

## Two types of confabulation

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**SUMMARY** Examples of confabulation in Korsakoff patients, Alzheimer-type dementing patients, and healthy subjects are discussed. It is argued that there may be two types of confabulation: spontaneous confabulation, which may result from the superimposition of frontal dysfunction on an organic amnesia, and provoked confabulation, which may reflect a normal response to a faulty memory. In the present study, instances of provoked confabulation, given by Korsakoff and Alzheimer patients in story recall, were compared with those produced by healthy subjects at a prolonged retention interval.

Berlyne<sup>1</sup> defined confabulation as "a falsification of memory occurring in clear consciousness in association with an organically derived amnesia". Under the umbrella of this definition, Berlyne followed Bonhoeffer<sup>2</sup> in distinguishing between "momentary" and "fantastic" confabulation. Momentary confabulation is fleeting, and Berlyne<sup>1</sup> stated that it is "invariably" provoked by questions probing the subject's memory, and that it consists of "real" memories displaced in their temporal context. Fantastic confabulation is spontaneous, sustained, wide-ranging, and grandiose; and it is readily evident in the subject's everyday conversation. However, this description confounds a number of factors, which are not necessarily correlated, as the distinguishing features of the two types of confabulation; and it is wiser, perhaps, to focus attention upon one central feature by referring to "provoked" and "spontaneous" confabulation, respectively. Berlyne gave various examples of the two types of confabulation in dementing and Korsakoff patients, but he admitted that the cause of confabulation remained obscure.

Subsequently, various researchers have identified an association between the spontaneous (or "fantastic") type of confabulation and either the presence of frontal lobe pathology or other evidence of "frontal" dysfunction. Luria<sup>3</sup> argued that deep mid-line lesions (for example, tumours of the wall of the third ventricle) give rise to a marked and relatively specific memory impairment; but that, if such lesions spread to involve the medial aspects of the frontal lobes, a syndrome appears which is characterised by confusion, confabulation, and the spontaneous "out-

pouring" of irrelevant associations. Similarly, Stuss *et al*<sup>4</sup> and Kapur and Coughlan<sup>5</sup> have described examples of "spontaneous" confabulation occurring in patients in whom there was both psychometric and neuroradiological (or neurophysiological) evidence of frontal damage, the latter authors<sup>5</sup> also reporting that the confabulation subsided as performance on "frontal" tests improved. More recently, Baddeley and Wilson<sup>6</sup> have described further examples of confabulation in patients with evidence of frontal dysfunction, and (like Berlyne<sup>1</sup> and Luria<sup>3</sup>) they pointed out that the confabulatory ideas can sometimes be bizarre, preoccupying, and held with firm conviction. At a functional level, it seems that spontaneous confabulation may reflect an extremely incoherent and context-free retrieval of memories and associations (Kopelman<sup>7</sup>); and Baddeley and Wilson<sup>6</sup> view the phenomenon as an aspect of what they have described as a "dysexecutive" syndrome.

Less attention has been paid to the nature of "provoked" (or "momentary") confabulation. One possibility is that these fleeting confabulations are a normal response to poor memory, similar to the distortions and intrusions described by Bartlett<sup>8</sup> in healthy subjects. This explanation of confabulation has been considered previously by Wyke and Warrington,<sup>9</sup> who rejected it on the basis of a tachistoscopic experiment. However, although they cited Bonhoeffer,<sup>2</sup> Wyke and Warrington<sup>9</sup> were writing before Berlyne's paper<sup>1</sup> had appeared, and they did not distinguish unambiguously between the two types of confabulation.

A number of recent studies have investigated whether there are qualitative differences in the memory performance of amnesic patients and healthy subjects, after controlling for their overall levels of performance. One technique used to do this involves

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comparing the recall of amnesic patients at a short retention interval (that is, soon after the presentation of the material to be recalled) with that of healthy subjects at a prolonged retention interval, commonly a week (for example Woods and Piercy;<sup>10</sup> Mayes and Meudell;<sup>11</sup> Meudell *et al.*<sup>12</sup>). The present study used this technique to investigate whether healthy subjects would produce “provoked” confabulations at a long retention interval, similar to those given by amnesic and dementing patients at immediate recall or after only a short delay.

