

Abstract

This paper presents data on the Pacific Assessment of Confabulation (PAC), which was designed to accomplish two goals. First, the PAC is intended to quantify confabulation. Confabulation has been described as dichotomous (i.e., present or absent), without attempts to quantify it. A second goal is to test the hypothesis that occurs in the normal population. Literature related to witness testimony suggests this may be true.

Pacific Assessment of Confabulation

Confabulation has been defined as unintentional verbal distortions or misinterpretations of events without the intention to deceive (Dalla Barba et al., 1997; Dalla Barba & Boisse, 2010; Metcalf et al., 2010). Confabulation has been reported in patients with traumatic brain injury (Demery et al., 2001; Schnider, 2000), Wernicke-Korsakoff Syndrome (e.g., Van Damme & d'Ydewalle, 2010), aneurysm of the anterior communicating artery (Kramer et al., 1998), and Alzheimer's disease (Jorn & Rybarczyk, 1995). Various anatomical correlations have been suggested. Metcalf & Coltheart (2003) indicate frontal lobe involvement, while Ptak et al. (2001), and Pihan et al. (2004) specify more specifically orbitofrontal structures while Demery et al. (2001) suggested left frontal cortex.

Assessment methods for confabulation have been reported. Moscovitch and Melo (1997) adapted the Crovitz Cue Word Test, however this test a considerable challenge to attention and memory. Dalla Barba (1993) described a *Confabulation Battery* which included questions regarding personal semantic memory, episodic memory, orientation to time and place, and general semantic memory. However, several items on this questionnaire required knowledge of French history, and/or French celebrities (e.g., "Who is Petain?" and "What happened in rue Copernic a few years ago?").

Purpose

This paper presents data on the Pacific Assessment of Confabulation (PAC), which was designed to accomplish two goals. First, the PAC is intended to quantify confabulation. As noted, confabulation has been described as dichotomous (i.e., present or absent), without attempts to quantify it. A second goal is to test the hypothesis that—given quantifiability—confabulation occurs in the normal population. Literature related to witness testimony (Hanba & Zaragoza, 2007) suggests this may be true.

Methods

Participants

Normal Group. Thirty-nine individuals met the following inclusionary criteria: eighteen years of age or higher; no history of TBI; no other history of neurologic damage.

Traumatic Brain Injury Group: Thirty-one individuals were recruited as consecutive cases from the speech pathology services at a teaching medical center in Northern California. The following criteria were met by these individuals: eighteen years of age or higher; a history of TBI; no additional history of neurologic damage.

Pacific Assessment of Confabulation (PAC).

The PAC was modeled after Dalla Barba's (1993) questionnaire, however, the latter contained 95 questions in seven categories. The PAC comprised 10 questions in six categories. Omitted were questions probing "Linguistic Semantic Memory" (Dalla Barba, 1993), which were actually items 16-30 on the Wechsler Assessment of Adult Intelligence Scale. The 10 questions were modified so that individuals living in the United States would be more likely to know the non-"I don't know" questions. For example, whereas Dalla Barba's questionnaire asked, "what happened in Paris in May, 1968" the PAC asked, "what happened on September 11, 2001."

Procedures

Participants signed a consent form and were interviewed immediately in a quiet environment. Responses were recorded verbatim for later scoring and analysis. Questions were repeated verbatim when requested, but no additional clarification was offered.

Scoring. Rather than scoring responses as correct or incorrect, it became apparent that there was room for interpretation, based on the number of unexpected responses. For example, it was expected that the answer to the question, “when did the Vietnam War start” would be “I don’t know.” However, 20% of responses from the normal group specified the 1970s or specific years within the 70s. Similarly, the expected responses for “What happened December 7, 1941,” were statements regarding the bombing of Pearl Harbor or “I don’t know.” However, 21% of respondents specified only “a war” or “a bombing” or an appropriate yet vague occurrence. Because these “in between” responses occurred for so many questions, a three-point scale was devised, where an accurate (or “I don’t know”) response was valued 1, an “in between” response 2, and a response deemed a confabulation (either inaccurate or more clearly a confabulatory response) 3. Thus, a score of 10 was possible if all responses were deemed accurate, and a 30 was possible if all responses were confabulatory.

Results

The mean overall scores on the PAC for the normal and TBI groups appear in Table 1. The TBI group scores were significantly higher than the control group. A second trained judge, agreed with this author on 21% of PACs, randomly selected. Agreement on the 150 items was 96%. Intra-rater reliability, also derived from 21% of PACs, was 98%. Disagreements were resolved by consensus.

With a mean score of 10.92 for the control group, these data were not subjected to a one sample t-test against the hypothetical “perfect score” of 10.

A concern was the extent to which the PAC would be sensitive not just to the presence of cognitive impairment, but to severity as well. Table 2 shows the scores on the PAC by Rancho Los Amigos (RLA) (Hagen & Malkmus, 1979).

