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A positive emotional bias in confabulatory false beliefs about place☆

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Abstract

Some neurological patients with medial frontal lesions exhibit striking confabulations. Most accounts of the cause of confabulations are cognitive, though the literature has produced anecdotal suggestions that confabulations may not be emotionally neutral, having a ('wish-fulfilment') bias that shapes the patient's perception of reality in a more affectively positive direction. The present study reviewed every case ($N = 16$) of false beliefs about place reported in the neuroscientific literature from 1980 to 2000, with blind raters evaluating the 'pleasantness' of the patient's actual and confabulated locations. In each case the confabulated location was evaluated as more pleasant. This striking finding supports the claim that there may be a systematic affective bias in the false beliefs held by neurological patients with confabulation.

1. Introduction

Confabulations are typically understood to represent instances of false beliefs: opinions about the world which are manifestly incorrect, and yet are held by the patient to be true in spite of clearly presented evidence to the contrary. Perhaps best known is so-called Korsakoff 'psychosis' (1889/1996), where confabulations occur in the context of a dense amnesic syndrome. Confabulation is also seen in a variety of other pathologies, such as cerebrovascular accidents involving the anterior cerebral artery, traumatic brain injury, and dementia (Dalla Barba, 1993; DeLuca, 2000; DeLuca & Diamond, 1995; Downes & Mayes, 1995; Kaplan-Solms & Solms, 2000; Luria, 1976; Moscovitch & Melo, 1997; Solms, 1998; Tallard, 1961). Confabulation has also been observed in the psychiatric population (typically in schizophrenia, e.g. Dalla Barba, 1993; see Berrios, 1998). In anatomical terms, confabulation appears to be more frequently observed, and is more severe, after lesions that involve the medial frontal lobes (see DeLuca, 2000; for review), though a more precise anatomical basis of the disorder has yet to be clearly specified.

One traditional explanation of the disorder (following Bonhoffer, 1901) is that confabulation is secondary to amnesia, and represents 'gap-filling' motivated by embarrassment. This account remains problematic in several ways. For example, while most confabulators are amnesic, most amnesics are not likely to confabulate. In addition, while confabulation is common in the acute stages of a Korsakoff psychosis, it recovers in the chronic period, leaving a *non*-confabulatory amnesia (see DeLuca, 2000; for review).

There have also been various attempts to explain the disorder in terms of general executive dysfunction (e.g. Baddeley & Wilson, 1986; Kapur & Coughlan, 1980; Kopelman, 1987, 1995; Luria, 1976; Papagno & Baddeley, 1997; Stuss et al., 1978), or processes *related* to executive dysfunction (Johnson, 1991, 1997; Johnson, Hayes, D'Esposito, & Raye, 2000; Johnson & Raye, 1998; Moscovitch, 1989; Schnider, Von Daniken, & Gutbrod, 1996). This 'dysexecutive' class of argument appears plausible, especially because a frontal lesion site is common in confabulation. In addition, a few detailed investigations have revealed that the severity of confabulation appears to improve as measures of executive function recover, even though the severity of amnesia remains constant (Kapur & Coughlan, 1980; Papagno & Baddeley, 1997; see also Cunningham, Pliskin, Cassissi, Tsang, & Rao, 1997). However, the dysexecutive account has also been criticised, primarily because cases of

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confabulation with *exclusively* executive disorders have not been convincingly demonstrated (e.g. Burgess & McNeil, 1999). In addition, most patients with dysexecutive disorders do not confabulate. In response to these difficulties, some authors have suggested that *both* an amnesic and a dysexecutive disorder are necessary to invoke a confabulatory state (see DeLuca, 2000; for review).

A substantial difficulty facing existing accounts of confabulation is their inability to explain why these patients confabulate *at all*—an issue made most notable by findings of the selectivity (or content-specificity) of confabulations. Burgess and McNeil (1999) knew of "no formal empirical investigation of this dimension" (p. 164), though their clinical experience, and their knowledge of the literature, suggested that the content often reflected "the personal concerns, experiences and predilections" of the patient (p. 164). For example, the Burgess and McNeil (1999) patient only confabulated in one domain (he would dress in formal clothes—more formal than his previous job required—saying that he had to go to work). However, he remained lucid and coherent on a wide range of other topics, and showed no other instances of false belief. On a strictly dysexecutive account, such a patient should produce false beliefs across *all* (or at least a very wide range) of domains. Thus, dysexecutive accounts have been regarded as "too *much* of an explanation for the syndrome" (Kinsbourne, 2000, p. 158; emphasis added), in that they predict a more diverse set of deficits than the patients actually produce.