**Method**

*Subject groups*

Korsakoff patients were selected to conform as closely as possible to the “acute onset” subgroup identified by Cutting<sup>13</sup> in a retrospective study of Maudsley Hospital patients. Eight out of nine cases in whom the mode of onset was known had had an “acute onset” of the disorder (less than 8 weeks between onset of symptoms and admission), and the patients had a similar sex ratio (13 male; three female) and mean age (56.5 years, range 38–66) to Cutting’s subgroup. With respect to Wernicke features, 12 out of 16 cases had a recorded history of nystagmus and/or ophthalmoplegia, all cases had a history of ataxia and of disorientation in time, and 10 cases had a history of peripheral neuropathy. All cases had a history of very heavy and prolonged alcohol abuse over a mean duration of 24 years (range 10–37.5 years). Median time “dry” was 24 weeks (range 8 weeks to 12 years), and all the patients were still severely incapacitated by their memory disorder, either living in institutions or being heavily dependent on institutional support. Mean WAIS (pro-rated) full scale IQ was 101.8 (range 81–124). Further psychometric and neurological details have been published in earlier papers.<sup>14 15</sup>

Alzheimer patients were diagnosed according to clinical history and examination, with physical investigations to exclude other possible causes of dementia. In addition, it was required that patients should have psychometric evidence of generalised cognitive impairment and CT scan (computed tomography) evidence of cortical atrophy. None of the patients was hypertensive and none had a history of cerebrovascular disease. The sex ratio was four males:12 females, and the mean age was 65.6 years (range 56 to 75), reflecting the different sex and age distributions of this disorder from Korsakoff’s syndrome. Mild extrapyramidal signs were elicited in five out of 16 patients, and either impaired copying and drawing or frank apraxic signs in 12 out of 13 tested. Inclusion in another component of the study<sup>14</sup> required that patients should be able to perceive and name items from magazine pictures without difficulty, and five further patients were excluded because they were unable to do this. Most of these patients have now been followed up for 2 years or more, and all have shown the deterioration in their clinical state that this diagnosis predicts. The more severe Alzheimer patients had IQ assessed by Raven’s coloured progressive matrices (Raven *et al.*<sup>16</sup>) and the less impaired patients by WAIS (pro rated) IQ; and the Alzheimer group showed a mean deterioration in IQ of approximately 30

points, relative to premorbid IQ estimated on the basis of a reading test.<sup>15</sup> The Alzheimer patients also had a significantly larger mean ventricular/brain ratio (VBR) on CT scan ( $t = 4.36, p < 0.001$ ) and a significantly greater rating of cortical atrophy ( $t = 3.61, p < 0.01$ ) than the Korsakoff patients.<sup>14</sup>

The control subjects were selected to overlap with the two patient groups in terms of age and sex. There were eight male and nine female subjects with a mean age of 59.65 years (range 40 to 75). A reading test (Nelson and O’Connell<sup>17</sup>) was employed to give a quick estimate of IQ and, by this means, the healthy controls were matched in terms of mean IQ to the premorbid IQ of the Korsakoff and Alzheimer groups. Previous research by the author had confirmed Nelson and O’Connell’s<sup>17</sup> finding that, in a group of healthy subjects, the mean IQ obtained by this method closely matches the mean WAIS full scale IQ.<sup>15</sup> Five of the control subjects in the present study had taken part in the author’s earlier studies, and 12 of the subjects were new.

Table 1 summarises the data regarding age, sex, and premorbid IQ (based on the reading test) in the three groups.

*Procedure*

Subjects were read one of two Wechsler Logical Memory stories (Wechsler<sup>18</sup>), adapted for British subjects. Fourteen subjects in each of the groups heard the “Anna Thompson” story, and two subjects in each of the clinical groups and three in the controls heard the “liner New York” story. (The reason why the “liner New York” story was given to these few subjects was that they had been tested recently on the Anna Thompson story). Subjects were asked to recall the story as closely to the original as possible, and scored one point for a verbatim repetition of a phrase and half a point for recalling the gist of a phrase. The standard demarcation of phrases was modified a little so that each story was scored out of a maximum of 23 points. Recall was tested immediately after hearing the story and at 45 minutes’ delay. The interval was filled by performing other types of test, and subjects were not warned that repeated testing would occur. The healthy controls were then tested again at a one week delay; the appointment was made at the initial testing session, but subjects were not told what test would be performed at the one week interval.

