The Causal Role of Mood in Confabulation

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The Causal Role of Mood in Confabulation.

Abstract

Following a presumed haemorrhage in the hypothalamic area during an operation to remove a tumour from the diencephalon and frontal lobes, a man (CA) presented with confabulatory amnesia. Previous research papers have shown that confabulations (CA's included) have a positive emotional bias and Turnbull et al (in press) have demonstrated that low mood appears to co-occur with confabulation. This paper explores the mood of CA across time. The first 155 confabulated statements and (on average) the first 2 non-confabulating statements before and after each confabulation, were extracted from audiotaped and transcribed interviews conducted by a neuropsychologist. The transcribed interviews, with the identified confabulations and non-confabulating statements, were listed in a scaled questionnaire. Four blind raters coded the mood of CA before, during and following each confabulation. The raters were unaware of which statements were confabulations and which were not. Intraclass correlations of 0.84, 0.80 and 0.83 were established between the raters for the ratings of CA's mood under the three categories. The rating of CA's mood was found to significantly differ as a function of the temporal category: before, during or after confabulation ($\chi^2_F = 6.5$, $p<0.05$). On average, CA's mood was rated as being at its lowest before he confabulated and at its highest following the confabulations. This suggests that low mood may play a causal role in the production of confabulations, and/or that confabulation improves mood.

Key Words:

Confabulation
Emotion
Mood
Memory
Reality-Monitoring

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Introduction

Confabulations are defined as "statements or actions that involve unintentional but obvious distortions" (Moscovitch and Mello, 1997, p.1018). Therefore, when an individual confabulates they are unaware of the distortions in their discourse and "show total belief in what they say and do" (Williams, 2002, Honours paper). Despite this widely accepted definition, "the precise anatomical basis of the disorder [confabulation] remains uncertain" (Turnbull, Jenkins and Rowley, in press). However, it is generally accepted that confabulation typically follows damage to the frontal and/or diencephalic regions of the brain (e.g., Conway and Tacchi, 1996; Kopelman, Ng and Van Den Brouke, 1997; O'Conner and Cantor, 1997; De Luca, 2000; Turnbull *et al*, in press). With respect to this anatomical basis, confabulation has been witnessed in a variety of pathologies, the most common being Korsakoff 'psychosis' (e.g., Dalla Barba, Cipoloth and Denes, 1990; Merce, Gardner and Benson, 1977, Talland, 1965; Burgess and Shallice, 1996; Turnbull *et al*, in press). Other pathologies include cerebrovascular accidents involving the anterior cerebral artery, dementia, traumatic brain injury (e.g., Dalla Barba, 1993; DeLuca, 2000; DeLuca and Diamond, 1995; Downes and Mayes, 1995; Kaplan-Solms and Solms, 2000; Luria, 1976; Moscovitch and Mello, 1997; Solms 1998; Talland, 1961; Turnbull *et al*, in press), subarachnoid haemorrhages and encephalitis (e.g., Burgess and Wood, 1990; Damasio, Graff-Radford, Eslinger, Damasio and Kassel, 1985; Delbecq-Derouense, Beauvois and Luria, 1976; Mosocovitch, 1989; Stuss, Alexander, Leibermann and Levine, 1978; Burgess and Shallice, 1996).

Condensing the literature on confabulation, eight prominent features of the disorder are evident. Moscovitch (1995, pp.229-230), using Talland's list (1965, pp.49-50), outlines these features as:

1. Confabulations are usually verbal statements, but can also include actions.
2. Confabulations usually include personal accounts, but can also include non-personal information.
3. Confabulations need not be coherent and internally consistent.
4. Confabulations are often false in context and in detail.
5. Confabulations are usually drawn from recollections of actual experiences.
6. Patients are not aware of the distortions in the information they provide.
7. The readiness to confabulate may be determined by the patient's personality.
8. Confabulations usually serve no obvious purpose.

It has also been comprehensively established that the executive system is the most common brain system to be impaired in cases of confabulation (e.g., Burgess and Shallice, 1996; Conway and Tacchi, 1996; O'Conner and Cantor, 1997; Burgess and McNiel, 1999; Turnbull *et al*, in press). This research starts from the assumption that points 1-7 above, and the impairment of the executive system, describe the general characteristics of confabulation. Point 8, however, is brought into question. Reviewing the literature on confabulation it is evident that there are not substantial grounds to make the assumption that confabulations serve no obvious purpose. Burgess and Shallice (1996, p363) were the first to point out that "there is as yet little evidence relating to the characteristic [of confabulation serving no purpose and] evaluation is impossible until further evidence is available". Awaiting such evidence, there are authors who have come to believe that confabulation might well serve a

purpose. Amongst these researchers, the most common argument is that confabulations may serve to "fill in" memory gaps (e.g., Moscovitch, 1995; Barbizet, 1963; Berlyn, 1972; Wyke and Warrington, 1960; O'Conner and Cantor, 1997; Tallberg, 1999). Conway and Tacchi (1996) provide one of the few psychodynamic explanations for confabulation. They recognise that life for an individual who confabulates must be extremely bewildering and at times reality must simply be unbearable to accept. Therefore they suggest that, for the subject in their research at least, confabulations "mistaken as memories served the psychodynamically useful purpose of protecting the self in a time of stress and isolation" (Conway and Tacchi, 1996, p345). Tallberg (1999, p.455) takes his lead from both of the above observations and suggests that while confabulations do serve to fill gaps in memory, the production of a confabulation is "strongly connected to domains related to the identity of the individual". Therefore confabulation also aids the individual in "keeping up a strong image of the self" (Tallberg, 1999, p.455).

These assertions with regard to the 'purpose' of confabulation seem plausible, but they remain mere assumptions until systematic empirical evidence is presented for or against them. Reviewing the most current literature on confabulation, Turnbull *et al* (in press) also recognise that not one account of this memory disorder has been able to "explain why these patients confabulate at all". They also note that some studies suggest that emotion may play a central role in the explanation of confabulations (e.g., Conway and Tacchi, 1996; Downes and Meyers, 1995; Prigatano and Weinstein, 1996; Villiers, Zent, Eastman and Swingler, 1996; Turnbull *et al*, in press). Until recently no attempts had been made to test this hypothesis. In what are understood to be the first three attempts, evidence has now been provided for the view that

confabulations show a 'positive' emotional bias (Foutopolou, Solms and Turnbull, in press; Turnbull *et al*, in press and Williams, 2002, honours paper). Foutopolou *et al* (in press) found a positive affective bias in 80% of the false belief instances reported by their patient (ES). According to Turnbull *et al* (in press), ES would assert that he was engaged in important business activities and a range of leisure pursuits that were not true. Williams (2002, honours paper) also demonstrated that the confabulations of a patient (CA) were significantly pleasant compared to his actual reality. CA too would refer to a career and work he was currently involved in. The truth however, was that CA had been unable to return to work since the removal of his tumour. In reality CA was undergoing extended neurological assessment and had become reliant upon the help of others in his activities of daily living. ES and CA demonstrate how most confabulations are "about matters that are emotionally significant to them [the patients], such as the integrity of their body... their prospects of recovering, and for reassuring their prior lifestyle and employment" (Kinsbourne, 2000, p.158).