It would appear that an additional variable might be required to explain the specific nature of confabulations—accounting for why executive resources seem to fail only under particular circumstances. In this context, several authors have suggested that motivational or emotional factors might be central in the production of confabulations—though the issue has yet to be systematically investigated. For example, many confabulations seem to modify the patient's personal circumstances, making them appear in an improved or even a grandiose light (Conway & Tacchi, 1996; Downes & Mayes, 1995; Prigatano & Weinstein, 1996; Villiers, Zent, Eastman, & Swingler, 1996). Kinsbourne suggests that a clear contributory factor to confabulation is "the affective significance of the topic about which the patient confabulates. Patients mostly confabulate about personal matters that are emotionally significant to them, such as the integrity of their body… their prospects of recovering, and for reassuming their prior lifestyle and employment" (Kinsbourne, 2000, p. 158).

We have recently demonstrated (Fotopoulou, Solms, & Turnbull, under review) that the false belief scenarios of a confabulatory patient had a clear *positive* affective bias, tending to be more pleasant than his actual circumstances in some 80% of false belief instances. The patient (ES) was assessed in a non-descript room which faced onto the road of a leafy suburb yet, in the absence of provocation, repeatedly suggested that he was engaged in apparently important business activities, or that he was involved in a range of leisure pursuits, etc. Similarly, Kaplan-Solms and Solms (2000; see also Solms, 1997), have described a series of confabulatory patients, whose false beliefs included a reunion with a long dead friend, and the transformation of the hospital ward to a barge.

Such examples appear, at face value, to modify the patient's view of reality in a generally positive direction. However, it might be claimed that the emotional quality (i.e., the 'pleasantness') of the confabulation cannot be accurately anchored against the patient's actual reality. For example, it appeared to the investigators that the patient's 'important business activities' were experienced as more pleasant than his interaction with the neuropsychologists. However, we have no way of knowing whether his real experience of work was pleasurable or (as is the case for some people) unpleasurable. Similarly, 'reunion with a long dead friend' appears to be pleasurable, but it is difficult for the investigators to know how *much* the friend was liked, in order to compare this with the patient's experience of seeing a stranger in the hospital. In sum, evaluating the 'pleasantness' of false beliefs can often be hindered by the investigator's inability to estimate how pleasant the patient's *actual* circumstances might be.

However, there is one class of confabulation in which the 'pleasantness' of both actual and confabulated reality can be established with some degree of certainty: the instance of false beliefs about *place*, including the classic disorder referred to as reduplicative paramnesia for place (see Feinberg, 1997; for recent review). Here, the investigator knows the actual location in which the patient is to be found (e.g., a hospital), and also the confabulated location (e.g., a barge). The extent to which these realities represent pleasurable or unpleasurable experiences can thus be quantified by a simple rating procedure. In an attempt to systematically investigate the question of whether neurological patients show a clear positive emotional bias in their confabulations, the present study reviewed every case ($N = 16$) of false belief about place that had been reported in the neuroscientific literature during 1980–2000, with blind raters evaluating the 'pleasantness' of the patient's actual and confabulated locations.

2. Method

A survey of the literature in neuropsychology, neurology, psychiatry, and associated neuroscience journals was conducted for the period 1980–2000. The first in-

Table 1
Demographic data for the neurological patients, and the raters who evaluated the actual and confabulated locations for 'pleasantness'

	Raters	Patients
N	10	13
Gender (M, F)	5, 5	10, 3
Mean age	55.1	56.3
Age standard deviation	9.1	9.2
Age range	46–72	43–73

clusion criterion was that patients should have suffered damage (identified by structural imaging technology) to the ventral and/or medial frontal lobes. Second, on behavioral grounds, all patients must have showed at least one clear instance of confabulation which involved a false belief about place. This produced a set of 16 confabulations (Dab, Claes, Morais, & Shallice, 1999; De Luca & Locker, 1996; Fischer, Alexander, Eposito, & Otto, 1995; Fukatsu, Yamadori, & Fujii, 1998; Hashimoto, Tanaka, & Nakano, 2000; Kaplan-Solms & Solms, 2000; Moscovitch, 1989; Parkin, 1997; Rohrenbach & Landis, 1995; Schnider et al., 1996; Vilkki, 1985; Wright, Boeve, & Malec, 1999).

The patient's location at the time of their confabulation, and the specific content of the confabulation, were detailed in brief descriptions. These were listed on a rating sheet, such that (1) no two actual locations were adjacent, and (2) no actual location was adjacent to its associated confabulated location. Each location description was listed only once.

Ten participants were recruited, age-matched to the patients (see Table 1). An independent samples t test revealed no significant difference between the mean age of the groups ($t(21) = 0.31$, $p > 0.05$). The participants were asked to act as raters, indicating "how pleasant, or enjoyable," they would find it to spend time in each of the locations, by giving each a score from 1 (very unpleasant) to 5 (very pleasant). They were paid £5 for participation.

3. Results

The actual location was a hospital in 15 cases, and a hospital clinic in the remaining case (Rohrenbach & Landis, 1995). The confabulated locations were (from worst to best): my old secondary school; at work (4×); at my doctor's home; in my old university; in my mother's home town; staying in a hotel or motel (2×); on a ferry in the Caribbean; on holiday on a barge; in a bistro; at home (3×).

