

Short report

Confabulation and frontal lobe dysfunction

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SUMMARY A patient is reported who displayed marked confabulation after frontal lobe damage, and whose pattern of performance on memory tests was not typically amnesic. He initially displayed both “fantastic” and “momentary” confabulation, but several months later showed only “momentary” confabulation, which was apparent on direct questioning. This change in type of confabulation was paralleled by improved performance on frontal lobe tests, although his overall pattern of performance on memory tests was unchanged. It is suggested that severity of frontal lobe dysfunction determines the type of confabulation displayed.

Confabulation is one of the more striking symptoms which can be displayed by patients with memory difficulties. Several authors¹⁻³ have distinguished between two types of confabulation. In the first type, which Berlyne terms “momentary or embarrassment confabulation,” the patient fabricates a past event in direct response to a probe of his recent memory. Often this fabrication may involve placing a past experience in the wrong temporal or spatial context. The second type of confabulation, called “fantastic or productive confabulation” by Berlyne, refers to the situation where the patient spontaneously generates false memories and behaves on the basis they are true. Stuss *et al*² studied the latter type of confabulation in some detail and noted the prevalence of frontal lobe pathology and signs in their series of patients. We report here a patient with an anterior communicating artery aneurysm, in whom the disappearance of fantastic confabulation was accompanied by improvement on tests of frontal lobe functioning.

Case report

SB, a 48 year old right-handed man, who worked as a building contractor, suffered a subarachnoid haemorrhage in November 1978. The aneurysm was approached by a right frontal craniotomy. A post-operative CT scan one week later

showed a “well-defined area of low density involving the medial aspect of the left frontal lobe extending upwards and backwards along the distribution of the left anterior cerebral artery.” He initially had a mild right-sided weakness and was incontinent of urine, but made a rapid physical recovery, with no notable neurological sequelae. He did, however, manifest gross behaviour disturbance with poor memory, confabulation and marked personality change. Six weeks postoperatively, he was still displaying bizarre behaviour such as feeding guests with biscuits like monkeys at a zoo, endeavouring to eat his children's toys, drawing erotic pictures and masturbating in front of others.

When first seen in the Psychology Department 12 and 16 weeks postoperatively, his wife reported that his bizarre behaviour had largely disappeared and his sexual disinhibition was less marked though still evident. Her main concern was his personality change (loss of motivation, irritability and lack of social graces), poor memory and confabulation. He would claim, first thing in the morning, to have fictitious business appointments, when in fact he was attending a day centre, and would frequently dress for dinner in the evening in the mistaken belief that guests were coming. He would also attempt to take cups of tea outside, saying that these were for his foreman, who had discontinued employment with him several years earlier. During the interview, his memory was confabulatory even for events an hour earlier and he would sometimes claim to have been engaged in imaginary business appoint-

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Accepted 13 March 1980

ments when in fact he had been undergoing psychological tests. When inconsistencies in his confabulations were pointed out to him, he would become perplexed and either profess ignorance of recent events or invent a new confabulation. His confabulations were not limited to his former business life, for when questioned about holidays or outings over the previous few days, he would again report events that bore no relationship to actual happenings. When the correct version of events was drawn to his attention, he would either seem puzzled and accept this or place the confabulated event in another temporal context.

Formal psychological testing was carried out both 12 and 16 weeks postoperatively. He was usually relatively well oriented for time and place, and his knowledge of current news events was patchy but often unexpectedly accurate. On the first occasion, he had a WAIS Verbal IQ of 116, a Performance IQ of 105, resulting in a Full Scale IQ of 112. His performance on the New Adult Reading Test⁴ was 34/50, which corresponded to an estimated premorbid IQ of 115. There was no evidence of any dysphasia, and he achieved a normal score of word fluency for the letter S (24 words in 90 seconds) and a near normal score for four-legged animals (15 in 90 seconds). He showed no evidence of constructional apraxia, as indicated by his good copy of the Rey-Osterrieth figure. Immediate recall of a short story was good (16/23 items), but was non-existent after an hour's delay. He scored at an average level on a forced-choice word recognition memory test (45/50) and obtained the same score on a recognition memory test for unfamiliar faces.⁵ He was impaired on a cognitive estimations test⁶ in which he scored 10 on a ten-item version, suggesting frontal lobe dysfunction (mean score for frontal lobe patients=7.7, mean score for non-frontal brain-damaged patients=4.9—T. Shallice, personal communication).

On the second test session (16 weeks postoperatively), he showed similar performance on intellectual and memory tests given previously, and in addition displayed slightly weak recall (14/30; normal=17.9±4.3) but excellent forced-choice recognition (34/35; normal=31.6±2.6) of low-frequency, high-concreteness word lists.⁷ In addition, he showed a level of perseveration on a modified Wisconsin Card Sorting Test⁸ which was consistent with frontal lobe damage (total errors=21, perseverative errors=8.)

SB was seen again 28 weeks postoperatively. On this occasion, his wife reported that his marked personality change persisted, that his

memory was still poor but that he no longer displayed spontaneous confabulation. He would still forget things she had told him several minutes earlier. However, she also felt that he was now more aware of day-to-day personal events—for example, he would now acknowledge having to attend a day centre regularly rather than confabulate about business appointments—and reported that he did not display the spontaneous confabulatory behaviour that was characteristic of his condition 12 to 16 weeks earlier. During interview, some confabulation was apparent on direct questioning about his recent past but this was less in evidence than on earlier occasions, and he was overall better oriented for everyday personal events. The content of his confabulations now reflected distortion of actual happenings and placing events in the wrong temporal or spatial context rather than fictitious constructions.

