

By reducing self-discrepancies individuals seek to promote self-coherence: a reassuring sense of self-continuity and predictability (Barclay, 1996; Brooks, Swann, & Mehta, 2011; Ryan & Deci, 2002). Self-coherence can also be achieved through the construction of AM (Bluck, 2003; Bluck & Alea, 2002; Pillemer, 2003). Discrepancies between representations of the self in the past and present can threaten coherence and ability to operate effectively (Conway, 2005). It has been suggested that individuals may alter or
bias recall of the past in order to promote self-coherence (Swann & Bosson, 2010; Wilson & Ross, 2003). Conway, Meares and Standart (2004a) propose that by retaining information in an abstract or conceptual, rather than detailed format, AM can provide a compromise for the tension that results from needing to both give an accurate enough record of goal-progress to inform self-regulation as well as provide a coherent sense of self through time.

**Overgeneral Memories and the Self-memory System**

OGM is clinically important because it has been found to predict depressive symptomology (Gibbs & Rude, 2004; Mackinger, Pachinger, Leibetseder, & Fartacek, 2000) and has been associated with poor prognosis and longer recovery times (Brittlebank, Scott, Williams, & Ferrier, 1993; Sumner, Griffith, & Mineka, 2010). According to Conway and Pleydell-Pearce’s (2000) self-memory system model (SMS), retrieval of AM involves the activation of information that is hierarchically organised across three levels of specificity. At the most general level, individuals’ lifetime periods are large units of time that reflect particular overarching goals, e.g., “When I lived with John”. More specific are general events, defined as categories of events, e.g., “Holidays in Spain”. Event specific knowledge (ESK) represents sensory-perceptual details of particular events (Conway, 2001), e.g., “Seeing that red dress when I went to Sarah’s party last Saturday”. According to Conway and Pleydell-Pearce (2000) OGM represents the retrieval of AMs from the general event level of specificity due to truncation of the retrieval process.

**Self-coherence Maintenance**

Within the SMS, formation of specific AM requires coordinated retrieval of non-immediate self-knowledge, including goals and self-guides, and
sensory-perceptual information. Here, in accordance with theories of self-regulation (Zimmerman, 2000), goals are conceptualised as representations through which individuals assess and attempt to reduce discrepancies between perceived current and standard or ideal self-states (Conway, Singer, & Tagini, 2004b). Goals are processed at more abstract levels than sensory-perceptual information. According to the SMS, if a specific AM represents an event that is discrepant from current goals, its retrieval is likely to cause a high degree of self-discrepancy and therefore information processing is re-directed to this more abstract level in order to maintain self-coherence (Conway et al., 2004b; Conway, 2005). This aborts the hierarchical search process for a specific AM at the general event level, which can result in OGM (Conway et al., 2004b). From herein this will be termed the self-coherence maintenance hypothesis (S-CMH).

The Autobiographical Memory Test

The majority of research investigating OGM has used the AM test (AMT; Williams & Broadbent, 1996). This method requires participants to produce a specific AM within 60 seconds of being presented with each of a series of cue words. The standard AMT cue set includes both positively and negatively valenced adjectives (van Vreeswijk & de Wilde, 2004). Variations include the minimal instruction AMT (MI-AMT; Debeer, Hermans, & Raes, 2009) in which participants are not explicitly told that the AM has to be specific. The MI-AMT has been found to be a more sensitive and valid instrument to detect OGM in non-clinical samples (Griffith et al., 2009). Debeer et al. (2009) suggest that this is because such samples, which are usually students,
tend to have high executive functioning skills which enable them to follow instructions accurately, thereby creating a ceiling effect using the AMT.

**Summary**

Self-regulation involves the reduction of discrepancies between perceived current and future self-states, or goals (Markus & Wurf, 1987). AM informs self-regulation by corresponding to experience via the provision of a record of the self in the past and therefore goal-progress (Conway, 2005; McLean, Pasupathi, & Pals, 2007). It has been suggested that to satisfy a need for self-coherence individuals may distort the way in which they construct AM (Conway, 2005; Greenwald, 1980). According to Conway and Pleydell-Pearce (2000), if specific to-be-remembered information is likely to cause self-discrepancy, individuals are more likely to process information at a lower level of specificity, thereby resulting in the failure to access ESK, i.e., OGM. The aim of this review was to explore the empirical evidence regarding whether individuals with greater self-discrepancies are more overgeneral than individuals with smaller self-discrepancies (between-person) and whether individuals are more overgeneral in relation to AM cues to which they are more self-discrepant, compared to cues to which they are less self-discrepant (within-person).

**Research Question**

“Are self-discrepancies, at the within- and between-person level, associated with OGM?”
Method

Search Terms

Participants included in the search were adults and adolescents because OGM has been found within these populations. Older adults were excluded because older age has been associated with increased AM specificity; this population tends to be investigated separately within existing OGM literature (e.g., Ricarte, Latorre, Navarro, Aguilar, & Serrano, 2011). Older age is usually defined within psychological literature as age 65 years and above (e.g., Laidlaw, 2001; Gustafson et al., 2013). Exclusion criteria included dementia because this degenerative process impairs AM encoding and retrieval (Glosser, Gallo, Clark, & Grossman, 2002). Table 1 shows participant, manipulation/predictor and OGM outcome criteria.
Table 1

**Participant, Manipulation/Predictor and Outcome Criteria**

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants</strong></td>
<td>(OAP* OR old* OR “old* ag*” OR aging OR ageing OR elder* OR Alzheimer* OR dementi*)</td>
</tr>
</tbody>
</table>
| **Manipulations**                                                                 | (“*discrepan*” OR “*concordan*” OR “*discordan*” OR “*congru*” OR “*coheren*” OR “*dissonan*” OR “*dispara*” OR “*diverg*” OR “*conflict*” OR “*clash*” OR “*incompatible*” OR “*inconsisten*” OR “ideal*sel*” OR “ought*sel*” OR “feared*sel*” OR “actual*sel*” OR “ideal sel*” OR “ought sel*” OR “feared sel*” OR “actual sel*” OR goal* OR “possible*sel*” OR “possible sel*” OR “self-relevan*” OR “self relevan*” OR “self guide*” OR “self-guide*”)
| **Outcomes**                                                                      | (“autobiographical knowledge” OR “autobiographical memor*” OR OGM OR “over*general memor*” OR “over general memor*” OR “over*general autobiographical memor*” OR “over*general autobiographical knowledge” OR “over general autobiographical memor*” OR “over general autobiographical knowledge” OR “memory specificity” OR “specificity of memory” OR AMT OR MI-AMT OR “minimal*instruction autobiographical memory test” OR “minimal instruction autobiographical memory test”)

**Search and Screening Procedures**

Ten databases were searched; Embase, PsychINFO, Web of Science®, Current Contents Connect®, MEDLINE®, BIOSIS Citation Index SM, Chinese Science Citation Database SM, PsychARTICLES, Journals@OVID and
Your Journals@OVID. All search string characters were altered to suit each database's use of Boolean operators and each set of search criteria was separated by the word “AND”. All searches were conducted in the “title” and “abstract” fields to ensure that retrieved literature addressed the key concepts of the research question. Articles published up to September 2015 were included to ensure up-to-date results. This search strategy yielded 939 articles; reference lists were then individually examined for additional articles of relevance. This yielded two articles, giving 941 in total (Figure 1). Firstly, duplicate records, conference abstracts, meetings and editorials were removed (n = 279). The following specifications were applied when examining the titles and abstracts (a) English-language publication; (b) human sample; (c) published in a peer reviewed journal; (d) exclusion of older adult participants; (e) exclusion of studies that did not primarily address the relationship between self- or goal- discrepancies and OGM. Based on these criteria, 651 articles were excluded. Of the remaining 11 articles, a further one was excluded that did not focus explicitly on self-or goal-discrepancy, leaving a total of 10 articles. Quantitative and qualitative papers were included. Purely theoretical papers were excluded.
Figure 1. Identification process of articles.
**Evaluation Criteria**

In order to guide this critique two checklists were referred to: the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE: Vandenbroucke et al., 2007; von Elm et al., 2007) and Consolidated Standards of Reporting Trials (CONSORT: Moher et al., 2009, 2010). These were used to inform discussion of the quality of the articles rather than to exclude studies based on suboptimal quality because they were not designed to be used as assessment tools (da Costa, Cevallos, Altman, Rutjes, & Egger, 2011).

**Results**

Ten articles which met full inclusion criteria were deemed eligible for this review (Table 2). Moberly and MacLeod (2006) published findings from three studies. Schoofs, Hermans and Raes (2012) and Schoofs, Hermans, Griffith and Raes (2013) each published findings from two studies. This resulted in a total of 14 studies across 10 articles.

**Participants**

Papers included a total of 868 participants, the majority of whom were female (73.6%). Schoofs et al. (2012) did not report the number of female participants. Studies predominately recruited adults with a mean age of over 18 years and under 60 years. Six recruited from university student populations and three from secondary school populations. Some studies included participants from more than one population including: never depressed (NDs, \(n = 3\)), PDs \((n = 4)\), CDs \((n = 2)\), not assessed for current or previous depression \((n = 10)\) and borderline personality disorder (BPD, \(n = 1\)).
<table>
<thead>
<tr>
<th>Reference</th>
<th>OGM op</th>
<th>Sample</th>
<th>n (% f)</th>
<th>M age (SD)</th>
<th>Design</th>
<th>S-D op (idiographic or nomothetic)</th>
<th>AM outcome measures</th>
<th>Key findings and effect sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moberly &amp; MacLeod (2006)</td>
<td></td>
<td>Study 1</td>
<td>Retrieval latencies for spec AMs recalled.</td>
<td>UG students</td>
<td>36 (80.5)</td>
<td>21.6 (7.2)</td>
<td>Quasi-ex.</td>
<td>Self-concordant and non-self-concordant goals (idiographic and nomothetic)</td>
</tr>
<tr>
<td>Study 2</td>
<td>Retrieval latencies for positive responses (i.e., whether or not goal-related event been experienced)</td>
<td>UG students 36 (75) 21.1</td>
<td>Quasi-ex.</td>
<td>Self-concordant and non-self-concordant goals (nomothetic)</td>
<td>GCP; stim pres = comp screen, time lim = 4s, responses = computer keys pressed by participants.</td>
<td>GEK was retrieved significantly faster in response to pre-existing goal cues representing general events than in response to pre-existing non-goal cues representing general events, $\eta_p^2 = .29$. GEK was retrieved significantly faster in response to those goal-cues participant-rated as self-concordant, compared to goal-cues participant-rated as non-self-concordant, $\eta_p^2 = .36$.</td>
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<tr>
<td>Study 3</td>
<td>No. spec AMs retrieved in response to goal striving cues</td>
<td>UG students 36 (75) 19.5</td>
<td>Quasi-ex.</td>
<td>Self-concordant and non-self-concordant goals (idiographic)</td>
<td>GCP; stim pres = cues on cards, time lim = 90s, responses = audio recorded and written verbatim.</td>
<td>No significant difference between no. spec AMs cued by idiographic self-concordant strivings compared to non-self-concordant strivings, $d = .09$.</td>
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<tr>
<td>Study</td>
<td>No. spec AMs retrieved</td>
<td>PDs and NDs</td>
<td>No.</td>
<td>Spec AMs</td>
<td>Corr.</td>
<td></td>
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<tr>
<td>Barnhofer, Crane, Spinhoven, &amp; Williams (2007)</td>
<td>35</td>
<td>(60)</td>
<td>32.1</td>
<td>35 (60)</td>
<td>12.7</td>
<td></td>
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<tr>
<td>In response to AMT cues thematically related to the dysfunctional attitude*, “need for approval”, PDs retrieved significantly fewer spec AMs under conditions of comprised executive control, compared to NDs, ( d = 0.16 ). There was no significant relationship between no. spec AMs retrieved in response to AMT cue words related to the dysfunctional attitude “performance evaluation” amongst PDs compared to NDs, ( d = 0.07 ). There was no significant relationship between no. spec AMs retrieved in response to standard AMT cues, not thought to be related to dysfunctional attitudes. Effect sizes unavailable.</td>
<td></td>
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</table>

| Crane, Barnhofer, & Williams (2007)      | 44                     | (50.1)       | 33  | 44 (50.1)| 12.6  |
|                                         |                        |              |     |          |       |
| Amongst PDs there was a significant negative correlation between no. of self-relevant AMT cues (i.e., that matched idiographic self-guides) and no. spec AMs retrieved, \( r = -0.07 \). Effect sizes unavailable. |
Among NDs, no significant correlation between cue self-relevance and AM specificity, $r = .07$. Amongst PDs, no. of self-relevant cues presented was also significantly negatively correlated with no. spec AMs retrieved in response to non-self-relevant cues, $r = -.76$. Amongst NDs, the presence of self-relevant cues had no significant impact on specificity to non-relevant cues, $r = -.18$.

Raes, Schoofs, Griffith, & Hermans (2012)

No. spec and no. cat AMs retrieved.

PDs

50, (82)

30.3, (14.1)


A-I S-G-Ds (nomothetic)

AMT; stim pres = cues aloud, time lim = 60s, responses = written verbatim.

Amongst PDs higher levels of rumination were significantly correlated with a smaller no. spec AMs retrieved in response to AMT cues following, but not before, a S-G-D induction whereby participants were asked to rate how closely positive single-word characteristics corresponded to their actual and ideal selves, $r = -.3$. 

Schoofs, Hermans, &
| Study 1 | Proportions of spec/cat AMs retrieved (no. spec/ cat and ext AMs divided by total no. responses) | Secondary school students | 126 (n/a.) | 17.57 (0.66) | Quasi-ex. A-I S-G-Ds (nomothetic) | MI-AMT; stim pres = cues aloud, time lim = 60s, responses = written by participants. |
| Study 2 | Proportions of spec/cat AMs retrieved (no. spec/ cat and ext AMs divided by total no. responses) | Secondary school students | 146 (n/a.) | 16.82 (0.72) | Quasi-ex. A-I S-G-Ds (nomothetic) | MI-AMT; stim pres = cues aloud, time lim = 60s, responses = written by participants. |
Van den Broeck, Claes, Pieters, & Raes (2012)  
Proportion of spec/cat AMs retrieved (details of calculation n/a.)  
In-patients diagnosed with BPD  
34, 27.2  
34, (79.4) (9.1)  
AMT; stim pres = n/a., time lim = n/a., responses = written by participants.  
Amongst CDs, but not non-depressed individuals, cue discrepancy (i.e., to what degree the AMT as a whole was independently rated as synonymous and discrepant with participants’ idiographic self-guides, respectively) was significantly negatively associated with proportion of spec AMs retrieved using the AMT, \( r = -0.89 \). Amongst non-depressed individuals, but not CDs, discrepancy was significantly negatively associated with proportion of cat AMs retrieved using the AMT, \( r = -0.19 \).  

Schoofs, Hermans, Griffith, & Raes (2013)  
Study 1  
Proportional indices of spec/cat AMs  
(UG students (currently non-depressed): positive single-words rated in AMT; stress cues aloud, time lim = 60s, responses = written by participants.  
Ex. S-D man: positive single-words rated in AMT; stress cues aloud, time lim = 60s, responses = written by participants.)  
43, 18.7  
43, (90.7) (1.7)  
Ex. S-D man: positive single-words rated in AMT; stress cues aloud, time lim = 60s, responses = written by participants.  
In response to AMT cues there was no significant difference in AM specificity between those who received a S-D induction (whereby participants were asked to rate how closely
Study 2

Proportional indices of spec/cat AMs (raw no. of spec/ cat AMs divided by total no. cues minus total no. omissions)

CD inpatients

26 (80.7) 42.9 (11.1) Ex. S-D man: positive single-words rated in relation to A-I self-guides.

AMT; stim pres = cues aloud, time lim = 60s, responses = recorded verbatim.

In response to AMT cues there was no significant difference in AM specificity between those who received a S-D induction (whereby participants were asked to rate how closely positive single-word characteristics corresponded to their actual and ideal selves) compared to those who did not when specificity was operationalised as proportion of spec AMs retrieved, $d = - .10$, or proportion of cat AMs retrieved, $d = .7$.

Smets, Griffith, Wessel, Walschaerst

No. spec/cat AMs retrieved.

Secondary school students

123 (55) 17.3 (0.5) Ex. S-D man: positive single-

A-I S-G-Ds (nomothetic)

MI-AMT; stim pres = cues aloud, time lim =

Depressive symptomology was significantly negatively associated with no. spec AMs following a S-D induction.

