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Eye-witness memory and suggestibility in children with Asperger syndrome

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Background: Individuals with autism spectrum disorders (ASD) present with a particular profile of memory deficits, executive dysfunction and impaired social interaction that may raise concerns about their recall and reliability in forensic and legal contexts. Extant studies of memory shed limited light on this issue as they involved either laboratory-based tasks or protocols that varied between participants. **Method:** The current study used a live classroom event to investigate eye-witness recall and suggestibility in children with Asperger syndrome (AS group; $N = 24$) and typically developing children (TD group; $N = 27$). All participants were aged between 11 and 14 years and were interviewed using a structured protocol. Two measures of executive functioning were also administered. **Results:** The AS group were found to be no more suggestible and no less accurate than their peers. However, free recall elicited less information, including gist, in the AS group. TD, but not AS, participants tended to focus on the socially salient aspects of the scene in their free recall. Both general and specific questioning elicited similar numbers of new details in both groups. Significant correlations were found between memory recall and executive functioning performance in the AS group only. **Conclusions:** The present study indicates that children with AS can act as reliable witnesses but they may be more reliant on questioning to facilitate recall. Our findings also provide evidence for poor gist memory. It is speculated that such differences stem from weak central coherence and lead to a reliance on generic cognitive processes, such as executive functions, during recall. Future studies are required to investigate possible differences in compliance, rates of forgetting and false memory. **Keywords:** Asperger syndrome, autistic disorder, memory, eye-witness, suggestibility, executive function. **Abbreviations:** ASD: autistic spectrum disorder; AS: Asperger syndrome.

Traditionally, children with a diagnosis of autism spectrum disorders (ASD) are regarded as having a good rote memory (Hermelin & O'Connor, 1967; Wing, 1981) but appear to be disadvantaged by a number of other memory deficits. For example, the free recall of pictures, as well as of written and spoken words, is known to be impaired in children with autism relative to children matched for verbal and non-verbal ability (Boucher & Warrington, 1976). More recent studies have replicated this finding (e.g., Bennetto, Pennington, & Rogers, 1996) even among adults with Asperger syndrome (Bowler, Matthews, & Gardiner, 1997), an autism spectrum disorder distinguished by a lack of language and cognitive delay. However, each of these studies also reports a pattern of intact recall when appropriate acoustic, graphemic or semantic cues are made available. The degree to which this pattern of memory functioning impacts on social functioning in general and eye-witness memory in particular remains unclear.

One important practical issue relates to whether young people with a diagnosis of ASD can be regarded as reliable witnesses in clinical, legal and forensic settings. To date, research in the field of children's testimony has not extended to explore the influence, if any, of specific developmental disorders on eye-witness memory or interrogative suggestibility. While this knowledge gap persists, there is a risk that the credibility of young people with ASD may be inadvertently undermined.

In a series of studies over the past decade Bowler and colleagues have employed a variety of paradigms in order to explore the characteristics of memory function in individuals with Asperger syndrome (e.g., Bowler et al., 1997; Bowler, Gardiner, & Grice, 2000). They have demonstrated normal priming and recognition processes characteristic of implicit memory, but a selective pattern of deficits in episodic memory requiring intentional recall (Bowler et al., 1997). They also report poorer source memory in Asperger syndrome but, in line with the research on cueing, have shown that support at test largely eliminates this deficit (Bowler, Gardiner, & Berthollier, 2004).

Hermelin and O'Connor (1970) were the first to demonstrate that children with autism often failed to use meaning to support memory. At the same time Frith (1970) reported that children with autism did not exploit the clear regularities in word sequences during recall. However, Tager-Flusberg (1991) was to show that high ability children with autism could attain normal memory performance when semantic cues were provided. This has since been replicated in adults with Asperger syndrome (Bowler et al., 1997). In addition, adults with ASD have been shown to succumb to 'memory illusions' for word associates,

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suggesting an intact representation of items at the basic semantic level (Bowler, Gardiner, Grice, & Saavalainen, 2000). This has informed an emerging view that, while individuals with Asperger syndrome appear to have a relatively unimpaired knowledge store, they have difficulty in profiting from the organisation of this information in specific memory tasks (Bowler et al., 1997). Bowler and colleagues have proposed the 'task support hypothesis' to account for this phenomenon. This contends that source memory in adults with ASD is no different from that of matched controls when recall is supported (Bowler et al., 2004). In a related vein Minshew and Goldstein (2001) have developed the view that the memory impairment in autism can be understood as a failure to use organising strategies or meaning to support memory, with the implication that the underlying memory representation is intact.

