Michelle Louise Ann-Marie Mattison

BSc (Hons), MSc

Drawing to Support Vulnerable Witnesses' and Victims' Episodic Memory: Increasing Access to Justice

Department of Psychology

Faculty of Science and Technology

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Supervisors: Professor Coral J. Dando and Professor Thomas C. Ormerod

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Declaration

I hereby declare that this thesis is my own work, and has not been submitted in substantially the same form for the award of a higher degree at this institution or elsewhere.

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Dissemination of Findings

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Contents

Chapter One: Introduction

Chapter Two: Police Officers' and Intermediaries' Perceptions and Use of Drawing and the Cognitive Interview with Vulnerable Witnesses

Chapter Three: The Efficacy of Sketch-Reinstatement of Context with Typically Developing Children and Adolescents

Chapter Four: The Efficacy of Sketch-Reinstatement of Context with Children and Adolescents with Autism

Chapter Five: Examination of Episodic Recall Performance of Children with Autism Compared and Typically Developing Children: A Comparison

Chapter Six: Discussion

Appendices

List of Tables

Chapter Four

Chapter Five

List of Figures

Appendix G: Additional Results from Study Two (Chapter Three)

For My Dad

James Dudley Mattison

If only you could see me now…

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Abstract

Information provided by witnesses is fundamental to the investigation of criminal offences, and vulnerable people make up a large proportion of witnesses who enter the criminal justice system. Research concerning particularly vulnerable witnesses (i.e., children with autism) is still in its infancy. Further, research concerning typically developing children and adolescents, while vast, does not fully address the developmental and cognitive needs that this population present.

Current best practice for eliciting information from vulnerable witnesses in England and Wales advocates the use of the Cognitive Interview (CI), which includes the Mental Reinstatement of Context (MRC) mnemonic. However, the benefits of MRC are unclear, both with typically developing children and children with autism. This thesis presents a series of studies that investigate how children might be better supported to recreate the context of an event using a developmentally appropriate drawing technique (Sketch-Reinstatement of Context; Sketch-RC). First, this thesis explores the interviewing practices of professionals who conduct or assist interviews with vulnerable witnesses, with a particular focus on the use of drawing. Following this, a series of studies examine the efficacy of Sketch-RC and MRC with both typically developing children and children with autism spectrum disorder.

Findings demonstrate that practitioners make regular use of drawing during investigative interviews. Importantly, Sketch-RC was found to be most effective for all children, improving remembering without a concomitant increase in incorrect or confabulated recall. Further, Sketch-RC enabled children with autism to perform on par with their typically developing peers. These findings provide evidence for an empirically and theoretically supported retrieval tool that can be used by practitioners when interviewing vulnerable witnesses.

Chapter One

Introduction

1.1. Aims and Structure of Thesis

The aims of this thesis are fourfold: (i) to gain an insight into the interviewing practices of police officers and intermediaries when interviewing typically developing children and children with an Autism Spectrum Disorder diagnosis, with an emphasis on the use of drawings/sketches, ii) to investigate the episodic memory performance of two groups of vulnerable witnesses/victims, namely typically developing children and children with an Autism Spectrum Disorder diagnosis, in goal-directed eyewitness interview settings, (iii) to examine the efficacy of the Mental Reinstatement of Context component of the Cognitive Interview for both participant groups, and iv) to evaluate the Sketch Reinstatement of Context as an external episodic retrieval support technique for typically developing children and children with autism.

The goal of this first chapter is to provide an overview of the topic areas relevant to the aims of this thesis. To begin, the importance of eyewitnesses to the criminal justice system will be introduced, with particular reference to typically developing children and children with autism. The principles of eyewitness memory will then be discussed. In particular, the development of event-related memory in typically developing children will be outlined and contrasted with the known differences in the memorial abilities of children with autism. This chapter will then explore the practices currently used in England and Wales when collecting eyewitness accounts from the vulnerable witness groups relevant to this thesis. Overall, this introductory chapter aims to present the reader with the relevant theory and empirical research relative to the interviewing of children, both with and without autism. The proceeding chapters go on to explore and empirically test the aforementioned interviewing approaches in more depth.

Chapter 2 investigates police officers' and registered intermediaries' perceptions of their interviewing behaviours when interviewing vulnerable witnesses/victims in England and Wales. The proceeding chapters (3 and 4) empirically examine the efficacy of one of the Cognitive Interview components, the Mental Reinstatement of Context technique, and compares it to the Sketch-Reinstatement of Context technique with typically developing children and children with autism using a mock witness paradigm. Chapter 5 compares the memorial performance of typically developing children and children with autism, exploring whether performance across conditions is comparable. The final chapter (Chapter 6) discusses the implications that these findings have for investigative interviewing practice in England and Wales.

1.2. Importance of Witnesses and Victims to the Criminal Justice System

Fundamental to the investigation of crime is the information provided by witnesses and victims[1] (e.g., Kebbell, & Milne, 1998; Association of Chief Police Officers (ACPO, 2009; Milne & Bull, 1999). Witness information directs most criminal investigations from the very beginning, and investigators aim to address two primary questions: (i) 'what happened?' and (ii) 'who did it?' (Milne & Bull, 2006). For example, in the initial stages of an investigation, witnesses typically provide a description events and of the culprit, and also, indicate other potential sources of

[1] From hereon in, referred to as 'witnesses', but incorporating both onlookers and victims of criminal offences.

information (e.g., the presence of other witnesses). As an investigation progresses, witnesses can be asked to identify perpetrators, objects or places. In the final stages of bringing an offender to justice, witness evidence is central to most criminal court cases (Zander & Henderson, 1993); it highly regarded by jurors (Lieberman, Carrell, Miethe & Krauss, 2008); and typically viewed as more important to the prosecution than an offender's admission of guilt (Wolchover & Heaton-Armstrong, 1996).

While there is widespread agreement on the importance of witness information *per se*, there is a consensus that the quality of the information that witnesses provide is also crucial. The better the quality, the more likely that crimes will be solved (Berresheim & Weber, 2003; Fisher & Geiselman, 2010; Kebbell & Milne, 1998; Larsson & Granhag, 2005), and perpetrators brought to trial and convicted (Huff, Rattner & Sagarin, 1996). For the purposes of this thesis, the quality of eyewitness evidence refers to the accuracy and completeness of witness accounts. That is, how much information is remembered about an experienced event, and of the remembered information, how much is actually correct. Unfortunately, a plethora of research has found eyewitness memory for an experienced event is, at best, incomplete, and at worst, inaccurate and unreliable. Thus, the process of collecting accurate and reliable witness accounts is punctuated with obstacles (Milne & Bull, 2006). The difficulty of obtaining the most complete and accurate eyewitness accounts is further exacerbated when the witness in question is regarded as vulnerable.

1.2.1. Vulnerable Witnesses

In England and Wales, irrespective of crime experience, all witnesses *under* the age of 17 years were automatically deemed vulnerable by the Youth Justice and Criminal Evidence Act (1999: YJCA). The Coroner's and Justice Act 2009 increased the age of vulnerability to 18 years old, thereby considering witnesses aged 17 and under as vulnerable. Further, witnesses whose evidence is likely to be diminished by: (i) a mental health disorder; (ii) an impairment of intelligence and social functioning; or (iii) a physical disability, are also considered to be vulnerable (YJCEA). As such, by virtue of age, all children are considered to be vulnerable and require developmentally appropriate treatment by the criminal justice system. However, the vulnerability of a child is exacerbated when he or she also has an impairment of intelligence or social functioning, such is the case with children who have Autism Spectrum Disorder (ASD).

Autism is a neurodevelopmental disorder that affects approximately 1% of the general population, but it is estimated that as many as 1 in 88 children are diagnosed with this condition (Baio, 2012). By definition, autism is measured on a spectrum and is characterised by deficits in social functioning and communication, as well as repetitive patterns of behavior (American Psychiatric Association, 2013). Asperger's syndrome (a condition that features on the autism spectrum) is also defined by the aforementioned deficits, but a distinction is made between ASD and Asperger's syndrome, in terms of language development. Namely, ASD is defined by language delay, whereas Asperger's syndrome is not. While this thesis focuses upon ASD, many of the factors to be outlined and discussed are relevant to populations with Asperger's syndrome, and indeed, much of the empirical research to-date considers the two conditions interchangeably.

Additional factors that punctuate autism spectrum conditions (ASD and Asperger's syndrome) such as social naivety, render this population as more vulnerable to crime than typically developed people (e.g., Browning & Caulfield, 2011). Research suggests that vulnerable people account for as much as 24% of prosecution witnesses (Burton, Evans & Sanders, 2007), are four times more likely to be victims of crime (Jones, et al., 2012), and are frequently the only witnesses to acts of abuse (Marchant, 2013). Such variables render the evidence provided by vulnerable witnesses as paramount to the investigation and prosecution of crimes against this population.

Many perpetrators of crime particularly choose to conduct criminal acts upon vulnerable people, believing that the victim will be ill-equipped to provide an account that is reliable and accurate enough in order to result in prosecution. Sadly, practitioners in the criminal justice system have also evidenced negative beliefs about the credibility and reliability of vulnerable witnesses (Valenti-Hein & Schwartz, 1993). Historically, vulnerable witnesses were deemed unable to provide accurate and reliable testimony. Thus, only a small proportion of cases involving vulnerable witnesses progressed through the criminal justice system (Valenti-Hein & Schwartz, 1993). In more recent years, vulnerable witnesses have become over-represented, but psychological research concerning particularly vulnerable children (i.e., children with autism) is still in its infancy (Agnew, Powell & Snow, 2006). As such, appropriate measures to elicit best evidence from this population do not currently exist.

Vulnerable eyewitnesses face numerous barriers in their quest for equal access to justice. Some of these barriers relate to cognitive and psychological factors associated with the witness' age or developmental condition. Other barriers relate to inappropriate police interviewing processes (Marchant & Page, 1992; Marchant, 2013; Murphy & Clare, 2006). Together, these barriers contribute to the 'obstacle course' of collecting complete and accurate information from vulnerable witnesses (Bull, 2010; Milne & Bull, 1999; Milne & Bull, 2006). By further understanding the mechanisms of vulnerable witness' eyewitness memory, it is possible to develop informed, effective and developmentally appropriate interviewing strategies that address the needs of vulnerable witnesses, and serve to reduce the barriers that this population currently face.