A-I S-G-Ds

Dynamometer
words rated in relation to A-I self-guides.

Ono & Devilly (2013) No. of spec/general (cat and ext, including negative and threat) AMs retrieved. UG students (58.3% reported a previous emotional difficulty, of which 45.2% reported PD) 72 (74.3) 21.3 (6.8) Corr. S-D man: A-I, A-O and A-F S-G-Ds rated for how much they bothered participants. A-I, A-O and A-F S-G-Ds. Differences between ideal or pre-existing sense of self resulting from trauma exposure (Idiographic) Corr. AMT; stim pres = written cues, time lim = 30s, responses = written by participants. In response to AMT cues magnitude and appraisal of A-F self-similarity significantly predicted number of negative general AMs, $R^2 = .14$, and general threat AM, $R^2 = .26$.

Wessel, Postma, No. spec AMs PDs and NDs 61 (100) 39.4 (7.5) Corr. A-I and A-F S-G-Ds AMT; stim pres = cues Participants (PDs and NDs) retrieved a significantly greater
Note. *differences between self-imposed actual and ideal standards resulting from perceived failures to meet needs deriving from dysfunctional attitudes, thought to reflect maladaptive schemata. \%f = percentage female; AM = autobiographical memory; AMT = autobiographical memory test; A-F = actual-feared; A-I = actual-ideal; A-O = actual-ought; BPD = borderline personality disorder; CDs = currently depressed individuals; comp screen = computer screen; corr. = correlational; ex = experimental; GCP = goal cueing paradigm; GEK = general event knowledge; M age = mean age; MI-AMT = minimal instruction autobiographical memory test; n/a. = not available; NDs = never depressed individuals; no. cat = number of categoric; no. ext. = number of extended; no. spec = number of specific; OGM = overgeneral memory; OGM op = OGM operationalisation; PDs = previously depressed individuals; quasi-ex = quasi experimental; SD = standard deviation; S-D= self-discrepancy; S-D op = self-discrepancy operationalisation; S-G-D = self-guide discrepancy; stim pres = stimulus presented as; time lim = time limit; UG = undergraduate.
Definitional and Related Methodological Problems

**Self-discrepancy conceptualisation.** All 14 studies conceptualised self-discrepancies as representing threats to self-coherence. Moberly and MacLeod (2006) investigated goals, which represent self-discrepancies, versus non-goals and whether both idiographic and (mainly) nomothetic goals were self-concordant or non-self-concordant i.e., goal motivation aligned and not aligned with the self, respectively. Ten of the remaining 11 studies defined self-discrepancies as differences between perceived current selves and self-guides: A-O, A-I and A-F self-guide discrepancies ($n = 3$), A-I and A-F self-guide discrepancies ($n = 1$) and A-I self-guide discrepancies ($n = 6$). Four of these utilised self-guides that were generated by participants (Crane, Barnhofer, & Williams, 2007; Ono & Devilly, 2013; Wessel et al., 2014; van den Broeck, Claes, Pieters, & Raes, 2012) and six studies provided participants with self-guides that had been generated prior to the study (Raes, Schoofs, Griffith, & Hermans, 2012; Schoofs et al., 2012; Schoofs et al., 2013; Smets, Griffith, Wessel, Walschaerst, & Raes, 2013). Finally, Barnhofer, Crane, Spinhoven, and Williams (2007) conceptualised self-discrepancies as differences between perceived current and self-imposed standards of performance; thought to reflect rigidly held dysfunctional attitudes.

**Overgeneral memory operationalisation.** Seven out of the 14 studies reviewed measured OGM using the AMT (Table 2). Types of AMT cues included the standard set ($n = 1$), nomothetic words rated as more likely (“high-discrepant”) or unlikely (“low-discrepant”) to induce self-discrepancy ($n = 1$), words derived from participants' self-generated A-I, A-O, A-F self-guides ($n = 1$), nomothetic dysfunctional attitude-related words ($n = 1$) and nomothetic
words thought likely to cause A-O, A-I and A-F self-comparisons \((n = 2)\) and A-I self-comparisons \((n = 1)\). Four studies used the MI-AMT. Cue types included nomothetic high-discrepant and low-discrepant words \((n = 2)\) and nomothetic words rated as likely to induce A-I self comparisons \((n = 2)\). Moberly and MacLeod's (2006) three studies employed goal cueing paradigms. These differed from the AMT in that the cue words used to elicit AMs were derived from both idiographic and (mainly) nomothetic goals. Studies operationalised OGM at particular levels of specificity, including latency of specific AM recall \((n = 1)\), latency of general (including categoric and extended) AM recall \((n = 1)\), number of specific AMs retrieved \((n = 4)\), number of specific versus categoric AMs retrieved \((n = 2)\), number of specific versus general (including categoric and extended) AMs retrieved \((n = 1)\) and proportion of specific versus categoric AMs retrieved \((n = 5)\).

**Design**

Studies were correlational \((n = 6)\), experimental \((n = 3)\) and quasi-experimental \((n = 5)\).

**Theoretical and Research Findings**

This review has been structured thematically to reflect the conceptualisation of self-discrepancy and sample characteristics of the studies.

**Discrepancy of Nomothetic Goals**

Eight studies elicited discrepancies of nomothetic goals. Barnhofer et al. (2007) propose that rigidly held attitudes whereby people self-impose high performance standards can be dysfunctional because perceived discrepancies between these and current performance are likely to be detected. The authors
found that in response to AMT cues thought to reflect the dysfunctional attitude, “need for approval”, PDs retrieved fewer specific AMs, compared to NDs. This between-person relationship was not detected in response to standard AMT cues. Raes et al. (2012) found higher levels of rumination to be associated with fewer specific AMs following, but not before, a self-discrepancy induction whereby PDs were asked to rate how closely a list of pre-selected characteristics matched their A-I self-guides. The use of a self-discrepancy induction in addition to AMT cues presumed to induce self-discrepant focus increased the likelihood that self-discrepancy was activated. Therefore, this finding strengthens the evidence provided by Barnhofer et al. (2007) for a positive association between nomothetic self-discrepancies and OGM amongst clinical samples. These moderate associations (Cohen, 1992) provide evidence at the within- and between-person level.

Conversely, Schoofs et al.’s (2013) study 2 found no difference in the proportion of specific or categoric AMs retrieved between CDs who received a self-discrepancy induction and those who did not. Like Raes et al. (2012), Schoofs et al. (2013) used self-discrepancy inductions in addition to self-discrepant AMT cues. This consideration along with Schoofs et al.’s (2013) null findings weakens the evidence for a positive association between nomothetically conceptualised self-discrepancies and OGM amongst clinical samples, at the between-person level.

Three of the eight studies which elicited discrepancies of nomothetic goals utilised the MI-AMT, which Griffith et al. (2012) suggest measures memory style, or the tendency to retrieve AMs in a more or less specific way, rather than the ability to retrieve specific AMs, which the AMT is thought to
measure (Dalgleish et al., 2007). The absence of participant instructions and therefore decrease in executive functioning demands, may increase the sensitivity of the MI-AMT to detect an OGM retrieval style (Griffith et al., 2012). Thus, these studies might reflect more valid measures of OGM.

Schoofs et al. (2012) and Smets et al. (2013) found evidence for a positive association between nomothetic self-discrepancies and OGM amongst secondary school students. Using quasi-experimental designs Schoofs et al.’s (2012) studies 1 and 2 found that after controlling for depressive symptoms, a greater proportion of specific and lower proportion of categoric AMs were retrieved in response to low- compared to high self-discrepant cues. These within-person associations were medium (Cohen, 1992). At the between-person level, Smets et al. (2013) found depressive symptomatology to be negatively associated with number of specific AMs and positively associated with number of categoric AMs, following but not before a self-discrepancy induction.

Also using a non-clinical sample, Schoofs et al.’s (2013) study 1 found no difference in the proportion of either specific or categoric AMs retrieved between undergraduates who received a self-discrepancy induction and those who did not. However, a theoretical weakness of the authors’ studies is that participant omissions were ignored in AM specificity calculations. This approach has been advised against because omissions have been found to represent non-specific content rather than true absences of AM (Crane et al., 2007; Raes et al., 2012).

Therefore, on balance, these findings illustrate that when self-discrepancies are nomothetically conceptualised a positive association with
OGM can be detected amongst non-clinical samples using the MI-AMT. Smets et al. reported a low effect size suggesting that this association was stronger at the within- than between-person level (Cohen, 1992).

**Discrepancy of Idiographic Goals**

It has been argued that because perceived self-discrepancy is subjective and because the SMS contains idiographic representations of goals and self-guides, idiographic methodologies are more valid than nomothetic methodologies (Conway, 2005; Rogers, 1961). Therefore, findings from the following four studies hold more theoretical weight than those studies which conceptualised self-discrepancies nomothetically.

Crane et al. (2007) defined self-discrepancy as AMT cues that were self-relevant i.e., cues matching participant-generated A-I, A-O and A-F self-guides. At the between-person level, it was found that amongst PDs, compared to NDs, number of self-relevant cues was negatively correlated with number of specific AMs retrieved. Also at the between-person level, van den Broeck et al. (2012) found that amongst CDs, but not non-depressed individuals, with BPD, proportion of specific AMs retrieved using the AMT was negatively associated with cue self-discrepancy. Both findings were large effect sizes (Cohen, 1992). These findings provide strong support for a positive association between idiographic self-discrepancies and OGM amongst clinical samples.

Wessel et al. (2014) found that both PDs and NDs retrieved a greater number of specific AMs in response to affective AMT cues compared to self-discrepant cues. This association was medium (Cohen, 1992), thus extending moderate support for a positive association between idiographic self-
discrepancies and OGM amongst non-clinical samples at the between-person level. Ono and Devilly (2014) found support for an association amongst non-clinical samples at the within-person level. They found participant distress relating to A-F self-guide discrepancies to be associated with a higher number of general AMs retrieved, in response to the AMT. The association was large (Cohen, 1992). However, this finding may have been conflated by the authors’ inclusion of extended as well as general event level AMs in their categorisation of “general AM”. Extended AMs are not theoretically implicated with the S-CMH (Conway & Pleydell-Pearce, 2000).

Collectively these findings offer strong support for a positive association between ideographically conceptualised self-discrepancies and OGM at the between-person level amongst clinical samples. Support amongst non-clinical samples at the between- and within-person level is weaker.

Goals are more directly implicated within the S-CMH than self-guides or dysfunctional attitudes because they are considered the main organising principle of the SMS. In support of this Moberly and MacLeod’s (2006) study 1 found that specific AMs related to currently pursued goals were retrieved faster by undergraduates than specific AMs unrelated to current goals. Conway (2005) proposes that AMs which challenge the SMS goal-structure represent direct threats to self-coherence, which can result in OGM.

At the within-person level, Moberly and MacLeod’s (2006) studies 1 and 3 found that AM relating to self-concordant goals was no more accessible than AM relating to non-self-concordant goals i.e., goals aligned with the self to a greater or lesser degree, respectively (Ryan & Deci, 2002; Sheldon & Elliot, 1999), at the event specific level. In study 2, at the within-person level, GEK
relating to self-concordant goals was found to be retrieved faster than GEK relating to non-self-concordant goals. The effect size was large (Cohen, 1992).

This finding holds more theoretical weight than studies 1 and 3 which did not address goal-related AM accessibility at the general event level, which is the level at which goal-processing and self-coherence maintenance is implicated within the SMS (Conway & Pleydell-Pearce, 2000). Thus, Moberly and MacLeod’s (2006) findings bolster the evidence for a positive association between discrepancy with respect to idiographic goals and OGM at the within-person level amongst non-clinical samples.

**Summary**

Ten of the 14 studies from the 10 articles reviewed reported positive associations between self-discrepancies and OGM amongst CDs, PDs and non-clinical samples at the within- and between-person level. Overall, these associations were greater amongst clinical compared to non-clinical populations and for studies that conceptualised discrepancy with respect to idiographic goals compared to nomothetic goals. Additionally, these associations were stronger at the between-person level within clinical populations and at the within-person level amongst non-clinical populations. These findings concord with Conway and Pleydell-Pearce’s (2000) S-CMH which suggests that specific AMs representing threats to self- (including goal-) stability, are less likely to be retrieved than non-threatening information.

Conway and Pleydell-Pearce (2000) do not state that the S-CMH operates differently amongst CDs or PDs compared to NDs. Concordant with this, a positive association between self-discrepancies and OGM was found amongst clinical as well as non-clinical populations.
Limitations

Systematic between-study comparisons were difficult due to methodological variations including OGM and self-discrepancy conceptualisation, operationalisation and measurement. A limitation of the AMT is that specific AM "retrieval" may measure semantic knowledge that an event was experienced rather than the subjective experience of reliving, which has been implicated as a relevant feature of AM as it relates to self-coherence maintenance (Griffith et al., 2012; Sutin & Robins, 2008). Studies utilising the AMT/MI-AMT differed in their procedures. Differences in the method of presenting cues and recording responses can influence test results (van Vreeswijk & de Wilde, 2004). The majority of participants across all papers were female, making generalisations to males difficult. The majority of studies reviewed were correlational which means that causation cannot be inferred.

Implications

Findings support the assertions that (a) the S-CMH operates in the same way amongst clinical and non-clinical populations; (b) the association between self-discrepancies and OGM is stronger amongst clinical compared to non-clinical populations. This might suggest the operation of an underlying mechanism amongst CDs or PDs, but not in NDs, that results in larger self-discrepancies. This is concordant with Williams et al. (2007) who theorise that OGM is maintained by rumination, a form of goal-discrepant self-focus, which is commonly experienced by CDs and PDs. Control theories propose that rumination is triggered by perceptions of insufficient goal-progress (Carver & Scheier, 1998; Martin & Tesser, 2006). Thus, rumination both indicates unattained goals and maintains this self-discrepancy focus. Clinically, this
suggests that CD or PD clients may find it harder than NDs to generate specific AMs. The National Institute for Health and Care Excellence (2009) recommends cognitive behaviour therapy (CBT) for treating severe depression amongst adults. A key component of CBT involves recalling AMs that challenge negative core beliefs which are often related to perceived goal failures (Beck, 2011; Crane et al., 2008). The findings of this review suggest that CD or PD clients, who perceive larger self-discrepancies, may struggle to recall specific AMs that challenge (i.e., are discrepant with) their negative core beliefs. Future research is required to first test the theoretical idea that OGM represents an extreme form of normal AM functioning rather than being qualitatively different between clinical and non-clinical populations.

**Conclusion**

This systematic review aimed to explore the association between self-discrepancies and OGM. Despite some difficulty making between-study comparisons due to methodological variation, findings support a positive association between self-discrepancies and OGM amongst CDs, PDs and non-clinical sample at the within- and between-person level. This is concordant with Conway and Pleydell-Pearce’s (2000) S-CMH of OGM which is model of normative AM retrieval. The positive association between self-discrepancies and OGM was stronger amongst clinical samples at the between-person level. Thus, findings suggest that OGM may represent an extreme form of normal AM functioning amongst PDs and CDs. Further research testing this theoretical assumption is required before clinical interventions can be informed.
References


measured by a minimal instructions autobiographical memory test. 

*Memory, 17,* 892-903.


Appendix A. The Adapted, Combined STROBE Checklist

(Vandenbroucke et al., 2007; von Elm et al., 2007) and CONSORT Statement (Moher et al., 2009)

Items from the CONSORT statement appear in italics.

