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

Gianfranco Dalla Barba and Caroline Decaixe

A R T I C L E   I N F O

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

A B S T R A C T

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.

© 2008 Elsevier Srl. All rights reserved.

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; Lupia, 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...
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 that are 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. Schneider 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, 1982; 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 (1988, 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, 1999), 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
result of a disrupted personal temporality (Dalla Barba, 1997a, 1997b, 1999, 2000, 2001, 2002). Based on clinical and experimental, evidence, this hypothesis assumes that in confabulating patients the knowledge of time is preserved, in that they are aware of a past, present and future. However, they are unable to distinguish between personal habits, repeated events and routines and true episodic memories or true personal plans. In spite of some important differences, this theory is not incompati-
ble with the theory proposed by Schnider and co-workers, which posits that confabulators fail to suppress inappropriate memory traces, resulting in all active traces appearing to relate to the present (but see Dalla Barba, 2000, 2001, 2002 for a critique of the concept of memory trace).

This paper describes the study of a patient, LM, with a Kor-
sakoff’s syndrome who developed an extraordinary form of confabulatory syndrome, which we refer to as confabulatory hypermnesia, i.e., the tendency to provide a confabulatory an-
swer to questions for which the predicted and most frequently observed response in normal subjects and in confabulators is “I don’t know”.

The aims of this study are to elucidate as fully as possible the nature of the impairment of patient LM by trying to find answers to the following questions:

“Can LM’s confabulatory hypermnesia be traced back to a specific cognitive deficit?”

“What distinguish LM from other confabulating patients who do not confabulate answering questions for which the expected answer is ‘I don’t know’?”

2. Case report

2.1. History

LM, retired warehouseman of an airways company, is a 68-
year-old right-handed man with 8 years of education. He is married and has five children.

He has a history of heavy drinking which lasted more than 30 years and was stopped approximately 3 months before the present evaluation.

Following the abrupt onset of temporo-spatial disorienta-
tion and memory loss, LM was referred to the Memory Clinic of the Charles Foix hospital in Ivry-sur-Seine for neuropsycho-
logical evaluation. The physical, neurological and psychiatric examination was normal. An MRI brain-scan showed a mild diffuse cortical atrophy without evidence of any focal lesion. The patient’s history of heavy drinking and the clinical picture suggested a diagnosis of Korsakoff’s syndrome.

2.2. Neuropsychological examination

The patient’s collaboration during the testing sessions was good. On direct questioning he was disoriented and confabu-
lated in time and space. He scored 15/30 on the Mini Mental State Examination (Folstein et al., 1975). On tests of oral expression, understanding of oral language, neglect, ideational, ideomotor and constructional apraxia, and short-term mem-
ory the patient was judged to be normal. LM showed to be impaired on some tests considered sensitive to executive dys-
function. He performed pathologically on the Trail Making Test (Davies, 1968) [Trail Marking Test part A 120 sec, 25/25, <10 percentile; Trail Marking Test part B 4 min, 17/25, <10 percent-
ile] and on the Digit Symbol subtest of the Wechsler Adult Intelligence Scale Revised (Wechsler, 1981) raw score = 17. His performance on Letter Fluency and on Category Fluency was also defective, producing an average of 6 and 12 words, re-
spectively. In contrast, he performed normally on both direct (7) and reverse (4) digit span.

2.2.1. Clinical tests of memory

On the Free and Cued Selective Reminding Test (Buschke, 1984; see Table 1) LM showed a massive deficit in free recall, whereas cued recall and recognition were relatively better preserved. On the Logical Memory subtest of the Wechsler Memory Scale – III (Wechsler, 1997; see Table 1), he showed very poor free recall and impaired recognition. In addition, his performance on this test was contaminated by many con-
fabulations. The patient also had great difficulty in retrieving autobiographical episodes and showed very poor knowledge of famous facts and famous people.