The passages were:

- (1) *Anna Thompson:*  
Anna Thompson of South Bristol, employed as a cleaner in an office building, reported at the Town Hall police station that she had been held up on the High Street the night before and robbed of 15 pounds. She had four little children, the rent was due, and they had not eaten for two days. The officers, touched by the woman’s story, made up a purse for her.
- (2) *The liner, New York:*  
The American liner “New York” struck a mine near Liverpool on Monday evening. In spite of a blinding snow storm and darkness, the 60 passengers, including 18 women, were all rescued, though the boats were tossed about like corks in the heavy seas. They were brought into port the next day by a British steamer.

*Confabulation* was considered present when an intrusion

error added irrelevant or inaccurate material (for example "Anna Robinson ... aged forty-four", "her husband had left her") or changed the sense of the passage (for example, "she was told she was a thief", "a boat was taken to Australia").

## Results

Table 1 shows that, although the groups were closely matched in terms of estimated "premorbid" IQ, the Korsakoff and Alzheimer patients were severely and comparably impaired at the Logical Memory Test, whether scored in terms of immediate recall, delayed (45 minutes) recall, or percent retention (45 minutes score, divided by immediate score). As expected, the healthy controls showed a progressive decline in their scores through time, although it emerged that they were still scoring significantly better at one week than the two clinical groups had done at immediate recall. However, the controls' mean score at one week was much closer to the mean scores of the two clinical groups at immediate recall than their own mean immediate recall score had been.

Table 2 shows that eight Korsakoff patients, five Alzheimer patients, and eight healthy controls gave examples of "provoked" confabulation in their recall of the Logical Memory passages. The table shows that four of the five Alzheimer patients who confabulated did so at immediate recall, whereas the Korsakoff patients tended to confabulate slightly more often at 45 minutes than at immediate recall, and the healthy controls produced their most striking confabulations at a week. Some of the confabulations added inaccurate or irrelevant material (for example "she had a little boy aged two"; "it happened near a railway station") whereas others changed the sense of the passage (for example "a hospital cleaner stole £15 and was stopped by the police") or were unrelated to it (for example "Jack Brown took his wife down to Brighton"). Whereas some of the healthy subjects produced confabulations at a week which were essentially elaborations of responses they had given at earlier recall (for example cases BG and JG), two healthy

subjects (Cases JE and WH) produced confabulations which appeared unrelated to what they had said before.

In addition, two further Alzheimer patients gave examples of "provoked" confabulation in response to items of the Gresham (memory and orientation) questionnaire,<sup>19</sup> which was being administered at the same time (see ref 15). For example, on being asked when she had last been employed, one of these patients explained that she worked in the hospital, although, in fact, she had last worked for the Gas Board 12 years earlier. Furthermore, two Alzheimer patients (case LC and one further patient, NJ) produced "spontaneous" confabulations. One of these two cases talked incessantly about her mother (who had in reality been dead for many years), explaining to the interviewer that she had to hurry to cook dinner for her mother, and that she had been ticked off for being late in preparing the dinner the day before. When the interviewer queried whether her mother was still alive, the patient replied very forcefully that she was "very much alive". She denied having any children herself, although in fact she had a son. None of the Korsakoff patients produced any examples of "spontaneous" confabulation.

Confabulation at admission had been reported in the case notes of 12 out of the 16 Korsakoff patients, whereas it was mentioned specifically in the case notes of only two Alzheimer patients (although examples of possible confabulations were given in the notes of a further three cases).

## Discussion

Two recent papers have examined related issues. Hammersley and Read<sup>20</sup> found that healthy subjects were more vulnerable to interference effects from misleading information when recalling a story at one week's delay than at immediate recall, and that the misleading information was most likely to produce errors if it was presented shortly before the recall of the story; however, these researchers did not study

Table 1 Subject groups and mean scores on the Wechsler Logical Memory test ( $\pm$ SD)

	Healthy controls	Korsakoff patients	Alzheimer patients
N	17	16	16
Sex	8M:9F	13M:3F	4M:12F
Mean age	59.6 ( $\pm$ 10.9)	56.5 ( $\pm$ 7.1)	65.6 ( $\pm$ 6.8)
(Age range)	(40-75)	(38-66)	(56-74)
Premorbid IQ*	106.9 ( $\pm$ 11.2)	106.3 ( $\pm$ 11.5)	105.9 ( $\pm$ 9.6)
(range)	(89-124)	(87-123)	(91-121)
Logical memory: Immediate recall	10.2 ( $\pm$ 3.0)	4.1 ( $\pm$ 1.6)	3.2 ( $\pm$ 2.2)
Logical Memory: Delayed recall (45 min)	8.7 ( $\pm$ 2.9)	0.4 ( $\pm$ 0.7)	0.3 ( $\pm$ 0.7)
Percent retention†	85.3%	9.8%	9.4%
Logical Memory: one week recall	6.3 ( $\pm$ 2.8)	—	—

\*Estimated by a reading test (Nelson and O'Connell, 1978): see text.