<table>
<thead>
<tr>
<th>Article section</th>
<th>Item number</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title and abstract</strong></td>
<td>1a</td>
<td>Indicate the study’s design with a commonly used term in the title or abstract.</td>
</tr>
<tr>
<td></td>
<td>1b</td>
<td>Provide in the abstract an informative and balanced summary of what was done and what was found. (Structured summary of trial design, methods, results, and conclusions.)</td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td>2</td>
<td>Explain the scientific background and rationale for the investigation being reported.</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>3</td>
<td>State specific objectives, including any prespecified hypotheses.</td>
</tr>
<tr>
<td><strong>Methods</strong></td>
<td>4a</td>
<td>Present key elements of study design early in the paper. (Important changes to methods after commencement (such as eligibility criteria), with reasons.)</td>
</tr>
<tr>
<td></td>
<td>4b</td>
<td>(Important changes to methods after commencement (such as eligibility criteria), with reasons.)</td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td>5</td>
<td>Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
<td>6a</td>
<td>Give the eligibility criteria, and the sources and methods (including dates) of selection of participants. Describe any methods (including dates) of follow-up.</td>
</tr>
<tr>
<td></td>
<td>6b</td>
<td>For matched studies, give matching criteria and number of exposed and unexposed. (How sample size was determined.)</td>
</tr>
<tr>
<td></td>
<td>6c</td>
<td>(The experimental manipulation for each group with sufficient details to allow replication, including how and when they were actually administered.)</td>
</tr>
<tr>
<td><strong>Manipulation</strong></td>
<td>7</td>
<td>(The experimental manipulation for each group with sufficient details to allow replication, including how and when they were actually administered.)</td>
</tr>
<tr>
<td><strong>Variables</strong></td>
<td>8a</td>
<td>Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable. (Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed.)</td>
</tr>
<tr>
<td></td>
<td>8b</td>
<td>(Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed.)</td>
</tr>
<tr>
<td></td>
<td>8c</td>
<td>(Any changes to trial outcomes after the trial commenced, with reasons.)</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
<td>Text</td>
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<td>---------------------------------</td>
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<tr>
<td>Data sources/ measurement</td>
<td>9</td>
<td>For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.</td>
</tr>
<tr>
<td>Bias</td>
<td>10</td>
<td>Describe any efforts to address potential sources of bias.</td>
</tr>
<tr>
<td>Quantitative variables</td>
<td>11</td>
<td>Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why.</td>
</tr>
<tr>
<td>Statistical methods</td>
<td>12a</td>
<td>Describe all statistical methods, including those used to control for confounding.</td>
</tr>
<tr>
<td></td>
<td>12b</td>
<td>Describe any methods used to examine subgroups and interactions.</td>
</tr>
<tr>
<td></td>
<td>12c</td>
<td>Explain how missing data were addressed.</td>
</tr>
<tr>
<td></td>
<td>12d</td>
<td>If applicable, explain how loss to follow-up was addressed or how matching of cases and controls was addressed or describe analytical methods taking account of sampling strategy.</td>
</tr>
<tr>
<td></td>
<td>12e</td>
<td>Methods for additional analyses, such as subgroup analyses and adjusted analyses.</td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participants</td>
<td>13a</td>
<td>Report the numbers of individuals at each stage of the study—e.g., numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups.</td>
</tr>
<tr>
<td></td>
<td>13b</td>
<td>Give reasons for non-participation at each stage.</td>
</tr>
<tr>
<td></td>
<td>13c</td>
<td>Consider use of a flow diagram.</td>
</tr>
<tr>
<td>Descriptive data</td>
<td>14a</td>
<td>Give characteristics of study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders.</td>
</tr>
<tr>
<td></td>
<td>14b</td>
<td>Indicate the number of participants with missing data for each variable of interest. A table showing baseline demographic and clinical characteristics for each group.</td>
</tr>
<tr>
<td></td>
<td>14c</td>
<td>If applicable summarise follow-up time (e.g., average and total amount).</td>
</tr>
<tr>
<td>Outcome data</td>
<td>15a</td>
<td>Report numbers of outcome events or summary measures over time or report numbers in each exposure category, or summary measures of exposure. For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval).</td>
</tr>
<tr>
<td></td>
<td>15b</td>
<td>For binary outcomes, presentation of both absolute and relative effect sizes is recommended.</td>
</tr>
<tr>
<td>Main results</td>
<td>16a</td>
<td>Give unadjusted estimates and, if applicable,</td>
</tr>
</tbody>
</table>
confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included.

16b Report category boundaries when continuous variables were categorized.

16c If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period.

Other analyses

17 Report other analyses done—e.g., analyses of subgroups and interactions.

Harms

18 All important harms or unintended effects in each group.

Discussion

Design

19 Summarise key results with reference to study objectives.

Limitations

20 Discuss limitations of the study, taking into account sources of potential bias or imprecision, and, if relevant, multiplicity of analyses. Discuss both direction and magnitude of any potential bias.

Interpretation

21 Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence. Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence.

Generalisability

22 Discuss the generalisability (external validity) of the study results.

Other information

Funding

23 Give the source of funding and other support and the role of the funders for the present study and, if applicable, for the original study on which the present article is based.
Appendix B. Submission Guidance for Authors from Memory

Manuscript preparation

1. Journal-specific guidelines

- The journal welcomes both single and multi-experiment articles that advance memory theory. The journal also publishes integrative reviews, commentaries, and short reports.
- The style and format of the typescripts should conform to the specifications given in the *Publication Manual of the American Psychological Association* (6th ed.).
- There is no word limit for manuscripts submitted to this journal, except short reports. Short reports are limited to 2,500 to 4,000 words in length (including the abstract, main text, and footnotes).

2. General guidelines

- Manuscripts are accepted in English. British English spelling and punctuation are preferred. Please use double quotation marks, except where “a quotation is ‘within’ a quotation”. Long quotations of words or more should be indented without quotation marks.
- Manuscripts should be compiled in the following order: title page; abstract; keywords; main text; acknowledgements; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figure caption(s) (as a list).
- Abstracts of 150-200 words are required for all manuscripts submitted.
- Each manuscript should have up to 5 keywords.
- Search engine optimization (SEO) is a means of making your article more visible to anyone who might be looking for it. Please consult our guidance here.
- Section headings should be concise.
- All authors of a manuscript should include their full names, affiliations, postal addresses, telephone numbers and email addresses on the cover page of the manuscript. One author should be identified as the corresponding author. Please give the affiliation where the research was conducted. If any of the named co-authors moves affiliation during the peer review process, the new affiliation can be given as a footnote. Please note that no changes to affiliation can be made after the manuscript is accepted. Please note that the email address of the corresponding author will normally be displayed in the article PDF (depending on the journal style) and the online article.
- All persons who have a reasonable claim to authorship must be named in the manuscript as co-authors; the corresponding author must be authorized by all co-authors to act as an agent on their behalf in all matters pertaining to publication of the manuscript, and the order of names should be agreed by all authors.
- Biographical notes on contributors are not required for this journal.
Please supply all details required by any funding and grant-awarding bodies as an Acknowledgement on the title page of the manuscript, in a separate paragraph, as follows:

- **For single agency grants:** "This work was supported by the [Funding Agency] under Grant [number xxxx]."
- **For multiple agency grants:** "This work was supported by the [Funding Agency 1] under Grant [number xxxx]; [Funding Agency 2] under Grant [number xxxx]; and [Funding Agency 3] under Grant [number xxxx]."

Authors must also incorporate a Disclosure Statement which will acknowledge any financial interest or benefit they have arising from the direct applications of their research.

For all manuscripts non-discriminatory language is mandatory. Sexist or racist terms must not be used.

Authors must adhere to SI units. Units are not italicised.

When using a word which is or is asserted to be a proprietary term or trade mark, authors must use the symbol ® or TM.

### 2. Style guidelines

- Description of the Journal’s reference style.
- Guide to using mathematical scripts and equations.
- Word templates are available for this journal. If you are not able to use the template via the links or if you have any other template queries, please contact authortemplate@tandf.co.uk.
- Authors must not embed equations or image files within their manuscript.

### 3. Figures

- Please provide the highest quality figure format possible. Please be sure that all imported scanned material is scanned at the appropriate resolution: 1200 dpi for line art, 600 dpi for grayscale and 300 dpi for colour.
- Figures must be saved separate to text. Please do not embed figures in the manuscript file.
- Files should be saved as one of the following formats: TIFF (tagged image file format), PostScript or EPS (encapsulated PostScript), and should contain all the necessary font information and the source file of the application (e.g., CorelDraw/Mac, CorelDraw/PC).
- All figures must be numbered in the order in which they appear in the manuscript (e.g., Figure 1, Figure 2). In multi-part figures, each part should be labelled (e.g., Figure 1(a), Figure 1(b)).
- Figure captions must be saved separately, as part of the file containing the complete text of the manuscript, and numbered correspondingly.
- The filename for a graphic should be descriptive of the graphic, e.g., Figure1, Figure2a.
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There is no submission fee for Memory.

Page charges
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Colour figures will be reproduced in colour in the online edition of the journal free of charge. If it is necessary for the figures to be reproduced in colour in the print version, a charge will apply. Charges for colour figures in print are £250 per figure ($395 US Dollars; $385 Australian Dollars; 315 Euros). For more than 4 colour figures, figures 5 and above will be charged at £50 per figure ($80 US Dollars; $75 Australian Dollars; 63 Euros).

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Effect of Goal Discrepancy Rumination on Overgeneral Memory

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Abstract

Objective: This study aimed to test predictions made by the self-memory system (SMS) model (Conway & Pleydell-Pearce, 2000), extensions of Williams et al.'s (2007) “capture and rumination” (CaR) mechanism (Debeer, Hermans, & Raes, 2009) and control theories of rumination (Martin & Tesser, 1996, 2006) in a non-clinical sample to further understand the processes underlying overgeneral memory (OGM). It was hypothesised that (i) ruminating on unresolved goals, compared to thinking about resolved goals, would increase OGM, in participants reporting high levels of trait brooding and (ii) that this effect would be greater following goal-cues that are derived from goal cues rated as (a) more important compared to those rated as less important; (b) more progress-discrepant compared to those rated as less progress-discrepant; (c) more relevant to unresolved goals compared to those that are rated as less relevant to unresolved goals.

Method: A between-subjects factor of condition (resolved versus unresolved goal-focus induction) and a within-subjects factor of time (pre- and post-manipulation Minimal Instruction Autobiographical Memory Test [MI-AMT; Debeer et al., 2009]) design was utilised with 75 undergraduate and three masters psychology students (86.3 % female [n = 65]; age, M = 20.2 years, range = 18-43, SD = 4.9) from the University of Exeter. The MI-AMT was used to measure autobiographical memory (AM) specificity before and following a manipulation whereby participants were randomly assigned to either a control condition in which participants focussed on a resolved goal or an experimental condition which was designed to induce rumination about an unresolved (i.e., self-discrepant) goal. MI-AMT cues were adjectives relating to nomothetic
Results: Hierarchical multiple regression analyses found neither an overall effect of condition nor an interaction between condition and brooding on AM specificity. Thus, induced rumination over unresolved goals did not lead to higher levels of OGM than induced focus on resolved goals amongst individuals high in trait brooding. Multilevel hierarchical regression found that the extent to which people high on brooding were less specific in the unresolved condition did not depend on the importance or progress-discrepancy ratings of the goal-statements from which the MI-AMT cues were developed, nor on the relevance of the goal-cues to the concern identified in the goal cueing task. Goal-cue relevance ratings showed a significant main effect on AM specificity qualified by an interaction with condition whereby participants reported decreasingly specific AMs in response to cues related to the concern after the resolved goal manipulation.

Conclusion: These null findings suggest that rumination over unresolved goals may not increase OGM amongst non-clinical samples. A replication of this study should utilise state rumination checks to ensure that the goal cueing task successfully differentially induced state rumination between conditions. Further exploration of the role of reflection might elucidate which qualities of rumination are positively associated with OGM but not present in rumination about unresolved goals. Given that Williams et al.’s CaR mechanism was constructed to understand OGM in clinical depression, a replication of this study using a clinical sample may be a useful next step in testing predictions made by this theory.
Keywords: Autobiographical memory, depression, goals, overgeneral memory, rumination, self-discrepancy.
Introduction

When asked to recall specific autobiographical memories (AMs), previously depressed individuals (PDs) and currently depressed individuals (CDs) are likely to generate overgeneral memories (OGM), which are generic summaries of general events (Williams et al., 2007). OGM has been found to predict depressive symptomology (Gibbs & Rude, 2004; Mackinger, Pachinger, Leibetseder, & Fartacek, 2000). A greater understanding of the mechanisms underlying OGM may contribute towards more clinically effective assessment, prevention and treatment of depression (Moore & Zoellner, 2007). Theories have suggested that OGM may result (a) from attempts to prevent threats to self-coherence posed by recalling specific AM (Conway, 2005); (b) when CDs or PDs engage in brooding: abstract negative repetitive thought focused on self-discrepancies (Debeer et al., 2009). Goal-progress discrepancies are theorised to result in rumination (Martin & Tesser, 1996, 2006). This study investigated whether induced rumination about unresolved goals would lead to OGM in individuals high in trait brooding.

AM has been defined as the recall of self-related past events that contribute to an individual’s sense of self and goal pursuit (Brewer, 1986; Nelson & Fivush, 2004). Goals can be defined as mental representations of desired future self-states that motivate individuals to reduce perceived discrepancies between these and the current self-state (Austin & Vancouver, 1996; Cantor & Kihlstrom, 1986; Kanfer, 1970, 1977). By reminding individuals about goal attainments and failures, specific AMs motivate self-regulation (Karniol & Ross, 1996; Pillemer, 2003; Tulving, 1983). It has been suggested that perceived discrepancies between the past-self and present-self may lead
to altered AM recall in order to promote self-coherence (Conway, 2005; Swann & Bosson, 2010; Wilson & Ross, 2003). Conway, Meares and Standart (2004a) propose that by retaining information in an abstract, rather than detailed format, AM can provide a (a) sufficiently accurate record of goal processing to inform self-regulation; (b) temporally coherent sense of self.

Conway and Pleydell-Pearce’s (2000) self-memory system (SMS) model proposes that AMs contain abstract knowledge derived from goals which informs goal-progress, and thus, self-coherence. Reconstruction of AMs involves retrieval across three hierarchically organised levels of specificity (Figure 1). At the most general level, individuals’ lifetime periods reflect the pursuit of particular overarching goals, e.g., “When I lived with John”. More specific are general events, defined as categories of events linked across time periods, e.g., “Holidays in Spain”. Event specific knowledge (ESK) represents specific knowledge of particular events and includes sensory-perceptual details (Conway, 2001), e.g., “Seeing that red dress when I went to Sarah’s party last Saturday”. OGM results when the retrieval process stops at a more general level instead of progressing to ESK.
AM retrieval results from interaction between three SMS structures: the long-term self, the episodic memory system and the working self (Figure 2). The long-term self encompasses the autobiographical knowledge base, containing lifetime periods and general events, and the conceptual self, which includes goals and self-guides (Conway et al., 2004a; Conway, 2005). Specific AM formation requires coordinated retrieval between the long-term self and episodic memory system, which contains sensory-perceptual information. This process is overseen by the working self, which monitors goal progress and maintains self-coherence by regulating the construction, retention and accessibility of AM (Conway, 2005). If recalling a specific AM is likely to cause self-discrepancy, such as awareness of distance between perceived current
circumstances and desired goals (Crane, Barnhofer, Visser, Nightingale, & Williams, 2007a), the working self re-directs information processing within the long-term self in order to maintain self-coherence (Conway, 2005). This aborts the hierarchical search process for a specific AM at a more general level, which can result in OGM (Conway, Singer, & Tagini, 2004b).

![Diagram of the self-memory system](image)

Figure 2. The self-memory system (Crane, Barnhofer, & Williams, 2007b).

In support of Conway and Pleydell-Pearce’s (2000) theory of OGM is evidence demonstrating a positive association between self-discrepancies and OGM amongst CDs and PDs (Raes, Schoofs, Griffith, & Herman, 2012; van den Broeck, Claes, Pieters, & Raes, 2012) and non-depressed individuals (Ono & Devilly, 2013). Studies measuring idiographic goal-discrepancies have reported larger effect sizes than nomothetic goal-discrepancies (Crane et al., 2007b; Wessel et al., 2014), suggesting that self-discrepant information which maps onto the conceptual self is likely to threaten self-coherence, and thus result in OGM.
Compatible with the SMS model, Williams (2006) suggests that “capture and rumination” (CaR) may be one mechanism underlying OGM. Rumination, a response to sad mood associated with depression (Nolen-Hoeksema, 2004), is suggested to involve the activation of abstract, evaluative negative self-concepts and perceived self-discrepancies (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Watkins, 2008; Valentino, 2011). Antithetical to active problem-solving, depressive rumination is thought to prolong distress (Nolen-Hoeksema et al., 2008). According to CaR models, conceptual self-representations are highly elaborated and therefore easily activated amongst PDs or CDs, via state (depressive) rumination (Raes et al., 2012). Consequently, CDs or PDs are more likely to remain, or become “captured”, at a more conceptual, general level of retrieval instead of moving down the SMS hierarchy to access ESK (Sumner, 2012). Supporting CaR, there is research suggesting that OGM and depressive rumination are positively associated and mutually reinforce one another (Raes et al., 2005; 2006a; Raes, Hermans, Williams, Geypen, & Eelen, 2006b). Additionally, both appear to be vulnerability markers for depression, rather than being mood-dependent, in that they can be detected in PDs who are no longer depressed (Raes et al., 2006b; Park, Goodyer, & Teasdale, 2002).

