CORTEX 45 (2009) 566–574

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Research report

"Do you remember what you did on March 13, 1985?" A case study of confabulatory hypermnesia

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ARTICLE INFO

Article history:
Received 8 March 2007
Reviewed 25 May 2007
Revised 7 January 2008
Accepted 11 March 2008
Action editor Michael Kopelman
Published online 5 June 2008

Keywords:
Confabulation
Episodic memory
Semantic memory
Temporal consciousness

ABSTRACT

We report on a patient, LM, with a Korsakoff's syndrome who showed the unusual tendency to consistently provide a confabulatory answer to episodic memory questions for which the predicted and most frequently observed response in normal subjects and in confabulators is "I don't know". LM's pattern of confabulation, which we refer to as *confabulatory hypermnesia*, cannot be traced back to any more basic and specific cognitive deficit and is not associated with any particularly unusual pattern of brain damage. Making reference to the Memory, Consciousness and Temporality Theory – MCTT (Dalla Barba, 2002), we propose that LM shows an expanded Temporal Consciousness – TC, which overflows the limits of time ("Do you remember what you did on March 13, 1985?") and of details ("Do you remember what you were wearing on the first day of summer in 1979?") that are usually respected in normal subjects and in confabulating patients.

1. Introduction

Confabulation is a symptom observable in some patients with memory impairment. At a general level, confabulation can be referred to as a symptom observable in amnesic patients who are unaware of their memory deficit, and which consists of actions and verbal statements that are unintentionally incongruous to the patient's history, background, present and future situation (Dalla Barba, 1993a).

This rather infrequent disorder is classically described in Korsakoff's syndrome (Benson et al., 1996; Bonhoeffer, 1904; Cermak et al., 1980; Dalla Barba et al., 1990; Korsakoff, 1889; Mercer et al., 1977; Schnider et al., 1996a, 1996b; Talland, 1961; Wyke and Warrington, 1960). But confabulation is also seen in patients suffering from ruptured aneurisms of the anterior communicating artery, subarachnoid haemorrhage or encephalitis (Alexander and Freedman, 1984; Dalla Barba et al., 1997a, 1997b; Delbecq-Derouesné et al., 1990; Irle et al., 1992; Kapur and Coughlan, 1980; Kopelman et al., 1995; Luria, 1976; Moscovitch, 1989, 1995; Papagno and Muggia, 1996; Schnider et al., 1996a, 1996b; Stuss et al., 1978), head injury (Baddeley and Wilson, 1986; Dalla Barba, 1993b; Schnider et al., 1996a, 1996b; Weinstein and Lyerly, 1968), Binswanger's Encephalopathy (Dalla Barba, 1993a), Alzheimer's disease and

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doi:10.1016/j.cortex.2008.03.009

frontotemporal dementia (Dalla Barba et al., 1999; Kern et al., 1992; Nedjam et al., 2000, 2004) and aphasia (Sandson et al., 1986). Confabulation may also be observed, on occasion, in normal subjects (Burgess and Shallice, 1996; Dalla Barba et al., 2002; Kopelman, 1987).

Within confabulatory behaviour some distinctions have been proposed. Berlyne (1972), following Bonhoeffer (1904), distinguished between ''momentary'' and ''fantastic'' confabulation. According to Berlyne (1972), momentary confabulation, which invariably must be provoked, is autobiographical in content, refers to the recent past and consists of true memories displaced in their time context. In contrast, fantastic confabulation is spontaneous and ''it is autobiographical, but entirely invented. The principal content is invariably grandiose and seems to be related to wish fulfilment and prestige seeking'' (Berlyne, 1972, p. 33). Subsequently Kopelman (1987) argued that Berlyne's description was inadequate because it failed to isolate the distinguishing features of the two types of confabulation and proposed to focus on the modality of appearance by referring to ''provoked'' and ''spontaneous'' confabulation. Provoked confabulation would reflect a normal response to a faulty memory, whereas spontaneous confabulation would reflect the production of an ''incoherent and context-free retrieval of memories and associations'' (Kopelman, 1987, p. 1482) resulting from the superimposition of frontal dysfunction on an organic amnesia. Schnider et al. (1996a, 1996b) have suggested that the term ''spontaneous confabulator'' should only be attributed to patients who show the tendency to act on their confabulations, since, they argue, action is the only observable symptom that cannot be directly provoked by the researcher or some other external trigger. However, the distinction between spontaneous and provoked confabulation has not gone unchallenged. In fact it has been shown that spontaneous confabulations are not necessarily ''fantastic and grandiose'' (Dalla Barba, 1993a; Dalla Barba et al., 1997a, 1997b) and that provoked confabulations can be fantastic and incoherent (Dalla Barba, 1993b; Dalla Barba et al., 1998). Accordingly, the line drawn between spontaneous and provoked confabulations often appears to be quite an arbitrary decision. Some authors, in fact, argue that it is not meaningful to impose a dichotomy, and that confabulation should be regarded as a continuous variable, ranging from minor distortions to the more fantastical (Dalla Barba, 1993b; Fischer et al., 1995; Kapur and Coughlan, 1980).