†(45 minute recall  $\div$  immediate recall)%.

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Table 2 Summary of "provoked" confabulations on logical memory test

Patient group subject	Story	Logical memory -immediate recall	Logical memory -45 minute delay	Logical memory -1 week delay	Comments
<i>Korsakoff patients:</i>					
1. JBS 58M	AT	"She got a job in a pub to make £15." He did not know how she had lost the money "but her husband had left her."		Not tested.	Confabulation noted at admission.
2. FG 62M	AT	"She lost her purse."	"Mrs Joyce who lived at Brighton and Hove was hanging out her washing." (Added "I'm not very happy about that (though) I think I've got the gist of it.")	Not tested.	Reported to have been confabulating at admission.
3. NM 57M	AT		"It concerned a man going somewhere and his time of arrival—whether he'd be late or not."	Not tested.	
4. AS 59M	AT	"She asked for help from the Council."	"A man. It was dark at night. They sent someone to catch a robber."	Not tested.	Confabulation noted at admission.
5. JS 52M	AT	"Anna Cooperfield lost her purse."	"Jack Brown took his wife down to Brighton."	Not tested.	Confabulation noted at admission.
6. SF 66M	AT	"Anna Thompson of Cane Hill Hospital. She died."		Not tested.	"Fluent" confabulation reported at admission.
7. PG 57M	NY		"Something about trees in a forest."	Not tested.	Confabulation reported at admission.
8. WB 60M	NY		"The boat struck a rock. Forty people were missing."	Not tested.	
<i>Alzheimer patients:</i>					
1. LK 71F	AT		"A man was posting a letter."	Not tested.	Reported to confound things people have told her at different times.
2. MF 70F	AT	"Her boss offered her some money. Did she decline boss's offer?"		Not tested.	Had previously been reported to be expressing worries about an imaginary bank account.
3. EW 74M	AT	"She stole or found a purse, the object in mind being to feed her children."		Not tested.	Claimed (erroneously) to have driven to hospital for his first appointment.
4. RB 59M	AT	"She had just come home and two police officers called in to see her about the position as it was."		Not tested.	
5. LC 72F	AT	"She had had her money and valuables taken. Her confederates—ladies in the office—made up the money to her."		Not tested.	Described how her mother (dead many years) and aunt had given her a good telling off the previous day.
<i>Healthy controls:</i>					
1. JE 51F	AT	"She was in her twenties and worked at the Town Hall."	"She worked at the Town Hall."	"She had a little boy aged two." (The subject repeated this three times and appeared very confident of it.)	
2. BG 56F	AT	"She was a cleaner at a hospital who was stopped by the police on the High St."	"A hospital worker (was) stopped by the police."	"A hospital cleaner stole £15 and was stopped by the police."	
3. CP 70F	AT	"Anne Thompson of Sussex."	"She lost her purse. The police thought she was a thief."	"She lost her purse and was told she was a thief."	
4. GK 60F	AT	"Anna Thompson aged forty-four."	"Anna Stevenson aged forty-four."	"Anna Robinson, in the city centre, aged forty-four."	
5. RH 55F	AT	"The police were very kind and made up a sum of fifty pounds."	"Her children were starving. The police made up £50."	"She was hungry. The police made up £50. She was out of work and had been a cleaner."	
6. WH 55M	AT		"She was attacked on her way home from Bristol. She was very poor and her children were starving."	"Thieves took all the money she had in the world. It happened near a railway station."	
7. EG 40M	NY	"It happened near Plymouth. A ship called the Empress."	"A ship, the Empress of something, out of Plymouth, going to New York, brought into Plymouth by lifeboats."	"The Princess of Canada was leaving Bristol for New York."	
8. JG 75F	NY	"It was a trawler."	"A boat was going into New York. It was taken into harbour to be done up."	"A boat was taken to Australia. It was taken into harbour for repair."	

amnesic patients. Butters *et al*<sup>21</sup> reported that Korsakoff and Alzheimer patients were severely and comparably impaired in the recall of brief paragraphs at 30 seconds' delay. In their experiment, subjects were read four stories in fairly rapid succession, and both the Korsakoff and Alzheimer groups showed a high rate of "prior-story" intrusion errors as well as "extra-story" intrusion errors. However, these authors did not vary the retention interval, and the healthy controls, who gave relatively few intrusion errors, were performing at a much higher level than the amnesic groups.