Treynor, Gonzalez, and Nolen-Hoeksema (2003) found support for a two-factor model of rumination comprising the components reflection and brooding. The authors define brooding as “...passive comparison of one’s current situation with some unachieved standard” that is more evaluative and conceptual in nature than reflection, which is defined as “...turning inward to engage in cognitive problem solving...”. Brooders are thought to be more
susceptible to capture because such abstract thinking strengthens connections between conceptual self-relevant information (Sumner et al., 2014). Support for this assertion comes from findings that inducing analytic rumination maintains OGM, whilst non-ruminative experiential processing reduces it, amongst CDs (Watkins & Teasdale, 2001, 2004) and non-depressed individuals (Raes, Watkins, Williams, & Hermans, 2008). That analytic and experiential manipulations have similar effects on levels of self-focus suggests that OGM cannot be explained by level of self-focus alone, but rather by the form of self-processing (Watkins & Moulds, 2005; Watkins & Teasdale, 2004). Empirical findings suggest that brooding is a maladaptive component of rumination that predicts depression (Burwell & Shirk, 2007; Lo, Ho, & Hollon, 2008; O’Connor & Noyce, 2008). Only two studies have investigated the relationship between brooding and OGM following self-discrepant AM cues (Schoofs, Hermans, Griffith, & Raes, 2013; Wessel et al., 2014). Neither reported significant associations amongst CDs, PDs or non-depressed individuals. The authors attributed these null findings to not having activated large enough self-discrepancies.

The response style theory conceptualisation of rumination differs from that offered by self-regulation theories (e.g., Martin & Tesser, 2006; Pyszczynski & Greenberg, 1987), which suggest that, initiated by perceived goal-discrepancies, rumination is a form of repetitive thought whose function is to continuously re-direct individuals’ attention back to goal-progress in order to resolve the discrepancy (Martin, Shriya, & Startup, 2004). Control theories focus on the rate at which self-discrepancies, perceived in terms of rates of goal progress, are reduced (Carver & Scheier, 1998). For example, Martin and
Tesser's (1996, 2006) goal-progress model proposes that goal progress and goal importance jointly predict rumination. They assert that perceived discrepant-from-desired goal progress triggers ruminative thoughts, which endures until satisfactory goal progress is resumed or the goal disengaged from. The model proposes that ruminative intensity is proportional to subjective goal importance and that rumination is likely to be cued by goal-related references in the environment. Studies have demonstrated positive associations between perceived lack of goal progress and rumination (Lavallee & Campbell, 1995; Moberly & Watkins, 2010; Roberts, Watkins, & Wills, 2013) and that constructs related to unattained goals are more accessible than those related to attained goals (Aarts & Dijksterhuis, 2000; Förster, Liberman, & Higgins, 2005). As yet, no studies have investigated the relationship between OGM and rumination, or brooding, in conjunction with goal progress-discrepancy. Rumination, as suggested by Martin and Tesser (2006) and Watkins (2008), is not necessarily adaptive or maladaptive. Brooding, however, is considered to be a maladaptive form of abstract self-discrepant focus (Treynor et al., 2003). Thus, when confronted with a goal-discrepancy, a person high in brooding might display increased OGM.

AM has been considered to be central to self-coherence and self-regulation (Nelson & Fivush, 2004; Williams, 2006). According to the SMS model, the retrieval of specific information is prevented if doing so is likely to cause self-discrepancy. Rather than changes in level of self-focus, brooding is also theorised to capture attentional processing at a more abstract level of AM retrieval, thereby preventing specific AM retrieval (Williams et al., 2007; Debeer et al., 2009). Because cueing an important and relevant unresolved
goal would risk the detection of self-discrepant to-be-recalled information, the re-direction of attentional processing to a more general event level within the SMS model would prevent specific AM construction and instead result in OGM. This would be most likely to occur amongst high brooders, whose abstract self-discrepant focus is theorised to capture attention at this more abstract level of AM retrieval. Although there is evidence supporting an association between self-discrepancies and OGM, no studies have yet tested the notion that ruminating about unresolved goals results in higher levels of OGM for higher trait brooders. Furthermore, this study aimed to test the prediction derived from the SMS model, that OGM would be particularly likely in relation to AMs relating to goals that were higher in importance, self-discrepancy and relevant to the ruminative concern. Hypotheses were:

1. Ruminating on unresolved goals, compared to thinking about resolved goals, will increase OGM, but only in participants reporting high levels of trait brooding.

2. This effect will be greater following goal-cues that are (a) derived from goals rated as more important compared to those rated as less important; (b) derived from goals rated as more progress-discrepant than those rated as less progress-discrepant; (c) more relevant to the ruminative concern compared to those that are rated as less relevant to the ruminative concern.

Method

Participants

Seventy-five undergraduate and three masters psychology students were recruited (86.3% female [n = 65]; age, M = 20.2 years, range = 18-43,
SD = 4.9). Inclusion criteria were (a) having English as a native language; (b) age between 18 and 60 years. An opportunity sample of students was recruited from the University of Exeter and remunerated with course credits and/or money. One hundred and ten participants were initially recruited; two dropped out during phase one, eight were excluded following phase one because English was not indicated as their native language and 22 chose not to complete phase two. Forty participants were randomised to the experimental condition and 38 to the control condition. Due to a lack of research utilising similar designs to the current study,

Due to a lack of previous research using comparable designs on which to base estimates of effect sizes, the study was powered to detect a medium effect size according to Cohen (1992). Therefore, for hypothesis 1, the effect size for the test of the increase in $\Delta R^2$ associated with the entry of the condition x trait brooding interaction in multiple regression was, $f^2 = .15$. Hypothesis 2 was a test of the condition x trait brooding x goal variable interaction in a binary multilevel regression. Power calculations for binary multilevel models are complex but, Moineddin, Matheson and Glazier (2007) suggest that a minimum sample size of 100 for level 1 and a minimum sample size of 50 for level 2 for multilevel regression reduces the risk that the standard errors of the variance component estimates are underestimated. For hypothesis 2 these criteria were met because the level 1 (goal-level) sample size was 1248 and the level 2 (person-level) sample size was 78. Hypothesis 2 was at the goal-level and therefore, although goals were clustered within participants, power was expected to be higher for the test of hypothesis 2 than
the test of hypothesis 1 because there were a larger number of goals than participants.

**Design**

The experiment had a between-subjects factor of condition (resolved versus unresolved goal-focus induction) and a within-subjects factor of time (pre- and post-Minimal Instruction Autobiographical Memory Test [MI-AMT; Debeer et al., 2009]). Outcome variables were OGM, mood (happiness and sadness ratings) and level of self-focus. Predictor variables were (at the between-person level) trait brooding and (at the within-person level) ratings of (a) goal-statement importance; (b) goal progress-discrepancy; (c) relevance of goal-cues to concerns identified in the experimental manipulation.

**Measures**

**Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996).** The BDI-II measures severity of depressive symptoms experienced during the preceding two weeks. It is a well-established, well-validated and reliable 21-item self-rated questionnaire (Dozois, Dobson, & Ahnberg, 1998; Sprinkle et al., 2002). Item responses range from 0 to 3. Responses are summed to generate an overall score (range = 0–63); higher scores indicating more severe depressive symptoms. Cronbach’s alpha was .93 in this study.

**Ruminative Responses Scale-Brooding (RRS-B; Treynor et al., 2003).**

Trait brooding was measured using five items from Response Styles Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991). Responses range from 1 (almost never) to 4 (almost always) for whether participants “generally” focus attention on negative or self-blaming thoughts, such as “Why do I always react this way?” when feeling sad or depressed (Appendix A1). This sub-
component of the measure has been found to be particularly strongly predictive of future depressive symptoms (Treynor et al., 2003). The authors reported the alpha for this subscale as .77 and the two-year test re-test correlation as .62. The RSQ has acceptable construct validity, high internal consistency and good test-retest reliability (Nolen-Hoeksema & Morrow, 1991). The five items of the RRS identified by Treynor et al. (2003) were summed to form an index of brooding. Cronbach’s alpha was .85 in this study.

**Generation of memory cues.** Eight goals that spanned a range of content domains were selected from Chulef, Read and Walsh’s (2001) taxonomy of personal goals. Goal statements were generated from these by the experimenter (Appendix A2):

1. have an intimate romantic relationship.
2. have good relations with my family.
3. look physically attractive.
4. maintain good friendships.
5. be in touch with my spirituality.
6. live according to moral principles.
7. appreciate the creative arts.
8. get a good education.

Following this, one pair of corresponding goal-cues was generated, to be used as MI-AMT cues, for each goal-statement. Each set of eight goal-cues was randomised and counterbalanced across the MI-AMT pre- and post-manipulation.

**Minimal Instruction Autobiographical Memory Test (MI-AMT; Debeer et al., 2009).** Whilst the majority of research has investigated OGM using the
Autobiographical Memory Test (AMT; Williams & Broadbent, 1986), the MI-AMT was utilised because it has been found to be a more sensitive and valid instrument in high-functioning non-clinical samples (Debeer et al., 2009; Griffith et al., 2009). In both versions, participants are asked to generate an AM within 60 seconds in response to single cue words (Appendix A3). Unlike the AMT, the MI-AMT does not explicitly instruct participants that AMs should be specific. No examples of correct responses are given, nor practice items provided. Responses are written by participants in A4 booklets: one page per cue word and AM. Participants were asked to score their AMs after each MI-AMT administration in accordance with Debeer et al.’s (2009) scoring procedure: specific (lasting less than a day), categoric (summarised events), extended (lasting longer than one day), semantic associates (verbal responses containing no AM), or omission (no response). Responses were later scored by the experimenter, blind to condition. An independent judge scored one third of the total AMs. Inter-rater reliability indicated good agreement (kappa = .82). Where experimenter and judge disagreed, participants' own scoring was used.

**Goal cueing task.** A goal-cueing task previously used by Roberts et al. (2013) was administered as an effective means of establishing the concerns that trigger rumination within a student population. In the experimental condition, participants were asked to identify an ongoing, unresolved concern that had repeatedly come to mind and caused feelings of sadness or stress during the preceding week. In the control condition, participants were asked to identify a concern that had previously caused distress, but had since been resolved. In both conditions, “concerns” are thought to represent goals.
Examples of appropriate concerns are provided. Participants are asked to briefly outline the identified concern so that the experimenter can verify their understanding. On six 9-point Likert-type scales, participants rated the identified problem in terms of (a) the extent to which it was personally important; (b) the extent to which it was currently bothersome; (c) the extent to which it had been bothersome at the time it was worst; (d) how much it had been thought about during the previous week; (e) how long it had been a difficulty; (f) how much it related to more general personal concerns. Over headphones, participants then listened to a pre-recorded, guided, 10 minute script designed to induce state focus on either the unresolved (experimental condition) or resolved (control condition) concern. An example script item from the unresolved condition: “Focus on what about this problem/difficulty bothers/troubles you”. An example from the resolved condition: “Think about how the problem/difficulty is now resolved” (full text in Appendix A4). The unresolved and resolved conditions were designed to directly contrast the impact of self-focus on resolved and unresolved goals, thereby manipulating self-discrepancy and rumination. Focus on unresolved goals has been found to increase rumination relative to focus on unresolved goals (Roberts et al., 2013).

**Goal-statement importance ratings.** A 7-point Likert-type item was used to rate the importance of each of the eight goal-statements: “Please rate the following goals in terms of how important they are to you”. Scores ranged from 1 (*extremely unimportant*) to 7 (*extremely important*).  

**Progress towards goal-statement ratings.** A 7-point Likert-type item was used to rate perceived progress towards each of the eight goal-
statements: “How much progress do you think you are making towards this goal?” Scores ranged from 1 (none at all) to 7 (very great).

**MI-AMT (Debeer et al., 2009) goal-cue relevance ratings.** A 7-point Likert-type item was used to rate the relevance of each of the 16 MI-AMT goal-cues to the personal concern identified in the goal cueing task (Appendix A5). Scores ranged from 1 (irrelevant) to 7 (highly relevant). Across the 16 goal-cues, average relevance ratings for each of the eight cue pairs corresponding with the eight goal-statements were collapsed to create eight mean goal-cue relevance scores per participant. As intended, no statistically significant difference was found between participants’ goal-cue relevance ratings between two cue sets, $t = 1.05$.

**Mood ratings.** Three 7-point Likert-type scale ratings were collected on five occasions to measure participant state (a) happiness; (b) sadness; (c) self-focus (Appendix A6). Responses ranged from 1 (not at all) to 7 (very).

**Procedure**

The study was implemented in two phases (Figure 3). Phase one was administered online at www.psychsurveys.org and lasted approximately 30 minutes: participants completed the BDI-II, RRS-B and completed the ratings for goal-statement importance and progress. Phase two occurred approximately one week later on campus using E-Prime software (Psychology Software Tools, 2012). Participation took approximately one hour. First, participants completed mood (happiness and sadness) and self-focus ratings. The first MI-AMT was then administered, followed by ratings of mood and self-focus. Following this participants were randomly allocated to either the unresolved or resolved condition of the goal cueing task, which they
completed. Participants then completed mood and self-focus ratings, followed by the second MI-AMT. After this participants completed mood and self-focus ratings, followed by the MI-AMT goal-cue relevance to concern ratings. Finally, participants completed a five minute mood neutralisation exercise (Appendix A7) and mood and self-focus ratings for the final time.
Figure 3. A flowchart illustrating the procedure.
Data Screening

All screening and statistical procedures were performed on the data for the 78 participants who completed phases one and two. For the continuous data, outliers were detected by inspecting z-scores, descriptive data, and distributions using stem and leaf plots, and histograms. No outliers were detected for RRS-B (brooding) scores. In order to more easily interpret effects RRS-B scores were mean centred. BDI-II scores were \( \log_{10} \) transformed to correct for skewed distribution, which also removed all outliers. After screening, data for all 78 participants were retained for analysis (Appendix B1).

Analytic Strategy

Equivalence between conditions was checked using \( t \)-tests and chi-squared tests. Moderated multiple regression and tests of simple slopes were utilised to test the first hypothesis. For the second hypothesis multilevel regression was used because it allowed an examination of associations between goal characteristics and AM specificity at the within-person level whilst taking into account the non-independence of each participant’s AMs (Khan & Shaw, 2011). Where data are nested, multilevel modelling (MLM) provides better parameter estimates than ordinary least squares (OLS) methods (Nezlek, 2007). To provide ‘pure’ estimates of within-person associations that were uncontaminated by between-person differences, all goal-level variables were centred around the person-means (Enders & Tofigi, 2007) and all individual difference variables were grand-mean-centred. In a hierarchical multilevel regression model predicting AM specificity post-manipulation, AM specificity pre-manipulation was entered in step one.
Depressive symptoms and brooding were entered in step two. Condition (unresolved versus resolved) was entered in the third step. To test hypothesis 1, an interaction between brooding and condition was entered at the fourth step. Within the MLM, ratings of (a) goal importance; (b) goal progress-discrepancy; (c) goal-cue relevance to concern were entered in three different models to examine whether each of these variables would explain significant additional variance at the within-person level. In each model two-way interactions involving each of the three goal-level variables with condition and brooding, as well as two-way interactions between condition and brooding were then included. In the final step, each model included a three-way interaction between condition, brooding and the particular goal-level variable, thereby testing hypothesis 2. All statistical tests are two-tailed and the .05 level is used for statistical significance.

**Operationalisation of AM Specificity**

For the OLS regression, AM specificity was operationalised both as number of specific AMs retrieved and (inversely) number of categoric AMs retrieved because (a) this is in line with previous research (e.g., Raes et al., 2012; Smets, Griffith, Wessel, Walschaerst, & Raes, 2013); (b) research has shown that OGM in depression does not depend on extended AMs (Williams & Dritschel, 1992). For the logistic MLM AM specificity was operationalised as number of specific AMs using a binary scoring system (coded “0” for nonspecific and “1” for specific).