Discussion

The first goal for this study was to determine whether the PAC could quantify confabulation. Indeed the PAC differentiated a group of individuals with a history of TBI from a control group. Normal individuals performed significantly better. The limited sample size at each Rancho Level in the TBI group was not conducive to parametric statistical analysis, however the trend within the TBI group was compelling, showing improved scores with less severe cognitive functioning (Table 2). Further study using the PAC with a larger sample size could be useful.

The second goal was to determine whether confabulation occurred in the normal population. The evidence points to a lack of confabulation in the normal population.

Within the TBI group, it is interesting to note that the small RLA VIII group had a mean score of 12.40. Although a larger sample would be required before making definitive conclusions, this could be an important finding for those individuals struggling in the workplace. By definition, a person in the RLA VIII category is often preparing to re-enter the work force. If this person is responding to questions with confabulations, the re-entry may be fraught with difficulty.

Confabulation has been noted in other populations. Future research could investigate responses on the PAC in these populations and compare them both quantitatively and qualitatively with the TBI group in this study.

Confabulation historically has been reported as either present or absent. This study conflicts with that description. Individuals with TBI confabulated less when they were less cognitively impaired and more when they were more cognitively impaired. Although normal individuals did not confabulate per se, neither did they all have perfect scores on the PAC. Thus, it appears that confabulation can be quantified, and may have a relationship to level of cognitive functioning. Future studies could lend more support to this observation in a longitudinal study, giving the PAC to an individual throughout a period of recovery.

References

- Dalla Barba, G. (1993). Confabulation: Knowledge and recollective experience. *Cognitive Neuropsychology*, 10. 1-20.
- Dalla Barba, G. & Boisse, M. (2010). Temporal consciousness and confabulation: Is the medial temporal lobe “temporal”? *Cognitive Neuropsychiatry*, 15, 95-117.
- Dalla Barba, G., Boisse, M., Bartolomeo, P., & Barchoude-Levi, A. (1997). Confabulation following rupture of posterior communicating artery. *Cortex*, 33. 563-570.
- Demery, J., Hanlon, R., & Bauer, R. (2001). Profound amnesia and confabulation following traumatic brain injury. *Neurocase*, 7. 295-302.
- Hagen, C. & Malkmus, D. (1979). Interaction strategies for language disorders secondary to head trauma. Paper presented at the annual convention of the *American Speech-Language Hearing Association*, Atlanta, GA.
- Hanba, J. & Zaragoza, M. (2007). Interviewer feedback in repeated interviews involving forced confabulation. *Applied Cognitive Psychology*, 21, 433-455.
- Jorn, M., & Rybarczyk, B. (1995). Interpreting the confabulations of geriatric medical inpatients: Two case studies. *Clinical Gerontologist*, 16. 59-62.
- Kramer, S., Bryan, K., & Frith, C. (1998). ‘Confabulation’ in narrative discourse by schizophrenic patients. *International Journal of Language & Communication Disorders*, 33. 202-207.
- Metcalf, K., & Coltheart, M. (2003). The construction of autobiographical memory: Evidence form confabulation. *Australian Journal of Psychology*, supplement. 156-161.

- Metcalf, K., Langdon, R., & Coltheart, M. (2010). The role of personal biases in the explanation of confabulation. *Cognitive Neuropsychiatry*, *15*, 64-94.
- Moscovitch, M., & Melo, B. (1997). Strategic retrieval and the frontal lobes: Evidence from confabulation and amnesia. *Neuropsychologia*, *35*. 1017-1034.
- Pihan, H., Gutbrod, K., Baas, U., & Schnider, A. (2004). Dopamine inhibition and the adaptation of behavior to ongoing reality. *Cognitive Neuroscience and Neuropsychology*, *15*. 709-712.
- Ptak, R., Birtoli, B., Imboden, H., Hauser, C., Weis, J., & Schnider, A. (2001). Hypothalamic amnesia with spontaneous confabulations: A clinicopathologic study. *Neurology*, *56*. 1597-1600.
- Schnider, A. (2000). Spontaneous confabulations, disorientation, and the processing of 'now.' *Neuropsychologia*, *38*. 175-185.
- Van Damme, I. & d'Ydewalle, G. (2010). Confabulation versus experimentally induced false memories in Korsakoff patients. *Journal of Neuropsychology*, *4*, 211-230.

Table 1

Scores on the PAC for TBI Group and Control Group. Possible Scores on PAC: 10-30.

	Mean Overall PAC score	SD	T (Sig)
TBI group (n=31)	14.97	4.25	-5.70 (.000)
Control group (n=39)	10.92	1.13	

Table 2

Mean PAC Scores by Rancho Los Amigos Scores.

Rancho Level	IV (n=10)	V (n=4)	VI (n=3)	VII (n=9)	VIII (n=5)
PAC total	18.00	15.75	14.33	12.89	12.40
SD	5.48	2.06	4.93	2.09	1.52