Demonstrating that the confabulations of CA were more pleasant compared to his actual reality, Williams (2002, honours paper) argues that "the confabulations depicting a more pleasant reality, automatically creates the ability to experience a more positive reality". Therefore it seems that CA created what he wished his reality to be through his confabulations. Accordingly, it is argued that CA "distorted reality in a tendentious direction so as to make it fulfil his wishes" (Williams, 2002, Honours paper).

The wish-fulfilment/emotion based interpretation of confabulation reported by Foutopolou *et al* (in press) and Williams (2002, Honours paper) are consistent with

those of Kaplan-Solms and Solms (2000). Kaplan-Solms and Solms have worked psychotherapeutically with many patients who confabulate and although their account of confabulation can be considered to be consistent with the emotion-based model, they incorporate a psychoanalytic model to understand the occurrence of confabulation. According to Kaplan-Solms and Solms (2000) and Solms (2000), patients who confabulate display what Freud (1915) referred to as the "special characteristics" of the system unconscious. Freud (1900) explained that primitive human mental characteristics, such as wishes and desires within the unconscious, are, under normal circumstances, suppressed because they have been driven out of the systems Consciousness and Pre-consciousness. These desires and wishes are therefore inhibited from surfacing but still implicitly affect our lives (Solms, 2000, p. 133). According to Freud (1915), the "special characteristics" of the system unconscious include 1) exemption from mutual contradiction, 2) primary process thinking (or mobility of cathexis), 3) timelessness, and 4) replacement of external by psychical reality. Under normal circumstances these characteristics are confined to the unconscious. However, Solms (2000) recognises that patients who confabulate do not only show negative symptoms (deficits in functioning), but also show positive symptoms in the release of these special characteristics of the unconscious.

Williams (2002, Honours paper) shows how CA also seemed to display the "special characteristics" of the system unconscious in his confabulations. As an example of 'Exemption from mutual contradiction', an occasion when CA spoke of problems he was having with his eyes is cited. At one point during the conversation, CA expressed that he had been with a particular eye department for at least twenty years. A few seconds later, CA stated that he had been with the same eye department for only a

year. CA was unaware of how he had just contradicted himself and saw no reason why these two statements could not be used in the same context. A conversation that took place during one of the neuropsychological assessments where CA discussed some testing he had undergone is provided as an example of 'timelessness'. CA was convinced that he had undergone eye and blood testing on that day. In reality CA had undergone tests, but testing had occurred weeks before. This example depicts how on certain occasions, CA had access to memories of events that had occurred to him, but he would often confuse them in relation to time and space. An example of 'replacement of external by psychical reality' was provided during an assessment at 13:40 in the afternoon. Despite the fact that the interview was taking place in the middle of the day, CA was under the impression that it was the evening. When CA was corrected, he looked out of the window and insisted that it was pitch black outside, even though the sun was clearly shining. CA's desire was for it to be dinnertime, so he distorted the external perception of the sun shining to meet his needs. In this sense, "the demands of the internal world of the drives take precedence over the constraints of veridical reality, so that inner wishes displace outer perceptions" (Turnbull *et al*, in press). Finally, examples of primary process (or mobility of cathexis) were often provided by CA when he was asked about things he could not remember. CA would not admit that he could not remember these facts and would often respond in an abstract manner. For example, when questioned about a Porsche that he did not in fact own, CA responded, "I must check if I have still got it. It's been in the garage for almost a month". For more examples of how patients who confabulate seem to release these "special characteristics" of the system unconscious see Kaplan-Solms and Solms (2000).

It is argued that the "system unconscious" has its "biological basis in a series of sub-cortical systems that form the core of motivation and emotion" (e.g., Panskepp, 1998; Kaplan-Solms and Solms, 2000; Solms and Nersessian, 1999; Solms and Turnbull, 2002). Therefore, according to Turnbull *et al* (in press):

> "This makes the Kaplan-Solms and Solms observations consistent with the emotion-based model suggested above (Foutopolou *et al*, in press). For example, the replacement of external by psychical reality can reasonably be understood as arguing that these patients accept views of external reality that are congruent with affective states. In particular, they are likely to accept versions of reality that lead to positive emotional consequences, and reject views of external reality that lead to aversive consequences. Hence, their confabulations should lead to a more affectively positive view of reality than truly exists" [in press].

Taking their lead from research that has discovered the pleasant emotional bias of confabulations and the hypotheses of Kaplan-Solms and Solms regarding the "special characteristics" of the system unconscious, Turnbull *et al* (in press) recently extended research into these issues. Firstly, Turnbull *et al* (in press) predicted that the degree of pleasantness of confabulations would be significantly different from the degree of pleasantness of mood. Secondly, they wished to investigate the extent to which confabulations of selected patients are accounted for by the four properties of the system unconscious.

Results showed significant findings in that 71% of confabulations occurred when patients were in states of low mood and these confabulations were indeed affectively positive. With regard to Freud's (1915) properties of the system unconscious, Turnbull *et al* (in press) are not satisfied with their ability to 'explain' the

confabulations produced by their patients in the scope of their study. More precisely, 'timelessness' was discovered to be the least predictor and 'replacement of external reality by psychical reality' was seen as having the greatest explanatory power. Despite the fact that Turnbull *et al* (in press) are not denying the explanatory power of the "special characteristics" of the system unconscious, they admit that their findings are not concrete since their "proposal did not represent a straightforward issue for scientific investigation" (Turnbull *et al*, in press).

Discovering that the confabulations expressed by their patients were significantly pleasant in nature compared to reality is consistent with previous findings. However, Turnbull *et al* (in press) explain that "the finding of low mood in association with confabulation is a novel result". They suggest that confabulations may occur in order to improve the patients' emotional states. In this sense, confabulation may act in such a way so as to "protect (or defend) the patient against low mood" (Turnbull *et al, in press)*. This hypothesis remains compatible with the 'wish-fulfillment' interpretation of confabulation and is highly attractive since it would finally provide a purpose for confabulation. However, Turnbull *et al* (in press) note that, patients often find themselves in a state of low mood for the bulk of their stay in hospitals. Therefore they recognize the need for an investigation into patients' mood states across time. If it can be proven that a patient's confabulations are significantly pleasant compared to his/her reality, and that their mood is not invariably low, but that it dips before a confabulation is produced, and is improved thereafter, a truly causative role for mood in the 'wish-fulfillment' interpretation of confabulation may be supported.