**Results**

Independent samples t-tests and chi squared tests revealed no significant demographic or baseline variable differences between the
unresolved or resolved conditions (Table 1). Participant goal cueing task concern ratings, and mood and self-focus ratings are reported in Appendices B2 and B3, respectively.

Table 1

Descriptive Characteristics for Participants

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<tr>
<th></th>
<th>Unresolved (n = 40)</th>
<th>Resolved (n = 38)</th>
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<th>p</th>
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<td>20.11 (4.84)</td>
<td>-.63</td>
<td>.95</td>
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<tr>
<td>Gender (% female)</td>
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<td>2.97</td>
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<tr>
<td>BDI score</td>
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<td>12.45 (11.83)</td>
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<tr>
<td>RRS-B</td>
<td>9.75 (3.66)</td>
<td>10.05 (3.58)</td>
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<td>.71</td>
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<tr>
<td>Person average goal-statement importance ratings</td>
<td>5.23 (.92)</td>
<td>5.45 (.81)</td>
<td>1.08</td>
<td>.28</td>
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<tr>
<td>Person average goal progress-discrepancy ratings</td>
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<td>3.55 (.74)</td>
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<td>.87</td>
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<td>5.08 (.88)</td>
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<td>4.53 (1.11)</td>
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<td>.61</td>
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</tbody>
</table>

Note. Standard deviations are presented between parentheses. Paired sample t-tests revealed no significant differences between the number of specific, categoric or "other" (scored as extended, semantic associates or omissions) AMs retrieved from pre- to post-manipulation amongst participants in either the unresolved or resolved goal condition (Table 2). Between-subjects correlations among depressive symptoms, brooding and AM specificity pre-manipulation (operationalised as number of specific and
categoric AMs) revealed that brooding was not significantly correlated with number of specific or categoric AMs pre-manipulation (Appendix B4). Gender did not correlate with any of these variables and so was not further analysed.
Table 2

*Descriptive Characteristics for the Number of Specific and Number of Categoric and Number of Other AMs Pre- and Post-manipulation in Unresolved and Resolved Conditions*

<table>
<thead>
<tr>
<th></th>
<th>No. spec AMs pre-man</th>
<th>No. spec AMs post-man</th>
<th>t</th>
<th>p</th>
<th>No. cat AMs pre-man</th>
<th>No. cat AMs post-man</th>
<th>t</th>
<th>p</th>
<th>No. other AMs pre-man</th>
<th>No. other AMs post-man</th>
<th>t</th>
<th>p</th>
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<td>1.06</td>
<td>.30</td>
<td>2.45</td>
<td>2.90</td>
<td>-1.42</td>
<td>.16</td>
<td>2.25</td>
<td>2.25</td>
<td>.00</td>
<td>1.00</td>
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<tr>
<td>Resolved</td>
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<td>2.76</td>
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<td>.18</td>
<td>2.47</td>
<td>2.47</td>
<td>.00</td>
<td>1.00</td>
<td>2.26</td>
<td>2.76</td>
<td>-1.76</td>
<td>.09</td>
</tr>
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</table>

*Note.* No. spec = number of specific; No. cat = number of categoric; AMs = autobiographical memories; man = manipulation. Other = all AMs scored as “extended”, “semantic associates” or “omissions”.
**Hypothesis 1. Did People with High Brooding Scores in the Unresolved Goal Condition Recall Fewer Specific AMs After the Manipulation than Other Participants?**

Two hierarchical multiple regression analyses were conducted to assess whether the interaction between brooding (RRS-B scores) and condition (unresolved versus resolved) predicted AM specificity (operationalised as number of specific or number of categoric AMs retrieved) post-manipulation, after controlling for AM specificity pre-manipulation and depressive symptoms (BDI-II score) (Tables 3 and 4).

**Number of specific AMs.** Number of specific AMs retrieved pre-manipulation was entered at step one, explaining 0.3% of the variance in number of specific AMs post-manipulation. This was not statistically significant. In step two, depressive symptoms and brooding scores were entered, explaining an additional 6% of variance, which was not significant. Whilst depressive symptoms was not a statistically significant individual predictor, brooding was statistically significant, $\beta = -.27, p < .05$. Condition was entered in step three, explaining an additional .04% of variance, which was not significant. The critical interaction between condition and brooding at step four explained an additional .1% of variance, which was not statistically significant, failing to support hypothesis 1.
Table 3

Summary of Hierarchical Multiple Regression Analysis to Explore the Association of Number of Specific AMs Pre-manipulation, Depressive Symptoms, Brooding and Condition on Number of Specific AMs Post-manipulation

<table>
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<tr>
<th></th>
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<th>B</th>
<th>ΔR²</th>
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<td>.10</td>
<td>-.05</td>
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<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td>.06</td>
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<tr>
<td>AM specificity pre-manipulation</td>
<td>-.02</td>
<td>.10</td>
<td>-.02</td>
<td></td>
</tr>
<tr>
<td>Depressive symptoms (BDI-II)</td>
<td>.24</td>
<td>.63</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Brooding (RRS-B)</td>
<td>-.12</td>
<td>.06</td>
<td>-.27*</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
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<td>.10</td>
<td>-.03</td>
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</tr>
<tr>
<td>Depressive symptoms (BDI-II)</td>
<td>.25</td>
<td>.64</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Brooding (RRS-B)</td>
<td>-.12</td>
<td>.06</td>
<td>-.27</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>.07</td>
<td>.37</td>
<td>.02</td>
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<tr>
<td>Step 4</td>
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<tr>
<td>Depressive symptoms (BDI-II)</td>
<td>.27</td>
<td>.64</td>
<td>.06</td>
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<tr>
<td>Brooding (RRS-B)</td>
<td>-.10</td>
<td>.08</td>
<td>-.23</td>
<td></td>
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<tr>
<td>Condition</td>
<td>.07</td>
<td>.37</td>
<td>.02</td>
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<tr>
<td>Condition x brooding</td>
<td>-.04</td>
<td>.10</td>
<td>-.06</td>
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</tr>
</tbody>
</table>

*Note.* The overall model was not statistically significant. *p < .05.

**Number of categoric AMs.** Number of categoric AMs pre-manipulation was entered at step one, explaining 2.3% of variance in number of categoric AMs post-manipulation, which was not statistically significant. Depressive symptoms and brooding scores were entered at step two, explaining an additional 3.6% variance. This was not statistically significant. Condition,
entered at step three explained a further 1.7% of variance, which was not statistically significant. Entry of the critical interaction between condition and brooding at step four explained a further 1.6% of variance, which was not statistically significant, failing to support hypothesis 1.

Table 4

Summary of Hierarchical Multiple Regression Analysis to Explore the Association of Number of Categoric AMs Pre-manipulation, Depressive Symptoms, Brooding and Condition on Number of Categoric AMs Post-manipulation

<table>
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<th>B</th>
<th>ΔR²</th>
</tr>
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<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td>.04</td>
<td></td>
</tr>
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<td>AM specificity pre-manipulation</td>
<td>.15</td>
<td>.12</td>
<td>.15</td>
<td></td>
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<tr>
<td>Depressive symptoms (BDI-II)</td>
<td>-.41</td>
<td>.68</td>
<td>-.08</td>
<td></td>
</tr>
<tr>
<td>Brooding (RRS-B)</td>
<td>.10</td>
<td>.06</td>
<td>.22</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td>.02</td>
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</tr>
<tr>
<td>AM specificity pre-manipulation</td>
<td>.15</td>
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<td>.15</td>
<td></td>
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<td>Depressive symptoms (BDI-II)</td>
<td>-.35</td>
<td>.68</td>
<td>-.07</td>
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<tr>
<td>Brooding (RRS-B)</td>
<td>.10</td>
<td>.06</td>
<td>.22</td>
<td></td>
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<tr>
<td>Condition</td>
<td>.44</td>
<td>.39</td>
<td>.13</td>
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<tr>
<td>Step 4</td>
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<td>.02</td>
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<td>AM specificity pre-manipulation</td>
<td>.17</td>
<td>.12</td>
<td>.16</td>
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<td>Depressive symptoms (BDI-II)</td>
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<td>.68</td>
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<td>Brooding (RRS-B)</td>
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<tr>
<td>Condition</td>
<td>.44</td>
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<td>.13</td>
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<tr>
<td>Condition x brooding</td>
<td>.12</td>
<td>.11</td>
<td>.18</td>
<td></td>
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</tbody>
</table>

Note. The overall model was not statistically significant.
Hypothesis 2. Did Participants with High Brooding Scores in the Unresolved Goal Condition Recall Fewer Specific AMs Post-manipulation Than Other Participants, Following AM Cues That Were Rated by Participants as (a) More Important; (b) Having Higher Progress-discrepancy Rates; (c) More Relevant to Unresolved Goals?

A hierarchical multilevel regression model was constructed to explore which goal qualities predicted unique variance in AM specificity post-manipulation, at both the between-person and within-person levels of analysis. To conduct the between-person analysis, person-level predictors were entered first: AM specificity pre-manipulation, depressive symptoms (BDI-II score), brooding (RRS-B score) and condition (unresolved versus resolved). This replicated the previous between-person OLS analysis. Subsequently, for the within-person analysis, AM specificity pre-manipulation was entered as a within-person predictor. Each goal-level predictor was then entered in separate models: (a) goal-statement importance (herein referred to as “goal importance”); (b) goal-statement progress-discrepancy ratings (herein referred to as “goal progress-discrepancy”); (c) goal-cue relevance to the concern identified by participants in the goal cueing task (herein referred to as “goal-cue relevance”). Goal-statement progress ratings were reverse-scored to produce goal-statement progress-discrepancy ratings: higher scores for goal progress-discrepancy indicate lower perceived rates of progress. After each goal-level predictor variable was entered, two-way interactions between this variable and (a) condition; (b) brooding were added, followed by the critical three-way interaction between the goal-level variable, condition and brooding, thereby testing hypothesis 2.
Tables 5 to 7 present summaries of two-level random intercept models exploring the association between AM specificity pre-manipulation, depressive symptoms, brooding, condition and each of the goal-level variables (goal importance, goal progress-discrepancy, or goal-cue relevance) and AM specificity post-manipulation. Each multilevel model specifies a random intercept and a fixed slope for each predictor variable. The $B_0$ coefficient is the fixed intercept and relates mathematically (log of the odds ratio) to the probability, over the whole sample, that a given AM post-manipulation is specific when all predictor variables have the value of zero. The $u_{0j}$ value represents the amount of between-person variability in AM specificity.

**Goal importance ratings.** After person-level predictors (AM specificity pre-manipulation, depressive symptoms, brooding and condition) were added at step one, none predicted statistically significant amounts of variance in AM specificity post-manipulation: AM specificity pre-manipulation, $B = -.03$, SE($B$) = .06, $z = -.50$, $p = .62$, depressive symptoms, $B = -.30$, SE($B$) = .27, $z = -1.10$, $p = .27$, brooding, $B = -.07$, SE($B$) = .03, $z = -1.94$, $p = .054$, and condition, $B = .03$, SE($B$) = .20, $z = .15$, $p = .88$. At step two the two-way interaction between condition and brooding was added which did not explain a statistically significant amount of variance, $B = -.02$, SE($B$) = .05, $z = -.32$, $p = .75$.

Following this, goal-level predictors were added to the model, starting with AM specificity pre-manipulation at step three, which did not explain a statistically significant amount of variance, $B = -.13$, SE($B$) = .20, $z = -.67$, $p = .50$. Next, goal importance was entered at step four, which did explain a statistically significant amount of variance, $B = -.13$, SE($B$) = .06, $z = 2.26$, $p < .05$. At step five a two-way interaction between goal importance and condition was entered.
which did not explain a statistically significant amount of variance, $B = .06$, $SE(B) = .12$, $z = .50$, $p = .61$. An interaction between goal importance and brooding was also entered at this step which did not explain a statistically significant amount of variance, $B = .01$, $SE(B) = .02$, $z = .75$, $p = .45$. Finally, at step six the critical three-way interaction was entered between goal importance, condition and brooding, which did not explain a statistically significant amount of variance, $B = -.009$, $SE(B) = .03$, $z = -.26$, $p = .79$. Failing to support hypothesis 2, the final model (Table 5) indicates that goal importance did not predict unique variance in AM specificity post-manipulation, in participants high in brooding, in the unresolved condition.
Table 5

Summary of Two-level Random Intercept Model Coefficients Exploring the Association of AM Specificity at Pre-manipulation, Depressive Symptoms, Brooding, Condition and Goal Importance on AM Specificity Post-manipulation

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE (B)</th>
<th>z</th>
<th>p (2-tailed)</th>
</tr>
</thead>
<tbody>
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<td><strong>Fixed effects</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Person-level variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM specificity pre-manipulation</td>
<td>.01</td>
<td>.06</td>
<td>.13</td>
<td>.90</td>
</tr>
<tr>
<td>Depressive symptoms (BDI-II)</td>
<td>.03</td>
<td>.32</td>
<td>.10</td>
<td>.92</td>
</tr>
<tr>
<td>Brooding (RRS-B)</td>
<td>-.06</td>
<td>.05</td>
<td>-1.24</td>
<td>.21</td>
</tr>
<tr>
<td>Condition</td>
<td>.03</td>
<td>.20</td>
<td>.15</td>
<td>.88</td>
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<td>Condition x brooding</td>
<td>-.02</td>
<td>.06</td>
<td>-.31</td>
<td>.76</td>
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<td><strong>Goal-level variables</strong></td>
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<tr>
<td>AM specificity pre-manipulation</td>
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<td>.20</td>
<td>-.68</td>
<td>1.50</td>
</tr>
<tr>
<td>Goal importance</td>
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<td>.09</td>
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<td>.06</td>
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<td>.67</td>
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</tr>
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<td>Goal importance x condition x brooding</td>
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<td>.03</td>
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</tbody>
</table>

*Note.* The overall model was not statistically significant. AM specificity pre-manipulation was coded as 0 = not specific, 1 = specific.