1.3. Eyewitness Memory

It is widely understood that children's eyewitness accounts are heavily influenced by a host of internal and external factors (Pipe, Lamb, Orbach & Esplin, 2004). Like adults, children are affected by both system and estimator variables, which collectively impact upon their ability to provide accurate eyewitness testimony. Outlined by Wells (1978), system variables relate to factors that can be controlled and manipulated by the criminal justice system, such as the process of investigative interviewing (an area that will be visited later in this chapter). In contrast, estimator variables relate to the characteristics of the individual witness, such as their memory for the event, their cognitive ability and developmental level. Unlike system variables, estimator variables cannot be controlled, and their effect on the process of gathering evidence can only be approximated (Wells, 1978). Consequently, in order for system variables to be appropriately controlled, it is vital for investigators to understand the potential effects that estimator variables have. One of the most examined variables is eyewitness memory, particularly in relation to witness' age (Jack, Leov & Zajac, 2014). Recent research has also been placed upon developmental disorders, such as learning disability and autism. This chapter will now examine the estimator variable central to this thesis: eyewitness memory, before considering the impact of age and the developmental disorder, autism.

Eyewitness memory encompasses a series of major cognitive processes, comprising of multiple systems, all of which interact with one another (Cohen, Kiss &

Le Voi, 1996; Tulving, 2002; Wells & Loftus, 2003). In order for information about an event to be stored and later retrieved from long-term memory, it must first be encoded in the short-term memory system. Information that is not encoded and stored is lost and no longer retrievable. Although the simplistic tripartite division of the stages (encoding, storage and retrieval) and types of memory (short and long-term) is useful in terms of aiding understanding, it belies the complexities of the multiple systems involved, which are all fragile, and known to fail at any stage (Brainerd, Reyna, Howe & Kingma, 1990). Further, this simplistic division of memory stages and types does not account for the multiple memory systems that have been identified.

In brief, theorists suggest that there are two major types of memory systems. The most basic type, *non-declarative memory*, encompasses implicit knowledge such as perceptual representations and memory for actions and physical behaviours. Non-declarative memory is considered to be present at birth, and does not require rehearsal or conscious recollection (Cohen & Squire, 1980). In contrast, *declarative memory* encompasses explicit information that is consciously recalled (Squire, 2004). Within the division of declarative, or explicit memory, are the semantic and episodic memory systems. The semantic memory system, developed during the early years of life, refers to the conscious recollection of knowledge and facts (Baddeley, 2001; Buckner, Logan, Donaldson, & Wheeler, 2000). In contrast, episodic memory denotes the ability of humans to recall personally experienced events (Tulving, 1972),

The recollection of what happened at particular times and in particular locations is the central function of episodic memory (Wheeler, Struss & Tulving, 1997), but for episodic memories to be formed, information must be bound together in a coherent, relational structure. In this sense, information needs to be linked in relation to the context by which it was encoded – namely, the ‘who, what, where and when' of an event (Schacter & Tulving, 1994). For example, recalling a 21st birthday meal with friends whilst in Paris, relies upon the episodic memory system, as opposed to remembering that Paris is the capital of France, which relies upon the semantic memory system. In contrast to other memory processes, such as procedural or semantic memory, which are said to develop within the first few years of life, episodic memory is considered to develop at a later time in a child's life (Raj & Bell, 2011).

Semantic and episodic memory systems are separate, yet interconnected systems. As suggested by Tulving (1995), encoding is serial, storage is parallel and retrieval is independent. Features of an event may be encoded and stored in semantic memory, but not necessarily encoded and stored in episodic memory. For example, one may recall what the capital of France is (semantic memory), but fail to recall when or where this information was learned (episodic memory). Remembering when and where information was learned, and when and where events were experienced, is a central feature of episodic memory. However, there are many instances where experiences of crime become a part of both episodic and semantic memory systems. Persons who are subject to abuse over a number of years and on frequent occasions may have difficulty recalling isolated incidents (episodic events), but may be able to recall semantic information that relates to the nature of these incidents, such as the typical behaviour of the suspect. For the purpose of the criminal justice process, victims and witnesses are required to recall details relating to at least one incident, thereby relying upon episodic memory (Powell, Roberts & Thomson, 2000). Thus, retrieval of information from this memory store is of great concern to the legal system and eyewitness memory research (Goodman & Melinder, 2007). In order to create an effective technique that enhances children's retrieval of long-term memories, in particular, recall of past events and experiences, one must understand the development and underpinnings of the episodic memory system. This chapter will now turn to a discussion of the research concerning episodic memory in typically developing children and children with autism.

1.4. Typically Developing Children's Episodic Memory

Age-related differences are known to exist in children's ability to recall episodic information (Bjorklund, 2005). Basic episodic skills emerge in typically developing children at around the age of 3 years old (Bauer, 2007; Hayne 2007; Nelson & Fivush, 2004), enabling them to produce limited but coherent reports of experienced events (Bauer, 2009). Further, typically developing children aged 5 years old can report events experienced up to one and two years prior to recall (Goodman, Hirschman, Heps & Rudy 1991; Pipe, Sutherland, Webster, Jones & La Rooy, 2004). Episodic recall skills accelerate up to the age of 6 years old, and continue to improve during middle childhood and thereafter into adulthood (Brainerd, Holliday & Reyna, 2004). A number of factors contribute to the development of episodic memory, for instance, neurological maturity (Ghetti & Bunge, 2012), which extends into early adulthood (Paus, 2005; Sowell, Thompson, Holmes, Jernigan & Toga, 1999). However, the most prominent age-related factor is considered to be metacognitive operations, namely, autonoetic consciousness (Gardiner, 2001), and its impact upon children's ability to encode and retrieve information (Demarie & Ferron, 2003; Ghetti, Castelli, Lyons, 2010; Roebers, Schmid & Roderer, 2009). The following sections will consider the features of autonoetic consciousness in turn.

1.4.1. Autonoetic Consciousness

In contrast to noetic consciousness (an awareness of familiarity, or 'knowing'), autonoetic consciousness refers to the capability of mental time travel with mindful reference to representations of events that were personally experienced (Suddendorf & Corballis, 2007; Wheeler et al., 1997). As such, in order to engage in autonoetic consciousness, children must be able to encode information as subjective and personally experienced events (Perner, 1995; 2000). They must understand that their memory of an event represents an episode that they previously experienced *themselves*. The role of autonoetic consciousness in relation to episodic recall ability is highlighted throughout the literature concerning memory development (Markowitsch & Staniloiu, 2011; Tulving, 1985). Theorists suggest that it is not until the age of 4 years old that typically developing children have the ability to experience autonoetic consciousness (Nelson, 1993; Perner & Ruffman, 1995; Tulving, 2002). However, this ability is often delayed or impaired in some children (Boucher & Lewis, 1989; Millward, Powell, Messer & Jordan, 2000; Toichi, 2008), so it is important to understand the cognitive abilities that form its basis.

Autonoetic consciousness is dependent upon three distinct, yet interconnected factors: (i) self-awareness and theory of mind; (ii) metacognitive representational ability; and (iii) source monitoring ability. Before the age of 4 years old, children demonstrate immature self-awareness and theory of mind (Perner, 2000; Perner, Kloo & Gornik, 2007). Typically developing children begin to acquire these skills via social interaction during their early years, and continue to develop in this area thereafter (Brainerd et al., 2004). Evidence for a correlation between theory of mind and episodic memory has been consistently demonstrated by children's performance on self-awareness tasks and episodic memory tasks (Lemmon & Moore, 2001; Naito, 2003; Perner et al., 2007; Welch-Ross, 2001). Perner (2000) argues that if children do not have adequate theory of mind, they are less likely to encode information relative to the source origin, and thus be unable to recall events accurately. However, the exact extent that self-awareness and theory of mind contribute to the development of episodic memory, as a whole, is not yet fully established (Lind & Bowler, 2008).

Second, for children to experience autonoetic consciousness, they must have explicit understanding that their memory of an event is indeed a memory – a representation of a past experience (Nelson & Fivush, 2004; Welch-Ross, 2001). Representational abilities fully develop at around the age of 4 years old in typically developing children (Perner, 1991; Suddendoff & Whiten, 2001; Wimmer, Hogrefe & Perner, 1988). Without the ability to form metarepresentations and to engage in mental time travel, episodic memory is limited (Lind & Bowler, 2008), and information is more likely to be stored in the semantic memory system (Perner, 1991). For instance, information may be *known*, but not necessarily *remembered*. Moreover, difficulties in forming metarepresentations can directly impact a child's ability to fully and accurately recall episodic events.

Third, central to autonoetic consciousness and the system of episodic memory retrieval, is the ability to connect items of information together in relation to an experienced event (Dobbins, Foley, Schacter & Wagner, 2002; Tulving, 2002). This mechanism is commonly referred to as source memory (Johnson, Hashtroudi & Lindsay, 1993). Source memory concerns information relating to: (i) contextual details (spatial and temporal/where and when); (ii) perceptual elements (such as colour, smell and sound); and (iii) affective information (such as emotion and thoughts) experienced during specific events (Cohen & Eichenbaum, 1993; Mather et al., 2006).

The framework of source memory defines three different forms of source 'monitoring': external (distinguishing between the origin of information between different places or people); internal (distinguishing between separate memories of one event); and internal-external (distinguishing between real and imagined events) (Johnson et al., 1993). In order to accurately encode and retrieve an episodic memory, one must be able to appropriately monitor the source from which information was acquired, and bind such elements into a coherent metarepresentation (Chalfonte & Johnson, 1996). Binding contextual information enables humans to not only construct and store memory traces for events, but crucially, to differentiate between events and episodes upon retrieval (Johnson, 2006). An ability to accurately monitor and distinguish between sources of information is vital when recalling events for the purposes of a criminal investigation (Quas, Schaaf, Alexander & Goodman, 2000).

Children aged 4 years old and over are typically able to demonstrate external source monitoring by recalling *where* and *when* information was learned (Perner & Ruffman, 1995). Source monitoring abilities gradually improve from this age, and accelerate from the age of 6 years old, with older children's source monitoring ability becoming comparable to that of adults (Drummey & Newcombe, 2002; Foley, Aman & Gutch, 1987; Ghetti, DeMaster, Yonelinas & Bunge, 2010). Theories concerning age-related differences in source monitoring abilities of typically developing children commonly refer to the information binding process. For instance, Sluzenski, Newcombe & Kovacs (2006) found that children aged 4 years old demonstrated greater difficulty recalling bound items than their peers aged 6 years old. However, recall of individual items (information that is not bound to a source) was comparable between age groups. Conversely, differences in source monitoring abilities are apparent in populations with developmental disorders, regardless of age (an area which will be examined later in this chapter). For the purposes of the criminal justice system, retrieval of episodic memories (which may be intertwined with semantic memories) is of fundamental importance.

