

When true memory availability promotes false memory: Evidence from confabulating patients

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Abstract

We explored the extent to which confabulators are susceptible to false recall and false recognition, and whether false recognition is reduced when memory for studied items is experimentally enhanced. Five confabulating patients, nine non-confabulating amnesics – including patients with (F amnesics) and without frontal-lobe dysfunction (NF amnesics) – and 14 control subjects underwent the DRM paradigm [Roediger, H. L., & McDermott, K. B. (1995). Creating false memories: Remembering words not presented in lists. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 21, 803–814.] in two experimental conditions. In both conditions participants studied eight lists of semantic associates, and free recall was tested after the presentation of each list. In the Standard condition recognition was tested after the presentation of all the lists, whereas in the Proximal condition patients were administered a six-item recognition task after the presentation of each list. Participants also provided *remember* or *know* judgements, and described the content of their recollections. All groups of patients recalled a lower proportion of targets and critical lures than did control subjects, but confabulators recalled more words unrelated to the studied lists than did NF amnesics and controls. All groups of participants improved true recognition across conditions. However, whereas normal controls suppressed false recognition to critical lures in the Proximal compared to the Standard condition, and non-confabulating amnesics showed comparable gist-based false recognition, confabulators showed increased levels of false recognition to critical lures across conditions. Furthermore, NF amnesics significantly reduced false recognition to unrelated lures in the Proximal compared to the Standard condition, whereas confabulators were unable to suppress false recognition to unrelated lures across conditions. Analysis of the phenomenological experience showed that, unlike non-confabulating amnesics, confabulators characterized true and false memories with irrelevant information related to test items. Results are interpreted in light of confabulators' monitoring deficits.

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1. Introduction

Confabulation is a symptom (Burgess & Shallice, 1996; Dalla Barba, 1993a,b, 1995; DeLuca, 1993; Johnson & Raye, 1998; Korsakoff, 1889; Moscovitch, 1989, 1995; Schnider, 2003; Talland, 1961) that involves the production of “erroneous memories, either false in themselves or resulting from true

memories misplaced in context and inappropriately retrieved or interpreted” (Kopelman, Guinan, & Lewis, 1995). This symptom is commonly found in amnesic patients who survived anterior communicating artery (AcoA) aneurysm (Alexander & Freedman, 1984; DeLuca, 1993; Vilkki, 1985), often in association with damage to the orbitofrontal (Schnider, 2003) and medial frontal regions (Gilboa & Moscovitch, 2002). Some researchers found it useful to distinguish between provoked confabulations, which can be elicited by questions, and spontaneous confabulations, which patients produce without a recognizable motive (Berlyne, 1972; Dalla Barba, 1993b; Kopelman, 1987). Confabulators may occasionally act upon

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their confabulation, reflecting their genuine belief in the false memory (Schnider, Gutbrod, Hess, & Schroth, 1996).

Some authors attribute confabulation to a failure of memory control processes (Burgess & Shallice, 1996; Schacter, Norman, & Koutstaal, 1998). For example, Moscovitch argued that confabulation results from a failure in the “strategic retrieval processes” involved in focusing the memory search and in monitoring the veracity of retrieved memories. According to Moscovitch, a monitoring deficit is necessary for confabulation to occur (Moscovitch & Melo, 1997).

Other authors have emphasized that confabulation reflects the inability to distinguish a memory derived from direct experience from one generated by imaginative acts (i.e. *reality monitoring*; Johnson, Hashtroudi, & Lindsay, 1993; Johnson & Raye, 1998). Reality monitoring deficits are seen as a factor contributing to confabulation, rather than its cause, since they have been found in confabulating (Johnson, O’Connor, & Cantor, 1997; Schnider, von Daniken, & Gutbrod, 1996), but also in non-confabulating patients (Janowsky, Shimamura, & Squire, 1989) and normal controls (Reyna & Brainerd, 1995; Roediger & McDermott, 1995; Payne, Elie, Blackwell, & Neuschatz, 1996).

It is worth noting, however, that a failure in reality monitoring might result from several factors, including defective encoding operations or defective monitoring processes at retrieval (Johnson, 1991). Thus, there is the possibility that group-specific mechanisms lead different populations of patients to poor reality monitoring abilities.