Aim of the study

Foutopolou *et al* (in press), Turnbull *et al* (in press), and Williams (2002, honours paper) have provided evidence for confabulations having a positive emotional bias. The aim of this study was to expand on these findings and investigate the claim made by Turnbull *et al* (in press) who suggest that low mood may play a causative role in the presentation of confabulation. The objective was thus to make a general conclusion by working with a transcribed interview that represented a conversation between a confabulatory patient (who's confabulations were known to be more pleasant in nature compared to reality) and a neuropsychologist, and quantitatively testing the mood of that patient across time. If it was discovered that the mood of the patient was significantly low directly before the patient confabulated and improved thereafter, support for low mood playing a causative role in the production of confabulations would be provided.

Method

Case History

CA was a 54-year-old male. He provided the material that was used as the research sample in the study. CA was admitted to hospital to have a tumour removed from the diencephalon and frontal lobes. During an operation to remove the tumour, (meningioma) it is believed that an artery was taken, which resulted in a haemorrhage in the hypothalamic area. On recovery from the operation, CA presented with confabulatory amnesia. Solms, who is a renowned neuropsychologist, has worked

with many patients who confabulate. After being introduced to CA, Solms confirmed that this patient exhibited a typical and generalisable confabulatory syndrome. Therefore, in August 2001, after receiving consent from CA and his wife, Solms conducted one-hour neuropsychological interviews, six days a week with CA until twelve sessions had taken place. These interviews were tape recorded and later transcribed. During the transcribing process, the transcript was highlighted at every point where CA confabulated and the reality of CA's situation was noted.

This transcript was used in 2002 by the researcher in her Honours paper. In part, the current study is an extension of this research, which discovered that the confabulations of CA were significantly pleasant in nature compared to his actual reality. In order to remain consistent with the emotion-based model of confabulation it was a pre-requisite of the current study to determine that the confabulations used as the research sample had a pleasant emotional bias. Since it had already been proven that the confabulations of CA were significantly more positive in nature compared to reality, it was felt appropriate to again use CA as the case study in the present research.

In the transcript CA was referred to by his real name. However, for ethical reasons, this is abbreviated to CA. Sadly, CA has now passed away, but permission from his wife remains in place to continue to use the material provided by CA in any future research.

Research sample

CA himself did not represent the research sample for this study, statements that were drawn from the transcribed interviews and edited into a questionnaire did. Specifically, the research sample consisted of the first 155 confabulated statements that appeared in the transcribed interviews mentioned above. The sample also consisted of sections of the transcript depicting CA's speech directly before and after every confabulation. In order to investigate whether there was a dip in mood before a confabulation was produced and an improvement thereafter, it had to be ensured that these statements were indeed those that occurred directly before and after the confabulations. Therefore, on average these statements were the last and first two non-confabulating statements expressed by CA on either side of a confabulation. This method not only determined that CA's mood could be judged directly preceding, during and following a confabulation, but it also encouraged a natural sample of confabulations and non-confabulating statements to be identified.

Participants

The participants were four blind raters. The blind raters (unfamiliar with the purpose of the study) were required to rate the mood of CA directly before he confabulated, during each confabulation and directly after he confabulated. The raters were not aware of which statements were confabulations and which were not. In fact, the term confabulation was only explained to the raters following their completion of the questionnaires. The blind raters believed that they were simply making judgements with regard to CA's mood at various times throughout a questionnaire that was

depicting a conversation between CA and Solms. The raters included 3 men who are of the ages 24, 24 and 52 years (M = 33.3) and one women of age 47 years (M = 47). The blind raters are all non-psychologists, currently working successfully outside of the mental health field. They are also all familiar with the researcher. The raters were all those that were available at the time of data collection and were specifically selected on the grounds that the researcher could trust that they would put in the needed effort when making their ratings and that they would participate honestly. This was important, because making judgements with regard to CA's mood was a lengthy process. To accommodate busy schedules, the raters were allocated a month to complete the questionnaires.

Procedures

On commencing the study, three necessary procedures were already in place. Firstly, consent from CA's wife had already been obtained to use the transcribed interviews. Secondly, material to be used as the research sample was also readily available (the confabulations and non-confabulating statements occurring directly before and after each confabulation). Thirdly, a previous study had already established that CA's confabulations were significantly pleasant compared to his actual reality (see Williams, 2002, honours paper). Therefore, since this study was an extension of the latter, procedures began by identifying the same confabulations (155 in total) used as the research sample in Williams's 2002 paper. Non-confabulating statements that occurred directly before and after each of these confabulations were then identified. These non-confabulating statements, the 155 confabulations and the remaining text of the transcript were then edited into a questionnaire (see Appendix 1).

The Questionnaire:

A questionnaire was used as the method of data collection and was specifically designed to inquire about the mood of CA directly before he confabulated, while he confabulated and directly after he confabulated. Sound quality was poor on the tapes used to record the first two interview sessions. Therefore, as in Williams's 2002 research, the process of identifying confabulations commenced from session three and concluded at the end of session six, once the same 155 confabulations had been recognised. Next, the, on average, last and first two non-confabulating statements expressed by CA directly before and after each of the confabulations were identified. However, CA often confabulated over extended periods of time. When many statements made up one confabulatory instance, the last and first two non-confabulating statements before and after these 'sections' of transcript were identified. Therefore, the research sample consisted of 57 confabulations, 57 sections of the transcript depicting CA's conversation directly before he confabulated and 57 sections depicting CA's conversation directly after he confabulated.

The relevant sections of the transcript, as well as the remaining text of the transcript, were edited into a questionnaire. During this process, no alterations were made to the transcript. This was to not influence the manner in which the relevant sections could be interpreted. The final questionnaire therefore provided the entire transcribed interviews from sessions three to six, although only specific sections of the transcript were required as the research sample. It was felt that this would provide a sense of flow throughout the questionnaire and enable raters to recognise alterations in CA's mood more easily. Editing the entire transcript into the questionnaire also encouraged

a sense of familiarity with CA for the raters, making it easier for them to make valid judgements with regard to his mood.

The end result was a questionnaire consisting of a 48-page conversation between CA and a neuropsychologist and 171 instances requiring to be rated with regard to CA's mood. There was no distinction between each of the three categories in the questionnaire (before, during or after confabulating statements). Each statement, whether it occurred in the before, during or after confabulation category, that was required to be rated was highlighted in red ink. Next to each of these instances, a rating scale was provided consisting of two options, (a) and (b). This was provided in blue ink to avoid the risk of raters missing a judgement. Option (a) consisted of a scale from 1-3. Using this scale, the raters were required to rate the mood of CA. Scale point 1 was to be selected if CA appeared to be of low mood at the time of the statement and point 3 was to be selected if CA appeared to be of high mood at the time of the statement. Point 2 represented those occasions where CA appeared to be neither of high mood nor low mood. Option (b) was provided so that the participants could indicate any instance that they found impossible to make a judgement.

A three-point scale was decided upon in response to the results of the pilot study. In the pilot study, raters were provided with a five-point scale to indicate their judgements of CA's mood. Although the raters seemed to agree on the occasions where CA appeared to be of high or low mood, they did not agree to what extent. Some seemed confident to use the extreme points of the scale where as others would constantly choose the numbers just before. This is "a phenomenon known as the error of central tendency" (Oppenheim, 2001, p. 223). Since an inquiry into the *extent* of

CA's low or high mood was not a requirement of this study, but a distinction upon which the raters agreed was, it was decided that a three-point scale would be most suitable.