1.5. Retrieving Episodic Memories From Typically Developing Children and Adolescents

The exact cause for reduced episodic recall performance in younger children is still uncertain (Sluzenski et al., 2006). Earlier research has suggested that deficits in memory binding abilities (as detailed above) and encoding are inferior in younger children. For instance, young children may not encode the link between items and source information (Howe & O'Sullivan, 1997; Sluzenski et al., 2006). Alternatively, the cause for reduced recall may be due to a failure to retrieve the link, rather than a failure to encode it.

The employment of less exhaustive retrieval strategies is suggested to be the cause for such retrieval failure (Barlow, Jolley & Hallam, 2011; Brainerd, Reyna, Howe & Kingma, 1990; Buckatko & Daehler, 1998; Lloyd, Doydum & Newcombe, 2009; Salmon, 2001). In particular, older children (i.e., adolescents) and adults are said to employ more strategic search processes than younger children, particularly when testing imposes greater retrieval demands, such as remembering source-bound information in free recall settings (Arnold & Lindsay, 2002; Gee & Pipe, 1995; Paz-Alonso, Ghetti, Matlen, Anderson, & Bunge, 2009).

In support of this notion, a child's ability to respond to open-ended questions (i.e., free recall) is well known to improve as they age, and fewer specific prompts (i.e., cued recall) are required to retrieve episodic information (Hammon & Fivush, 1991), thus suggesting that information is stored, yet access is limited when no retrieval support is provided. Interestingly, there is a dearth in research that has focused upon adolescents' recall abilities, despite neurological maturity extending to early adulthood (Blakemore & Choudhury, 2006; Paus, 2005; Sowell et al., 1999), and adolescents being in a stage of significant hormonal and social development (Feldman & Elliot, 1990; Rutter & Rutter, 1993). Nonetheless, the limited research conducted to-date, suggests that adolescents' episodic free recall performance, while more improved than younger children, is not comparable to that of adults (e.g., Jack et al., 2014). Despite the known age-related differences in free recall ability, theorists suggest that the key to improving episodic memory (regardless of age), may therefore lie in the provision of appropriate retrieval strategies that effectively support recall, and encourage a more effortful, goal-directed memory search.

1.5.1. Context Reinstatement and Encoding Specificity

One well-established approach to support recall of episodic memories for children, adolescents and adults, is to explore the context in which memories were originally encoded. For instance, the emotion experienced at the time or as a result of the event (e.g., fear or anger); the spatial and temporal attributes of the event (e.g., the place, time and sequencing of actions); and also, the significance that the event has within one's life. The importance of the context in which a memory was created is highlighted in the principle of *encoding specificity* (Thomson & Tulving, 1970; Tulving & Thomson, 1973; Tulving, 1983). This principle states that retrieval of memories is enhanced when the original context in which the event was encoded is reinstated during recall. In particular, it is argued that the contextual features of a to-be-remembered event can act as cues for effective memory retrieval (Krafka & Penrod, 1985). The work by Tulving (1974) maintains that limited episodic recall is not always a result of merely forgetting information, but rather, a consequence of inaccessibility to the particular memory store. Therefore, reinstating the context of which a memory was originally stored, holds the key to this access.

Context reinstatement, or rather, cued-remembering is highly dependent upon a number of factors, the majority of which centre upon the ability to experience autonoetic consciousness (as described in section 1.4.1). Firstly, contextual details of the to-be-remembered event must be encoded. For example, the time of day in which the event occurred must be stored in (source) memory if this item of information is to act as a cue for retrieval. Secondly, information must be appropriately extracted from the retrieval cue by the rememberer. For instance, the rememberer must be able to understand, process and apply all verbal instructions (if retrieval cues are delivered verbally).

Finally, retrieval cues must correspond with the original memory trace (or metarepresentation) of the event and the contextual details of the event itself. The more that cues are compatible with metarepresentations and the event details, the greater the probability of effective context reinstatement and memory retrieval (Tulving & Thomson, 1973). Conversely, incompatible retrieval cues are known to impair episodic retrieval performance (Schacter, Norman, & Koutstaal, 1998). Similarly, impairment in the ability to fully experience autonoetic consciousness in some populations, namely, individuals with autism, would render context reinstatement as a problematic episodic retrieval technique. The following sections examine the memory profile of people with autism, and their ability to recall episodic memories.

1.6. Episodic Memory in People with Autism Spectrum Disorder

Differences in the memory profile of typically developed children and those with autism indicate a number of impairments arising with autism (Boucher, Mayes & Bingham, 2012; Frith & Hill, 2003). A three-tier model identifies basic, integrative and higher-level processing levels of cognitive functioning (Ben Shalom, 2009). Persons with autism have unimpaired (and sometimes enhanced) basic perceptual, procedural, and information processing (Bowler, Gaigg & Lind, 2011; Mottron, Dawson, Souliéres, Hubert & Burack, 2006), but impaired higher-level processing ability. Higher-level processing includes both semantic and episodic memory systems. Semantic memory is largely unimpaired and often enhanced (Jordan, 2008). In particular, recognition memory is consistently revealed to be unimpaired (Bowler & Gaigg, 2008; Bowler, Gaigg & Gardiner, 2008; Minshew and Goldstein, 1998). However, higher-level processing abilities such as episodic and autobiographical memory are diminished in people with autism (Bowler, Gardiner & Gaigg, 2007; Crane & Goddard, 2008; Crane, Goddard & Pring, 2009; Goddard, Howling, Dritschel & Patel, 2007; Russell & Jarrold, 1999; Tager-Flusberg, 1991).

Impairments in episodic memory within this population centre not on the accuracy of information produced, but on the amount of information produced. In particular, early studies report that people with autism produce less information, and of what information they do produce, they take longer to retrieve it when compared to typically developing people (Boucher, 1981; Boucher & Lewis, 1989; Boucher & Warrington, 1976). More recently, Bruck, London, Landa & Goodman (2007) also found that children with autism aged 5 to 10 years old, recalled significantly less information than their typically developing peers. Here, reduced recall performance was found for past autobiographical experiences, and also for a controlled episodic event that children took part in. Similarly, McCrory, Henry & Happé (2007), found that children with Asperger's syndrome (a condition on the autism spectrum) produced less information than their typically developing peers when interviewed under free recall conditions. Despite differences in the amount of information produced, no differences in accuracy or suggestibility have been revealed in autistic populations (Bruck et al., 2007; McCrory et al., 2007).

The cause for episodic memory impairments in people with autism are said to stem from an inability to fully engage in autonoetic consciousness. Children with autism are consistently able to recall event-related knowledge, but they fail to demonstrate the ability to mentally relive experiences and relate knowledge to the context by which it was learned (Lind & Bowler, 2008). The cause for such is threefold, and directly linked to the abilities that form autonoetic consciousness, as previously outlined. First, delayed or impaired self-awareness and theory of mind punctuate the diagnostic criteria of autism spectrum disorder (American Psychiatric Association, 2013; Baron-Cohen, 2008; Hobson, 1993; Millward et al., 2000; Tomasello, 1995). If children do not have adequate theory of mind, they are less likely to encode information relative to the source origin, and thus be unable to recall events accurately (Perner, 2000).

Although, the extent to which self-awareness and theory of mind affect episodic memory has yet to be fully established (Lind & Bowler, 2008), what is known, is that self-awareness corresponds with metarepresentational ability – the second characteristic of autonoetic consciousness that is considered to be impaired in people with autism (Baron-Cohen, Leslie & Frith, 1985; Bowler, et al., 2008; Egeth & Kurzban, 2009; Happé, 1995, Jordan & Powell, 1995). In light of these deficits, this population may therefore have difficulty understanding that memories are not just representations of past events, but representations of past events that they themselves have experienced.

Third, source memory is also impaired in people with autism (Bowler et al., 2004; Farrant, Blades & Boucher, 1998). For example, Bennetto Pennington and Rogers (1996) demonstrated that children made more errors/produced less incorrect information than matched controls when recalling the temporal aspects of stimuli, namely, the order in which items were presented. Further, impairments in recalling *where* information was learned has also been demonstrated (Farrant et al., 1998). More recent evidence suggests that impairments in episodic memory found in people with autism may not be attributed to the process of encoding, but instead, attributed to the process of retrieval (Bowler et al., 2004), just as has been suggested with young, typically developing children (Arnold & Lindsay, 2002; Gee & Pipe, 1995; Paz-Alonso et al., 2009). Evidence to support this notion comes from research that has investigated the cued recall and free recall abilities of children.

1.6.1. Retrieving Episodic Memories from People with Autism

Cued recall in children and adults with autism is generally found to be unimpaired and comparable to typically developed people (Bennetto et al., 1996; Gardiner, Bowler & Grice, 2003). In contrast, spontaneous or free recall is diminished, where people with autism perform at lower levels than typically developed people on tasks that provide no retrieval support (Bowler, Gardiner, Grice & Saavalinen, 2000; Smith, Gardiner & Bowler, 2007; Tager-Flusberg, 1991). This falls in line with the consensus that people with autism have greater ability in recall activities centered on *knowing* information, than they do on activities that rely upon *remembering* information (Bowler, Gardiner & Graig, 2007). Research from memory tasks that include priming and cued recall indicate that information is implicitly intact, but that recall failure occurs during the process of retrieval. For example, source monitoring deficits found in people with autism were eliminated when participants were provided with appropriate retrieval support during tests, as opposed to when retrieval support was absent (Bowler et al., 2004).

Taking into account the strengths and weaknesses found in the memory performance of people with autism, the Task Support Hypothesis aims to address the retrieval needs of this group. Coined by Bowler, Mathews, & Gardiner (1997), the Task Support Hypothesis indicates that individuals with autism can be helped to perform at more typical levels with appropriate support at retrieval, as was the case in the aforementioned research where adult participants with autism were supported to engage in mental time travel. Importantly, this theory advocates the notion that children with autism do not produce less accurate reports of events. Rather, these reports are generally less detailed when retrieval is not supported. Providing retrieval support appears to scaffold recall, thus enabling access to memories that may have previously been inaccessible.

The Task Support Hypothesis (Bowler et al., 1997) provides a theoretically and empirically based rationale for the need to provide retrieval support to people with autism during instances where they are required to freely recall episodic memories. Similarly, the premise of this hypothesis may also be extended to typically developing children and adolescents, where this Chapter has highlighted that younger children demonstrate less exhaustive retrieval strategies than their older peers, particularly under free recall conditions (Brainard et al., 1990; Paz-Alonzo et al., 2009). As noted, an important instance where vulnerable groups are required to recall episodic memories is when they are the victim or witness to a crime. The following section will focus upon the current methods used to collect eyewitness accounts from vulnerable people in England and Wales.