2.3. Examination of confabulation

LM produced most of his confabulations in informal conversa-
tion, when answering specific questions and spontaneously, mainly referring to autobiographical episodic memory. Con-
fabulation was always plausible and semantically appropriate so that an hypothetical observer not familiar with LM’s his-
tory, background and present situation could hardly tell whether LM’s reports were confabulatory or not. For example he would claim that on the previous day he had a soup for din-
ner and that he didn’t watch television because there was no television in the ward where he was hospitalised.

2.4. Confabulation Battery

To further examine LM’s confabulation, we submitted him to a new version of the Confabulation Battery (Dalla Barba, 1993a). The Confabulation Battery involves the retrieval of various kinds of information and consists of 165 questions, 15 for each of the following domains:

<table>
<thead>
<tr>
<th>Table 1 – Memory test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Free and Cued Selective Reminding Test</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Logical Memory</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
(1) Personal Semantic Memory (age, date of birth, current address, number of children, etc.).
(2) Episodic Memory. Episodic, autobiographical questions.
(3) Orientation in Time and Place.
(4) Linguistic Semantic Memory. Items 16–30 of the Wechsler Adult Intelligence Scale vocabulary subtest were selected for a word definition task.
(5) Recent General Semantic Memory. Knowledge of facts and people, which have been repeatedly reported in the news during the last 10 years. For example, "Who is Ben Laden?"
(6) Contemporary General Semantic Memory. Knowledge of famous facts and famous people from 1940 to 1990. For example, "What happened in Paris in May 1968?"
(7) Historical General Semantic Memory. Knowledge of famous facts and famous people before 1900. For example, "What happened in 1789?"
(8) Semantic Plans. Knowledge of issues and events likely to happen in the next 10 years. For example, "Can you tell me what you think will be the most important medical breakthrough likely to take place in the next 10 years?"
(9) Episodic Plans. Personal events likely to happen in the future. For example, "What are you going to do tomorrow?"
(10) "I don’t know" Semantic. These were questions tapping semantic knowledge and constructed so as to receive the response "I don’t know" from normal subjects. For example, "What did Marilyn Monroe’s father do?"
(11) "I don’t know" Episodic. These tapped episodic memory and were constructed so as to receive the response "I don’t know" by normal subjects. For example, "Do you remember what you did on March 13, 1985?"

2.4.1. Procedure
Questions from the 11 domains were randomised and presented to the patient and to 10 age and education matched normal controls (NCs). Responses were scored as ‘correct’, ‘wrong’, ‘I don’t know’, and “confabulation. For episodic memory, responses were scored “correct” when they matched information obtained from the patient’s relatives. Correct responses were self-evident for semantic memory questions. For “I don’t know” questions, both Semantic and Episodic, an “I don’t know” response was scored as correct. Since there is no sufficiently acceptable external criterion capable of defining confabulation, for its detection an arbitrary decision necessarily had to be made. In order to distinguish between a wrong response and a confabulation a clear-cut decision was adopted only for answers to questions probing orientation in time. In this case the most strict criterion was chosen: answers to questions regarding the current year, season, month, day of the month, day of the week and hour of the day were judged to be confabulations only if erring for more than 5 years, 1 season, 2 months, 10 days, 3 days or 4 h, respectively. Answers to the other questions of the Confabulation Battery were independently rated as ‘correct’, ‘wrong’, and ‘confabulation’ by four different raters, and interrater reliability was 100%. It must be emphasised that the decision as to whether an answer was wrong or confabulatory was never puzzling, although it may have been made on an arbitrary or subjective basis. As far as questions concerning personal and semantic plans are concerned, it might be argued that any possible answer is a confabulation, since, by definition, the future is only “probable” and there is in principle no “correct” answer to questions about the future. Yet, answers concerning the future can be definitely confabulatory when they show a marked discrepancy or a real contradiction with what a predicted future event might be, in view of the present situation. For example, although he was hospitalised and despite the fact that there wasn’t any television in the ward, to the question “What are you going to do to night?”, LM answered “I’ll have dinner with my wife and then watch the news at the television”.