Following the development of the questionnaire, the four raters were each allocated a copy. The researcher went through the instructions and examples with each rater individually. It was explained that their participation in the study would be confidential and that the purpose of the study would be explained on completion of data analysis and write up. It was also explained why it was required that they acted as blind raters and that their responses would not be judged in any way. Following their consent, the raters completed the questionnaires individually and in their own time. They were asked to contact the researcher if any difficulties arose. The questionnaires were then returned to the researcher.

Once the questionnaires had been returned, the ratings of CA's mood were divided into three categories (before, during and after confabulation) and recorded in three tables (see Appendices 2-4). Appendix 2 depicts the raters' judgements of CA's mood at times directly before he confabulated. Appendix 3 represents the raters' judgements of CA's mood during each confabulation and Appendix 4 shows the ratings of CA's mood following each confabulated statement. Every instance where a rater found it impossible to make a judgement with regard to CA's mood can be recognised by the letter 'b'. Statistical analysis on these statements was not possible, as statistical tests considered this information missing data. Therefore, whenever there was an instance where a rater found it impossible to judge CA's mood, the entire section surrounding that confabulation across time was excluded from analysis for

every rater. In other words, the section before, during and after the confabulation was excluded. On three occasions one or more of the raters found it impossible to make a judgement. For example, rater 3 found it impossible to make a judgement on the fifth statement that occurred in the questionnaire. When the ratings were divided into the three categories this was the second statement to be rated in the 'during' confabulation category. Since statistical analysis was only possible if there were ratings across all three categories, the second 'before' 'during' and 'after' confabulation rating was deleted from analysis for every rater. Deleting these statements left a research sample consisting of 162 judgements to work with in data analysis (54 judgements in each category). Tables for the 'before, 'during' and 'after' confabulation category for these statements were then developed (see Appendices 5-7). Only including the statements and confabulations that all of the raters rated, encouraged a final research sample that was unambiguous in terms of CA's mood.

Measures used in the analysis

Data analysis required the use of two measures: A) Intraclass correlation and B) Friedman's rank test for *k* correlated samples.

A: Intraclass correlation

Intraclass correlation was used in data analysis to investigate the level of inter-rater reliability. According to Howell (1997), intraclass correlation measures the reliability with which raters rate the statements, taking differences due to the raters into account. There are a number of different ways of calculating intraclass correlation, depending

on whether raters are treated as a fixed or random variable and whether raters evaluate the same or different subjects (Howell, 1997, p.491). Since the raters were all those that were available at the time of data collection, raters were a fixed facet (see Shrout and Fleiss, 1979 for a discussion on intraclass correlations). The raters also all evaluated the same statements. Therefore the formula used to calculate intraclass correlation was:

$$Intraclass\ correlation = \frac{MS_{Subjects} - MS_{J\times S}}{MS_{Subjects} + (j-1)MS_{J\times S}}$$

Where j = the number of raters (4)

Intraclass correlation was established separately for each of the three categories. This was to ensure that there was significant agreement in ratings across all of the categories and not in just one or two that may have evened out and generated overall significance. To calculate intraclass correlation, the known values were placed into the above equation, and the unknown values were established by running Analysis of Variance (ANOVA) on the data using the statistical computer program STATISTICA. During the rating of the statements, every rater rated each of the 162 statements once. Therefore, a repeated-measures design was used. ANOVA summary tables were provided. ANOVA is a statistical technique that is usually used for testing the differences in the means of several groups (Howell, 1999, p. 457). This particular statistical analysis was not required in the present study. ANOVA was simply used to provide the values that were required to calculate intraclass correlation. These values were then plugged into the formula. The formula was calculated by hand. According

to Howell (1999), as a rule of thumb, a value of 0.80 shows a significantly high reliability and low differences between the raters' scoring.

B: Friedman's Rank Test for *k* Correlated Samples

The second phase in data analysis required an investigation into whether there was a significant difference in the level of CA's mood before he confabulated compared to thereafter. Friedman's Rank Test for *k* Correlated Samples was used to investigate this by testing the hypothesis that the judged mood of CA differed as a function of the category under which CA's mood was rated ('before', 'during' or 'after' a confabulation). The mean mood rating each rater gave the statements in the 'before' confabulation category with their minimum and maximum scores and standard deviations was established and tabulated by running the 'descriptive statistics' program on the data in STATISTICA (see Table 5). This was repeated for the data in the 'during' confabulation category and then for the data in the 'after' confabulation category (see Tables 6 & 7). Each rater's mean scores were then edited into Table 8. The mean scores (12 in total) were taken as the dependent variable. Each rater's three mean mood scores were then ranked from 1 – 3 across the three categories. 1 stands for the lowest mood rating and 3 stands for the highest mood rating. The rankings under each category were then summed and noted at the bottom of the table (e.g. see Table 1).

Table 1

	Statements across time		
Rater	**Before confabulation**	**During confabulation**	**After confabulation**
1	Mean score (ranking)	Mean score (ranking)	Mean score (ranking)
2	Mean score (ranking)	Mean score (ranking)	Mean score (ranking)
3	Mean score (ranking)	Mean score (ranking)	Mean score (ranking)
4	Mean score (ranking)	Mean score (ranking)	Mean score (ranking)
	Sum of rankings	Sum of rankings	Sum of rankings

The variability of the sums was evaluated by computing:

$$\chi_F^2 = \frac{12}{Nk(k+1)} \sum_{i=1}^{k} R_i^2 - 3N(k+1)$$

Where

Ri = the sum of the ranks for the ith condition

N = the number of subjects (4)

K = the number of conditions (3)

The value of χ_F^2 was evaluated with respect to the standard chi-square distribution on k – 1df. If the value for χ_F^2 on 3 – 1 = 2df was greater than the value in the χ^2 distribution table at p level 0.05, it would be possible to reject the null hypothesis and conclude that the rating of CA's mood did differ as a function of the category under which the rating took place. If the sum of the rankings revealed the lowest score in the 'before' confabulation column and the highest in the 'after' confabulation' column, it would be possible to further conclude that CA's mood was on average at its

lowest before he confabulated and improved thereafter. Therefore suggesting that low mood does appear to play a causative role in the occurrence of confabulation.

Results

As discussed above, when completing the questionnaires, the four raters were aware that they were making judgements with regard to CA's mood across time based on statements expressed by CA. However, they were unaware that they were specifically rating CA's mood, directly before he confabulated, while he confabulated and directly after he confabulated. Following data collection, the raters' judgements of CA's mood under each of the categories were identified and recorded in three tables. Table Appendix 2 represents the raters' judgements of CA's mood at points in time before he confabulated. Appendix 3 shows their judgements of CA's mood during each confabulation and Appendix 4 shows their judgements of CA's mood following each confabulation. Statements that the raters found impossible to judge are indicated by the letter (b). Appendices 5-7 represent the judgements that were used in the final analysis, with the statements that had been impossible to judge deleted. The data used in the final analysis consisted of 162 judgements of CA's mood across time (54 in each category).