1.7. Collecting Event Information From Vulnerable Witnesses

Current practice guidelines, namely, Achieving Best Evidence (ABE; MOJ, 2011), provide comprehensive recommendations for the interviewing of vulnerable witnesses in forensic settings. These guidelines commence by highlighting the importance of careful planning of investigative interviews with vulnerable people, and takes into particular consideration, the fragility of memory and testimony within this population. However, in contrast to the manner in which physical evidence is collected (under rigorously strict protocols that aim to avoid contamination), eyewitness evidence is collected largely by police officers that have no specialist knowledge in the workings of human memory (Wells & Olson, 2003), and who have limited understanding of how developmental impairments can affect eyewitness accounts. Nonetheless, in England and Wales, child witnesses must be interviewed in a developmentally appropriate manner by specially trained interviewers.

Investigative interviewer training was introduced in the UK in 1992 and was structured into five levels known as ‘tiers’. Tier one involved newly recruited officers being familiarised with the foundations of investigative interviewing. Tier two built upon the concepts explored in tier one, and was aimed at more experienced officers who conduct volume crime interviews, such as those relating to theft and assault. Tier three, again, built upon the knowledge and skills demonstrated in tiers one and two, but was specifically intended for officers who deal with serious crime and/or vulnerable victims and witnesses, with other elements of the training dedicated to suspect interviewing and the ‘Cognitive Interview’ (discussed later in this chapter).

Tier four focused upon monitoring, supervision and quality assurance of interviews, with tier five training officers in the role of coordinating interviews concerning serious crimes (Griffiths & Milne, 2006). Interviewer training has evolved over the past 20 years, and has recently been restructured into the Professionalising Investigation Programme (PIP), comprising of four distinct levels. Level one focuses upon priority and volume crime investigative interview training, and level two focuses upon serious and complex investigations (core functions training). Levels three and four concentrate upon major investigations and management of these investigations.

After successfully demonstrating competence in level one and level two, interviewing officers who wish to specialise in interviewing vulnerable victims and witnesses, must complete a (PIP level two) Specialist Child Abuse Investigator Development Programme (formally 'tier three with ABE'). In line with National Occupational Standards (College of Policing, 2014), investigators who complete this programme are equipped with a number of skills, including the ability to: i) plan and conduct child abuse investigations; and ii) plan, conduct and evaluate interviews of child victims and witnesses in accordance with tier three of the ACPO National Investigative Interviewing Strategy (ACPO, 2009). This level of training is the expected standard for interviewers who conduct specialist interviews with vulnerable witnesses (ACPO, 2009), however, there is considerable variation in the delivery and duration of vulnerable witness interview training across police forces in England and Wales. To assist specialist interviewers in their role, and to enable vulnerable witnesses to provide their best evidence, recent legislation advocates the appointment of a Registered Intermediary (Youth Justice and Criminal Evidence Act; YJCEA 1999).

1.7.1. The Role of Registered Intermediaries

As detailed in the YJCEA 1999 and ABE, the appointment of an intermediary may be made to vulnerable witnesses if they are considered to be: (i) persons under the age of 18; (ii) persons whose quality of evidence is likely to be affected by a mental disorder or impairment of intelligence and social functioning (including autistic spectrum disorders); or (iii) persons who have a physical disorder or disability, including deafness, to the extent that the court may grant that the quality of their evidence is likely to be diminished (YJCEA, 1999).

Recruited, trained and appointed by the Ministry of Justice, and managed by the National Crime Agency (NCA), a Registered Intermediary's function is: i) to communicate to the witness any questions put to them; ii) to communicate to any persons asking such questions the answers given in reply; and iii) to explain such questions or answers so far as necessary to enable them to be understood by the witness or questioner. Their practical role is to support the process of eliciting best evidence from every witness in terms of seeking to avoid potential misunderstandings between parties (Agnew, 2006; Registered Intermediary Procedural Guidance Manual (RIPGM; Ministry of Justice, 2012; Smith & Tilney, 2007).

Intermediaries are not appointed to discuss, assess or comment upon a witness' competence to give evidence, but rather to ensure that vulnerable witnesses understand the questions asked of him/her at interview and any subsequent trial, and that the listener correctly comprehends the answers delivered in response (Plotnikoff & Woolfson, 2008). In brief, the intermediary's practical role is to: i) conduct a communication assessment (using a mixture of formal and informal tools); ii) prepare a report on their findings for the police and court; iii) assist in the planning and recommend appropriate communication methods and questioning strategies to be used during investigative interviews; iv) facilitate communication during investigative interviews; v) assist pre-trial consultations and visits; and vi) facilitate communication between the witness and all members of the justice system with whom he/she encounters in the court.

Following the intermediary's assessment of a vulnerable witness, he/she will provide the interviewing officer with a preliminary report (often provided verbally if the interview is to take place on the same day). This report facilitates the planning of the interview and provides the interviewing officer with details of the vulnerable witness' communication needs. Factors addressed include, not only how the officer should establish the witness' understanding of the interview process, but also the style of questioning and vocabulary that is appropriate. The intermediary will also provide recommendations as to the appropriate use of communication aids (such as drawing).

During the investigative interview, the intermediary's role is simply to facilitate communication as and when required. Their role is not that of a second interviewer, appropriate adult, or support person. Nonetheless, the intermediary's role of facilitating communication extends to intervening during any breakdown in communication. For instance, the intermediary may ask the interviewing officer to check the witness' understanding of words and concepts, and may also suggest that questions are rephrased if they are deemed to be too long and/or complex. During breaks in interviewing, the intermediary may discuss with the interviewing officer, any communication issues that have arisen, and how best to address these during the next stage(s) of the interview.

Registered Intermediaries are subject to a rigorous selection, training and examination process prior to appointment upon the register (Plotnikoff & Woolfson, 2008). Selection for training is dependent upon the applicants' ability to demonstrate the communication competencies regarded to be necessary for the role. Particular emphasis is placed upon the ability to quickly develop rapport, and to conduct assessments of children's and vulnerable adults' communication abilities and limitations; as well as the applicants' ability to communicate effectively themselves. Because of these requirements, applicants and trainees commonly descend from the areas of speech and language therapy; psychology; education and social work (O'Mahony, 2009). Successful applicants then attend a six-day accredited training and assessment course, which provides trainees with the relevant knowledge that they will require for their role.

The content of the training is centered upon the key procedural aspects of the criminal justice system, and the intermediary's role and responsibilities throughout their involvement in a criminal case (see RIPGM, 2012). Prior to training, the intermediary's knowledge of investigative interviews and the judicial system is often limited to that of a layperson. Further, dependent upon their professional background, intermediaries do not necessarily have specific expertise in the subject of memory and event recall relevant to police questioning. In contrast to the interview training that specialist police officers undertake, intermediaries are not trained on the specific recommendations (such as appropriate question types) outlined in ABE during the Registered Intermediaries' training course.

This provision of service is crucial, particularly when consideration is given to the cognitive difficulties (i.e. poor memory and/or limited vocabulary) that many vulnerable interviewees possess (Milne & Bull, 2001; 2006; Poole, & Lindsay, 1998). Nonetheless, utilisation of this service (at police investigation stage) is currently dependent upon successful identification of vulnerable witnesses by police officers assigned to investigate the case in question – a concept that is often described as a barrier in itself (O'Mahony, 2009). While this thesis focuses upon witnesses who *are* identified as being vulnerable and in need of the assistance of an intermediary, one must not assume that identification is always achieved, particularly with adults who have a 'hidden disability' such as ASD or learning disability.

Indeed, vulnerability is not limited to victims and witnesses of crime. Many suspects and defendants are also identified as vulnerable and in need of intermediary assistance (O'Mahony, 2009). However, at present, the YJCEA 1999 makes no provision for the accused be appointed a Registered Intermediary, regardless of whether or not vulnerability is identified. As such, Registered Intermediaries are not trained in this capacity. Despite legislation making no provision, a vulnerable suspect or defendant may be appointed a 'non-registered' intermediary on the basis of case law. In stark contrast to the training and management of Registered Intermediaries by the Ministry of Justice, non-registered intermediaries are not required to complete a training and assessment course, nor are they monitored by a governing body. This is concerning, particularly in light of the anecdotal evidence that suggests demand for Registered Intermediaries for vulnerable witnesses is not being met, thus police forces are turning to non-registered intermediaries for communication assistance.

1.8. Conducting Interviews with Vulnerable Witnesses in England and Wales

Central to the process of an effective investigative interview, is the gathering of as much information about the witness prior to the interview commences. Factors to be established include the child's preferred name; their willingness to talk to an interviewer; and their understanding of the purpose of the interview. Additionally, the person's cognitive, social and emotional development is also taken into account, as well as their language capability. Importantly, the presence of any developmental disorder(s); disability (learning and/or physical); and mental health problems, should be identified and explored prior to the ABE interview taking place. The gathering of this additional information enables interviewers and intermediaries to assess how such factors may impact upon the interview and questioning process, thus, to plan the interview accordingly. Identifying vulnerability is not always a simple task for investigators, however, particularly when many witnesses do not present with obvious or typical indicators of vulnerability (e.g., young children or people with physical disabilities). Many children, while being vulnerable by virtue of age, may be especially vulnerable if they suffer from an impairment in communication. Further, adults who have 'hidden' conditions such as autism or learning disability, may chose not to disclose their status. Investigating officers therefore require appropriate training about how to effectively identify when a witness should be considered vulnerable in order for them to provide appropriate provision for interview(s).

Following the process of effective interview planning, but central to the guidance that ABE provides, is the use of a phased approach to interviewing. The recommended phased approach is based upon a substantial body of relevant psychological research (Bull, 2010). The four phases outlined by ABE include: i) *establishing rapport*; ii) *free narrative account*; iii) *questioning*; and iv) *closing the interview*. The process of preparation can form a significant part of the *rapport* phase of interviews with vulnerable witnesses. The rapport phase of ABE interviews should consist of the interviewer providing the basis for effective communication between him/herself and the child, with the ultimate outcome being improved quality of the account gained. Although *establishing rapport* and *closing the interview* phases are of great importance when interviewing a vulnerable witness (Collins, Doherty-Sneddon

& Doherty, 2014), this review will be limited to a discussion of the phases central to this thesis: the *free narrative account* and the *questioning* phase.

1.8.1. The Free Narrative Account

The *free narrative account* (referred to as 'free recall' from hereon in), recommends that the interviewer encourages the interviewee to freely recall the event(s) in question. Encouragement comes in the form of an open invitation, such as "Tell me everything that happened from the beginning to end as best you can." (ABE, 2011). Research has consistently demonstrated that the most accurate recollections materialise when witnesses provide accounts in their own words (Lamb, Orbach, Hershkowitz, Esplin & Horowitz, 2007; Milne & Bull, 2006), but in order to achieve this, open invitations must be constructed with care. For example, invitations that are preceded with 'Can you tell me…' linguistically no longer present as open invitations. Rather, the simple addition of 'can you' transforms the prompt into a closed question, which does not encourage detailed narrative. Similarly, the *type* of particular open-ended prompts is also important. For instance, 'open-ended breadth' questions, such as "What else happened?' and 'open-ended depth' questions, such as 'Tell me more about the bit where…?' are known to improve the level of detail and accuracy achieved during investigative interviews with vulnerable populations (Powell & Snow, 2007).