**Goal progress-discrepancy ratings.** After person-level predictors (AM specificity pre-manipulation, depressive symptoms, brooding and condition)
were added at step one, none predicted statistically significant amounts of variance in AM specificity post-manipulation: AM specificity pre-manipulation, $B = -0.03$, SE($B$) = .05, $z = -0.50$, $p = .62$, depressive symptoms, $B = -0.30$, SE($B$) = .27, $z = -1.10$, $p = .27$, brooding, $B = -0.07$, SE($B$) = .03, $z = -1.94$, $p = .05$, and condition, $B = .03$, SE($B$) = .20, $z = .15$, $p = .88$. At step two, the two-way interaction between condition and brooding was added, which did not explain a statistically significant amount of variance, $B = -0.02$, SE($B$) = .06, $z = -0.32$, $p = .75$. Following this, goal-level predictors were added to the model, starting with AM specificity pre-manipulation at step three, which did not explain a statistically significant amount of variance, $B = -0.13$, SE($B$) = .20, $z = -0.67$, $p = .50$. Next, goal progress-discrepancy was entered at step four, which did not explain a statistically significant amount of variance, $B = 0.09$, SE($B$) = .05, $z = 1.78$, $p = .08$. At step five, a two-way interaction between goal progress-discrepancy and condition was entered, which did not explain a statistically significant amount of variance, $B = -0.02$, SE($B$) = .10, $z = -0.22$, $p = .83$. An interaction between goal progress-discrepancy and brooding was also entered at this step which did not explain a statistically significant amount of variance, $B = .002$, SE($B$) = .02, $z = -1.3$, $p = .89$. Critically, at step six a three-way interaction was entered between goal progress-discrepancy, condition and brooding which did not explain a statistically significant amount of variance, $B = .03$, SE($B$) = .03, $z = 0.11$, $p = .91$. Failing to support hypothesis 2, the final model indicates that goal progress-discrepancy did not predict unique variance in AM specificity post-manipulation, in participants higher in brooding, in the unresolved condition (Table 6).
Table 6

Summary of Two-level Random Intercept Model Coefficients Exploring the Association of AM Specificity Pre-manipulation, Depressive Symptoms, Brooding, Condition and Goal Progress-Discrepancy on AM Specificity Post-manipulation

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<th>SE (B)</th>
<th>z</th>
<th>p (2-tailed)</th>
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<td>.86</td>
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<td>.32</td>
<td>.09</td>
<td>.93</td>
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<tr>
<td>Brooding (RRS-B)</td>
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<td>.05</td>
<td>-1.24</td>
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<tr>
<td>Condition</td>
<td>.03</td>
<td>.20</td>
<td>.13</td>
<td>.90</td>
</tr>
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<td>.10</td>
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<td>.02</td>
<td>-.95</td>
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<td>.03</td>
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<td>.19</td>
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<td>(.12)</td>
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</table>

*Note.* The overall model was not statistically significant. AM specificity pre-manipulation was coded as 0 = not specific, 1 = specific.
MI-AMT goal-cue relevance to concern ratings. After person-level predictors (AM specificity pre-manipulation, depressive symptoms, brooding and condition) were added at step one, none predicted statistically significant amounts of variance in AM specificity post-manipulation: AM specificity pre-manipulation, $B = -.03$, $SE(B) = .06$, $z = -.50$, $p = .62$, depressive symptoms, $B = -.30$, $SE(B) = .27$, $z = -1.10$, $p = .27$, brooding, $B = -.07$, $SE(B) = .03$, $z = -1.94$, $p = .05$, and condition, $B = .03$, $SE(B) = .20$, $z = .15$, $p = .88$. At step two, the two-way interaction between condition and brooding was added which did not explain a statistically significant amount of variance, $B = -.02$, $SE(B) = .05$, $z = -.32$, $p = .75$. Following this, goal-level predictors were added to the model, starting with AM specificity pre-manipulation at step three, which did not explain a statistically significant amount of variance, $B = -.13$, $SE(B) = .20$, $z = -.67$, $p = .50$. Next, goal-cue relevance was entered at step four, which did explain a statistically significant amount of variance, $B = -.10$, $SE(B) = .05$, $z = -1.98$, $p < .05$. At step five a two-way interaction between goal-cue relevance and condition was entered which also explained a statistically significant amount of variance, $B = .30$, $SE(B) = .12$, $z = 2.79$, $p = .005$. Plotting this interaction (Figure 4), revealed the following pattern: within the resolved goal condition, goal-cue relevance was negatively associated with AM specificity; within the unresolved goal condition, goal-cue relevance was not associated with AM specificity. The slope for resolved condition was significant, $B = -.25$, $SE(B) = .08$, $z = -3.18$, $p < .01$. The slope for unresolved condition was not significant, $B = .05$, $SE(B) = .07$, $z = .67$, $p = .50$. An interaction between goal-cue relevance and brooding was also entered at step five, which did not explain a statistically significant amount of variance, $B = .02$, $SE(B) = .02$, $z =$
Critically, at step six a three-way interaction was entered between goal-cue relevance, condition and brooding, which did not explain a statistically significant amount of variance, $B = -.01$, $SE(B) = .17$, $z = -.08$, $p = .93$. Failing to support hypothesis 2, the final model indicates that goal-cue relevance did not predict unique variance in AM specificity post-manipulation, in participants high in brooding, in the unresolved condition (Table 7).

![Figure 4. AM specificity post-manipulation (log odds) for low and high goal-cue relevance to concern (predicted values plotted when the pre-manipulation AM was non-specific). Goal-cue relevance to concern ratings were centred so that 0 represented the mean. Low and high relevance scores represent less than, and more than, one standard deviation from the mean, respectively.](image-url)
Table 7

Summary of Two-level Random Intercept Model Coefficients Exploring the Association of AM Specificity Pre-manipulation, Depressive Symptoms, Brooding, Condition and Goal-cue Relevance on AM Specificity Post-manipulation

<table>
<thead>
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<th>SE (B)</th>
<th>z</th>
<th>p (2-tailed)</th>
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<tr>
<td>Person-level variables</td>
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<td>AM specificity pre-manipulation</td>
<td>.004</td>
<td>.06</td>
<td>.06</td>
<td>.95</td>
</tr>
<tr>
<td>Depressive symptoms (BDI-II)</td>
<td>.04</td>
<td>.32</td>
<td>.11</td>
<td>.91</td>
</tr>
<tr>
<td>Brooding (RRS-B)</td>
<td>-.05</td>
<td>.05</td>
<td>-1.15</td>
<td>2.71</td>
</tr>
<tr>
<td>Condition</td>
<td>.06</td>
<td>.20</td>
<td>.29</td>
<td>.77</td>
</tr>
<tr>
<td>Condition x brooding</td>
<td>-.02</td>
<td>.06</td>
<td>-.39</td>
<td>.70</td>
</tr>
<tr>
<td>Goal-level variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM Specificity pre-manipulation</td>
<td>-.12</td>
<td>.20</td>
<td>-.54</td>
<td>.59</td>
</tr>
<tr>
<td>Goal cue relevance</td>
<td>-.27</td>
<td>.08</td>
<td>-3.33</td>
<td>.0008</td>
</tr>
<tr>
<td>Goal cue relevance x condition</td>
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<td>.11</td>
<td>1.21</td>
<td>.23</td>
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<tr>
<td>Goal cue relevance x brooding</td>
<td>.02</td>
<td>.02</td>
<td>1.14</td>
<td>.25</td>
</tr>
<tr>
<td>Goal cue relevance x condition x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>brooding</td>
<td>-.01</td>
<td>.03</td>
<td>-.47</td>
<td>.64</td>
</tr>
<tr>
<td>Random effect u_{0j} (SE)</td>
<td>.20</td>
<td>(.12)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. The overall model was not statistically significant. AM specificity pre-manipulation was coded as 0 = not specific, 1 = specific.
Discussion

To the best of the experimenter’s knowledge this is the first study to investigate the relationship between OGM, goal-progress and related ruminative processes as informed by the SMS model (Conway & Pleydell-Pearce, 2000) and control theories of rumination (Carver & Scheier, 1998; Martin & Tesser, 2006). Support for this study’s first hypothesis that, at the between-person level, induced rumination over unresolved goals would lead to higher levels of OGM than induced focus on resolved goals amongst individuals high in trait brooding, was not found. Secondly, this study hypothesised that, at the within-person level, the expected change in AM specificity would be greater for AMs associated with (a) more important goals; (b) goals on which progress is poorer; (c) goals rated as more relevant to the concern identified in a goal cueing task. Support for this hypothesis was not found.

Induced rumination over unresolved goals did not lead to higher levels of OGM amongst individuals high in trait brooding. When operationalised as number of specific AMs, but not categoric AMs, AM specificity following the induction was predicted by brooding, after controlling for AM specificity pre-manipulation and depressive symptoms. Debeer et al.’s (2009) extension of Williams et al.’s (2007) CaR mechanism, suggests that brooding, a subcomponent of rumination, rather than depressive rumination in general, contributes to and maintains OGM due to its self-discrepant nature. That brooding was negatively associated with change in AM specificity regardless of condition (i.e., self-discrepant rumination versus non self-discrepant focus) suggests that an interaction between brooding and processing related to the
self more generally, rather than self-discrepancy, increases AM overgenerality. For example, abstract, analytic forms of rumination in combination with lower levels of differentiation of schematic models of the self has been found to be positively associated with elevated retrieval of categoric AMs (Eldridge, Barnard, & Bekerian, 1994). It has been suggested that avenues for further research on OGM should consider the extent of self-representation differentiation as well as the mode of processing (Barnard, Watkins, & Ramponi, 2006).

MLM was used to explore whether any effect of condition and brooding on AM specificity might be more apparent when taken in combination with MI-AMT goal-cue characteristics. The extent to which people high on brooding were less specific in the unresolved condition was not found to depend on the importance or progress-discrepancy ratings of the goal-statements from which the MI-AMT cues were developed, nor on the relevance of the goal-cues to the concern identified in the goal cueing task. For AMs related to goals that were rated as more important to participants’ identified concerns, there was a statistically significant decrease in specificity following the induction, after controlling for person-level variables and AM specificity pre-manipulation at the goal-level. Thus, being induced to focus on goals (resolved or unresolved) was associated with less specificity of AMs related to important concerns. Research has shown an effect of using the AMT on AM specificity whereby number of AMT trials was positively associated with OGM (Roberts, Carlos, & Kashdan, 2006). Although speculative, it may be that for cues relating to certain types of important goals, all individuals tend to get more or less specific over time when tested with the AMT e.g., for AMs related to more important
goals, individuals may become less specific, the more they retrieve. Alternatively, processing relevant to the self in general (i.e., in both conditions) may be associated with decreases in specificity for AMs related to important goals.

Of the goal-level variables, only goal-cue relevance ratings showed a significant main effect on AM specificity qualified by an interaction with condition. That importance and progress ratings did not show a significant main effect on AM specificity is inconsistent with assumptions that follow from Conway and Pleydell-Pearce’s (2000) theory of OGM: if specific AMs are self-discrepant, the hierarchical AM retrieval process becomes aborted at a more abstract level of specificity in order to maintain self-coherence. Whilst goal-cue relevance ratings were made in relation to participants’ idiosyncratic concerns as identified in the goal cueing task, importance and progress ratings were obtained in relation to the goal-statements presented one week prior to the manipulation. Hence, whilst importance and progress-discrepancy ratings were cue-relevant variables, these did not directly measure the concerns identified in the goal cueing task. It may be that the effects of factors relevant to the manipulation were more powerful than factors relevant to the individual goal-cues. In terms of the significant interaction between goal-cue relevance and condition, participants reported decreasingly specific AMs in response to cues related to the concern after the resolved goal manipulation, whereas no such relationship was observed after the unresolved goal manipulation. This pattern was not expected and contradicts Conway and Pleydell-Pearce’s (2000) self-coherence maintenance theory of OGM. Although speculative, these findings are partly consistent with the Zeigarnik effect whereby specific
representations of AMs relating to goals are less likely to be available following the resolution of those goals (Zeigarnik, 1938). However, this finding awaits replication.

In this study, high brooders did not display increased OGM when induced to ruminate over unresolved goals compared to being induced to focus on resolved goals, when cued by more important and self-relevant goals. Raes et al. (2012) suggests that the activation of state rumination, a form of discrepancy-based processing (Watkins, 2008), enables the detection of a positive association between rumination and OGM amongst PDs and non-clinical samples. State rumination has been found to moderate the association between self-discrepancy and OGM amongst PDs (Crane et al., 2007a). According to Martin and Tesser’s (2006) goal-progress theory, state rumination is predicted to result from perceived insufficient progress towards goals that are more personally important and that rumination is likely to be cued by unresolved goal-related stimuli. The current study did not utilise a measure of state rumination making it impossible to determine whether it was successfully induced by the unresolved goal manipulation. However, findings relating to participants’ mood, self-focus and concern ratings were consistent with those reported by Roberts et al. (2013) suggesting that the task operated as expected. Specifically, participant mood ratings indicated a statistically significant decrease in happiness in the unresolved goal condition compared to the resolved goal condition. This would be expected because negative repetitive thought tends to be associated with exacerbation of negative mood (Watkins, 2008). Roberts et al. (2013) found that the manipulation successfully induced differential state rumination and that this was more pronounced for
individuals higher in trait rumination. It is surprising that number of specific
AMs pre-manipulation did not significantly predict number of specific AMs
post-manipulation. This lowers confidence in the predictive validity of the MI-
AMT. It should also be noted that brooding was not significantly associated
with AM specificity pre-manipulation. This is inconsistent with the literature that
has reported positive associations between brooding and OGM (Romero,
Vasquez, & Sanchez, 2014). These observations strengthen the possibilities
that (a) the methodology used was insufficiently sensitive to detect a
relationship between brooding and OGM; (b) levels of brooding in this non-
clinical sample were not sufficiently extreme to show an effect on OGM.

The null findings of this study may suggest that OGM might be positively
associated with trait brooding only under stressful conditions. Elaborating
control theory, Watkins (2008, 2011) suggests that rumination can be
unconstructive under conditions of stress, whereby individuals are less able to
specify how higher-level reference values translate into subordinate goals and
concrete behaviour, the achievement of which serves to meet the higher-order
goals. Depression, in which OGM is observed, might constitute “stress”.
Perhaps there was no main effect of condition on increases in OGM, an
unconstructive consequence of rumination (Sumner et al., 2014), because the
sample comprised high functioning, non-clinical participants who were likely
more able, than CDs, to specify concrete subordinate goals in order to achieve
their unresolved goals. Perhaps inductions of conditions of more acute stress
or low mood would impair participants’ ability to generate the subordinate
goals necessary for high-order goal attainment and increases in OGM.
The null findings of this study may also suggest that goal-discrepancies among high brooders are unimportant in predicting OGM in non-clinical samples. Although brooding and reflection have been described as maladaptive and adaptive components of rumination respectively (Treynor et al., 2003), conclusions about whether reflection is positively associated with OGM are equivocal (Surrence, Miranda, Marroquin, & Chan, 2009). Subtypes of rumination are not described in Martin and Tesser’s (2006) goal-progress theory. It would be of interest to explore whether high reflectors become less specific when induced to ruminate over unresolved goals as a function of lack of progress on important and/or relevant goals. This would be unexpected because reflection has been conceptualised as a concrete, specific form of self-focus compared to brooding (Watkins, 2008), and so is not directly implicated in Williams et al.’s (2007) CaR mechanism. Additionally, brooding, but not reflection, has been found to mediate the relationship between higher levels of depressive symptoms and OGM in a non-clinical sample (Debeer et al., 2009).

This study has several limitations. The predominantly female student sample limits the generalisability of the results to the wider population. Ros et al. (2013) found a positive association between depressive symptoms and OGM amongst women, but not men and suggested that the role of OGM in depression may be more important in women than in men. Roberts et al. (2013) used the sustained attention to response task (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997) as a valid and sensitive measure of state rumination. The SART was not used in the current study as a manipulation check due to the risk of increased fatigue effects that may have
diluted the manipulation’s influence on AM. However, the use of such a measure would have enabled clearer conclusions about whether state rumination, when activated in high brooding individuals, was associated with increased OGM. Assuming that the manipulation differentially induced state rumination, this would not appear to be the case. A simple, less time-consuming measure than the SART would have been to ask participants to rate the extent to which they were experiencing thoughts about the resolved or unresolved goal, using a Likert-type scale.

The findings of this study are inconsistent with predictions that were derived from an integration of the SMS model (Conway & Pleydell-Pearce, 2000), extensions of Williams et al.’s (2007) CaR mechanism (Debeer, Hermans, & Raes, 2009) and control theories of rumination (Martin & Tesser, 1996, 2006): self-discrepancy was not significantly related to increased OGM as a function of lack of progress on important and/or relevant goals amongst high brooders. This could be because the manipulation did not successfully induce state rumination. Assuming that the manipulation did successfully induce state rumination, these null findings may suggest that rumination over unresolved goals does not predict increased OGM amongst non-clinical samples. Given that Williams et al.’s (2007) theory was constructed to understand OGM in CDs, a replication of this study with a clinical sample would be a useful next step in investigating derivate predictions about the effect of goal-discrepancy rumination on OGM. It would be useful to expand on these preliminary findings because a greater understanding of the relationship between goals and OGM may contribute towards more effective treatments for depression (Moore & Zoellner, 2007).
References


Appendices

A. Additional method measures information

1. Ruminative Responses Scale-Brooding (RRS-B; Treynor et al., 2003)
2. Generation of memory cues
3. Minimal Instruction Autobiographical Memory Test (MI-AMT; Debeer et al., 2009)
4. Goal cueing task (Roberts, Watkins, & Wills, 2013)
5. MI-AMT (Debeer et al., 2009) goal-cue relevance ratings
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7. Mood neutralising exercises

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3. Mood and self-focus ratings
4. Between-subjects variables correlation matrix

C. Participant pack

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   ii. Information sheet for phase two
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   ii. Informed consent form for phase two
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D. Ethics documentation
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2. University ethics approval for survey for generation of memory cues

E. Dissemination statement
Appendix A: Additional Method Measures Information

1. Ruminative Responses Scale-Brooding (RRS-B; Treynor et al., 2003).

People think and do many different things when they feel down, sad or depressed. Please read each of the items below and indicate whether you never, sometimes, often, or always think or do each one when you feel down, sad or depressed. Please indicate what you generally do, not what you think you should do.

<table>
<thead>
<tr>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Think “Why do I always react this way?”
2. Think about a recent situation, wishing it had gone better
3. Think “Why do I have problems other people don’t have?”
4. Think “What am I doing to deserve this?”
5. Think “Why can’t I handle things better?”
2. Generation of memory cues.

