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Confabulation in children with autism

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ABSTRACT

Some children with high-functioning autistic spectrum conditions (ASC) have been noted clinically to produce accounts and responses akin to confabulations in neurological patients. Neurological confabulation is typically associated with abnormalities of the frontal lobes and related structures, and some forms have been linked to poor performance on source monitoring and executive function tasks. ASC has also been linked to atypical development of the frontal lobes, and impaired performance on source monitoring and executive tasks. But confabulation in autism has not to our knowledge previously been examined experimentally. So we investigated whether patterns of confabulation in autism might share similarities with neurologically-based confabulation. Tests of confabulation elicitation, source monitoring (reality monitoring, plus temporal and task context memory) and executive function were administered to four adolescents with ASC who had previously been noted to confabulate spontaneously in everyday life. Scores were compared to a typically developing (TD) and an ASC control group. One confabulating participant was significantly impaired at reality monitoring, and one was significantly worse at a task context test, relative to both the ASC and TD controls. Three of the confabulators showed impairment on measures of executive function (Brixton test; Cognitive Estimates test; Hayling Test B errors) relative to both control groups. Three were significantly poorer than the TD controls on two others (Hayling A and B times), but the ASC control group was also significantly slower at this test than the TD controls. Compared to TD controls, two of the four confabulating participants produced an abnormal number of confabulations during a confabulation elicitation questionnaire, where the ASC controls and TD controls did not differ from each other. These results raise the possibility that in at least some cases, confabulation in autism may be less related to social factors than it is to impaired source memory or poor executive function.

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1. Introduction

Over the last 30 years, the cognitive impairments underlying autism have been increasingly investigated and a number of prominent theories have been suggested, the best known of which is the frequent presence of a mentalizing impairment (Frith, 2003). These cognitive impairments attempt to explain the core behavioural symptoms of the disorder. However, there are also a number of behavioural features that are not considered to be core to the autism spectrum. These occur with some consistency, but only in a minority of individuals with the diagnosis. One such feature is confabulation, which is defined as the tendency to relate experiences that have not occurred, as if they had. Interestingly, some of the first clinical accounts of people with autism noted the occurrence of confabulation. For instance, Hans Asperger described confabulatory behaviour in one of the four children he originally studied:

> *He was said to be an inveterate 'liar'. He did not lie in order to get out of something that he had done - this was certainly not his problem, as he always told the truth very brazenly - but he told long, fantastic stories, his confabulations becoming ever more strange and incoherent. He liked to tell fantastic stories, in which he always appeared as the hero. He would tell his mother how he was praised by the teacher in front of the class, and other similar tales.* (Asperger [1944] translated in Frith, 1991, p.51.)

The tendency for some people with autism to construct such confabulations is recognised within the widely-used assessment tool the Autism Diagnostic Observation Schedule (ADOS-G, Lord et al., 2000) which asks raters to code whether the interviewee "describes an event that seems unlikely to have been real". Despite this, no research to date has been conducted into confabulatory behaviour in autism. So in this novel research study, we extended a recent trend for applying methods from the field of adult cognitive neuroscience to examine developmental confabulation in children with autism, in particular focusing on source monitoring and executive function.

1.1. *The nature of confabulation*

Confabulation has been defined as "a falsification of memory occurring in clear consciousness" (Berlyne, 1972). People who confabulate are typically agnosognosic: they are unaware of any memory deficit, or at least grossly underestimate its severity (McGlynn & Schachter, 1989). They have no intent to deceive the listener; as such, confabulation has been described by Moscovitch (1989) as "honest lying". Burgess and Shallice (1996b), describe the principal features of confabulation as follows:

a. Confabulations are typically (but not necessarily) coherent accounts that concern the person describing them, most apparent when autobiographical recollection is required.
b. The account is false within its context, and may also be false in detail.
c. The content is most often drawn from the patient's own experiences, including thoughts that they have had. However some aspects may be derived from semantic memory.
d. Confabulations are a product of impaired memory processes, not a result of conscious compensatory procedures.
e. People often act on the basis of their confabulations.
f. Confabulators are unaware that they are confabulating.

But although these characteristics are common to all confabulations (at least, those identified so far), there are still a very wide variety of different forms, and discussions about them have a substantial history (e.g. Berlyne, 1972; Burgess & McNeil, 1999; Damasio, Graff-Radford, Eslinger, Damasio, & Kassell, 1985; Kopelman, 1987, 1999; Moulin, 2013; Schnider, Gutbrod, Hess, & Schroth, 1996; 2013). In general, it is assumed that at least some confabulatory phenomena relate to unusual behaviours seen in experimental tasks that tap "executive" or "metacognitive" aspects of memory. Examples are intrusion errors or false positives in recall of word lists; being willing to answer direct questions to which one cannot possibly know the answer; overconfidence in judging their memory performance, and reality monitoring deficits (e.g. Moulin, 2013; Nahum, Bouzerda-Wahlena, Guggisberga, Ptaka, & Schnider, 2012; Stolzenberg & Pezdek, 2013). There is plenty of evidence that confabulators tend to do (although do not invariantly do) poorly on a range of memory tests. Many also perform poorly on tests of executive abilities associated with frontal lobe function. However, the precise relation between different forms of confabulation and performance on experimental or clinical tests is far from clear (e.g. Nahum et al., 2012; Shingakia, Paeksoon, Keita, Muraic, & Tsukiurab, 2016). It is probably fairest to summarise our current level of understanding by saying that while *most* confabulators show some kind of disturbance on clinical and lab-based memory tests, and/or also often also on tests of executive function, it is not possible to predict well from knowing the test scores what form of confabulation will be displayed, nor perhaps even if confabulation will be shown. Nevertheless, although there is a distinct lack of specificity at present in our understanding of the relation between test performance and symptom, the consistent presence of at least some sort of decrement on tasks relating to memory control, metacognitive and executive functions, albeit unpredictable, means that it is common in experimental investigations of confabulation in neurological patients to include such measures. Accordingly, we do so here. In particular, we consider explanations that relate to three of the principal putative explanations of confabulation. It is important to note that these accounts are not competitors, nor are they exclusive. Rather, they seek to explain different aspects of the highly varied presentations seen in confabulation, and more than one can be relevant in any one case.

The first, and one of the oldest, accounts is the *dysexecutive hypothesis* of confabulation, which holds that deficits in executive function are a predisposing feature of confabulation (Baddeley & Wilson, 1988; Berlyne, 1972; Stuss, Alexander, Lieberman, & Levine, 1978). Confabulation is thus viewed as one symptom of the broader set of dysexecutive symptoms (see Burgess, Alderman, Evans, Emslie, & Wilson, 1998 for

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