3. Results
LM’s and NCs’ performance on the Confabulation Battery is reported in Table 2.

3.1. Correct responses
LM produced significantly fewer correct responses than NC to questions probing Personal Semantic Memory, Episodic Memory, Orientation in Time and Place, Recent General Semantic Memory \(t(9) = 15, p < .001;\) estimated percentage of normal subjects falling below LM’s scores = 0.0\%]. Contemporary

Table 2 – LM’s and NCs’ performance (%) on the confabulation battery

<table>
<thead>
<tr>
<th></th>
<th>Correct</th>
<th>Confabulation</th>
<th>Wrong</th>
<th>IDK</th>
<th>Total recall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LM</td>
<td>NC</td>
<td>LM</td>
<td>NC</td>
<td>LM</td>
</tr>
<tr>
<td>Personal Semantic Memory</td>
<td>73</td>
<td>100</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Episodic Memory</td>
<td>33</td>
<td>100</td>
<td>53</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Orientation in Time and Place</td>
<td>53</td>
<td>100</td>
<td>13</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>Linguistic Semantic Memory</td>
<td>66</td>
<td>81.4 (15.7)</td>
<td>0</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>Recent General Semantic Memory</td>
<td>33</td>
<td>96.5 (3.7)</td>
<td>40</td>
<td>.7 (2.2)</td>
<td>27</td>
</tr>
<tr>
<td>Contemporary General Semantic Memory</td>
<td>73</td>
<td>93.2 (7.7)</td>
<td>7</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Historical General Semantic Memory</td>
<td>53</td>
<td>73.2 (28.9)</td>
<td>13</td>
<td>.7 (2.2)</td>
<td>20</td>
</tr>
<tr>
<td>Semantic Plans</td>
<td>80</td>
<td>95.9 (6.5)</td>
<td>7</td>
<td>0</td>
<td>1.4 (3)</td>
</tr>
<tr>
<td>Episodic Plans</td>
<td>33</td>
<td>98 (6.3)</td>
<td>33</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>“I don’t know” Semantic</td>
<td>66</td>
<td>99.3 (2.2)</td>
<td>33</td>
<td>.7 (2.2)</td>
<td>0</td>
</tr>
<tr>
<td>“I don’t know” Episodic</td>
<td>7</td>
<td>100</td>
<td>93</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
General Semantic Memory \( [t(9) = 2.3, p < .05; \text{estimated percentage of normal subjects falling below LM's scores} = 2\%] \), Semantic Plans \( [t(9) = 2.5, p < .05; \text{estimated percentage of normal subjects falling below LM's scores} = 1.5\%] \), Episodic Plans \( [t(9) = 10.3, p < .001; \text{estimated percentage of normal subjects falling below LM's scores} = 0\%] \), and to “I don’t know” Semantic \( [t(9) = 14.4, p < .001; \text{estimated percentage of normal subjects falling below LM's scores} = 0\%] \), and “I don’t know” Episodic questions (Crawford and Garrthwaite, 2002; Crawford and Howell, 1998). LM produced fewer correct responses than NC to questions probing Linguistic Semantic Memory and Historical General Semantic Memory, but this effect was not significant. The estimated percentage of normal subjects falling below LM’s scores was 19.7% for Linguistic Semantic Memory and 27.3% for Historical Semantic Memory.

LM produced significantly fewer correct responses, i.e., “I don’t know”, to “I don’t know” Episodic questions than to any other type of question (all \( p < .0001 \); estimated percentage of normal subjects exhibiting a difference more extreme than LM = .0, Crawford and Garrthwaite, 2002; Crawford and Howell, 1998). Episodic Memory, Recent General Semantic Memory and Episodic Plans were also significantly affected compared to Orientation in Time and Place and Historical General Semantic Memory (all \( p < .0001 \); estimated percentage of normal subjects exhibiting a difference more extreme than LM = .0), which in turn were impaired compared to Personal Semantic Memory, Linguistic Semantic Memory, Contemporary General Semantic Memory, Semantic Plans, and “I don’t know” Semantic questions (all \( p < .0001 \); estimated percentage of normal subjects exhibiting a difference more extreme than LM = .0, Crawford and Garrthwaite, 2002; Crawford and Howell, 1998).