In the present study, the retention interval was varied for the recall of the Wechsler Logical Memory paragraphs. Examples of "provoked" confabulation were produced by five Alzheimer patients, most commonly at immediate recall, eight Korsakoff patients, most commonly at 45 minutes' delay, and by eight (out of 17) healthy subjects at a one week delay. A further two Alzheimer patients produced "provoked" confabulations in response to other tests; and, in another experiment, the author has obtained instances of "provoked" confabulation by healthy subjects, who have been administered a cholinergic "blocker" (hyoscine/scopolamine) to impair anterograde memory (Kopelman and Corn, in preparation). The "provoked" confabulations produced by healthy subjects at the prolonged (one week) retention interval resembled those of the amnesic groups at shorter delays, and consisted of the kinds of intrusions and distortions described by Bartlett<sup>8</sup> in 1932: "Epithets are changed into their opposites; incidents and events are transposed; names and numbers rarely survive intact . . . .; opinions and conclusions are reversed . . . . At the same time, the subjects may be very well satisfied with their efforts believing themselves to have passed on all important features with little or no change . . . . Consider particularly the case in which a subject was remembering a story which he heard, say, five years previously, in comparison with the case in which he was given certain outline materials and constructs what he calls a new story . . . . In both cases, it was common to find the preliminary check, the struggle to get somewhere, the varying play of doubt, hesitation, satisfaction and the like, and the eventual building up of the complete story accompanied by the more and more confident advance in a certain direction. In fact . . . remembering appears to be far more decisively an affair of construction rather than one of mere reproduction . . . . As has been shown again and again, condensation, elaboration and invention are common features of ordinary remembering."

It seems very likely that, had the healthy subjects in the present experiment been tested at an even longer retention interval (such that their recall scores exactly

matched the initial recall scores of the clinical groups), their confabulations might have been that much more florid.

Confabulation is often regarded as almost pathognomic of the Korsakoff syndrome, and the observation in the present study that confabulation had been much more commonly reported in the case notes of Korsakoff than Alzheimer patients may, in part, have reflected this belief. In fact, Korsakoff<sup>22</sup> tended to place greater emphasis upon his patients' inability to recall the temporal sequence of events, involving the inappropriate and jumbled recall of genuine events, rather than the fabrication of fictions; and this failure to recall the temporal sequence of events has also been noted in modern clinical and experimental studies.<sup>12 23-25</sup> Spontaneous confabulation is seen relatively seldom in the chronic phase of the disorder, and Victor *et al*<sup>23</sup> did not include confabulation as part of their definition of the syndrome. Possibly because of its association with fairly severe frontal dysfunction, spontaneous confabulation may be much commoner in the more advanced stages of Alzheimer's disease. Berlyne<sup>1</sup> reported that spontaneous confabulation was present in eight out of 62 dementing patients in his series, including six out of 32 cases of senile dementia; on the other hand, it was present in only one Korsakoff patient, who was described as having had a frontal lobe syndrome following a head injury. In contrast, "provoked" confabulation appears to be common in both amnesia and dementia; Berlyne reported instances in a further six Korsakoff patients and a further 15 dementing patients. In the present study, none of the Korsakoff group gave any examples of spontaneous confabulation and only two Alzheimer patients did so, whereas instances of "provoked" confabulation were obtained from 50% (N = 8) of the Korsakoff sample and 44% (N = 7) of the Alzheimer group.

In conclusion, the present findings provide some support for the hypothesis that there are two types of confabulation. Spontaneous confabulation is a pathological phenomenon, which is relatively rare, and may result from the superimposition of frontal lobe pathology on an organic amnesia. On the other hand, "provoked" confabulation is common in amnesic patients when given memory tests, resembles the errors produced by healthy subjects at prolonged retention intervals, and may represent a normal response to a faulty memory.

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