Enabling vulnerable witnesses to provide the most detailed, yet accurate account under free recall conditions is imperative in order to minimise the potential use of inappropriate questions (as detailed below). Although ABE provides substantial guidance regarding appropriate verbal prompts that interviewers should use during the free narrative phase, these prompts do not provide witnesses with any episodic memory retrieval support. Rather, they assume that witnesses have fully functional autonoetic consciousness. Namely, that witnesses are able to mentally relive experiences, and these experiences are bound together in one coherent structure by the contextual details corresponding to the source. In particular, open verbal prompts assume that witnesses have unimpaired relational memory systems. However, research outlined within this Chapter has demonstrated that such is not the case with younger children and children with autism.

For instance, various factors including age and developmental impairments are known to affect the length and detail of such accounts given under free recall conditions (Agnew & Powell, 2004; Boucher & Lewis, 1981; Lamb et al., 2003; Millward et al., 2000). Namely, younger children and children with developmental impairments typically provide shorter and less detailed episodic accounts when retrieval is not supported or cued with directive questions (Agnew & Powell, 2004; Bennetto et al., 1996; Davies, Westcott & Horan, 2000; Goodman & Melinder, 2007). In spite of this, there is no evidence to suggest that developmental factors affect the level of accuracy demonstrated by younger children and those with developmental difficulties (provided that prompts are non-leading and non-suggestive) (Henry & Gudjonsson, 2003). Nonetheless, shorter accounts can affect interviewers' approach during the phase of *questioning*, with increased likelihood of the use of inappropriate (i.e., closed) questions (Powell, Fisher & Wright, 2005; Wright & Powell, 2006).

Further, ABE guidance is only directed for use with typically developed children, and those with learning disabilities. No such guidance is provided within ABE regarding children (or even adults) with autism, despite their known episodic memory problems. It is reasonable to suggest that a lack of guidance, coupled with less detailed accounts from children with autism, may inevitably lead to a vast increase in closed questioning, thus, increasing the risk of inaccurate information being produced.

1.8.2. The Questioning Phase

Irrespective of developmental differences in child witness' recall during the free narrative phase of ABE interviews, it is generally considered that this phase does not elicit all details that are held within the witness' memory, pertinent to the event in question (Powell, 2002). Therefore, the use of appropriate questioning is recommended. Overall, the use of non-leading, open questions is regarded as the most appropriate way in which to elicit accurate event details (Goodman & Melinder, 2007; Poole & Lamb, 1998; Powell, 2002; Wilson & Powell, 2001). Open-ended questions are those that encourage elaborate detail without dictating what specific information is required (e.g., "Tell me what happened?") (Powell & Snow, 2007). Further, with regard to accuracy, witnesses continuously demonstrate improved performance when open-ended questions are asked, in comparison to closed questions (e.g., who, what, when, where) (Powell & Snow, 2007). Detail and accuracy inevitably declines when inappropriate questions, such as force-choice, multiple, suggestive, leading and misleading are used (Bull, 2010; Feltis, Powell, Snow & Hughes-Scholes, 2010; Powell & Snow, 2007).

Unfortunately, the discrepancy between recommended and actual interviewing practice is widespread, revealing itself in almost every interviewer performance evaluation worldwide (Powell et al., 2005). The occurrence of inappropriate questioning highlights the need for effective interview techniques that can be readily and easily applied both before and during the free narrative phase. Such techniques should support the process of retrieving episodic memories without jeopardising the accuracy of the evidence produced. The Cognitive Interview (CI), described by ABE as a special interview technique with strong theoretical groundings, is one method that goes some way to providing retrieval support to witnesses. The following section will now provide an overview of the interview technique central to this thesis, the CI.

1.9. The Cognitive Interview

The CI developed by Ed Geiselman and Ron Fisher in 1985, is a widely accepted and effective method of interviewing both adult and child witnesses (Memon, Meissner & Fraser, 2010). Moreover the CI is hailed to be one of the most successful developments within the realm of psychology and law within the past 25 years (Memon et al., 2010). With typically developed adults, the CI has been proven to be powerful enough to increase the amount of correct information recalled without increasing the amount of incorrect or confabulated items produced (see Memon et al., 2010 for review). The principle of the CI is based upon the theory of encoding specificity described in section 1.5.1 of this chapter (Tulving & Thomson, 1970; Tulving & Thomson, 1973; Tulving, 1983). In particular, the CI adopts the premise that memory traces are multi-featured – thereby, if one method of retrieving particular memorial information is not available or accessible, another route (or cue) may facilitate access to the memory store (Bower, 1967; Larsson & Granhag, 2005). Importantly, retrieval cues are most effective when they reinstate the context in which the memory was initially encoded (Tulving and Thompson, 1973). The CI therefore aims to enhance episodic retrieval by providing cues that correspond with the context in which the event was experienced (Fisher & Geiselman, 1992; Fisher, Geiselman & Raymond, 1987; Tulving & Thomson, 1973).

In practice, the original CI engages the interviewee in a comprehensive retrieval process of the to-be-remembered event. The process of event retrieval comprises of four distinct components (also known as mnemonics) (Tulving & Thomson, 1973). The first mnemonic, *mental reinstatement of context,* involves the interviewer instructing the interviewee to mentally return to the event in question and to form a mental reconstruction of this event. The second mnemonic, *report everything,* requires the interviewee to report all details in relation to the event, regardless of whether or not the interviewee can recall all aspects, or whether or not such details are deemed to be important by the interviewee. The third mnemonic, *reverse order recall,* instructs the interviewee to recall the to-be-remembered event in a different temporal order (e.g., backwards). Finally, *change perspective,* asks the interviewee to recall the event from the viewpoint of another person. In 1992, the CI was refined. Known as the Enhanced Cognitive Interview (ECI; Fisher & Geiselman, 1992), this version saw the introduction of additional mnemonics, such as *building rapport*; *witness compatible questioning; focused retrieval* and *transfer of control*. These mnemonics take into account the social dynamics and communication principles of interviewing (Wright & Holliday, 2007).

The CI and ECI (when used in full) have proven to be beneficial for vulnerable witnesses, particular children aged 6 years old and over. For instance, both the CI and ECI have been found to improve children's recall of events in comparison to a traditional Structured Interview (similarly structured, but excluding the CI mnemonics) (Gentle, Milne, Powell & Sharman, 2013; Holliday, 2003; Larsson & Lamb, 2009; Kohnken, Milne, Memon, & Bull 1999; McCauley & Fisher, 1993; Saywitz, Geiselman & Bornstein, 1992). An increase in correct recall has also been found when the CI is used with children with learning disabilities compared to the

Structured Interview technique (Milne, Sharman, Powell & Mead, 2013). Similar positive effects of the CI with atypical populations have also been reported (Milne, Clare & Bull, 1999; Milne et al., 2013; Robinson & McGuire, 2006). No study has yet revealed that the CI produces less details being reported by children. However, two studies have revealed that the CI elicits no positive effects for very young children (Cronin, Eaves, Kupper, Memon & Bull, 1992; Memon, Wark, Holley, Bull & Kohnken, 1996) – findings which are suggested to be a consequence of the delay between the to-be-remembered event and the interview, as well as the differing application of the CI mnemonics (Akehurst, Milne & Kohnken, 2003; Gentle et al., 2013).

Recent research has investigated the suitability of the CI procedure for adult witnesses with autism. In contrast to the findings from CI research concerning children and people with learning disabilities, the CI did not improve memorial performance for this group (Maras & Bowler, 2010; 2012). Instead, the CI increased the reporting of incorrect information, and significantly reduced recall accuracy. The cause for these negative findings is attributed to the *mental reinstatement of context* (MRC) mnemonic, where it is suggested that MRC is cognitively inappropriate for people with autism (discussed in Chapters 3 and 4). Notwithstanding the importance of the numerous mnemonics described above, and the CI/ECI as a whole process, the remainder of this review will now concentrate upon MRC – the CI component relevant to this thesis.

1.9.1. Mental Reinstatement of Context

The Mental Reinstatement of Context (MRC) mnemonic of the CI employs the principles of encoding specificity outlined in section 1.5.1. Here, the interviewee is verbally instructed to mentally reinstate the environment in which the event was experienced; that is, both the external features (surroundings), as well as the internal features (state of mind, such as emotional aspects) experienced during the event in question (Dietze, Powell & Thomson, 2010; Larsson & Granhag, 2005). For example, asking the interviewee to think carefully about the context at the time of encoding, with directions such as "think about how you felt at the time", "think about the room that you were in; what did it smell like?" (Geiselman, Fisher, MacKinnon & Holland, 1986; Memon, Cronin, Eaves & Bull, 1993).

The benefits of MRC, namely, its power to enhance typically developed adult witnesses to recall, is well defined within empirical literature. In brief, when used with adults, MRC is known to increase the amount of correct information recalled, without detriment upon the quality of information produced. In particular, the amount of incorrect and confabulated information does not increase when the MRC is applied correctly (e.g., Dando, Wilcock & Milne, 2009[a]; Davis, McMahon & Greenwood, 2005; Emmett, Clifford & Gwyer, 2003; Milne & Bull, 2002). The efficacy of the MRC has also been explored with typically developing children aged 4 to 13 years old, but unlike adult populations, findings have been mixed.

The first of such studies to examine MRC, compared recall across three conditions: (i) MRC; (ii) a free recall condition with no cued-prompts ("Tell me everything that happened?"), and also, (iii) a specific questions-based condition (Dietze & Thomson, 1993). The MRC and questions-based conditions generated more correct information than the free recall only condition. These findings occurred across both child age groups (6 year old and 11 year old children) as well as with adults. The MRC and free recall conditions did not increase incorrect information, although, specific questions did. Further, an age-related increase in incorrect information was also found, with 6 year old children producing less than 11 year old children and adults. Similar findings also emerged when the MRC mnemonic was compared to standard interview instructions with children aged 5 to 7 and 9 to 11 years old (Hayes & Delamothe, 1997). In particular, children who were given instructions that aimed to reinstate the context in which they viewed the to-be-remembered video event, demonstrated increased accuracy compared to those who were interviewed under standard interview conditions (free recall, proceeded by cued-recall questioning, with no additional retrieval support). Similarly, Hershkowitz, Orbach, Lamb, Sternberg and Horowitz (2001), found that MRC increased information provided by children during open-ended recall processes – those that are known to elicit the most accurate details. However, the MRC did not produce an increase in reported information during interviews, overall.