The study of memory in autism, however, has been limited by the use of measures with questionable ecological validity such as pictures, stories or word lists. Two studies by Boucher and colleagues represent exceptions to this pattern (Boucher, 1981; Boucher & Lewis, 1989; see also Millward, Powell, Messor, & Jordan, 2000). In a study of 10 children with autism, ranging in age from 10 to 16 years, Boucher investigated memory for a set of activities in which the children had participated earlier that day (Boucher, 1981). In a later study, free recall was assessed for events experienced over the previous year (Boucher & Lewis, 1989). In both studies, the children with autism were found to recall significantly less information about the experienced events during free recall. When leading questions were used as cues, recall was found to be comparable across the groups, although the group effects did approach significance (Boucher & Lewis, 1989).

These findings, like those from laboratory studies, point to a clear pattern of compromised intentional or free recall in ASD that is ameliorated by the provision of external support or cues. However, what is less clear is whether the memory representation in episodic memory, where there is broader scope for more complex relations between items to be remembered, is normative. One hypothesis would be that gist representation, which is likely to structure an individual's free recall of an event, is selectively impaired in individuals with ASD while verbatim memory is intact (Happé & Frith, 2006). According to Fuzzy-trace theory, an influential model derived from typical development (Brainerd & Reyna, 1990), children store separate representations of a target's surface forms and other item-specific information (verbatim traces), and of the semantic, relational and elaborative properties in which targets participate (gist traces). Alternatively, it may be the case that memory representation in ASD is intact, as proposed by Bowler and colleagues (2004), with differences in how that representation is exploited.

A growing body of empirical work has investigated a number of aspects related to social functioning in ASD such as emotion recognition (e.g., Grossman, Klin, Carter, & Volkmar, 2000), face recognition (e.g., Joseph & Tanaka, 2003), and the attribution of social meaning (e.g., Klin, 2000). How these areas of functioning might relate to memory remains unclear. The relationship between memory and executive functioning has been considered by several researchers (Pennington et al., 1997; Minshew, Goldstein, & Siegel, 1997) with some evidence for correlations between memory and executive functioning ability in autism (Bennetto et al., 1996). This mirrors the broader pattern of associations between memory functioning and non-verbal reasoning in ASD, not seen in typically developing children (Toichi & Kamio, 2003). Together, these findings point to qualitative differences in the underlying memory system and need to be accounted for in any complete theory of memory in ASD.

How do specific characteristics associated with ASD, in relation to central coherence, theory of mind and executive functioning, relate to interrogative suggestibility? One model has delineated several factors that are likely to influence an individual's appraisal of a questioning experience, including uncertainty, expectation, and interpersonal trust (Gudjonsson & Clark, 1986; Gudjonsson, 2003). When considered in these terms a theory of mind impairment can lead to predictions of either increased or decreased suggestibility, depending on the circumstances. That is, impairments in theory of mind may lead to difficulty in gauging appropriate levels of trust (increasing suggestibility) or in gauging implicit expectations of the interviewer (reducing suggestibility). For example, in a forensic interview a child is typically told 'it is really okay to say you don't know'. Poorer cognitive flexibility may reduce suggestibility if there is a literal adherence to this 'rule'. Conversely, gauging interpersonal trust and appropriate levels of suspiciousness may be compromised by impairments in processing subtle or complex mental states (e.g., Happé, 1994). This may lead to increased compliance (going along with a proposition) and possibly suggestibility (the personal acceptance of a proposition), depending on the degree of uncertainty.

The current study was designed to provide a structured and ecologically valid appraisal of memory in Asperger syndrome. While the studies carried out by Boucher and colleagues were seminal in studying memory for actual events experienced by children with autism, they were characterised by a number of methodological limitations (Boucher, 1981; Boucher & Lewis, 1989). Both studies used small numbers of participants. In addition, the 'events' studied and the questioning procedure were not fully standardised across participants. A common paradigm that has been used to address these concerns within the field of eye-witness research is

the use of a scripted live event. Typically, children witness an event within the classroom and are interviewed the following day using a systematic set of questions; these sometimes include a subset of misleading questions that evaluate a child's degree of suggestibility. The nature of eye-witness recall and suggestibility in typically developing children is now an area of considerable empirical research (e.g., Ceci & Bruck, 1993); this has been extended more recently to children with intellectual disabilities (e.g., Henry & Gudjonsson, 1999, 2003) but the study of specific developmental disorders remains an outstanding task.

