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Research report

Divided attention during retrieval suppresses false recognition in confabulation

Elisa Ciaramelli^{a,b,*}, Simona Ghetti^{c,d} and Marco Borsotti^b

^aRotman Research Institute, Toronto, Canada

^bCentro Studi e Ricerche di Neuroscienze Cognitive, Cesena, Italy

^cDepartment of Psychology, University of California, Davis, United States

^dCenter for Mind and Brain, University of California, Davis, United States

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ABSTRACT

The present research tested the hypothesis that false recognition in confabulating patients results, at least in part, from sustained processing of irrelevant information about test items. Thus, we predicted that false recognition would be reduced if cognitive resources available for such a processing are experimentally reduced. Two experiments provided evidence consistent with this proposal. In Experiment 1, confabulating patients exhibited lower false recognition in a divided attention (DA) compared to a full attention (FA) retrieval condition. The opposite trend was observed in non-confabulating patients with comparable memory and executive deficits and normal controls. In Experiment 2, in a Deese–Roediger–McDermott paradigm, confabulating patients exhibited lower false recognition to lures that were unrelated to the studied words in the DA compared to the FA retrieval condition, but unvaried levels of false recognition to critical lures. In contrast, false recognition to both unrelated and critical lures increased in non-confabulating patients and normal controls in the DA compared to the FA condition. These results are consistent with the hypothesis that an excessive processing of task-irrelevant memories at retrieval may contribute to false recognition in confabulating patients.

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1. Introduction

Confabulation is a symptom that occurs in some amnesic patients (Burgess and Shallice, 1996; Dalla Barba, 2001; Johnson and Raye, 1998; Moscovitch, 1995; Schnider, 2003), and involves the production of “erroneous memories, either false in themselves or resulting from true memories misplaced in context and inappropriately retrieved or interpreted” (Kopelman et al., 1995, p. 71). This symptom is commonly found in patients with anterior communicating artery (AcoA)

aneurysm (Alexander and Freedman, 1984; Vilkkki, 1985), often in association with damage to the orbitofrontal and ventromedial prefrontal regions (see for a review Gilboa and Moscovitch, 2002).

A distinction has been drawn between spontaneous confabulations, which are produced without any external trigger and provoked confabulations, which may be elicited by prompting patients (Dalla Barba, 1993; Kopelman, 1987; Schnider et al., 1996). Also, spontaneous confabulation is considered distinct from false recognition, given that these

* Corresponding author. Rotman Research Institute, 3560 Bathurst Street, Toronto, ON M6A 2E1, Canada.

E-mail address: elisa.ciaramelli@utoronto.ca (E. Ciaramelli).

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two types of memory distortion may occur either together (Ciaramelli et al., 2006; Delbecq-Derouesne et al., 1990; Rapsack et al., 1998) or independently from one another (Dab et al., 1999; Kapur and Coughlan, 1980; Papagno and Baddeley, 1997; Schacter et al., 1996). Nonetheless, since both confabulation and false recognition involve the misattribution of events that never occurred to direct experience, systematic differences in the nature of false recognition between confabulating and non-confabulating amnesics might provide insight into the retrieval mechanisms impaired in confabulation.

Gilboa et al. (2006) have recently investigated memory for fairy tales and autobiographical information in confabulating and non-confabulating patients. Confabulators showed higher levels of false recognition than did non-confabulating amnesics with both types of materials, with comparable levels of true recognition of veridical details. Interestingly, in confabulating (compared to non-confabulating) patients memory errors were not only more frequent, but also qualitatively different: during free recall of fairy tales only confabulators produced “idiosyncratic” intrusions (Gilboa et al., 2006). Specifically, these patients produced intrusions that showed no content relation with the original tales, whereas both confabulating and non-confabulating patients produced intrusions involving distortions of true details. Further, in the autobiographical recognition test confabulating patients were as likely to falsely recognize plausible lures, which included false details of actually experienced events, as implausible lures, which involved entirely false events, whereas non-confabulating patients only endorsed plausible lures (Gilboa et al., 2006). The authors concluded that post-retrieval monitoring is impaired in confabulation, but also noted that monitoring is a complex set of processes including both pre-retrieval processes, such as feeling of knowing (Koriat, 1993), and post-retrieval processes, involving early intuitive processes as well as later, conscious verification of retrieved contents (Gilboa et al., 2006; see also Burgess and Shallice, 1996; Schacter et al., 1998a). The evidence in favour of the distinct nature of memory errors in confabulating and non-confabulating patients suggests that different sub-components of retrieval may be impaired in these classes of patients.