Investigation A: Intraclass correlation

Intraclass correlation was calculated to ensure significant agreement between the raters in their ratings of CA's mood. Intraclass correlation was calculated separately for each category. The values required to compute the intraclass correlation formulas

were established by running Analysis of variance (ANOVA) on the data in STATISTICA. Tables 2, 3 and 4 provide the ANOVA summary tables for the three categories. Calculating the intraclass correlation for the judgements of CA's mood for the 'before' confabulation category, a measure of reliability of 0.84 was established (see Figure 1). For the 'during' each confabulation category, a measure of reliability of 0.80 was established (see Figure 2) and for the 'after' confabulation category a measure of reliability of 0.83 was established (see Figure 3). Each measure of reliability was 0.80 or above criterion, revealing that most of the variability in the data was due to differences between the statements, with only a small amount of difference due to differences between raters. Therefore, having determined significant agreement between the raters across the three conditions, it was possible to statistically test whether the rating of CA's mood differed depending on whether the raters were judging his mood before he confabulated, during a confabulation or following a confabulation.

Table 2

Repeated measures ANOVA Summary Table for the 'before' confabulation category

Effect	SS	Df	MS	F	P
Intercept	665.0046	1	665.0046	394.9252	0.000000
Error	89.2452	53	1.6839		
Rater	0.2361	3	0.0787	1.0000	0.394509
Error	12.5139	159	0.0787		

Table 3

Repeated measures ANOVA Summary Table for the 'during' confabulation category

Effect	SS	Df	MS	F	P
Intercept	696.9630	1	696.9630	479.4971	0.000000
Error	77.0370	53	1.4535		
Rater	0.1852	3	0.0617	0.7105	0.547105
Error	13.8148	159	0.0869		

Table 4

Repeated measures ANOVA Summary Table for the 'after' confabulation category

Effect	SS	Df	MS	F	P
Intercept	759.3750	1	759.3750	458.0014	0.000000
Error	87.8750	53	1.6580		
Rater	0.6065	3	0.2022	2.4456	0.065938
Error	13.1435	159	0.0827		

Figure 1

Intraclass correlation for the 'before' confabulation category

$$Intraclass\ correlation = \frac{MS_{Subjects} - MS_{J\times S}}{MS_{Subjects} + (j-1)MS_{J\times S}}$$

$$= \frac{1.684 - 0.079}{1.684 + (4-1)0.079}$$

$$= \frac{1.605}{1.684 + 0.237}$$

$$= \frac{1.605}{1.921}$$

$$= 0.84$$

Figure 2
Intraclass correlation for the 'during' confabulation category

$$Intraclass\ correlation = \frac{MS_{Subjects} - MS_{J\times S}}{MS_{Subjects} + (j-1)MS_{J\times S}}$$

$$= \frac{1.453 - 0.087}{1.453 + (4-1)0.087}$$

$$= \frac{1.366}{1.453 + 0.261}$$

$$= \frac{1.366}{1.714}$$

$$= 0.80$$

Figure 3

Intraclass correlation for the 'after' confabulation category

$$Intraclass\ correlation = \frac{MS_{Subjects} - MS_{J\times S}}{MS_{Subjects} + (j-1)MS_{J\times S}}$$

$$= \frac{1.658 - 0.083}{1.658 + (4-1)0.083}$$

$$= \frac{1.575}{1.658 + 0.249}$$

$$= \frac{1.575}{1.907}$$

$$= 0.83$$

Investigation B: Friedman's Rank Test for k Correlated Samples

As discussed in the literature review, there are good grounds for considering that low mood in these patients may play a causative role in the occurrence of confabulations. In order to justify this statement, investigation B was designed to measure whether the judged mood of CA did in fact differ as a function of the category under which it was rated.

The data investigating this hypothesis are presented in Tables 5-8 and Figure 4. Tables 5, 6 and 7 present the mean score each rater gave the 54 statements under each of the three categories, with each rater's minimum and maximum score allocated to CA's mood and standard deviations. Although each rater judged CA's mood to be of low, neutral and high mood at various times throughout the questionnaire (see Appendices 2, 3 and 4), all of the raters' mean scores across all of the categories were

between 1.7 and 1.9. These mean scores all round to two, which is expected since a three-point scale was used.

Table 8 presents the mean scores each rater rated CA's mood across the three categories. The mean mood ratings were then ranked from 1-3 across the three different conditions for each rater. 1 represents the lowest mood rating and 3 the highest. On average, rater 1 rated CA's mood to be at its lowest at those times directly before he confabulated, slightly higher during those times he confabulated and at its highest following a confabulation. Rater three and four, although with slightly different mean scores, judged CA's mood in the same pattern. Rater 2 also judged CA's mood to be at its lowest at those times directly before CA confabulated, but judged his mood to be at its highest at those times he confabulated and slightly lower following the confabulations. The rankings were then summed and placed at the bottom of the table. The sum ranking for the 'before' confabulation category was 4, 9 for the 'during' confabulation category and 11 for the 'after' confabulation category. This suggests that as a rule, raters rated CA's mood to be at its lowest before he confabulated, increasing during the confabulations and peaking following the confabulations. Friedman's Rank Test for *k* Correlated Samples was calculated to test whether this pattern was indeed significant.

In calculating Friedman's Rank Test for *k* Correlated Samples, the null hypothesis (Ho) was: the judged mood of CA did not differ as a function of the category under which the rating took place and the alternate hypothesis was: the judged mood of CA did differ as a function of the category under which the rating took place (i.e., before,

during or after a confabulation). Using the rankings from Table 8, Friedman's Rank Test for *k* Correlated Samples was calculated by hand.

For the data in Table 8, $\chi_F^2 = 6.5$ (see Figure 4). This value was then evaluated with respect to the standard χ^2 distribution on k – 1df, which revealed that $\chi^2_{0.05}(2) = 5.99$. Since χ_F^2 at 2 degrees of freedom was greater than the value in the χ^2 table at p-level 0.05, the null hypothesis was rejected and it was concluded that the judged mood of CA did differ as a function of the categories under which the mood ratings took place.

Table 5

Descriptive Statistics: The mean score each rater rated CA's mood before he confabulated with their minimum and maximum score and standard deviation.

Rater (R)	Valid N	Mean	Minimum	Maximum	Std.Dev
R1	54	1.722222	1	3	0.68451
R2	54	1.796296	1	3	0.710557
R3	54	1.777778	1	3	0.718139
R4	54	1.722222	1	3	0.656367

Table 6

Descriptive Statistics: The mean score each rater rated CA's mood during each confabulation with their minimum and maximum score and standard deviation.