The main aim of the current study was to provide an ecologically valid investigation of memory functioning in Asperger syndrome in relation to everyday experience. There were three main predictions:

1. Children with Asperger syndrome were predicted to display impoverished free recall in relation to the number of details recalled as well as in relation to gist.
2. Owing to deficits in social cognition, preferential recall of details regarded as 'socially salient' was predicted to be reduced during free recall in the children with Asperger syndrome.
3. In the light of earlier studies, executive functioning ability was predicted to be positively correlated with recall in children with Asperger syndrome only.

Given the range of possible theoretical positions, the nature of interrogative suggestibility in the children with Asperger syndrome was explored here as an open question.

Method

Sample

Twenty-four children (22 boys and 2 girls) with a diagnosis of Asperger syndrome (AS) were recruited from two specialist schools in England dedicated to children with the disorder. Inspection of the school records indicated that all the children in the AS group had been given a formal diagnosis by an appropriately qualified clinician according to current diagnostic criteria; DSM-IV (APA, 1994) and ICD-10 (WHO, 1993). This group was comparable with respect to age and IQ with a sample of 27 typically developing (TD) children (24 boys and 3 girls) recruited from a mainstream mixed ability secondary school. Participants' intellectual ability was assessed by the authors using the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999) after the experimental part of the study was completed. Characteristics of both groups are summarised in Table 1. Independent *t*-tests confirmed that the groups did not differ significantly with respect to Verbal, Performance or Full Scale IQ ($t(49) = .33$, $p = .74$; $t(49) = -1.16$, $p = .25$; $t(49) = -.55$, $p = .58$, respectively) or in chronological age ($t(49) = 1.49$, $p = .14$).

Eye-witnessed scene

A scene, lasting approximately 5 minutes in total, was specifically developed for this study and performed by two actors, one male and one female. It was designed to be of interest to children and not appear unduly suspicious. Earlier in the day the children were told by their teacher that two artists were visiting the school that morning. The entire scene was scripted. Clothing and props were standard for each enactment.

The event began with two actors coming into the classroom. They introduced themselves as John and Melanie and explained that they were artists carrying out a photography project. Two sub-scenes, matched for approximate length and complexity, then followed:

1. Neutral sub-scene: The actors decided to use the tripod but noticed that it was broken. John tried to help Melanie fix it without success so they decided to do without it.
2. Socially salient sub-scene: The actors decided to use a tape measure but Melanie accidentally hurt John's finger. He became upset and annoyed, while Melanie was apologetic in response. They then decided to do without the tape measure.

The event ended with Melanie taking three photographs of the class. The actors thanked the children. As they were about to leave, John reminded Melanie that she had forgotten her notebook. She fetched it and the actors left.

Interview protocol

The day following the classroom scene, a previously unknown experimenter (EM) interviewed each child at their school in a private room. The experimenter followed a structured protocol closely based on the guidelines in *Guidance for Vulnerable and Intimidated Witnesses, including Children* (Home Office, 2002). The rapport phase consisted primarily of setting ground rules. The interviewer indicated he had not been present when the events in question took place, made it clear that it was okay to say 'I don't know', and encouraged the child to correct the interviewer if he got something wrong. The children were asked general questions first, followed by more directive questions, with potentially misleading questions left until the end.

Free recall. Children were asked: 'I want you to tell me what happened when those people came into your

Table 1 Participant characteristics: mean (s.d.)

Group	*n*	CA (yrs)	VIQ	PIQ	FSIQ
Asperger syndrome	24	13.02 (1.15)	103.04 (17.29)	106.04 (15.82)	104.67 (15.12)
Typically developing	27	12.55 (1.12)	101.67 (12.09)	110.41 (10.81)	106.74 (11.64)

classroom yesterday.' Once the child had finished, the interviewer gave two prompts: 'Is there anything else you can remember?' and 'Can you remember anything else?'

General questioning. Six general questions (drawn from Henry & Gudjonsson, 1999) were asked that were relatively broad in scope, drawing the child's attention to the main aspects of the event: 'What were they wearing?'; 'What things had they with them?'; 'What did they look like?'; 'What did the man do?'; 'What did the woman do?'; 'What did they say?' Each question was followed by one of two prompts ('Anything else?' or 'Is there anything else you can remember?').

Specific questioning. Ten questions were then asked, five related to the neutral sub-scene and five related to the emotional sub-scene. The participants were asked about what the actors said (e.g., 'When the woman had trouble with the tripod, what did she say?'), about what they felt (e.g., 'How was the man feeling?') and about the props used (e.g., 'What did the tape measure look like?'). These questions were asked irrespective of whether the child had recalled the events earlier.