In order to shed light on the basis of false recognition in confabulating patients, in previous studies of recognition memory we asked participants to label endorsed items according to the Remember (R)/Know (K) distinction (Tulving, 1985), and to motivate their judgments by reporting what they actually remembered from study (Ciaramelli and Gheiti, 2007). We found that, unlike other frontal patients and normal controls, confabulating patients reported to “remember” unstudied items when processing these items during retrieval triggered vivid autobiographical recollections that appeared to be independent of the experimental context (e.g., “I remember the word CUP because I had bought a red one in London”; Ciaramelli and Gheiti, 2007). Consistent with this interpretation, this type of response was more frequent for unstudied than for studied items, thereby bolstering the argument that it reflected associations triggered by test items during retrieval attempts (Koriat, 1993), rather than genuine recollections of the study episode. In general, in healthy individuals the

retrieval of associative information in itself is not sufficient for remembering, that is, associations may be automatically retrieved, but attributed to pre-experimental experience, and therefore judged as not relevant to the recognition task at hand (Jacoby and Whitehouse, 1989; Whittlesea and Williams, 2001; Wolk et al., 2004). However, confabulators seem to be impaired at inhibiting task-irrelevant information. Schnider and Ptak (1999), for example, tested spontaneous confabulators and non-confabulating amnesics in two runs of a continuous recognition paradigm, in which some items appearing as targets on the first run were included as lures in the second one. Compared to non-confabulating patients, confabulators showed a marked tendency to endorse lures that had been targets on the previous run, but were not relevant to the current task (Schnider and Ptak, 1999).

There is evidence that the amount of information resulting from retrieval attempts is computed in order to judge whether an item is available in memory (Kelley and Lindsay, 1993; Koriat and Goldsmith, 1996). Indeed, Koriat (1993) found a positive relation between the amount of information retrieved about an item and ratings of future retrievability for that item, or feeling of knowing. Importantly, this relation is observed regardless of the accuracy of the information retrieved. That is, when individuals attempt to retrieve an item from memory, the more information about that item reaches consciousness, the stronger their feeling of knowing for that item is, regardless of whether this information is pertinent or not (Koriat, 1993). As a consequence, a failure to inhibit task-irrelevant information about unstudied items might contribute to false recognition in confabulation by increasing the perceived availability in memory for items that are actually unstudied (see also Kelley and Lindsay, 1993; Koriat and Goldsmith, 1996).

If false recognition in confabulation depends, at least in part, on the excessive processing of task-irrelevant information about test items, then an experimental manipulation that reduces patients’ cognitive resources during retrieval, thereby hampering such a dysfunctional processing, should paradoxically suppress false recognition in these patients. To test this hypothesis, we investigated the effect of dividing attention during retrieval in confabulators, non-confabulating amnesics and normal controls in two experiments. The logic behind Experiment 1 and Experiment 2 is discussed below.

2. Experiment 1

In Experiment 1, confabulating patients, non-confabulating patients with comparable memory and executive deficits, and normal controls took part in a standard recognition task under full attention (FA) and under divided attention (DA) conditions. Our hypothesis was that DA during retrieval would reduce the probability that confabulating patients produced associations to test items as a result of retrieval attempts. Thus, although these patients may be unable to filter irrelevant information during retrieval (Ciaramelli and Gheiti, 2007; see also Schnider, 2003), less information would be in need of evaluation in the DA compared to the FA condition, thereby potentially reducing false recognition. In contrast, given that non-confabulating patients and normal

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