Milne and Bull (2002) also examined children's memorial performance across six experimental groups. These groups were based upon independent components of the CI (as well as a control/no mnemonic condition). Children interviewed in the *context reinstatement* and *report all* (both mnemonics combined) condition, demonstrated an increase in the amount of correct information reported (without an increase in the amount of incorrect or confabulated information, when compared to conditions where CI components were explored independently). However, no significant increase in accuracy was found when MRC was applied in isolation (without the *report everything* mnemonic).

Building upon these findings, Dietze, Powell and Thomson (2010), further examined the effects of the MRC mnemonic in relation to its effect upon children's recall. To address the issue of whether or not MRC instructions were being attended to, children were encouraged to reinstate context out loud rather than silently.

Although the MRC group produced more correct and less incorrect information than standard interview instructions (regardless of whether or not context was reinstated 'out loud'), these results only emerged in relation to information produced during the cued-recall questioning phase, and not during free recall. However, it is important to note that in this study, participants were interviewed on more than one occasion. The second interview may have strengthened children's metarepresentations of the to-be-remembered event, thus, resulting in improved cued recall during the second interview. In a further study where MRC was applied in isolation, no beneficial effect of MRC was found upon the information elicited by children aged 6, 9 and 11 years old during both the free recall or cued-recall interview phases (Dietze, Sharman, Powell & Thomson, 2012). Similar results have also been demonstrated when the number of prompts provided by interviewers were controlled for (Dawinkel, Powell & Sharman, 2014). Here, MRC produced no benefit on children's recall abilities.

There is considerable variability in the way that MRC is applied across studies, namely, by the length and complexity of the instructions provided to interviewees, with some studies providing short and simple prompts, and others providing more detailed and lengthy instructions. Indeed, this may be a factor contributing to the mixed results revealed of MRC with typically developing children, however, it may be a pertinent factor in the aforementioned Maras and Bowler (2010) study, where adults with autism were provided with lengthy instructions given in present tense. It can be argued that, in light of the aforementioned characteristics associated with autism (outlined in section 1.6) such as impaired autonoetic consciousness, literal interpretation, and deficits in working memory, instructions presented in present tense may have contributed to the negative findings revealed. Nonetheless, if MRC is potentially detrimental to the recall performance of adults with autism (as demonstrated by Maras & Bowler, 2010; 2012), it is reasonable to expect that this will also be the case for children with autism.

Regardless of the presence or absence of a developmental impairment in vulnerable witnesses, the MRC is at the very least, cognitively demanding (as will be discussed in Chapters 3 and 4). Reducing the demands of this task, while also facilitating context reinstatement is difficult. Nonetheless, the Task Support Hypothesis (Bowler et al., 1997) suggests that context *can* be utilised if appropriate support is provided during retrieval, as demonstrated in the aforementioned research. The following sections will explore the use of drawing, and a novel interviewing technique known as Sketch-Reinstatement of Context, as a means of providing appropriate retrieval support for vulnerable witnesses in line with the Task Support Hypothesis.

1.10. The Use of Drawing During Interviews with Vulnerable Witnesses

The benefits of using drawing to enhance children's eyewitness reports have long been demonstrated in empirical studies. For example, Butler, Gross and Hayne (1995) examined the reports of children aged up to 6 years old following a unique event at a fire station. Half of the group was asked to 'draw and tell' about the event, while the remaining half was asked just to tell. Overall, older children (5 to 6 years old) in the 'draw and tell' group reported up to twice as much information as their peers who did not draw, yet no increase in information was yielded with younger (2 to 4 years old) children. Drawing has also been shown to increase the amount and the accuracy of information produced when open questions are presented (Gross & Hayne, 1999, Salmon, Roncolato & Gleitzman, 2003). Similarly, with emotionally-laden events, children (up to the age of 12 years old) recalled twice as much information than those who just verbally recalled, with no negative effects upon accuracy (Gross & Hayne, 1998; Patterson & Hayne, 2011; Wesson & Salmon, 2001). Corresponding results were also generated following a field study with children aged 4 to 14 years old following an exhaustive interview about alleged abuse (Katz & Hershkowitz, 2010). Moreover, increased recall has also been observed even with the introduction of a long delay (Gross & Hayne 1999).

In light of these positive findings to-date, drawing is recommended in ABE guidelines as an effective interviewing tool that is easy to implement (ABE, 2011). Further, anecdotal evidence suggests that drawing is widely used by Registered Intermediaries to support effective communication. However, practitioners' perceptions of the use of drawing, is unknown. What is known, is that use of drawing during retrieval children's attempts has only revealed advantages when used in conjunction with real events and appropriate, non-suggestive questioning. When used in parallel with false events or suggestive questioning, an increase in the recall of incorrect information is observed (Bruck, Melnyk & Ceci, 2000; Gross, Hayne & Poole, 2006; Strange, Garry & Sutherland, 2003). As such, appropriate use of this tool by practitioners is paramount, thus the need for empirically supported guidance is highlighted.

Despite the positive effects of drawing on episodic memory recall, the studies described here and the guidance detailed in ABE do not provide interviewers with a method by which drawing can be strategically used to enhance memorial recall to optimum levels. Similarly, no study has explored the use of drawing in a forensic-based context with children who have autism. The enhanced spatial abilities and relatively unimpaired drawing skills of many children with autism (Eames & Cox, 1994; Lee & Hobson, 2006) suggest that this technique is one that may prove to be effective in the facilitation of recall during investigative interviews with this population. Importantly, drawing may provide the support required for effective retrieval of event memories, in line with the task support hypothesis (Bowler et al., 1997). The Sketch-Reinstatement of Context technique, outlined below, may provide such external support, while also accessing the positive effects that the MRC has produced.

1.10.1. Sketch-Reinstatement of Context

Sketch-Reinstatement of Context (Sketch-RC: Dando, Wilcock & Milne, 2009[a]) is a modification of MRC, whereby the interviewer provides the interviewee with pencils and paper, before verbalising instructions: "What I would like you to do, is draw a detailed sketch or plan of the event that you saw"; "I would like you to draw on that plan, as many details as you can about the event. It can be absolutely anything that you wish and anything that might help you to remember that event. Also, I would like you to describe to me, each item/thing that you are drawing as you draw it." (Dando et al., 2009[a], p. 141). This modified MRC component is designed to precede the free recall phase of interviews. It is intended to facilitate eyewitness memory by enabling the interviewee to generate their own salient retrieval cues. Furthermore, this modification serves to address previous research that suggests police interviewers often do not appropriately apply the MRC (Dando, Wilcock & Milne, 2008[a]).

Sketch-RC has been shown to be as effective as traditional methods (i.e. applying the MRC without the drawing component; Dando et al., 2009[a]; 2009[c], 2011, 2013). Further, the number of confabulations that Sketch-RC has produced is lower, when compared to participants interviewed in MRC and control conditions (Dando et al., 2009[a]). While this tool is known to be effective for adult witnesses, its efficacy with typically developed children and children with autism has yet to be established. A number of factors suggest that this technique may be particularly beneficial for these groups of witnesses. First, the CI (as a whole process) has produced largely positive effects with typically developed children, however, as outlined in this chapter, use of the MRC (in isolation) has produced mixed findings. Although the cause of the latter is yet to be entirely understood, it is likely that MRC is cognitively demanding for vulnerable witnesses.

The Sketch-RC technique does not demand that witnesses mentally place themselves back in an experience (which, as previously outlined, is difficult for younger children and individuals with autism). Rather, the Sketch-RC technique encourages mental time travel by supporting an effortful search for salient contextual cues, which the witness can immediately externalise, but which remain available in the form of visual record. Hence, the witness controls the type of cues accessed, rather than them being interviewer-led, thereby, potentially ineffective. It is reasonable to expect positive effects from the use of the Sketch-RC with vulnerable witnesses.

1.11. Summary

Despite significant developments in investigative interviewing practices over the last 20 years, there is a dearth in empirically supported, yet developmentally appropriate tools that can assist interviewers in the process of eliciting episodic memories from vulnerable witnesses. However, interviewing vulnerable witnesses in a developmentally appropriate manner is essential in order to help police officers to obtain more accurate and complete statements (Natali, Marucci & Mastroberardino, 2012). The lack of such tools, inevitably impacts upon witnesses' access to justice, as advocated by the Youth Justice and Criminal Evidence Act, 1999. The following chapters present findings from exploratory and empirical research. Here the use of drawing as a more developmentally appropriate interviewing technique is examined, and compared with traditional retrieval support, namely MRC.

Chapter Two

Police Officers' and Intermediaries' Perceptions and Use of Drawing and the Cognitive Interview with Vulnerable Witnesses

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2.1. Abstract

The primary aim of this study was to explore practitioners' perceptions and use of drawing during investigative interviews with vulnerable witnesses. Further, this study aimed to augment the current research concerning practitioners' use of the Cognitive Interview as a whole. A sample of specialist interviewing police officers (*N* = 50) and intermediaries (*N* = 35) completed a self-report questionnaire. Findings indicate regular use of drawing by both practice groups during investigative interviews with vulnerable witnesses. Further, results suggest a consensus regarding the benefits that this tool brings to the interviewing process. In contrast, perceptions and use of the CI were strikingly different between police officers and intermediaries.

2.2. Introduction

The interviewing of vulnerable witnesses in England and Wales is currently guided by the Ministry of Justice (Achieving Best Evidence, 2011), where it is recommend that vulnerable witnesses should be interviewed in a developmentally appropriate manner by specially trained interviewers. At present, Achieving Best Evidence (ABE) guidelines in England and Wales recommend a variant of the Cognitive Interview, which includes the MRC technique, but excludes the *change perspective* and *reverse temporal order* mnemonics, due to the difficulties that young children and people with autism may have with this component (Milne & Bull, 1999). ABE also suggests that drawings may be used before or during investigative interviews to: i) assess a witness' language or understanding; ii) keep a witness calm and settled in one place; iii) support recall of events; and iv) enable a witness to give an account of events (ABE, 2011, p.89). Further, ABE recommends that interviewers consider using a Registered Intermediary when appropriate. However, little is known about the frequency, perceived effectiveness, or the manner in which both the CI and drawings are used with vulnerable witnesses, either by police officers or Registered Intermediaries. Before going on to empirically explore the use of the CI and drawing with different groups of children in the remainder of this thesis, we begin with a survey of current levels of use and understanding of these techniques.

This chapter commences with an overview of the current literature concerning police officers' use and perceptions of their interviewing practices. Following this, a summary of the research concerning the use of Registered Intermediaries in England and Wales (with reference to investigative interviews) is presented. The findings of an exploratory study with police officers and intermediaries are then reported concerning use and perceptions of the efficacy of drawing during interviews and the CI more generally.