NC produced significantly fewer correct responses to questions probing Linguistic Semantic Memory and Historical General Semantic Memory than to any other type of question (all \( p < .05 \)) except for questions probing Contemporary General Semantic Memory.

To summarise, compared to NC, LM performed poorly across the board on the Confabulation Battery, with his performance being relatively better preserved in Personal Semantic Memory, Linguistic Semantic Memory, Contemporary Semantic Memory and Semantic Plans. He was particularly impaired in answering “I don’t know” Episodic questions where he correctly answered “I don’t know” only 1 out of 15 times.

### 3.2. Confabulations

NC produced virtually no confabulations. In fact, only one subject produced one confabulation in Recent General Semantic Memory and one in Historical General Semantic Memory.

A Chi-square test revealed a global significant effect of the type of questions on LM’s confabulations \( [\chi^2 (10) = 246.9, p < .001] \). LM did not confabulate in response to Linguistic Semantic Memory questions. He produced significantly more confabulations to “I don’t know” Episodic questions than to any other type of question (Chi-square test, all \( p < .001 \)). He also produced significantly more confabulations to Episodic Memory, Recent General Semantic Memory, Episodic Plans and “I don’t know” Semantic questions than to questions probing Personal Semantic Memory, Orientation in Time and Place, Contemporary General Semantic Memory, Historical General Semantic Memory and Semantic Plans (Chi-square test, all \( p < .05 \)).

To summarise, LM produced an impressive percentage of confabulations in response to “I don’t know” Episodic questions. He also produced more confabulations to questions involving episodic recall and episodic plans compared to questions involving recall from semantic memory.

### 3.3. Examples of LM’s confabulation for each domain

#### 3.3.1. Personal Semantic Memory

Q. “What is your brother’s job?”
A. “Rémy is an artist. He works in variety shows.” LM confuses his brother with his son (Patrik) who actually works as an artist in variety shows.

#### 3.3.2. Episodic Memory

Q. “Do you remember the last time a doctor examined you?”
A. “Well, he examined me without really examining me, because my doctor lives near me, so I see him quite often. The last time... not so long ago in any case.”

#### 3.3.3. Orientation in Time and Place

Q. “What month is it?”
A. “End of December.” In fact it was the end of April.

#### 3.3.4. Recent General Semantic Memory

Q. “What does the Dreyfus affaire remind you of?”
A. “It’s the story of a poisoning and of a murder.”

#### 3.3.5. Contemporary General Semantic Memory

Q. “What happened in May 1968?”
A. “It was the beginning of the workmen’s revolution; the government opposed Africa.”

#### 3.3.6. Historical General Semantic Memory

Q. “What does the Mir station remind you of?”
A. “It’s a metro’s station in the 15th arrondissement in Paris.”

#### 3.3.7. Semantic Plans

Q. “What do you think will be the most important advancements in the exploration of space in the next 10 years?”
A. “We will land on the Moon and see if somebody lived there, if it is habitable.”

#### 3.3.8. Episodic Plans

Q. “What are you going to do the day after tomorrow?”
A. “I’ll go shopping, as usual, and then watch television.”

#### 3.3.9. “I don’t know” Semantic

Q. “Who won the Palme d’Or at the Canne Festival in 1980?”
A. “Fernandel.”

#### 3.3.10. “I don’t know” Episodic

Q. “Do you remember what you had for dinner on Tuesday two weeks ago?”
R. “Steak with French fries.”
Q. “Do you remember what you were wearing on the first day of summer in 1979?”
R. “A short and a T-shirt.”
Q. “Do you remember what you did on March 13, 1985?”
A. “We spent the day at the Senart Forest” (a place where LM used to go often with his family).
Q. “Do you remember what you did for your 27th birthday?”
R. “Wait a minute... I came back from the army when I was 23, so the 27th birthday... I think... Yes! I had dinner at my future wife’s place.”