Leading questions. The interviewer proceeded to ask 18 leading questions each of which entailed an incorrect assumption. Nine related to the physical aspects of the scene, e.g., 'What colour was the man's scarf?' (he didn't have a scarf) and nine to social interaction, e.g., 'Why did the woman suggest using the screwdriver?' (she didn't – John had made the suggestion). There were equal numbers of three kinds of leading question: open-ended, forced-choice and a closed yes/no format.

Scoring

Mean number of facts recalled (the detail score) in response to free recall, general and specific questioning were calculated for each participant. Every correct piece of new information was scored one point (e.g., 'The man (1) cut (1) his finger (1) on the tape-measure (1)'). This scoring procedure was based on that used by Rudy and Goodman (1991). Errors were scored separately; group accuracy was then calculated as a percentage of correct information recalled. An independent rater scored 40% of the sample in order to assess the reliability of scoring. Intra-class correlations were: $r = .92$ for free recall; $r = .90$ for general questions; and $r = .88$ for specific questions in the eyewitness task. These represent very high agreement and suggest that scoring was reliable. All data, therefore, include ratings by the first rater only. Gist was scored on a five-point scale. The five most salient aspects of the scene were defined as follows: (1) they talked to the class, (2) they had a broken piece of equipment, (3) they were measuring (something), (4) the man hurt himself, (5) they took photographs. One mark was accorded for each aspect reported, giving a possible total score of 5. Gist scores were calculated only on the free recall component of the interview. There were 18 leading questions. A response indicating that the child acquiesced with the misleading premise of a question was scored as 1 point. Other responses, including 'don't know', were scored as 0. The maximum possible total score was therefore 18 points, with a higher score reflecting a higher degree of suggestibility.

Neuropsychological assessment

Within 2 months of the interview two tasks were administered in order to assess executive functioning. The Hayling Sentence Completion Test assesses response initiation and suppression (Burgess & Shallice, 1997). In this test the participant is asked to complete one set of sentences with an appropriate word as quickly as possible (Section A) and for a second set of sentences (Section B) provide an unconnected word (e.g., 'The captain wanted to stay with the sinking … *lightbulb*'). A verbal fluency task required the respondent to generate as many words as possible beginning with the letters 'F', 'A' and 'S' in one minute (Borkowski, Benton, & Spreen, 1967).

Results

Table 2 shows the mean scores for recall, number of errors and accuracy for each component of the eyewitness interview. Given that the scores for free recall and for guided and leading questions were not independent, the use of a combined ANOVA was precluded. Therefore, paired *t*-tests were performed to test for group differences in each section of recall. Outliers (greater than 2 standard deviations from the mean) were removed from the analysis: two outliers, one from each group, were identified for the free recall component, and one outlier from the AS group was identified in relation to specific questioning. For consistency, all comparisons following from our original predictions are reported as one-tailed. Other comparisons, when they are made, are indicated as two-tailed in the text.

Free recall. The TD group recalled significantly more information than the AS group [$t(23) = -2.90$; $p < .01$]. Accuracy was high in both groups and is detailed in Table 2.

Units of information recalled relating specifically to the neutral and socially salient sub-scenes were compared across groups. Group means are shown in Table 2. The data were entered into a 2 (Group) × 2 (Scene) ANOVA with Group as the between-subjects factor and repeated measures for Scene (Neutral vs. Socially Salient). The analysis indicated a main effect of Scene [$F(1, 49) = 26.17$; $p < .0001$]. Inspection of the means indicated that both groups recalled more details from the socially salient sub-scene. A significant Group × Scene interaction [$F(1, 49 = 3.30$; $p < .05$] reflected less recall of the socially salient relative to the neutral sub-scene by the AS group. This interaction remained significant even when chronological age and verbal IQ were entered as covariates.

As the gist scores did not meet criteria for parametric analysis, a Mann–Whitney comparison was

Table 2 Performance on eye-witness memory task by group: mean (s.d.)