2.3. Police Officers' Use of the Cognitive Interview

Empirical research suggests that the MRC mnemonic is one of the most effective CI components, where when applied correctly, it has been demonstrated to increase the amount of correct information recalled by typically developed adult witnesses, without detriment upon the quality of information produced (e.g., Dando, Wilcock & Milne, 2009[b]; Davies et al., 2005; Emmett et al., 2003; Memon et al., 2010; Milne & Bull, 2002). Nonetheless, the benefits of MRC with vulnerable groups are not as clear, and a small number of studies have demonstrated that police officers do not routinely apply the CI in its entirety, typically choosing not to use MRC. For instance, Kebbell, Milne and Wagstaff (1999) found that officers favour and use particular components of the CI more than others. In particular, *establish rapport*; *report everything*; *encourage concentration*; and *witness compatible questioning* components were noted to be used more frequently and were regarded as most useful by officers. Similarly, Dando et al. (2008) found that *establish rapport*; *uninterrupted account*; *explain the interview process*; and *report everything*, were the most frequently used components, and considered to be the most effective. Wheatcroft, Wagstaff and Russell (2013) echoed these findings, establishing that police officers perceived *build rapport* and *report everything* as most useful when interviewing witnesses. Further, officers perceived the CI to be more beneficial for adults than children and people with learning disabilities (Wheatcroft et al., 2013). However, to date, no research has examined ABE trained interviewers' use and perceptions of the CI with vulnerable witnesses only, nor with people who have autism.

The disparity between empirical research and forensic practice appears to emanate from officers' need to obtain witness information quickly and efficiently in a manner that is less complex and time consuming than the CI offers in its traditional form (Dando et al., 2009[b]). With the exception of advising interviewers to omit the *change perspective* component when interviewing young children and witnesses with autism, ABE does not provide further guidance on the use of the CI. In light of recent findings suggesting that officers' perceive the CI to be less effective with vulnerable witnesses (Wheatcroft et al., 2013), and mixed findings concerning the efficacy of the CI with this group, the need to understand practitioners' use and perceptions of this interviewing technique is imperative.

2.4. Police Officers' Use of Drawing

Recent research has suggested that drawing may be an effective replacement for the MRC component of the CI (Dando et al, 2009[a]), not least because it may be more developmentally appropriate for supporting episodic remembering in vulnerable witnesses (as discussed in Chapter 1). ABE provides general guidance on the use of drawing during investigative interviews, and compelling empirical research suggests that this tool has positive benefits on information recalled by vulnerable witnesses when combined with appropriate questioning (e.g., Salmon, 2001; Wesson & Salmon, 2001). Indeed, there is some evidence to suggest that drawing is often used by police officers during interviews with children (Poole & Dickinson, 2014). Nonetheless, no study has investigated practice with regard to the use of this tool. Accordingly, the frequency and manner by which drawing is used by specialist interviewers, and its perceived effectiveness, has yet to be established.

2.5. Registered Intermediaries' Perceptions of Investigative Interviews

As described in Chapter 1, the Youth Justice and Criminal Evidence Act 1999 provides provision for the use of Registered Intermediaries when interviewing vulnerable witnesses. In line with ABE guidelines, Registered Intermediaries advise interviewers on the use of appropriate communication techniques in order to facilitate communication between witnesses and members of the criminal justice system, (i.e., interviewing police officers) (Registered Intermediaries Procedural Guidance Manual; RIPGM, 2012). Registered Intermediaries are trained about how to facilitate communication during a vulnerable witness interview in general, but they are not trained on the appropriate application of ABE guidelines.

Intermediaries' lack of knowledge of ABE guidelines is demonstrated by research produced by Krähenbühl (2011). Here, thematic analysis was applied to intermediaries' perceptions of police questioning methods used in a mock witness interview. It was established that intermediaries, as expected, were extremely vigilant to the use of appropriate and inappropriate linguistic structure and vocabulary. For instance, some questions and statements made by police officers were regarded by intermediaries as being 'too complex' or containing 'poor grammar'. Suggestions put forward by intermediaries were to simplify the language, often with the use of closed questions as an alternative. The overall questioning format used by police in the mock interview was a major theme that was considered by intermediaries to be inappropriate. However, one of the overarching conclusions that this paper arrived at was that there is a demonstrated lack of awareness by intermediaries concerning ABE recommendations and the general research findings that support these recommendations. This conclusion highlights the importance of training with regard to the application of ABE, particularly as this guidance document not only covers appropriate questioning, but also, the use of other interviewing techniques such as the CI, as well as the use of drawing. Currently, intermediaries are not trained about the appropriate use of the CI and drawing, despite being expected to facilitate these methods in practice.

Anecdotal evidence and guidance provided by RIPGM (2012) suggests that drawing is a tool that is regularly used by intermediaries, but there is no evidence (anecdotal or otherwise) to suggest that intermediaries recommend the CI. An absence of training about these topics, as well as the lack of literature in general concerning the efficacy of Registered Intermediaries in the interviewing of vulnerable witnesses, means that it is not possible to understand the extent to which intermediaries actually recommend or facilitate investigative interviews with these tools, if at all. Moreover, there is a distinct lack of understanding about the effectiveness of such techniques by this group of professionals. As such, current understanding of practice is severely limited.

2.6. Aim of Study 1

The primary aim of the study presented in this chapter was to explore practitioners' (police officers and intermediaries) perceptions and use of drawing and the CI. As described in Chapter 1 (Section 10.1), empirical literature demonstrates the effectiveness of using drawing to enhance witness' episodic recall and thus, current ABE (2011) guidance recommends the use of this tool. Further, the RIPGM (2012) also advocates the use of drawing to Registered Intermediaries. ABE (2011) guidelines also recommend the use of the CI, but previous research suggests that practitioners do not consistently apply this technique (Dando et al., 2009[b]). Moreover, the perceived effectiveness of the CI is questioned by police officers when this technique is used with vulnerable groups (Wheatcroft et al., 2013). In light of this, it was hypothesised that:

1. Both professional groups will use drawing during investigative interviews with vulnerable witnesses;
2. Police officers will use the CI when interviewing vulnerable witnesses, but they will perceive the CI to be less effective with particular groups of vulnerable witnesses (e.g., young children, people with autism and people with learning disability).

Because of the lack of empirical research, interview training, and guidance within the RIPGM (2012) concerning the CI, it is unclear whether intermediaries recommend the use of the CI and to what extent they believe it to be effective, thus no hypotheses are formulated for this group.

2.7. Method

2.7.1. Participants and Procedure

Participants were specialist ABE interviewing police officers (as described in Chapter 1, Section 1.5.) and Registered Intermediaries. All participants were sourced via opportunity sampling. Police officers were invited to take part in this study via an email invitation that was disseminated by officers within each police force. Officers were recruited from 11 forces across England and Wales, with the majority (42.5%) representing Greater Manchester Police (GMP). Registered Intermediaries were invited to take part in this study during a continuing professional development event, and also, by an advert posted on the Registered Intermediary Online forum (the national forum for Registered Intermediaries, managed by the National Crime Agency). The sample of Registered Intermediaries worked nationwide across England and Wales.

A questionnaire was used rather than interviews because it minimised the impact of participation upon practitioners' professional day-to-day duties, allowing respondents unrestricted time to think about their replies, and to complete the questionnaire anonymously. All participants were provided with information about the purpose of the study, namely, its aim to explore the use of drawing and the CI when interviewing vulnerable victims and witnesses (see Appendix A). Participants were assured of the confidentiality of their participation and informed of their right to withdraw prior to giving informed consent to take part. Respondents completed the questionnaires in their own time, and received no payment.

2.7.2. Materials

Two separate questionnaires were developed: one for police officers (see Appendix B) and one for intermediaries (see Appendix C). The questionnaires differed for both practice groups because of their function in investigative interviews; namely, police officers conduct interviews while intermediaries facilitate them. As such, the wording of questions was reflective of this. Further information about the presentation of each questionnaire is described in the proceeding sections.

Overall, the structure of the questionnaires was guided by the research approach and a review of the relevant literature. The questions consisted of both closed and open questions, collecting both quantitative and qualitative forms of data. The questionnaires for both groups of respondents were divided into three separate sections:

(i) About You and Your Experience of Working with Vulnerable People

The first section of the questionnaire asked respondents to provide details about their professional training and general interviewing experience. Police officers were asked about their length of service and their level of investigative interview training. Officers also answered questions about their interviewing experience, such as how many victim and witness interviews they conduct per week; whether or not they conduct interviews with vulnerable victims and witnesses, and if so, how many. In addition, officers were asked about their interviewing experiences with particular groups of vulnerable witnesses, such as children, vulnerable adults and people with autism spectrum disorder. Finally, officers were asked to give details about their experiences of working with intermediaries during investigative interviews.

For the intermediaries, the first section of the questionnaire asked respondents to provide information about their main occupation and details about their work as an intermediary, such as how long they have worked in that capacity; what regions they work in; how many cases they have been appointed to; and what groups of vulnerable people they specialise in working with. Additionally, intermediaries were asked to list any investigative interview training courses that they had attended. Respondents were then asked to answer questions about their experiences of facilitating communication during police interviews, in particular, how many interviews they have facilitated as an intermediary.

(ii) Communication Tools and Props

The second section focused upon respondents' experiences and perceptions of using communication tools and props during investigative interviews with vulnerable witnesses. Respondents were asked if they had ever used communication tools or props during interviews. Those who said 'yes' were asked to list the tools and props they had used, and were invited to comment about their use of props, citing the reasons why they used them and the benefits they felt they bring to the interviewing process.

The questionnaire then focused upon use of drawing during investigative interviews with vulnerable people. Respondents were asked to indicate on a five-point Likert scale from 'never' (scored as 1) to 'always' (scored as 5) how often they used drawing. Respondents were then asked a series of open questions: i) Please explain WHEN (during what stages) you use drawing during investigative interviews with vulnerable victims and witnesses. For example, during rapport building; at certain times during the interview; or throughout the entire interview process; ii) Please explain HOW you use drawing during police interviews with vulnerable victims and witnesses. For example, how do you introduce it to the interview process and what type of equipment do you use? iii) Please explain what instructions you provide to the interviewee as to what s/he should draw. Please describe the instructions that you give; and iv) Please explain WHY you use drawing during investigative interviews with vulnerable victims and witnesses.