4. Discussion

The patient we have described suffers from a relatively pure amnesic syndrome, in the sense that the memory impairment is not associated with other cognitive impairments likely to interfere with memory performance. Although he performs poorly on the Mini Mental State Examination, mainly due to his disorientation, LM doesn’t show a general deterioration of intellectual and attentional abilities, and he scores normally on tests of short-term memory. His amnesia involves memory for both personal and public events, as well as learning of new information as shown in his poor performance on the Free and Cued Selective Reminding Test and on the Logical Memory subtest of the Wechsler Memory Scale. LM confabulates both spontaneously and on direct questioning. His confabulations are always plausible and never show the bizarre, “fantastic” (Baddeley and Wilson, 1986) or semantically anomalous (Dalla Barba, 1993b) content described in some confabulating patients.

On the Confabulation Battery, LM produced fewer correct responses than NCs to all types of questions, although he performed relatively better in Personal Semantic Memory, Linguistic Semantic Memory, Contemporary Semantic Memory and Semantic Plans than in other domains. This result is similar to the pattern of performance of other amnesic patients on the Confabulation Battery (Dalla Barba, 1993b; Dalla Barba et al., 1997a, 1997b; Fotopoulou et al., 2004). In LM, like in other patients, semantic memory and semantic plans are better preserved than episodic memory and episodic plans. However, unlike other confabulators, LM produced only one correct –“I don’t know”, response to “I don’t know” Episodic questions. To this type of question, 14 out of 15 times he produced a confabulation.

LM confabulated in response to all types of questions, with the exception of Linguistic Semantic Memory. However, he produced significantly more confabulations in Episodic Memory, Recent Semantic Memory and Episodic Plans compared to the other types of questions. Like in other confabulators (Dalla Barba, 1993a, 1993b; Dalla Barba et al., 1997a, 1997b), LM showed confabulations with a pattern of selectivity, affecting the episodic domain more than the semantic domain. He also confabulated in Recent General Semantic Memory, which may represent a grey area between semantic and episodic memory (Shallice, 1988), and in “I don’t know” Semantic questions. But the most striking aspect of LM’s confabulations is his tendency to confabulate 3 times as much with episodic memory questions that are usually answered “I don’t know” by normal subjects and which produce confabulations, but less florid than LM’s, in other confabulating patients (Dalla Barba, 1993a; Dalla Barba et al., 1998).

As far as total recall is concerned, i.e., the sum of correct responses, errors and confabulations, LM and NC showed a similar pattern of performance. They both showed the tendency to provide an answer, correct or not, rather than an “I don’t know” response to all types of questions with the exception of “I don’t know” questions where LM was always productive, whereas NC always correctly answered “I don’t know”.