The experimenter selected the first 10 conceptually distinct clusters from Chulef, Read and Walsh’s (2001) taxonomy of human goals. Chulef et al. (2001) asked participants to sort goals into piles based on conceptual similarity. The authors found that people rated goals as similarly important to them within the clusters and provided a diagrammatic scale which could be used to measure the conceptual distinctiveness of each cluster. The 10 most distinct goals were selected in order to reduce the likelihood that the meaning of the goals would be confounded with each other. These were:

1. sex/romance,
2. marriage/family,
3. physical appearance/health,
4. belongingness/ recognition/ friendship
5. leadership/mentoring/support,
6. religion/spirituality,
7. social awareness/ethics/freedom,
8. aesthetics/creativity/openness,
9. well-being/growth/achievement,
10. career/education,

To convert clusters into goal statements the experimenter and an independent rater worded them according to the overall conceptual meaning of the items included until inter-rater agreement was achieved. For example, for the goal ‘marriage/family’ the goal construct ‘To have good relations with my family’ was created. Discrepancies were resolved through discussion.
Inter-rater reliability was calculated as kappa = .82. The resulting goal statements were:

1. To have an intimate romantic relationship
2. To have good relations with my family
3. To look physically attractive
4. To maintain good friendships
5. To positively influence others
6. To be in touch with my spirituality
7. To live according to moral principles
8. To appreciate the creative arts
9. To strive for personal improvement
10. To get a good education

Using a thesaurus the experimenter selected approximately 20 adjectives and 20 nouns for each goal statement that corresponded in meaning to that goal statement. Word frequencies as recorded in and Francis and Kučera (1982) for each word were recorded. It was subsequently decided that adjectives were closer to the types of cue word usually used on the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986) and so nouns were disregarded. From the remaining pool of approximately 160 adjectives 41 with similar word count frequencies were selected so that each goal statement had either 4 or 5 corresponding to that goal statement.

An online survey was created using www.psychsurveys.org whereby adjectives were rated on 7-point Likert-type scales for (a) emotionality, with scores ranging from 1 (unemotional) to 7 (very emotional); (b) imageability, with scores ranging from 1 (not very easy to visualise) to 7 (very easy to
visualise); (c) familiarity, with scores ranging from 1 (unfamiliar) to 7 (very familiar). Semantic correspondence between all adjectives and goal statements was also rated with scores ranging from 1 (dissimilar) to 7 (very similar). The survey was advertised online to undergraduate psychology participants at the University of Exeter. Participants were offered course credits for taking part. Two samples were recruited across all ratings to reduce fatigue effects. Between 12.03.14 and 01.04.14, 19 participants with a mean age of 19.42 years (SD = 1.61, range = 18-25) rated the adjectives for imageability, familiarity and emotionality. During this same period 23 undergraduate psychology students with a mean age of 19.17 (SD = 1.47, range = 18-25) rated the adjectives for relevance. Inclusion criteria were having English as a native language in order to decrease variance between subjects’ conceptual interpretation of adjectives.

The mean, standard deviation and range scores were calculated for each adjective. First, for each goal statement the adjective that had the highest mean rating over 4 and the lowest mean rating below 4 was highlighted. At this stage it was found that all adjectives corresponding to five goal statements (statements 2, 4, 7, 9 and 10) were rated as highly relevant (mean ratings of 4 or higher) to goal statement 5. Additionally, all adjectives corresponding to goal statements 9 and 10 were rated as highly similar (mean rating of 4 or higher) to each other. Therefore, in order to maximise conceptual distinction between goal statements and their corresponding goal statements 5 and 9 were disregarded, leaving the following eight goal statements:

1. To have an intimate romantic relationship
2. To have good relations with my family
3. To look physically attractive
4. To maintain good friendships
5. To be in touch with my spirituality
6. To live according to moral principles
7. To appreciate the creative arts
8. To get a good education

For each of the eight remaining goal statements the experimenter selected two corresponding adjectives that had been rated as closely as possible to the standard of having high mean relevance ratings to the statement (4 and higher), low mean relevance ratings to other statements (4 and lower), high mean familiarity ratings (4 or over), low mean emotionality ratings (4 or under) and high mean imageability ratings (4 or over). Although all four dimensions (relevance, familiarity, emotionality and imageability) were considered important in order to reduce possible differences between cues which could have confounded the results, priority was given to relevance ratings to ensure as close a match as possible between cues and goals because not having conceptually distinct goal statements would have undermined the internal logic of the study. The final set of cue word pairs for each goal statement was rated similarly highly on emotionality, familiarity, imageability, and relevance. For each pair adjectives were assigned to set A or set B so that one adjective for each goal was represented in each set, with approximately balanced mean ratings on each variable (relevance, familiarity, emotionality and imageability). Again, priority was on balancing relevance. This process involved comparing every possible order of each pair of goal cues for each goal statement with every other pair of goal cues for each goal
statement. To do this the mean of mean ratings for each cue in each set for each AB combination on each variable was calculated. Then the difference between means for each variable was calculated. Following this the sum of squared differences was calculated and the AB set with the sum of squared difference score closest to 0 was selected. The following is a list of the goal statements and their corresponding adjectives for set A:

1. To have an intimate romantic relationship; Romantic
2. To have good relations with my family; Parental
3. To look physically attractive; Stylish
4. To maintain good friendships; Liked
5. To be in touch with my spirituality; Spiritual
6. To live according to moral principles; Humane
7. To appreciate the creative arts; Artistic
8. To get a good education; Studious

Similarly, set B was:

1. To have an intimate romantic relationship; Erotic
2. To have good relations with my family; Family-orientated
3. To look physically attractive; Good-looking
4. To maintain good friendships; Popular
5. To be in touch with my spirituality; Religious
6. To live according to moral principles; Ethical
7. To appreciate the creative arts; Imaginative
8. To get a good education; Scholarly
Sets A and B were used as Minimal Instruction Autobiographical Memory Test (MI-AMT; Debeer et al., 2009) cues.
Appendix A: Additional Method Measures Information

3. Minimal Instruction Autobiographical Memory Test (MI-AMT; Debeer et al., 2009).

For each goal-cue the following sentence frame was presented to participants, whereby "[GOAL-CUE]" represents the goal-cues as listed in Appendix A2: “Can you write down an event than [GOAL-CUE] remind you of?” For example, for the goal-cue “religious” participants were presented with the instructions “Can you write down an event than religious remind you of?”
Appendix A: Additional Method Measures Information


Goal manipulation protocol. Script that was delivered over headphones is italicised.

1. Unresolved goal (experimental condition):

For the next ten minutes I am going to ask you to close your eyes and focus your attention on a problem and difficulty that is still unresolved and bothering you – so this is an ongoing and unresolved concern that has been repeatedly coming in to your mind over the past week and causing you to feel negative, sad, down or stressed.

When I ask you to begin, please close your eyes and dwell on this current problem or concern, in the way that you usually dwell on and ruminate about unresolved concerns, as intensely as you can, until I ask you to stop and to open your eyes.

Examples of the kind of difficulty that I would like you think about are... (Give example topics).

Example topics:

An ongoing concern about an important relationship, which you feel that you should be managing better.

A recent negative event and its impact upon how you have been feeling over the past few weeks.

Concerns that you have failed to achieve a goal that is of personal importance to you.

Feeling that you disappoint someone who means a lot to you.
Feeling that you do not compare favourably to other people with respect to an area of functioning that is important to you.

*The problem or difficulty that you think about must be one that has been repeatedly troubling you recently and that you have not resolved, that is, it still bothers you and still comes repeatedly to mind.*

*Can you think of a problem or difficulty of this kind to think about?*

If no remind participant of examples and give them some time to think of a suitable topic. If yes proceed as follows:

*Would you mind telling me very briefly what the problem is?*

If not an appropriate topic remind participant of the type of concern that we are interested in and the examples and give further time to try to identify a concern of this kind.

*Now I would like you to evaluate this difficulty using the following scales.*

Six 9-point Likert-type scale items are presented on the computer screen. Responses range from 1 (not at all) to 9 (very much). Participants are asked to rate their identified concern in relation to the following items: (a) how important it is to you; (b) how much it bothers you now; (c) how much it did bother you at the time it was worst; (d) how much you have been thinking about it over the last week; (e) how long has this been a difficulty for you; (f) how much does this difficulty relate to more general concerns that you have.

*Please close your eyes and dwell on this current problem or concern, in the way that you usually dwell on and ruminate about unresolved concerns, as intensely as you can, until I ask you to stop and to open your eyes.*

Recorded script items:

*Think about the problem and difficulty – what is it?*
Focus on what about this problem/difficulty bothers and troubles you.

Think about what is important about this difficulty in terms of your personal goals.

Focus on how this problem reflects a lack of progress on important personal goals.

Think about how the problem/difficulty is still unresolved.

Concentrate on the aspects of the problem that reflect unfinished business
Focus on the aspects of the difficulty that repeatedly come to mind.

Think about any related concerns and unresolved issues that this problem reminds you of.

2. Resolved goal:

For the next few minutes I am going to ask you to close your eyes and focus your attention on a recent problem or difficulty that is now resolved and no longer bothering you – so this is an past and resolved difficulty that has not been coming in to your mind over the past week and no longer causes you to feel negative, sad, down or stressed. When I ask you to begin, please close your eyes and think about this past problem or concern, in the way that you usually think about resolved concerns, as intensely as you can, until I ask you to stop and to open your eyes.

Examples of the kind of difficulty that I would like you think about are... (Give example topics)

Example topics:

A concern that you would not achieve a goal that you have now succeeded in achieving.
A past dispute with someone who means a lot to you that has now been resolved and you now feel very positively about this relationship.

A situation or event that you had been finding stressful, but that you have now learned to manage well.

An area of functioning that is important to you, and which you previously felt you did not manage well, but that you now manage as well as other people.

A negative event that happened many years ago and that you have now come to terms with and are not troubled by.

*The problem or difficulty that you think about must be one that has not been troubling you recently and that you have now resolved.*

*Can you think of a problem or difficulty of this kind to think about?*

If no remind participant of examples and give them some time to think of a suitable topic. If yes proceed as follows:

*Would you mind telling me very briefly what the problem was?*

If not appropriate remind participant of the type of concern that we are interested in and the examples and give further time to try to identify a concern of this kind.

*Now I would like you to evaluate this difficulty using the following scales.*

Six 9-point Likert-type scale items are presented on the computer screen.

Responses range from 1 (not at all) to 9 (very much). Participants are asked to rate their identified concern in relation to the following items: (a) how important it is to you; (b) how much it bothers you now; (c) how much it did bother you at the time it was worst; (d) how much you have been thinking about it over the last week; (e) how long has this been a difficulty for you; (f) how much does this difficulty relate to more general concerns that you have.
Please close your eyes and think about this past problem or concern, in the way that you usually think about past resolved difficulties, as intensely as you can, until I ask you to stop and to open your eyes.”

Recorded script items:

Think about the problem and difficulty – what was it?

Focus on what about this problem/difficulty bothered and troubled you in the past.

Think about what was important about this difficulty in terms of your personal goals.

Focus on how resolving this problem reflects progress on important personal goals.

Think about how the problem/difficulty is now resolved.

Concentrate on the aspects of the problem that are now finished and dealt with.

Think about any other resolved difficulties that this problem reminds you of.
Appendix A: Additional Method Measures Information

5. MI-AMT (Debeer et al., 2009) goal-cue relevance ratings.

For each goal-cue the following instructions were presented to participants, whereby “[GOAL-CUE]” represents the goal-cues as listed in Appendix A2: “How relevant is the word [GOAL-CUE] to the concern you identified in the previous thinking exercise?” For example, for the goal-cue “religious” participants were presented with the instructions “How relevant is the word religious to the concern you identified in the previous thinking exercise?” Scores ranged from 1 (irrelevant) to 7 (highly relevant).
Appendix A: Additional Method Measures Information


At each of the five time points as described in the “procedure” section participants were asked (a) “How happy are you feeling right now?”; (b) “How sad are you feeling right now?”; (c) “How self-focused are you feeling right now?” Responses were made on a scale from 1 (not at all) to 7 (very).
Appendix A: Additional Method Measures Information

7. Mood neutralising exercises.

The experimenter ran a focus group with 5 adult members of a Lived Experience Group at the University of Exeter on 03.03.14. The members were shown amusing film clips and asked to brainstorm what clips they thought might be appropriate for participants who may be experiencing low mood and/or who had received the rumination induction. The film clips that were voted as most appropriate were a 3 minute 49 second clip from the film Mamma Mia (Craymer, Goetzman, & Lloyd, 2008) during which the song Dancing Queen was performed and a 58 second clip from the film Love Actually during which Hugh Grant dances (Bevan, Kenworthy, & Curtis, 2003).
Appendix B: Extended Data Analysis

1. Data screening procedure.

Seventeen data points representing more than 3 standard deviations from the mean were detected across scores from the Likert-type scale variables. These were retained in the analysis because (1) replacing them with the mean value plus two SDs (Field, 2009) created new outliers, and (2) they did not indicate any biased participant responding. For the categorical data value totals and ranges using frequency tables were inspected and no outliers were detected.

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. BDI-II score was log transformed to correct for skewed distribution. Brooding was mean-centred as this is recommended to provide more easily interpretable results (Aiken & West, 1991).
Appendix B: Extended Data Analysis

2. Goal cueing task concern ratings.

Participants in the unresolved condition reported having spent a greater proportion of time thinking about their goal in the past week, $t(76) = -9.05, p < .001, \eta^2 = .01$ (M = 6.95, SD = 1.36) than participants in the resolved condition (M = 3.05, SD = 2.3), and being more bothered by the goal, $t(76) = -11.28, p < .001, \eta^2 = 0.01$ (M = 7.33, SD = 1.14) than participants in the resolved goal condition (M = 2.95, SD = 2.12). This was as intended and consistent with Roberts et al. (2013). There was no significant effect of condition on participants’ evaluation of how much the goal had bothered them at its worst ($p > .7$), the importance of the goal ($p > .1$), how long the goal had been a difficulty ($p > .3$), or how much the goal related to general goals and concerns ($p > 0.1$). Thus, the goals identified in the two conditions did not differ in subjective evaluations of their nature or severity, but participants in the unresolved goal condition reported that the goal was bothering them more than participants in the resolved goal condition.
Appendix B: Extended Data Analysis

3. Mood and self-focus ratings.

Table 8 presents descriptive statistics for happiness/sadness/self-focus at each of the time points after the first time they were rated in the unresolved and resolved goal conditions.

Table 8

Descriptive Characteristics for Happiness, Sadness and Self-Focus Ratings at Times 2, 3, 4 and 5 in the Unresolved and Resolved Goal Conditions.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 2</td>
<td>4.93</td>
<td>5.21</td>
<td>3.45</td>
<td>4.84</td>
<td>4.40</td>
<td>5.21</td>
<td>5.28</td>
<td>5.95</td>
</tr>
<tr>
<td>(post MI-AMT time 1, pre-manipulation)</td>
<td>(1.25)</td>
<td>(.88)</td>
<td>(1.11)</td>
<td>(1.37)</td>
<td>(1.19)</td>
<td>(1.12)</td>
<td>(1.09)</td>
<td>(1.01)</td>
</tr>
<tr>
<td>Time 3</td>
<td>3.45</td>
<td>4.84</td>
<td>4.40</td>
<td>5.21</td>
<td>5.28</td>
<td>5.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(post-manipulation)</td>
<td>(1.11)</td>
<td>(1.37)</td>
<td>(1.19)</td>
<td>(1.12)</td>
<td>(1.09)</td>
<td>(1.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 4</td>
<td>4.40</td>
<td>5.21</td>
<td>5.28</td>
<td>5.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(post MI-AMT time 2)</td>
<td>(1.19)</td>
<td>(1.12)</td>
<td>(1.09)</td>
<td>(1.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 5</td>
<td>5.28</td>
<td>5.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(post mood neutralising task)</td>
<td>(1.12)</td>
<td>(1.09)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Unres = unresolved goal condition; res = resolved goal condition.