The aim of the present study was to explore the extent to which confabulators are susceptible to false recall and false recognition in two classes of lures, that is, lures that are semantically related and lures that are semantically unrelated to the studied material. Moreover, we investigated whether this susceptibility decreases when memory for studied words is experimentally enhanced. To this aim, we selected a paradigm originally developed by Deese (1959), and modified by Roediger and McDermott (1995). In the Deese, Roediger and McDermott (DRM) paradigm, individuals study lists of semantic associates (e.g. *mug, handle, coffee*, etc.) converging on a non-studied but semantically associated word (i.e. critical lure; e.g. *cup*), and are then required to recall the studied words and to recognize them among new words. The DRM recognition test includes both new words similar to the studied words in meaning (i.e. critical lures; e.g. *cup*) and new words unrelated to the studied words (i.e. unrelated lures; e.g. *lion*).

Previous research has shown that, in the DRM paradigm, normal subjects are as likely to recall and recognize the critical lures as words that actually appeared on the studied list (Roediger & McDermott, 1995). False recognition of critical lures has been attributed to subjects binding together studied items at study, thereby encoding the gist of the lists (i.e. critical lure) along with the studied items (Reyna & Brainerd, 1995). Several authors have demonstrated that amnesic patients with medial temporal lobe (MTL) lesions exhibit lower levels of true recognition and false recognition to critical lures, but higher levels of false recognition to unrelated lures compared to normal controls (Melo, Winocur, & Moscovitch, 1999; Schacter, Verfaellie, &

Pradere, 1996; Schacter, Verfaellie, Anes, & Racine, 1998). In contrast, non-amnesic patients with frontal-lobe damage show higher levels of false recognition to critical lures than do controls (Budson et al., 2002; Melo et al., 1999). Of relevance for the present study, Melo et al. (1999) administered the DRM paradigm to four patients with frontal-lobe pathology in addition to amnesia. Three of these patients were confabulators. Similar to the MTL amnesics, frontal amnesic patients evinced extremely low levels of true recognition and false recognition to critical lures, but high levels of false recognition to unrelated lures.

It has been proposed that relatively high levels of false recognition to unrelated lures and low levels of false recognition to critical lures might be due to problems in understanding the semantic theme of the studied lists at study (i.e. gist extraction), or to poor gist memory at the time of retrieval (Melo et al., 1999). In contrast, high levels of false recognition to critical lures occur when individuals are able to extract and remember the gist of the studied lists, but unable to distinguish studied words from gist-consistent, but unstudied, lures. This failure may be due to poor memory for the studied words (i.e. item-specific memory; Schacter et al., 1998) or to defective monitoring processes (Melo et al., 1999). Indeed, previous research showed that normal subjects significantly suppress false recognition to critical lures when item-specific memory is experimentally enhanced (Budson et al., 2002; Schacter et al., 1998).

In the present study, we introduced a manipulation designed to enhance memory for studied words and, as a consequence, for the gist of the lists, assuming that individuals are able to extract it. This manipulation would allow us to verify whether confabulators may benefit from increased true memory to suppress false recognition to critical and unrelated lures. At variance with the typical DRM procedure (Standard condition), in which recognition is tested after the presentation of all the lists, in the Proximal condition patients were administered a six-item recognition test after the presentation of *each* list. Each recognition test included studied items, the critical lure of that list and unrelated lures. We administered the DRM to confabulators, non-confabulating amnesics without frontal-lobe dysfunction (NF amnesics), non-confabulating amnesics with frontal-lobe dysfunction (F amnesics), and normal controls, both in the Standard and in the Proximal condition. Moreover, to begin to explore the subjective experience of true and false memories in confabulators, patients were required to determine whether endorsed items were *remembered* or *known* (Tulving, 1985) and to describe their recollections by reporting exactly what they remembered about the learning episode (see also Norman & Schacter, 1997).

Based on previous evidence (Melo et al., 1999), we expected that in the Standard condition both confabulating and non-confabulating amnesics would show lower levels of true recognition and false recognition to critical lures, but higher levels of false recognition to unrelated lures, compared to normal controls. Compared to the Standard condition, in the Proximal condition true recognition was expected to increase in all groups. In contrast, the effect of the Proximal condition

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