In each instance the confabulated location was rated as more pleasant than the actual location (see Fig. 1). A paired samples t test showed a significant difference between the actual vs confabulated location ratings ($t(9) = 10.37$, $p < 0.05$).

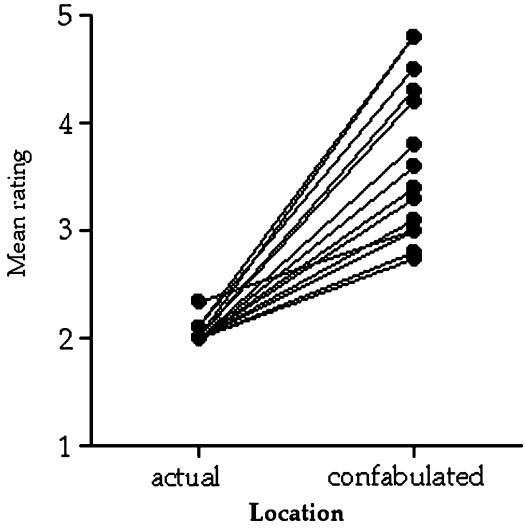

Fig. 1. 'Pleasantness' rating for actual and confabulated locations for each of the 16 patients with false beliefs about place surveyed from the literature.

4. Discussion

The present study sought to test the claim that confabulations have a positive emotional bias—predicting that the rating of pleasantness for the patients' confabulations would be significantly higher than similar ratings of their actual location. This was clearly supported: indeed, the confabulated location was rated as more affectively positive in each case. The finding of increased 'pleasantness' of the false beliefs is consistent with our recent findings based on a different case (Fotopoulou et al., under review) and the more general claim that confabulations seem to have an element of 'wish fulfilment' (e.g. Berlyne, 1972; Conway & Tacchi, 1996; Kaplan-Solms & Solms, 2000; Solms, 1998, 2000).

There is, however, a possible objection to this apparently striking finding. The fact that all of the confabulated locations were rated as showing a positive affective bias might simply be interpreted as a consequence of the low rating of the actual location. In other words, if hospitals (and hospital clinics) are seen as 'negative' locations, then *any* other location might be rated as more positive. There are clear counter-arguments to this claim.

First, while the false beliefs of confabulatory patients show a clear positive affective bias, this situation is not the case for other false belief states. Perhaps the most notable example is that of delusional beliefs in psychotic states such as schizophrenia. While it is true that *some* of the false beliefs of schizophrenics have a positive affective bias (notably in megalomania) the majority of such beliefs are far more negative, especially in the context of paranoid schizophrenia. In many cases such patients are living in 'actual' locations (hospitals, or poorly appointed accomodation in the community) that are

probably no more pleasant than the hospital locations seen in the patients reported in the present study. We know of no literature that *directly* addresses the 'pleasantness' of delusions in schizophrenia, but the clinical descriptions of such patients suggest a frequent negative bias. For example, Frith and Dolan (2000, p. 116) provide brief descriptions of seven classes of hallucination and delusion in schizophrenia, of which four are explicitly negative (one in which a work colleague is attempting murder the patient, one in which the patient is required to kill God, and two in which the patient is told that they will be unable to achieve an intended action). Thus, the striking emotion-related effects seen in neurological patients do not appear (at least superficially) to be matched by the false beliefs of schizophrenics. However, in discussing this matter it is also appropriate to mention the work of Bentall and colleagues, who have suggested that paranoid beliefs in schizophrenic patients might serve as a defence, which biases the perceived world of such patients in a positive manner (see Blackwood, Howard, Bentall, & Murray, 2001, p. 158). Consistent with this, there is evidence to suggest that schizophrenics who hold delusional beliefs are happier than those who (by virtue of 'successful' treatment) no longer hold the beliefs (Roberts, 1991). In other words, it may well be that a positive affective bias may be applicable to many (perhaps all) classes of false belief.

Additional support for the claim that the finding reported here is not an artefact of unpleasant 'actual' locations comes from our investigation of another confabulatory patient discussed above (Fotopoulou et al., under review). It is of some note that ES was investigated in a more pleasant *actual* location (a quiet room looking out on a suburban area) than the hospitalised patients surveyed in the literature. Nevertheless, as in the present study, ES also showed a positive affective bias in his false beliefs (with roughly 80% of 155 consecutive confabulations rated as more 'pleasant'). Thus, the findings emerging from the survey reported in the present study seem compatible with those collected using the same methods but on a different sample, and are also consistent with the impression of authors who have noted an emotion-related bias in the confabulations of neurological patients in the existing literature (e.g. Berlyne, 1972; Conway & Tacchi, 1996; Kaplan-Solms & Solms, 2000; Solms, 1998, 2000).

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