From LM’s performance on the Confabulation Battery emerges a previously unreported phenomenon, which we refer to as confabulatory hypermnesia, i.e., the tendency to provide a confabulatory answer to questions for which the predicted and most frequently observed response in normal subjects and in confabulators is “I don’t know”. It might be argued that LM’s specific pattern of performance reflects a methodological bias, in that “I don’t know” Semantic questions may be more difficult or less likely to elicit confabulations than “I don’t know” Episodic questions. Confabulations in response to “I don’t know” questions, both semantic and episodic, have been reported in some confabulating patients (Dalla Barba, 1993b; Dalla Barba et al., 1998; Fotopoulou et al., 2004, 2007; Kopelman et al., 1997), whereas other patients do not confabulate at all to these questions (Box et al., 1999; Dalla Barba, 1993a; Dalla Barba et al., 1997a, 1997b). However, none of the reported cases confabulated as much as LM to “I don’t know” Episodic questions, and in none of these cases was there such a clear dissociation between confabulations to “I don’t know” Episodic and “I don’t know” Semantic questions. Actually some patients confabulated slightly more to “I don’t know” Semantic than to “I don’t know” Episodic questions (Fotopoulou et al., 2007). So, although some patients confabulate to “I don’t know” Episodic questions, none of them show the specific pattern of performance described in LM. This pattern of performance, that we call confabulatory hypermnesia, doesn’t seem to simply reflect differences in task difficulty. This leads us to address the problem of the origin of confabulatory hypermnesia. By asking the following questions: “Why does LM confabulate when answering episodic memory questions for which the expected answer is ‘I don’t know’?” and “What is the difference between LM and confabulating patients who do not confabulate so floridly with ‘I don’t know questions’?”

It has been argued that confabulation reflects poor source monitoring. Source monitoring refers to the set of processes involved in making a decision about the origin of different information (see Metcalfe et al., 2007, for a review). A related concept is reality monitoring, which refers to the ability to discriminate between internally and externally generated information (e.g., imagination vs veridical perception). According to this view, confabulation is the result of mistaking imagined events for truly experienced events (Johnson, 1991). This kind of explanation, however, does not account for the fact that confabulation, as in the present case and in other studies (Dalla Barba, 1993a, 1993b; Dalla Barba et al., 1990, 1997a, 1997b; Delbecq-Derouesné et al., 1990), is absent or significantly less frequent in tasks that require retrieval of non-episodic information. In fact, if a disruption of reality monitoring were responsible for confabulation, confusion
between truly experienced and imagined events and information should not be limited to episodic retrieval but should extend across all memory domains. Moreover, if we consider the examples of LM’s confabulations in “I don’t know” Episodic questions, there is no evidence that he is mistaking imagined events for really experienced events. Most of his confabulations to ‘I don’t know’ Episodic questions reflect the retrieval of personal habits or semantic information rather than retrieval of imagined events: the Senart Forest is a place where he used to go often with his family, steak and French fries are a very common meal in France, in summer many people wear shorts and T-shirts.

The retrieval of personal habits and semantic information in LM’s confabulations could be traced back to a deficit of strategic retrieval (Moscovitch, 1989, 1995; Moscovitch and Melo, 1997). In the presence of such a deficit, only associative retrieval is possible and this might be reflected by the type of confabulations produced by LM. A deficit of strategic retrieval applies equally across all domains of memory. In other words, confabulation should equally affect episodic and semantic memory if both episodic and semantic memory tasks require the involvement of strategic retrieval processes. However, this hypothesis has difficulties in accounting for cases in which confabulations are confined to the domain of episodic memory (Dalla Barba, 1993b; Dalla Barba et al., 1990, 1997a, 1997b), also when both episodic and semantic memory tasks require the involvement of strategic retrieval processes (Dalla Barba et al., 1997a, 1997b, 1999). As far as LM’s case is concerned, a strategic retrieval deficit account predicts that if ‘I don’t know’ Semantic and ‘I don’t know’ Episodic questions make equal demands on strategic retrieval processes then confabulations should occur both for ‘I don’t know’ Semantic and ‘I don’t know’ Episodic questions, which is not what was actually observed. As discussed above, there is no reason to consider one type of ‘I don’t know’ question more difficult or more likely to elicit confabulation than the other type. Since there is no specific available measure of the amount of strategic retrieval involved in a task, it is impossible to know whether ‘I don’t know’ Episodic questions are more demanding in terms of strategic retrieval processes than ‘I don’t know’ Semantic questions. However, there is clear evidence that LM was engaged in an active search when answering both ‘I don’t know’ Episodic questions (see his answer to the question “Do you remember what you did for your 27th birthday?”) and ‘I don’t know’ Semantic questions, as clearly emerges from the following example:

Q. “What is the first name of Jimmy Carter’s wife?”
R. “Her first name? ...(search); no; no though I should know it because she is well known”;

To this type of questions, normal subjects don’t even attempt to search and immediately produce an “I don’t know” response, even when they are explicitly asked to make a plausible guess.