Mean happiness ratings became greater across conditions from time 4 (mean = 4.79, SD = 1.22) to time 5 (mean = 5.50, SD = 1.10) and sadness ratings became smaller from time 4 (mean = 2.65, SD = 1.31) to time 5 (mean = 2.12, SD = 1.15) indicating that as intended, the mood neutralising task improved participants’ mood post-manipulation. All participants reported lower rates of happiness and increased rates of sadness from pre- to post manipulation. This difference was statistically significant for sadness ratings amongst participants in the unresolved condition, \( t(39) = -6.38, p < .01 \) and in
the resolved condition, $t(37) = -2.12, p = .04$. This difference was statistically significant for happiness ratings amongst participants in the unresolved but not the resolved condition, $t(39) = 8.79, p < .05$. Levels of self-focus did not statistically significantly differ from pre- to post-manipulation in either condition.
### Appendix B: Extended Data Analysis


Table 9

*Between-subjects Pearson Product-moment Correlations Among and Descriptive Statistics for Gender, Depressive Symptoms, Trait Brooding, AM Specificity Pre-manipulation*

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>Gender</th>
<th>BDI score</th>
<th>RRS-B</th>
<th>No. spec AMs pre-man</th>
<th>No. cat AMs pre-man</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.17 (.38)</td>
<td></td>
<td>-.19</td>
<td>-.07</td>
<td>-.01</td>
<td>-.10</td>
</tr>
<tr>
<td>BDI score</td>
<td>.95 (.34)</td>
<td></td>
<td></td>
<td>.52**</td>
<td>.13</td>
<td>.06</td>
</tr>
<tr>
<td>RRS-B</td>
<td>-.00 (3.60)</td>
<td></td>
<td></td>
<td>.13</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>No. spec AMs pre-man</td>
<td>3.28 (1.82)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.70**</td>
</tr>
<tr>
<td>No. cat AMs pre-man</td>
<td>2.46 (1.67)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* No. spec = number of specific; no. cat = number of categoric; AMs = autobiographical memories; man = manipulation. Standard deviations are presented between parentheses. For gender, 0 = female, 1 = male. ** *p* < .01.
Appendix C: Participant Pack

1. Information sheets.

   i. Information sheet for phase one.

   Thank you for your interest in this study. My name is Laura Lanning. I am a postgraduate clinical psychology student at the University of Exeter. This study aims to investigate the relationship between goals, personality and autobiographical memory.

   This is a very important area of research because memory has not been investigated in this way before. Some research has shown that the way people feel about themselves can affect their memory.

   Your participation in this study will make a valuable contribution. Please read the following information about the study. If you are happy to take part then please click ‘continue to next page’ to go on and read the consent form.

I would like you to complete this study in two steps; over 2 separate days:

   Step 1 (today): You will be asked to:

   • provide some general information about yourself including your age, gender, native language and email address so that further information can be emailed to you.

   • rate a list of 8 goal statements.

   • complete 2 questionnaires containing sets of statements which you will be asked to respond to. One will measure your mood and the other will measure the extent to which you experience ruminative thoughts.

   Step 2: This will happen in approximately 1 week, at the University of Exeter in the Washington Singer Building, Streatham Campus (room and time
details will be discussed between us and decided via email). There you will be asked to:

- complete 2 autobiographical memory tests. During these tests some words will be presented to you on a computer screen and after each one you will be given 60 seconds in which to generate a memory.
- generate and think about a personal goal for approximately 10 minutes.
- rate 8 words.
- complete some mood and self-focus ratings.
- watch 2 short YouTube videos.

Participation in this study should take approximately one hour, spread across steps 1 and 2.

If you are an undergraduate psychology student you will be presented with 1.5 course credits for taking part in this study; 0.5 will be allocated for taking part in step 1 and a further 1 credit allocated for step 2.

You are under no obligation to take part in this study, especially if it makes you feel uncomfortable in any way. For example, being asked to generate some personal goals or memories may cause you to feel upset or distressed.

The study findings will be written up and reported (a thesis) in part completion of a Doctorate in Clinical Psychology. In accordance with University of Exeter Open Research Exeter policy, the thesis will be stored electronically at the University of Exeter, and will be accessible online (open access). The study findings might also be written up for publication in research journals and presented at conferences. The published journal article will also be available online (open access, University of Exeter).
I would like to make it clear that the information you give me will be treated with strict confidentiality. After I have contacted you using your university email address this will be deleted on 10th March 2014. Your name will not be used in connection with the results in any way.

After you have completed the study you will be shown a debriefing form. The results of this study will not be fed back to you individually. However, if you would like to receive further information about the results then please contact me using the details on the debriefing form. Thank you very much for your help.

If you are happy to take part then please click the 'continue to next page' button to proceed to the Informed Consent form.

Laura
Appendix C: Participant Pack

1. Information sheets.

ii. Information sheet for phase two.

Thank you for taking part in step 2 of this study. To remind you, my name is Laura Lanning and I am a postgraduate clinical psychology student at the University of Exeter. This study aims to investigate the relationship between goals, personality and autobiographical memory.

This is a very important area of research because memory has not been investigated in this way before. Some research has shown that the way people feel about themselves can affect their memory.

Your participation in this study will make a valuable contribution. Please read the following information about the study. If you are happy to take part then please click “continue to next page” to go on and read the consent form.

Step 2: Today you will be asked to:

- complete 2 autobiographical memory tests. During these tests some words will be presented to you on a computer screen and after each one you will be given 60 seconds in which to generate a memory.
- generate and think about a personal goal for approximately 10 minutes.
- rate 8 words.
- complete some mood and self-focus ratings.
- watch 2 short YouTube videos.

Participation in this part of the study should take approximately 40 minutes. You are under no obligation to take part in this study, especially if it makes you feel uncomfortable in any way. For example, being asked to generate some personal goals or memories may cause you to feel upset or distressed.
The study findings will be written up and reported (a thesis) in part completion of a Doctorate in Clinical Psychology. In accordance with University of Exeter Open Research Exeter policy, the thesis will be stored electronically at the University of Exeter, and will be accessible online (open access). The study findings might also be written up for publication in research journals and presented at conferences. The published journal article will also be available online (open access, University of Exeter).

I would like to make it clear that the information you give me will be treated with strict confidentiality. After I have contacted you using your university email address this will be deleted on 10th March 2014. Your name will not be used in connection with the results in any way.

After you have completed the study you will be shown a debriefing form. The results of this study will not be fed back to you individually. However, if you would like to receive further information about the results then please contact me using the details on the debriefing form. Thank you very much for your help.

If you are happy to take part then please click the “continue to next page” button to proceed to the Informed Consent form.

Laura
Appendix C: Participant Pack

2. Informed consent forms.

   i. Informed consent form for phase one.

Title of research: Mood, personal goals and memory.

Investigators: Laura Lanning, supervised by Dr Nick Moberly (Senior Lecturer).

Research is affiliated with the University of Exeter.

Purpose of research: To investigate the relationship between goals, personality and autobiographical memory.

Description of procedures:

Step 1: On day 1, online, you will be:

   • presented with 3 questionnaires containing sets of statements which you will be asked to respond to.
   • asked to rate a list of 8 goal statements.

Step 2: On day 2, one week later, at the University of Exeter in the Washington Singer Building (Streatham Campus) you will be asked to:

   • complete 2 autobiographical memory tests.
   • generate and think about a personal goal for approximately 10 minutes.
   • talked through an exercise during which you generate and think about a personal goal.
   • rate a set of words.
   • complete some mood and self-focus ratings.
   • Watch 2 short YouTube clips.

Participation in this study (steps 1 and 2) should take approximately one hour.
Being asked about personal goals and autobiographical memories may cause you to feel upset or distressed. If you are not comfortable answering any questions, you can withdraw from the study at any time.

Now please read the following statements and only click "continue to next page" if you understand and agree with them. I understand that:

- This study will take approximately one hour to complete and will be spread across 2 days, 1 week apart.
- My participation in this study will be completely anonymous; my name will not be used in connection with the results in any way.
- I am free to withdraw my participation at any time during the study and for any reason; I can do this by alerting Laura.
- If I am an undergraduate psychology student I will be offered 0.5 course credits for taking part in step 1 of this study and another 1 course credit for taking part in step 2.
- I will also be offered the chance to discuss the DClinPsy application process with Laura and other trainee Clinical Psychologists. Details can be arranged after study completion.
- There is no penalty for not taking part or for choosing to leave the experiment after starting the tasks. I will still be allocated 0.5 course credits for taking part in step 1 and 1 credit for taking part in step 2.
- I will not be reimbursed for travelling to take part in this study.
- I can choose to withdraw my data at a later date. I will need to provide Laura with my participant number to do this as it will not be connected to my name in any way. The deadline for doing this is 20th March 2015.
• The University of Exeter will own the data that I provide by participating in this study.

• After the study has been completed all data will be archived and stored in accordance with the University’s Open Access Policy. This means that data will be made available to other post-graduate researchers. However, my data will remain anonymised.

• I have the right to obtain information about the findings of the study and about how they will be used after the study is complete. Individual feedback cannot be provided, but the overall results will be published at a later date.

• Some tasks may cause me to feel mildly distressed, but I can choose not to continue with the study if I feel uncomfortable at any point. If I feel at all sad or distressed following participation in this study, I can contact Laura for advice and support.

By clicking "continue to next page" you are confirming your agreement with the above statements and are proceeding to start the questionnaires.
2. Informed consent forms.

ii. Informed consent form for phase two.

Title of research: Mood, personal goals and memory.

Investigators: Laura Lanning, supervised by Dr Nick Moberly (Senior Lecturer).

Research is affiliated with the University of Exeter.

Purpose of research: To investigate the relationship between goals, personality and autobiographical memory.

Description of procedures:

Step 2: Today you will be asked to:

- complete 2 autobiographical memory tests.
- generate and think about a personal goal for approximately 10 minutes.
- talked through an exercise during which you generate and think about a personal goal.
- rate a set of words.
- complete some mood and self-focus ratings.
- Watch 2 short YouTube clips.

Participation in this part of the study should take approximately 40 mins.

Being asked about personal goals and autobiographical memories may cause you to feel upset or distressed. If you are not comfortable answering any questions, you can withdraw from the study at any time.

Now please read the following statements and only click "continue to next page" if you understand and agree with them. I understand that:

- My participation in this study will be completely anonymous; my name will not be used in connection with the results in any way.
• I am free to withdraw my participation at any time during the study and for any reason; I can do this by alerting Laura.

• If I am an undergraduate psychology student I will be offered 1 course credit for taking part today.

• I will also be offered the chance to discuss the DClinPsy application process with Laura and other trainee Clinical Psychologists. Details can be arranged after study completion.

• There is no penalty for not taking part or for choosing to leave the experiment after starting the tasks. I will still be allocated 1 credit for taking part today.

• I will not be reimbursed for travelling to take part in this study.

• I can choose to withdraw my data at a later date. I will need to provide Laura with my participant number to do this as it will not be connected to my name in any way. The deadline for doing this is 20th March 2015.

• The University of Exeter will own the data that I provide by participating in this study.

• After the study has been completed all data will be archived and stored in accordance with the University’s Open Access Policy. This means that data will be made available to other post-graduate researchers. However, my data will remain anonymised.

• I have the right to obtain information about the findings of the study and about how they will be used after the study is complete. Individual feedback cannot be provided, but the overall results will be published at a later date.
• Some tasks may cause me to feel mildly distressed, but I can choose not to continue with the study if I feel uncomfortable at any point. If I feel at all sad or distressed following participation in this study, I can contact Laura for advice and support.

• By clicking "continue to next page" you are confirming your agreement with the above statements and are proceeding to start the questionnaires.
Appendix C: Participant Pack

3. Debriefing form (for both phases).

Thank you very much for completing step 1 of this study. If you feel upset or distressed as a result of taking part in this online study I recommend that you contact one of the following helplines:

Student Counselling Service

The Counselling Service is available free of charge to all students, full-time, part-time, undergraduate and postgraduate. Because student life can be stressful, the Counselling Service is there to provide confidential help and support. We aim to help students cope more effectively with any personal problems or emotional difficulties that may arise during their time at University.

Telephone (to book an appointment): (01392) 264381
Email: counselling@exeter.ac.uk
Website: http://services.exeter.ac.uk/counselling/about.html

Student Counselling Service (opening hours: 9.30 – 1.00pm, 2 – 5pm)
Reed Hall, Hailey Wing
Streatham Drive
Exeter EX4 4PD

VOICE (University of Exeter)

Voice is a student run listening and information service, run by students for fellow students at the University of Exeter and is available from 8pm to 8am every night during term time. It is completely confidential, anonymous and
prejudice-free, which means you can call with the confidence of knowing you can discuss anything you want without being judged.

Telephone (8pm – 8am): 4000 (internal, free of charge)

External: (01392) 275284

Website: http://www.exetervoice.co.uk/

Exeter Samaritans

Samaritans provides confidential emotional support, 24 hours a day for people who are experiencing feelings of distress or despair. Samaritans are there if you're worried about something, feel upset or confused, or you just want to talk to someone.

10 Richmond Road
Exeter
Devon
EX4 4JA (open 10.30am – 9.30pm Mon–Sat, 1.30pm – 9.30pm Sun)

24 hour telephone helpline: 01392 411711 (Exeter branch) / 08457 909090 (national)

Email: jo@samaritans.org

Website: http://www.exetersamaritans.org/

Depression Alliance
Depression Alliance is a charity working to relieve and to prevent depression by providing information, support and understanding. Depression Alliance offers a range of publications and self-help groups.

Depression Alliance
20 Great Dover Street
London
SE1 4LX

Telephone: 0845 123 23 20 (for an information pack only)
Email: information@depressionalliance.org
Website: http://www.depressionalliance.org/

In order to collect your 0.5 course credit please email me the password “Christmas” and I will allocate this on SONA. In order to complete step 2 of the study to earn a further 1 course credit please email me:
Laura Lanning: LL308@exeter.ac.uk

Alternatively, and/or if you have any further questions please contact either myself, or my supervisor (Dr Nick Moberly) using the contact details below:
Dr Nick Moberly: n.j.moberly@exeter.ac.uk

An explanation of the purpose of this study will be provided after you have completed stage 2. I will be unable to give individual feedback, but if you wish the overall results of this study can be fed back to within the next year. If you would like to receive this information please contact me using the email address I have provided.

My sincere thanks again for agreeing to participate in this study. Laura
1. University ethics approval for empirical study.

To: Laura Lanning
From: Cris Burgess
CC: Nicholas Moberly
Re: Application 2013/510 Ethics Committee
Date: February 26, 2016

The School of Psychology Ethics Committee has now discussed your application, 2013/510 – Effect of goal discrepancy rumination on overgeneral memory. The project has been approved in principle for the duration of your study.

The agreement of the Committee is subject to your compliance with the British Psychological Society Code of Conduct and the University of Exeter procedures for data protection (http://www.ex.ac.uk/admin/academic/datapro/). In any correspondence with the Ethics Committee about this application, please quote the reference number above.

I wish you every success with your research.

Cris Burgess
Chair of Psychology Research Ethics Committee
Appendix D: Ethics Documentation

2. University ethics approval for survey for generation of memory cues.

Psychology Research Ethics Committee

Psychology, College of Life & Environmental Sciences

Washington Singer Laboratories
Perry Road
Exeter
EX4 4QG

Telephone  +44 (0)1392 724611
Fax       +44 (0)1392 724623
Email      Marilyn.evans@exeter.ac.uk

To: Laura Lanning
From: Cris Burgess
CC: Nicholas Moberly
Re: Application 2013/519 Ethics Committee
Date: February 26, 2016

The School of Psychology Ethics Committee has now discussed your application, 2013/519 – Mood, personal goals and memory: Goal statement and cue selection and similarity ratings. The project has been approved in principle for the duration of your study. The agreement of the Committee is subject to your compliance with the British Psychological Society Code of Conduct and the University of Exeter procedures for data protection (http://www.ex.ac.uk/admin/academic/datapro/). In any correspondence with the Ethics Committee about this application, please quote the reference number above.

I wish you every success with your research.

Cris Burgess
Chair of Psychology Research Ethics Committee
Appendix E: Dissemination Statement

The results of this study will be disseminated to interested parties through feedback, journal publication and presentation.

**Dissemination to participants and NHS services.**

As stated on the participant information sheet participants the results of this study will not be fed back to participants individually. However, participants have been informed that they may contact myself using the contact details on the debriefing form should they wish to receive information about the results.

**Journal Publication**

It is expected that the study will be submitted for publication to Memory (five-year impact factor 2.29). See Appendix B of literature review for instructions for authors.

**Presentation**

On 24th November 2015, my research findings were presented to an academic audience, for peer review, as part of the Doctorate in Clinical Psychology at the University of Exeter.