Rater (R)	Valid N	Mean	Minimum	Maximum	Std.Dev
R1	54	1.759259	1	3	0.671107
R2	54	1.833333	1	3	0.665880
R3	54	1.814815	1	3	0.702397
R4	54	1.777778	1	3	0.702397

Table 7

Descriptive Statistics: The mean score each rater rated CA's mood after he confabulated with their minimum and maximum score and standard deviation.

Rater (R)	Valid N	Mean	Minimum	Maximum	Std.Dev
R1	54	1.907407	1	3	0.707601
R2	54	1.814815	1	3	0.675000
R3	54	1.833333	1	3	0.665880
R4	54	1.944444	1	3	0.711540

Table 8

Data on mean judgements of CA's mood across time

	Statement rated across time		
Rater	Before Confabulation	During Confabulation	After Confabulation
1	1.722 (1)	1.759 (2)	1.907 (3)
2	1.796 (1)	1.833 (3)	1.815 (2)
3	1.778 (1)	1.815 (2)	1.833 (3)
4	1.722 (1)	1.778 (2)	1.944 (3)
Summed Rankings	4	9	11

Figure 4

Friedman's Rank test for k correlated samples

$$\chi_F^2 = \frac{12}{NK(K+1)}\sum_{i=1}^{K} R_i^2 - 3N(K+1)$$

$$= \frac{12}{(4)(3)(4)}(4^2 + 9^2 + 11^2) - 3(4)(4)$$

$$= \frac{12}{48}(218) - 48$$

$$= 54.5 - 48$$

$$= \underline{6.5}$$

Discussion

The present study sought to investigate the mood of a confabulatory patient across time - predicting that the rating of his mood would be significantly different depending on whether it was rated directly before he confabulated, while he confabulated or directly after he confabulated. This expands on Foutopolou *et al* (in press), Turnbull *et al* (in press) and Williams (2002, honours paper) finding a positive emotional bias in confabulation and Turnbull *et al* (in press) finding an association between low mood and confabulation. Therefore, extending the emotion based approach, the aim was to demonstrate that the patient's mood was not invariably low but rather that it was low before he produced a confabulation and improved thereafter. Data of this kind was required to provide support for Turnbull *et al*'s (in press) claim that mood may play a causative role in confabulation, in that "confabulation might occur in order to improve the patient's emotional state, such that it 'protects' (or defends) the patient against low mood".

A significant degree of agreement between the raters in their ratings of CA's mood across time was established in investigation A. When investigating whether the ratings of CA's mood differed depending on the category under which the rating took place (before, during or after a confabulation), a significant result was also obtained. The summed rank scores for the mean mood ratings under the three categories revealed the lowest score for the 'before' confabulation category and the highest for the 'after' confabulation category. Therefore, typically CA's mood was judged to be significantly lower before he confabulated compared to after.

In essence, the results show a specific pattern in the patient's mood state across time. They reveal that while the ratings of his mood varied depending on whether it was judged before, during or after he confabulated, his mood was on average low before a confabulation and improved thereafter. Although it was not possible to demonstrate a *causative* link between low mood and confabulation statistically, these findings represent a novel and suggestive empirical result that paves the way for this claim to be investigated.

The progressive improvement of CA's mood before, during, and after confabulation suggests that confabulation may serve a mood-regulating purpose. This is consistent with the established fact that confabulations themselves are positively biased emotionally. By fabricating false realities that are more pleasant than the actual reality, confabulations might plausibly be productive of positive affective states. Thus, it is suggested that low mood may play a causative role in the triggering of confabulations and/or that confabulation improves mood.

However, another account is also possible. It may be that CA's mood does not only fluctuate in this pattern in relation to confabulations. That is, his mood may fluctuate between confabulations too. Since a specific proof of causality is not possible, a broader investigation of the patient's mood will provide further evidence for this claim. A longitudinal study into the patient's mood that includes ratings of his mood *between* confabulations is needed. Data that shows that the patient's mood does not fluctuate constantly, but that it dips somewhere between confabulations and only shows an improvement on and proceeding the next confabulation is required. If this can be shown, it will be difficult to interpret the results in any other way than that

mood plays a causative role in confabulation and/or that confabulation improves mood.

A noteworthy issue, which also points to future research, is that the results of this study are based on the investigation of only one confabulatory patient. To state that the mood of all confabulatory patients generally dips before a confabulation is produced and is improved thereafter, requires a study into mood across time for a number of similar confabulatory patients. Only then will the pattern of mood in relation to confabulation seen in this paper be generalisible to all cases of confabulation.

A last point to note, which bears on future research, is that the raters participating in the present study were required to make judgements on the patient's mood based on written statements depicting his conversational speech. It is undoubtedly difficult to make judgements with regard to a person's mood under these conditions, especially when at times this particular patient seemed to not make any sense. It is suggested that future research should incorporate the use of videotaped conversations of confabulatory patients. In this way, raters who are required to make judgements with regard to the patients' moods will be able to make use of visual and audio cues, such as body-language and prosody, rather than conversational content alone. However, it is not felt that using a written transcript to base judgements of CA's mood on was necessarily a limitation of the study. With such a large set of data (162 judgements of CA's mood) revealing such consistent results, the validity and reliability of the method and findings cannot be scrutinised.

In conclusion, despite the vast amount of literature available on the topic of confabulation, past papers have failed to investigate why patients confabulate. It is understood that this is the first time empirical evidence has been brought to bear on the purpose of confabulation. If the findings presented in this paper can be generalised to similar confabulatory patients, an important step has been made in understanding this debilitating disorder. Papers on confabulation have already provided an extensive amount of knowledge and are necessary in legitimising ongoing research in this field. However, looking at these research papers on confabulation in isolation reveals only parts of the story. By combining and discussing past and future findings it is believed that the time will come when a fuller understanding of the function and nature of this disorder will be provided. When this time comes, not only will we finally understand confabulation, but we will also have a fuller understanding of how the mind actually works.

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APPENDIX

Appendix 1.

Sample of the questionnaire used to collect data with regard to the mood of CA before, during and after his confabulations.

CA: Oh my goodness I haven't been around here for a while.
Mark: Well in fact you were here yesterday. And um one of the main things we talked about when you were here last was the fact that you were having some problems with your memory. So that's interesting that you don't know that you were here yesterday that's an example of the memory difficulties that you are having.
CA: No I wasn't here yesterday.
Mark: You were, believe me Scratch. You were here. But the fact that your memory doesn't tell you that you were here is the very thing that's important…
CA: No but yesterday I was in Witbank…not Witbank the South Coast.
Mark: That's where you were yesterday?

CA: Ja. Then I came back. No, I was never here.
Mark: Well let me…

CA: Two days ago I was here. Well the other place.
Mark: Well each of us has our own point of view…

CA: No, sure.

Mark: …and from my point of view my memory tells me you were here yesterday. And I also know if you feel your head over here where there is that scar there you had an operation on your brain to remove a tumour, to remove a growth and that affected your memory. So shocking as that may seem, that's what happened. One of my main tasks – one of the main things that I am trying to do is to get you to recognise that you've got problems with your memory. Because obviously if you have memory problems you don't know that you've got them.