On formal testing, he again showed good immediate recall of a short story (14/23 items), but non-existent recall after an hour. His scores on verbal and non-verbal recognition memory tests were rather lower than before (40/50 and 39/50 respectively) but still well above the level for amnesic patients (30.5 and 27.25 respectively).⁵ As was the case on the previous occasion, his recall of low-frequency, high-concreteness word list material was slightly impaired (11/30), but forced-choice recognition was good (33/35). His score on the paired-associate learning subtest of the Wechsler Memory Scale was close to normal (11.5), though his delayed recall of the Rey-Osterrieth figure was markedly impaired 40 minutes after his accurate copy of the original. In spite of this patchy memory test performance and his forgetfulness at home, his knowledge of current news items was surprisingly good. On a test of verbal fluency, his performance was unchanged from the previous testing. The main change which occurred in his psychometric test performance was on the tests of frontal lobe function administered previously. On both the cognitive estimations test (score=1) and the modified Wisconsin Card Sorting Test (total errors=9, perseverative errors=2) his scores were within normal limits.

Discussion

The present study gives support to the distinction made by Berlyne¹ between fantastic and momentary confabulation and also suggests that the presence of these types of confabulation may be related to the degree of frontal lobe dysfunction. Furthermore, this study suggests that neither

type of confabulation is dependent upon global amnesia.

The observation that our patient showed confabulation following frontal lobe damage is consistent with the report of Stuss *et al.*,² and the change in confabulation in conjunction with improvement in frontal lobe functioning further suggests that a more substantial degree of frontal lobe dysfunction is required for fantastic rather than momentary confabulation to occur. The patient reported here showed marked fantastic confabulation as well as momentary confabulation up to four months after suffering frontal lobe damage. However, after a further three months the fantastic confabulation had disappeared leaving a reduced but clearly identifiable degree of momentary confabulation. In that momentary confabulation continued despite the disappearance of fantastic confabulation, the distinction between the two types would appear to have some validity. At the time that he displayed fantastic and momentary confabulation, our patient also showed disinhibited behaviour at home, impaired performance on tests of frontal lobe function and some impairment on memory tests. The disappearance of fantastic confabulation and reduction in the degree of momentary confabulation was accompanied by less disinhibition in his behaviour and by improvement to normal performance on frontal lobe tests, but not by any substantial change in other cognitive functions.

The role of memory functions in confabulation is difficult to specify, and the present study suggests that the relationship between the two is not a simple one. Although our patient's memory was certainly impaired, he was not globally amnesic, for he obtained normal or near normal scores on recognition and paired-associate learning tests. On the earlier test occasion, when he displayed fantastic confabulation, he obtained normal performance on verbal and nonverbal recognition memory tests with poor scores on tests of long-term retrieval. It is worth noting in this regard that Berlyne's patient JM,¹ who displayed fantastic confabulation, was reported as having only "slightly impaired" memory and that patient 4 of Stuss *et al.*² at one stage had a Wechsler Memory Quotient of 112, yet still showed marked spontaneous confabulation.

In conclusion, it would seem that confabulation is not a unitary disorder, and varies from contextual misrecall, where events appear to be simply recalled in the wrong spatial or temporal context, to instances in which highly implausible events that bear no relationship to actual happenings are spontaneously generated by the patient and may influence his behaviour. These latter instances may well be triggered by the misidentification or misuse of environmental cues. We suggest that neither fantastic nor momentary confabulation requires a global amnesic syndrome to become manifest and also suggest that the greater the degree of frontal lobe dysfunction, the more the patient's behaviour will resemble what has been termed fantastic confabulation. Finally, as many amnesic patients do not confabulate,⁹ it appears that confabulation and amnesia are dissociable.

We are grateful to Dr J Meadows for permission to examine and report our findings on a patient under his care.

References

- 1 Berlyne N. Confabulation. *Br J Psychiat* 1972; **120**:31-9.
- 2 Stuss DT, Alexander MP, Lieberman A, Levine H. An extraordinary form of confabulation. *Neurology* 1978; **28**:1166-72.
- 3 Sweet WH, Talland GA, Ballantine HT. A memory disorder associated with ruptured anterior communicating aneurysm. *Trans Am Neurol Assn* 1966; **91**:346-8.
- 4 Nelson HE, O'Connell A. Dementia: the estimation of premorbid intelligence levels using the new adult reading test. *Cortex* 1978; **14**:234-44.
- 5 Warrington EK. Deficient recognition memory in organic amnesia. *Cortex* 1974; **10**:289-91.
- 6 Shallice T, Evans ME. The involvement of the frontal lobes in cognitive estimation. *Cortex* 1978; **14**:294-303.
- 7 Coughlan AK. Effects of localized cerebral lesions and dysphasia on verbal memory. *J Neurol Neurosurg Psychiatry* 1979; **42**:914-23.
- 8 Nelson H. A modified card sorting test sensitive to frontal lobe defects. *Cortex* 1976; **12**:313-24.
- 9 Victor M, Adams RD, Collins GH. *The Wernicke-Korsakoff Syndrome*. Oxford: Blackwell Scientific Publications, 1971.