	AS group		TD group			Effect size: *d*
Free recall						
Information units recalled	15.61	(10.86)	23.65	(8.84)	**	.80
Errors	.33	(.76)	.68	(.99)		
% Accuracy	97.88		97.12			
Gist (max = 5)	2.58	(1.38)	3.44	(.97)	*	.71
Socially salient scene[a]	4.38	(5.20)	6.30	(5.20)		
Neutral scene[a]	2.13	(4.13)	1.48	(2.42)		
Guided questioning						
General questioning[a]	17.54	(8.66)	20.16	(9.86)		.28
Errors	1.70	(1.33)	1.36	(1.22)		
% Accuracy	90.31		93.25			
Specific questioning[a]	15.52	(7.52)	17.48	(9.30)		.23
Errors	.64	(.73)	.37	(.49)		
% Accuracy	95.88		97.88			
Socially salient scene[a]	13.04	(7.92)	14.78	(7.85)		
Neutral scene[a]	7.96	(4.73)	7.44	(5.62)		
Leading questions (/18)	8.96	(4.09)	8.67	(2.87)		.08

Note: [a]Mean number of information units recalled; *$p < .05$; **$p < .01$.

used to compare the groups. This analysis indicated poorer gist recall of the event in the AS group (U = 205, $p < .05$).

Guided questioning. The TD and AS groups did not differ on units of new information recalled in response to either general questioning or specific questioning.

A second analysis was carried out in relation to the additional information recalled about the two sub-scenes during guided recall: i.e., the total number of units of information recalled relating to the sub-scenes elicited by both general and specific questioning that were not reported during free recall. Again there was a main effect of Scene [$F(1,49) = 43.93$; $p < .0001$, two tailed] but no group effect [$F(1,49) = .14$; $p = .71$, two tailed] nor interaction was observed [$F(1,49) = 1.40$; $p = .24$, two tailed]. Both groups preferentially recalled details from the socially salient sub-scene on questioning.

Leading questioning. Performance data on the leading questions are presented in Table 2. Analysis indicated an absence of group differences. This suggests that the AS and TD groups presented with comparable levels of suggestibility in relation to the eye-witnessed task.

Executive function tasks. Performance of both groups on the two tasks of executive functioning is shown in Table 3. Two children with AS did not complete the Hayling Sentence Completion Test and one did not complete the Fluency task. No group differences were found with respect to time taken to completion for either Section A or Section B, although the latter approached significance ($p = .08$). The AS group made significantly more errors than the TD group in Section B (Mann–Whitney: U = 174, $p = .01$, two tailed). This suggests normal response initiation but deficits in response suppression in the AS group. There were no group differences on the Fluency task.

Partial correlations between total recall (total units of information recalled) and Hayling B total time ($r = .55$, $p = .01$) and Letter Fluency ($r = .48$, $p < .05$) were significant in the AS group with IQ entered as the covariate. The equivalent partial correlations in the TD group did not reach significance (Hayling B: $r = -.26$, $p = .21$; Letter Fluency: $r = -.11$, $p = .60$). No significant correlations were found between executive function measures and suggestibility in either group.

Discussion

This study investigated the ability of a group of children with Asperger syndrome to recall a classroom event about which they were not expecting to be questioned. As such, it resembles the situation in which eye-witness testimony is elicited within an interview format. According to our first hypothesis, it was predicted that the level of free recall by children with Asperger syndrome would be less than that of their peers; on the basis of previous findings it was expected that questioning would serve to facilitate recall. We found that the Asperger group recalled approximately a third less information during free recall and were less likely to mention the most salient or gist elements of the event. However, general and specific questioning elicited the same number of units of new information in both groups. Thus free recall appears to underestimate memory for an event in an individual with Asperger syndrome, while questioning can elicit near normal levels of recall. In addition, we found no differences in the tendency of either group to concede to a set of misleading ques-

Table 3 Performance on the tasks of executive functioning; mean (s.d.)

	AS group		TD group			Effect size: *d*
Hayling task						
Section A: total time (secs)	23.28	(14.74)	22.04	(10.68)		.10
Section B: total time (secs)	44.92	(17.96)	37.90	(28.11)		.30
Section B: total errors	4.00	(3.54)	1.67	(1.62)	**	.83
Verbal Fluency (FAS: items)	31.5	(10.02)	31.33	(6.26)		.02

**$p < .01$.

tions asked about the event. That is, the children with Asperger syndrome were found to be no more suggestible than their peers.

According to our second hypothesis, information recalled during free recall was expected to differ qualitatively in the Asperger group. A separate analysis compared recall for the two sub-scenes within the eye-witnessed event – one regarded as socially salient because it involved a disagreement and emotional responses from the actors, and one which was designed to be comparatively neutral. The children with Asperger syndrome focused less on the socially salient sub-scene than their peers during free recall. Importantly, however, questioning elicited a similar pattern of recall in both groups, biased towards information pertaining to the socially salient sub-scene.