CA: No, sure, sure, sure.

(a) Low mood 1 – 2 – 3 High mood
(b) Impossible to judge

Mark: So this is what I am trying to help you to recognise.

CA: No I understand that because I've been in the last two three years maximum to the dentistry department. Wits University. And they also say problems with memory and so on. And I went there, um, its about three years now and I tested and I found a very very little problem.

(a) Low mood 1 – 2 – 3 High mood
(b) Impossible to judge

You know things that myself and one doctor and another doctor but not operated um worked on um feeding in the brain I don't know what parts. And then um two of those lads um they called me and they said you know "What's happening?". See the doctors and I said Oh no I was here two days ago and they said "Oh!" the guy says. "You remembered huh?" And then the guy says what about my side why don't you come

and see me. No no I said I came to see you and it wasn't later it was now now so…

(a) Low mood 1 – 2 – 3 High mood
(b) Impossible to judge

Mark: Was this an operation on your brain or on your teeth?

CA: On the braai-…you see what happened I joined Wits University about three years ago and they send us to go and see for a place to work and I went there and I found one – two teeth which could be corrected to …line not directly but on that line. And then one doctor said no. I don't like it over here. I will treat them and then see what we can do. Pulled out at the beginning of the year and I'm fine. I mean I don't miss any teeth.

Mark: Your teeth look fine to me

CA: That's the thing. And they moved the bottom. What happens is at the beginning of the year they put the teeth to mask the teeth here and they took mine off because I am supposed to go back now to Durban on a different treatment. So what I wanted to do is carry on because I know.. and came to…payment is not easy. And I thought well you are the expert – what do you suggest I should do.

Mark: OK well my suggestion is based on the following conclusion. My impression is that since this operation, not on your teeth but on your brain, when you remember. When you look inwards and you draw back memories the one that comes to mind isn't always the right one. Although, for example now, I am talking to you about a brain operation and that makes you remember a dental operation and then the one replaces the other.

CA: Yes I understand but I never had any problems with thinking that I am making the right decision.

Mark: I am sure. I can see that you are a very sensible and highly skilled person.

CA: Well not so much that it's just that at the right time you need the right decision. You know I mean look every now and then everybody makes a stupid decision. I mean I can't say that I ever made any decision that caused anything nasty.

(a) Low mood 1 – 2 – 3 High mood
(b) Impossible to judge

So I thought I understand because I spoke to the doctor Hopkins now in Joburg and he said well if that is the case then the doctor down in Durban still owes you some time. No, serious, see what he's got to say. Because you know it might be I'm 58 and the teeth are not bad. Fixing up in December. So I hope I can and I came down here and my department told me – and I thought I would come and see what you can suggest. So it's just a matter of looking and saying "Ah!" and this is who you go and see because I am in charge of everyone.

(a) Low mood 1 – 2 – 3 High mood
(b) Impossible to judge

Mark: Right. But now you see this is part of the difficulty that I am faced with is that at the moment we are not in South Africa.
CA: Oh, I see.
Mark: We are in England and you have come here with Val to England to see me to talk about your memory.

CA: Yes, actually until…well I still think I do fall under England under oh my goodness the two guys. The one guy actually more than just a few nurses who might need is a few kicks in the bum.
Mark: (Laughs) And that's that? (a) Low mood 1 – 2 – 3 High mood (b) Impossible to judge

CA: Oh you know in the Cape – not in the Cape in –

Mark: Natal?
CA: Natal. South Natal. The wind is blowing and…(laughs) Steve.
Mark: Steve?
CA: Big Steve. Yeah. I've known the ones from Scotland are…I mean I used to come from Natal University twenty years ago. So they started at one stage down here to – um I'm quite happy with my teeth – they're quite well…
Mark: And are you happy with your memory?
(a) Low mood 1 – 2 – 3 High mood (b) Impossible to judge

CA: Oh yes my memory is fine.
Mark: You don't have any difficulty remembering for example what you did this morning?
CA: No. Well I am quite happy with the whole situation I mean I just..some time…the guys…
Mark: I remember yesterday when you left Val you said that you were going to go down to the bridge and the river and Big Ben and so on.

CA: So I ended up in Cape Town.
Mark: You ended up in Cape Town?
CA: I ended up in Cape Town. I don't know I've got 5c left and I spent 6c. (Laughs) No, but I had to go into a shop just for the charge, the shop is not official yet but it might…No I have problems with my teeth for about – when did it start here?
Mark: Well the problem with your teeth I think started quite a few years ago.

CA: Oh yes! And Then, Steve and oh crikey I have forgotten the name. The dentist from England. I just started coming out and the guy reversed and…they started looking at my teeth and they have been treating them here. And the new pathology department here it is going to make quite a difference.

Mark: Looks good, really does look good.
CA: I can't complain I really can't complain.
Mark: But I think that –
CA: Well you see another thing is I only got out of work for a couple of days –
Mark: Ah hah on their –

CA: No not on their…we've got a problem here in Italia with teeth artificial feeling. I am involved I am an electronic engineer and I have been involved in Natal

University's studying and so on and in the last four or five years nothing in varisty because of the problem with um teething and the doctor, oh my goodness.

(a) Low mood 1 – 2 – 3 High mood
(b) Impossible to judge

He was my house doctor as you call it. Anyway we started late about three years ago sending out about ten million caps and then they closed the plants and they started and this is the first time, which is working well. I can't remember.

(a) Low mood 1 – 2 – 3 High mood
(b) Impossible to judge

Mark: That happens to us all – we never to remember names. What's interesting to me is that you don't have any difficulty recognizing that you can't remember names but the events that you can't remember you don't seem to realize that you can't remember them. There are some events that I know happened, like for example that you were here yesterday talking to me. I know that you were here but you don't have a memory of that event and you don't realize that you don't have a memory of

Appendix 2

Mood ratings for the 'before' confabulation category

Statement	Rater 1	Rater 2	Rater 3	Rater 4
1	3	3	3	3
2	2	2	3	2
3	2	2	2	2
4	2	2	2	2
5	3	3	3	2
6	3	3	3	3
7	1	1	1	1
8	2	2	2	2
9	1	1	1	1
10	2	2	2	2
11	1	1	1	2
12	1	1	1	1
13	1	1	1	1
14	2	2	2	2
15	3	3	3	2
16	1	1	1	1
17	1	1	1	1
18	1	1	1	1
19	2	2	2	2
20	2	2	2	2
21	2	2	1	1
22	2	2	2	2
23	2	2	2	2
24	1	1	1	1
25	1	1	1	1
26	1	b	1	2
27	2	2	2	2
28	3	3	3	3
29	2	2	2	3
30	1	1	2	1
31	2	3	2	2
32	1	2	3	1
33	1	1	1	1
34	1	2	1	1
35	2	2	2	2
36	1	1	1	1
37	2	3	1	2
38	1	1	1	1
39	2	2	2	2
40	2	2	2	2
41	2	2	2	2
42	2	2	3	2