We have argued (Dalla Barba, 2000, 2001; Dalla Barba et al., 1997a, 1997b, 1999) that confabulation can be interpreted within the framework of the MCTT (Dalla Barba, 2002), The MCTT, that is schematised in the model presented in Fig. 1, holds that (1) consciousness is not a unitary and generic dimension that passively receives what comes from outside, but is the set of distinct and original modes for addressing the object. Among the modes of consciousness there is
terms, this is a condition in which TC is still working but is no longer able to accomplish its usual task, i.e., to distinguish between Multiplicity and Uniqueness in order to set up a personal temporal workspace. What TC does instead in this condition is to address Multiplicity of the object as Uniqueness, so that the result is that not only unique personal episodes, but also habits or personal semantic information are considered in a personal temporal framework. When asked what they did the previous day or what they are going to do the following day, confabulating patients of this type typically answer reporting as memories and plans what they usually do in their daily life. Although admitted to the hospital, they will say, for example, that the previous day they went out shopping and that the following day will be visiting some friends, acts that presumably were part of their routine life.

This kind of interpretation, however, still doesn’t explain why, unlike other confabulators, LM confabulates to “I don’t know” Episodic questions. The analysis of total recall shows that, with the exception of “I don’t know” questions, LM and NC have the same performance, a mean of 94% and 95% of responses, respectively. This indicates that both LM and NC have answers to almost all the questions, although in LM the answer is often confabulatory, especially in the episodic domain. It also indicates that, according to the MCTT, in both NC and LM, KC and TC are working, although the latter is working in an abnormal way in LM. However, while in NC, KC and TC respect the boundary of “I don’t know” questions, in LM this boundary is overstepped. What is the nature of this boundary? Why NC and most confabulators promptly respond “I don’t know” to “I don’t know” questions, whereas LM confabulates?

One possibility is that LM may have always been a cognitive ‘outlier’, in the sense that, even premorbidly, he may have used unusual cognitive strategies and that his confabulatory hypermnesia is a continuation of the use of such strategies. However, no evidence in this sense emerged from questioning the patient’s wife. So, although this possibility cannot be excluded, there is no specific evidence favouring a premorbid personality account of LM’s disorder.

LM’s confabulatory hypermnesia doesn’t seem to be correlated to any specific pattern of brain damage. The MRI brain scan showed a mild diffuse cortical atrophy, which is an unremarkable finding. LM’s cognitive profile was also unremarkable. In particular, he didn’t show an especially severe impairment of executive functions, compared to other confabulators. Accordingly, LM’s confabulatory hypermnesia cannot be traced back to any specific pattern of brain damage or of cognitive impairment. From a merely descriptive point of view, and making reference to the MCTT, LM, compared to normal subjects and to other confabulators, shows an expanded 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.

5. Conclusions

We have described a previously unreported phenomenon, confabulatory hypermnesia, arguing that it reflects an expansion of TC beyond its normal limits. Although we believe that our interpretation best accounts for the LM’s confabulatory hypermnesia, other interpretations of this phenomenon cannot be completely dismissed since a clear double dissociation between “I don’t know” Semantic and Episodic questions has not been yet reported. Be that as it may, this leaves us with a number of open questions: What are the cognitive and neural correlates of confabulatory hypermnesia? How are the boundaries of TC normally determined? What is the cause of their breakdown? What would be the critical test or set of evidence that would confirm or disprove this hypothesis? Answers to these questions would shed light on confabulatory hypermnesia and on the organisation of TC in general. In the absence of further experimental evidence these remain unanswered, indeed “I don’t know” questions.

References