Together these findings have a number of practical and theoretical implications. From a practical standpoint we suggest that the evidence presented here suggests that young people with Asperger syndrome can act as reliable witnesses: although their free recall was less detailed it was just as (highly) accurate as that of their peers; general questioning elicited normal levels of accurate new information; and there were no differences in level of suggestibility. One implication, however, in relation to the formal interviewing of children with ASD may be a recognition that general questioning needs to play a more central role in facilitating recall. Nonetheless, forensic interviewing of children rightly emphasises the importance of free recall, which we found to elicit the most accurate information (i.e., least errors) in both groups. A second implication relates to our observation of normal levels of suggestibility in the children with Asperger syndrome. It is important that this finding is not generalised to include *compliance*. Suggestibility, which has been investigated here, implies personal acceptance of the information provided, whereas compliance refers to the tendency of an individual to go along with propositions, requests or instructions while not necessarily accepting that they are true or right (Gudjonsson, 2003, p. 370). The possibility that children with ASD may be more *compliant* than their peers still requires formal investigation. We would predict that deficits in theory of mind and an increased propensity towards anxiety in ASD may predispose to increased compliance.

From a theoretical standpoint our findings help shed light on the nature of the underlying memory deficit in autism. Central coherence theory proposes a processing bias for featural versus configural information (Frith, 1989; Happé & Frith, 2006). In this context a weak processing bias for featural versus configural information may lead to a poorly specified memory representation of gist in ASD. We would speculate that this failure to exploit fully the semantic, relational and contextual properties of items to be remembered in turn impairs the recall of details during free recall. When an external structure is provided, however, in the form of prompts or guided questions, this recall appears to be ameliorated. By contrast, Minshew and Goldstein (2001) have described the memory deficits in ASD in terms of a failure 'to use organising strategies or meaning to support memory', while Bowler and colleagues suggest in their task support hypothesis a failure of retrieval rather than encoding (Bowler et al., 2004). It remains an important task, therefore, to clarify whether there is a representational deficit with respect to gist (but not verbatim) storage, and whether this, rather than differences in retrieval alone, accounts for the observed performance deficits during free recall. In addition, the degree to which other aspects of social impairment in ASD influence memory, for example in relation to social attribution and emotional processing, represent important questions for future research.

Our final hypothesis related to the relationship between executive functioning and memory recall in Asperger syndrome. The positive correlation between recall and executive functioning ability in the AS group reported here replicates the findings of previous studies (e.g., Bennetto et al., 1996). One possibility is that weak central coherence leads to a greater reliance on more generic cognitive resources during memory recall in autism. That is, in the absence of typical gist-based organisational strategies to guide recall, greater reliance is placed on generic processing ability, either in relation to executive functioning specifically or in relation to a common factor that underlies both executive functioning and memory.

Further investigation of memory in Asperger syndrome is required to establish whether differences exist in relation to rates of forgetting, as the current study was limited to a period of only one day between encoding and test. According to Fuzzy-trace theory, verbatim traces become inaccessible more rapidly than gist traces in typically developing children. More rapid rates of forgetting in ASD for free recall

might therefore be predicted based on the hypothesised increased reliance on verbatim memory in the absence of a fully specified gist trace.

In conclusion, this study has found that free recall for a witnessed event in children with Asperger syndrome is diminished compared to that of age and ability matched peers, while overall accuracy and recall in response to guided questioning was intact. We found no evidence that children with Asperger syndrome were more suggestible when asked misleading questions or poorer in their recall of additional information when prompts were given. These findings suggest that the information provided by a child with Asperger syndrome during free recall or questioning can be considered as reliable as that obtained from a typically developing child. However, our finding of impoverished levels of free recall in terms of gist and number of details recalled, and the reduced tendency by the young people with Asperger syndrome to focus on the socially salient aspects of a scene, point to clear differences in memory processes in this group. Practically, there may need to be an acknowledgement that general questioning may play a greater role in facilitating recall in this population within a formal interview context. However, any use of directive questioning needs to be balanced against a likely increase in error rate, relative to free recall. Theoretically, our findings point to qualitative differences in memory processes in intentional recall in ASD. We speculate that poor central coherence contributes to poorer gist but not verbatim memory. This appears to lead to both quantitative and qualitative impairments in free recall, but largely spares recall in response to direct questioning. Finally, the observed correlations between memory and executive functioning in the Asperger syndrome group may reflect an increased reliance on generic cognitive abilities during recall.

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