43	3	3	3	3
44	2	2	2	2
45	1	1	1	1
46	2	2	2	2
47	1	1	2	2
48	2	2	2	2
49	1	1	1	1
50	1	1	1	1
51	1	1	1	1
52	1	1	1	1
53	2	2	2	2
54	3	3	3	3
55	2	3	1	2
56	2	2	2	2
57	2	2	2	2

Appendix 3

Mood ratings for the 'during' confabulation category

Statement	Rater 1	Rater 2	Rater 3	Rater 4
1	2	2	2	2
2	3	2	b	2
3	2	2	2	2
4	3	3	3	2
5	2	2	2	2
6	2	2	2	2
7	1	1	1	1
8	2	2	2	2
9	1	1	1	2
10	2	2	2	2
11	2	2	2	2
12	1	1	1	1
13	1	1	1	1
14	2	2	2	2
15	2	2	2	2
16	1	1	1	2
17	1	1	1	1
18	1	1	1	1
19	1	1	1	1
20	3	3	3	2
21	1	1	1	1
22	2	2	2	2
23	1	1	3	3
24	1	2	1	1

25	2	2	2	2
26	2	2	1	2
27	1	1	1	1
28	2	2	2	2
29	2	2	2	2
30	2	2	2	2
31	1	1	3	1
32	2	2	2	2
33	1	2	1	2
34	2	2	2	2
35	2	2	2	2
36	1	1	1	1
37	3	3	3	3
38	1	1	1	1
39	2	3	2	2
40	2	2	2	2
41	1	1	1	1
42	3	3	3	3
43	3	3	3	3
44	2	2	2	2
45	2	2	2	2
46	2	2	2	2
47	2	2	2	2
48	2	2	2	2
49	1	2	1	2
50	1	1	1	1
51	2	2	1	2
52	1	1	1	1
53	3	3	3	3
54	3	3	3	3
55	3	3	3	2
56	2	2	2	2
57	2	2	2	2

Appendix 4

Mood ratings for the 'after' confabulation category

Statement	Rater 1	Rater 2	Rater 3	Rater 4
1	3	2	2	2
2	3	2	b	2
3	2	2	2	2
4	2	2	2	2
5	3	3	3	3
6	2	1	1	1
7	2	2	2	2
8	1	1	1	1
9	1	1	1	1
10	2	2	2	2
11	1	1	2	2
12	3	3	3	3
13	1	1	1	1
14	3	3	3	3
15	2	2	2	2
16	2	2	2	2
17	2	2	2	2
18	2	2	2	2
19	1	1	1	1
20	1	1	2	1
21	2	2	2	2
22	2	2	2	2
23	1	1	1	1
24	2	2	2	2
25	3	3	3	3
26	3	3	2	2
27	2	2	2	2
28	1	1	1	1
29	2	2	2	2
30	3	2	2	3
31	2	2	3	3
32	2	2	2	2
33	1	1	1	1
34	2	2	2	2
35	2	2	3	3
36	2	2	2	2
37	3	b	b	2
38	1	1	1	1
39	3	3	2	3
40	2	1	1	2
41	1	1	1	1
42	3	3	3	3

43	3	3	3	3
44	3	1	1	3
45	2	2	2	2
46	2	2	2	2
47	3	3	2	3
48	1	1	1	1
49	1	1	1	1
50	1	2	1	2
51	1	1	1	1
52	1	1	1	1
53	2	2	2	2
54	2	2	2	2
55	2	2	2	2
56	2	2	2	2
57	2	2	2	2

Appendix 5

Mood ratings for the 'before' confabulation category with those statements that were impossible to judge deleted.

Statement	Rater 1	Rater 2	Rater 3	Rater 4
1	3	3	3	3
2	2	2	2	2
3	2	2	2	2
4	3	3	3	2
5	3	3	3	3
6	1	1	1	1
7	2	2	2	2
8	1	1	1	1
9	2	2	2	2
10	1	1	1	2
11	1	1	1	1
12	1	1	1	1
13	2	2	2	2
14	3	3	3	2
15	1	1	1	1
16	1	1	1	1
17	1	1	1	1
18	2	2	2	2
19	2	2	2	2
20	2	2	1	1
21	2	2	2	2
22	2	2	2	2
23	1	1	1	1
24	1	1	1	1
25	2	2	2	2
26	3	3	3	3
27	2	2	2	3
28	1	1	2	1
29	2	3	2	2
30	1	2	3	1
31	1	1	1	1
32	1	2	1	1
33	2	2	2	2
34	1	1	1	1
35	1	1	1	1
36	2	2	2	2
37	2	2	2	2
38	2	2	2	2
39	2	2	3	2
40	3	3	3	3
41	2	2	2	2
42	1	1	1	1

43	2	2	2	2
44	1	1	2	2
45	2	2	2	2
46	1	1	1	1
47	1	1	1	1
48	1	1	1	1
49	1	1	1	1
50	2	2	2	2
51	3	3	3	3
52	2	3	1	2
53	2	2	2	2
54	2	2	2	2

Appendix 6

Mood ratings for the 'during' confabulation category with those statements that were impossible to judge deleted

Statement	Rater 1	Rater 2	Rater 3	Rater 4
1	2	2	2	2
2	2	2	2	2
3	3	3	3	2
4	2	2	2	2
5	2	2	2	2
6	1	1	1	1
7	2	2	2	2
8	1	1	1	2
9	2	2	2	2
10	2	2	2	2
11	1	1	1	1
12	1	1	1	1
13	2	2	2	2
14	2	2	2	2
15	1	1	1	2
16	1	1	1	1
17	1	1	1	1
18	1	1	1	1
19	3	3	3	2
20	1	1	1	1
21	2	2	2	2
22	1	1	3	1
23	1	2	1	1
24	2	2	2	2
25	1	1	1	1
26	2	2	2	2
27	2	2	2	2
28	2	2	2	2
29	1	1	3	1

30	2	2	2	2
31	1	2	1	2
32	2	2	2	2
33	2	2	2	2
34	1	1	1	1
35	1	1	1	1
36	2	3	2	2
37	2	2	2	2
38	1	1	1	1
39	3	3	3	3
40	3	3	3	3
41	2	2	2	2
42	2	2	2	2
43	2	2	2	2
44	2	2	2	2
45	2	2	2	2
46	1	2	1	2
47	1	1	1	1
48	2	2	1	2
49	1	1	1	1
50	3	3	3	3
51	3	3	3	3
52	3	3	3	2
53	2	2	2	2
54	2	2	2	2

Appendix 7

Mood ratings for the 'after' confabulation category with those statements that were impossible to judge deleted

Statement	Rater 1	Rater 2	Rater 3	Rater 4
1	3	2	2	2
2	2	2	2	2
3	2	2	2	2
4	3	3	3	3
5	2	1	1	1
6	2	2	2	2
7	1	1	1	1
8	1	1	1	1
9	2	2	2	2
10	1	1	2	2
11	3	3	3	3
12	1	1	1	1
13	3	3	3	3
14	2	2	2	2