As far as the mechanisms of confabulation are concerned, three major approaches have been proposed.

(1) Johnson argued that confabulation reflects poor *source monitoring*, or *reality monitoring*, i.e., deciding whether a memory is a trace of something that actually happened to you or is a memory of an imagined event (Johnson, 1991). Damage to frontal/executive functions would result in an impairment of judgment processes involved in reality monitoring and so in confabulation. This interpretation of confabulation is consistent with the idea that confabulation is a form of source amnesia (Moscovitch, 1989; Schacter et al., 1984) combined with misattribution of temporal and spatial context (Schacter, 1987). However, in a more recent paper, Johnson et al. (1997) demonstrated that reality monitoring, or source monitoring, was equally disrupted in a confabulatory patient, and in non-confabulating patients with frontal lobe damage. The latter findings lead Johnson and colleagues to propose that a reality monitoring, or source monitoring, deficit may occur with confabulation but is not the only factor involved in the genesis of confabulation (Johnson, 1997).

(2) Moscovitch (1989, 1995), Moscovitch and Melo (1997) and Gilboa et al. (2006) have proposed that confabulation is the result of a deficit of *strategic retrieval*. They propose a distinction between two components of retrieval. One, *associative retrieval*, is relatively automatic and independent from frontal functions. The other, *strategic retrieval*, is self-initiated, goal-directed, effortful and intelligent. Within strategic retrieval processes, two further components are hypothesised. The first involves organising a memory search that uses whatever knowledge is available, whether semantic or episodic. Once knowledge is recovered, a second strategic process is involved in monitoring the output of the memory search and checking whether it is consistent with other information in semantic and episodic memory. When strategic retrieval is disrupted, following damage in the ventromedial and orbitofrontal cortex (Gilboa et al., 2006; Moscovitch, 1982), both semantic and episodic confabulations should occur if the demands on the strategic retrieval of episodic versus semantic information are matched. Burgess and Shallice's (1996) model is consistent with Moscovitch's proposal that confabulation is associated with deficits in strategic retrieval, which implicate defective search and monitoring.

These hypotheses that emphasise the role of a frontal/executive dysfunction and of the disruption of monitoring processes in the origin of confabulation are challenged by several types of observations: (a) two patients have been described with a confabulatory syndrome where there were spared executive functions and no frontal pathology (Dalla Barba, 1993a; Dalla Barba et al., 1990); (b) the confabulating patient described by Delbecq-Derouesné et al. (1990) had a documented frontal lobe lesion but performed normally on tasks supposed to be sensitive to frontal lesion; (c) the confabulating patient described by Dalla Barba et al. (1997a, 1997b) showed impaired executive functions without any evidence of structural or functional damage to the frontal lobe; (d) in some patients confabulation affects the performance on episodic memory tasks but not on semantic memory tasks (Dalla Barba, 1993a; Dalla Barba et al., 1997a, 1997b, 1990), even when demands on the strategic retrieval of episodic versus semantic information are matched (Dalla Barba et al., 1997a, 1997b, 1999). It is also well known that only a relatively small proportion of patients with ventromedial and orbitofrontal lesions confabulate. Retrieval models of confabulation propose that it is a very specific set of cognitive functions that are not measured by traditional frontal/executive tests that is disrupted in confabulation. However, these models don't predict what would be a good measure of the set of frontal/executive functions supposed to be involved in strategic retrieval and monitoring.

(3) The third approach concerning the mechanisms involved in confabulation predicts that confabulations are the