Respondents were then asked, using a five-point Likert scale ranging from ‘not effective at all’ to ‘extremely effective’, to indicate how effective they believed drawing to be, and which age groups (from ‘under 5’ to ‘over 65’, selecting all that apply) they believed drawing to be most effective for. Intermediaries were asked to indicate which groups of vulnerable witnesses (selecting all that apply, based upon the areas of specialism listed by the Registered Intermediary matching service) they believed drawing to be most effective for. Intermediaries were then asked if they use drawing during any other stage of their work with vulnerable victims and witnesses. Police officers were also asked to comment upon which groups of victims and witnesses for whom drawing is most and least effective. This question was presented as an open question, rather than being based upon the categories of witnesses that Registered Intermediaries specialise in working with. Finally, respondents were asked to describe their reasons for not using drawing as a tool during investigative interviews (if applicable).

(iii) The Cognitive Interview

Respondents were asked about their experiences of the CI (which necessarily includes the MRC) with vulnerable witnesses. Police officers were initially asked if they had ever used the CI with a victim or witness, before being asked if they have ever used the CI with a vulnerable victim or witness. Intermediaries were provided with a brief description of the CI: 'The Cognitive Interview is a technique that is sometimes included during police interviews with victims and witnesses. The interviewing officer gives the interviewee verbal instructions to help 'mentally reinstate' the context of the event in question (e.g., "close your eyes and think about what you could see; what you could hear; how you felt at the time…").' This information was provided to intermediaries due to the lack of intermediary training on the CI. Intermediaries were then asked if they had ever facilitated a CI with a vulnerable victim or witness, and if so, to indicate how many CIs they had facilitated.

Respondents who reported using the CI with vulnerable victims and witnesses were asked to indicate on a five-point Likert scale from 'never' (scored as 1) to 'always' (scored as 5) how often they use the CI with this group. Similarly, respondents were asked to indicate on a 5 point Likert scale ranging from 'not effective at all' to 'extremely effective', how effective they believe the CI to be with vulnerable victims and witnesses. Respondents were then asked to indicate which age groups (ranging from 'under 5' to 'over 65', selecting all that apply) they believe the CI to be most effective. Intermediaries were asked to indicate which groups of vulnerable witnesses (selecting all that apply, based upon the condition/vulnerabilities listed by the Registered Intermediary matching service) they believe the CI to be most effective. Police officers were also asked to comment upon which groups of victims and witnesses, drawing is most and least effective. This question was presented as an open question, rather than being based upon the categories of witnesses that Registered Intermediaries specialise in working with.

Draft questionnaires were distributed to five police officers and five intermediaries. The wording of the questionnaires was amended according to feedback received. Further, due to the various stages within the criminal justice process that intermediaries facilitate communication, an additional question was included in the final intermediaries' questionnaire. Namely, intermediaries were asked to comment as to whether or not they use drawing during any other stage of their role in the criminal justice process.

2.7.3. Analysis Approach

Questions collecting quantitative data were first subject to descriptive analysis, where means and standard deviations were calculated. Where appropriate, inferential analysis was conducted, employing a series of *t*-tests and Spearman's rank correlation coefficient. Qualitative data were analysed using conventional content analysis. Here, coding categories were created directly and inductively from participants' responses to each open-ended question (Elo & Kyngas, 2008; Zhang & Wildemuth, 2009). In the first instance, five questionnaires from each practitioner group (total N = 10) were carefully read. The content of open questions were coded and allocated to a newly identified category. Upon analysis of the remaining questionnaires, content was coded into the defined categories, and where apparent, additional categories were added (Hsieh & Shannon, 2005). See Appendix D for the final matrix of categories in respect of each open-ended question.

2.8. Results

2.8.1. Sample Details

The police sample comprised 50 trained, specialist vulnerable witness interviewing officers from 11 forces across England and Wales ($N = 50$), who conducted a mean number of 3.56 ($SD = 3.18$) interviews per week. All officers confirmed that they were trained at the required level for interviewing vulnerable witnesses. At the time of data collection, the training for the majority of officers (those from GMP), spanned 15 days and was delivered to small groups of eight. On this particular course, trainees learn theory concerning vulnerable witness interviewing, before putting theory into practice by interviewing different types of vulnerable interviewees (played by actors and actress) and visiting representatives of vulnerable groups (M. Confrey, personal communication, September 18, 2015). Nine respondents were excluded from the final analysis because they indicated that they had not conducted any interviews with children or vulnerable adults. The final sample of police officers consisted of 41 respondents with a mean service of 19.40 years ($SD = 118.21$ months).

Thirty-five intermediaries were also recruited, of whom, 27 (77.1%) were Registered and eight (22.9%) Non-Registered. Intermediaries came from a range of full-time occupations, including speech and language therapy (42.9%); education (5.2%); and psychology (5.7%). Fifteen respondents worked as intermediaries on a full-time basis (42.9%), and one intermediary worked in an occupation unrelated to children's services. Respondents had been working in their intermediary role for a mean number of 3.3 years ($SD = 38.74$ months). Seven intermediaries (20%) reported that they had attended ABE interview training courses, with 80% reporting to have received no investigative interview training.

2.8.2. Experience of Working with Vulnerable People

Police officers reported that they conducted a mean number of 1.28 vulnerable witness interviews per week, with a mean number of 109.08 (*SD* = 169.51) child interviews during their police career. Further, 27 (65.9%) police officers reported having worked with an intermediary on a case concerning a vulnerable witness, with the mean number of cases being 5.89 (*SD* = 5.91). The sample of intermediaries reported that they had facilitated communication on a mean number of 66.97 cases (*SD* = 72.32). Of these participants, 25 (71.4%) reported that they had facilitated an investigative interview, with the mean number of facilitated interviews being 55.92 (*SD* = 59.56). Respondents were also asked, if during their role, they had ever worked with a person who has autism. Twenty-four police officers (58.5%) and 30 intermediaries (85.7%) reported 'yes', with police officers conducting a mean number of 5.83 (*SD* = 6.073) interviews and intermediaries facilitating a mean number of 15.72 cases (*SD* = 19.30) with persons who had autism.

2.8.3. The Use of Props and Communication Aids

Thirty-four (85.4%) police officers and 22 intermediaries (81.5%) reported that they had used props and/or communication aids in investigative interviews (total 87.5%, *N* = 56). Table 1 displays police officers' and intermediaries' percentage responses for the different types of props and communication tools used.

Table 1. *Police officers' and intermediaries' percentage response rate for the different types of props and communication tools used during investigative interviews.*

Prop / Communication Tool	Police officers (N = 34)	Intermediaries (N = 22)	Total (N = 56)
Writing / drawing materials	91.2	87.5	89.7
Dolls	17.6	66.7	37.9
Body maps / diagrams	23.5	41.7	31.0
Pictures / photographs	26.5	37.5	31.0
Cue / prompt cards	2.9	54.2	24.1
Timelines / calendars	8.8	37.5	20.7
Post-it notes	5.9	41.7	20.7
Model furniture	8.8	25.0	15.5
Makaton / Widgit	0	25.0	13.8
Modelling clay / play-doh	5.9	20.8	12.1
Communication boards / charts	8.8	12.5	10.3
Talking mats	2.9	4.2	3.4

Respondents were asked to describe why they use interviewing props and the benefits that they bring to the interviewing process. Fifty-two participants (92.9%) provided a response, 30 police officers and 22 intermediaries. Responses were coded and allocated into six categories created following inductive content analysis. Forty-three respondents (82.7%) reported that they use props to *aid communication*. For example, a police officer stated that s/he used props "to assist in communication and to make it easier to understand especially if I haven't been to the scene." Another officer stated "to aid to assist witness describe a location/scene, what someone was wearing. Witness wanted to draw a picture." An intermediary responded by saying “[props are] necessary for many children and adults if they are not able to answer/describe verbally.”

Fourteen respondents (26.9%) claimed that they use props to *assist with clarification / questioning*. For example, a police officer stated that s/he used props “to describe room layouts. Helps clarity and understanding between interviewer and interviewee.” An intermediary stated “Drawing, timelines, body maps and toys used to assist VW’s ability to explain, and IO to clarify and check back information.” Seven respondents (13.5%) claimed they used props to *enhance memory*. For example, a police officer stated that “The drawing is a good trigger for a witness when recalling from memory.” Another officer said “[props] allowed interviewee to communicate effectively and assisted in memory recall.” Six respondents (11.7%) stated that the reason they use props is to *focus attention*. For example, one police officer stated “was useful as child would speak well if distracted with toys etc but if he had to focus solely on the questions put to him he answered poorly.” An intermediary claimed “for some young children, drawing helps them focus.”

In addition to the categories defined above, two police officers (3.6%) claimed that props *aid the value of the evidence*, with one stating “improved evidential value”, and the other stating “to assist in communication, and describing the location of assaults on a body. When recorded on video this is impactive and retains the integrity of the process.” No intermediaries commented on the evidential value of using props. Similarly, no police officers reported that props aid assessments or rapport building. However, one intermediary did cite these as reasons for using props: “I use some for assessment purposes and some for rapport building. Some to initiate communication.”

2.8.4. Use of Drawing During Investigative Interviews

Thirty-six police officers (90.0%) and 22 intermediaries (77.8%) reported using drawing during an investigative interview (total = 80.6%, $N = 58$). A t-test was performed on the frequency of the use of drawing as a function of profession. There was no significant difference between the two groups, $t(57) = .344$, $p = .304$. Table 2 displays police officers' and intermediaries' percentage responses for the frequency that drawing is used during investigative interviews with vulnerable witnesses.

Table 2. *Police officers' and intermediaries' percentage response rate for the frequency of use of drawing during investigative interviews with vulnerable witnesses.*

	1 Never	2 Rarely	3 Often	4 Almost Always	5 Always	Mean (*SD*)
Police officers ($N = 36$)	0.0	25.0	38.9	33.3	2.8	3.14 (.83)
Intermediaries ($N = 22$)	0.0	9.1	50.0	36.4	4.5	3.36 (.72)
Total ($N = 58$)	0.0	19.0	43.1	34.5	3.4	3.22 (.79)

Respondents who reported using drawing, were asked to describe the stage(s) during the interviewing process that they use this tool. One intermediary claimed that the use of drawing "depends upon the officer in charge". Four intermediaries (20.0%) reported that they use drawing during assessments of vulnerable interviewees' communication needs. Two intermediaries (10.0%) also reported that they use drawing during the rapport-building phase, with another intermediary stating that drawing is used during breaks in the interview. No police officers cited these stages in response to when they use drawing.

In contrast, police officers' responses to when they use drawing varied. For example, one police officer claimed "sometimes at the start, but in the main during the interview after a free recall and I will then refer to it throughout. Leave the sketch on view and the witness will continue to refer to it. It helps clarification." Figure 1 displays police officers' percentage responses for the stages when drawing is used during investigative interviews with vulnerable witnesses.

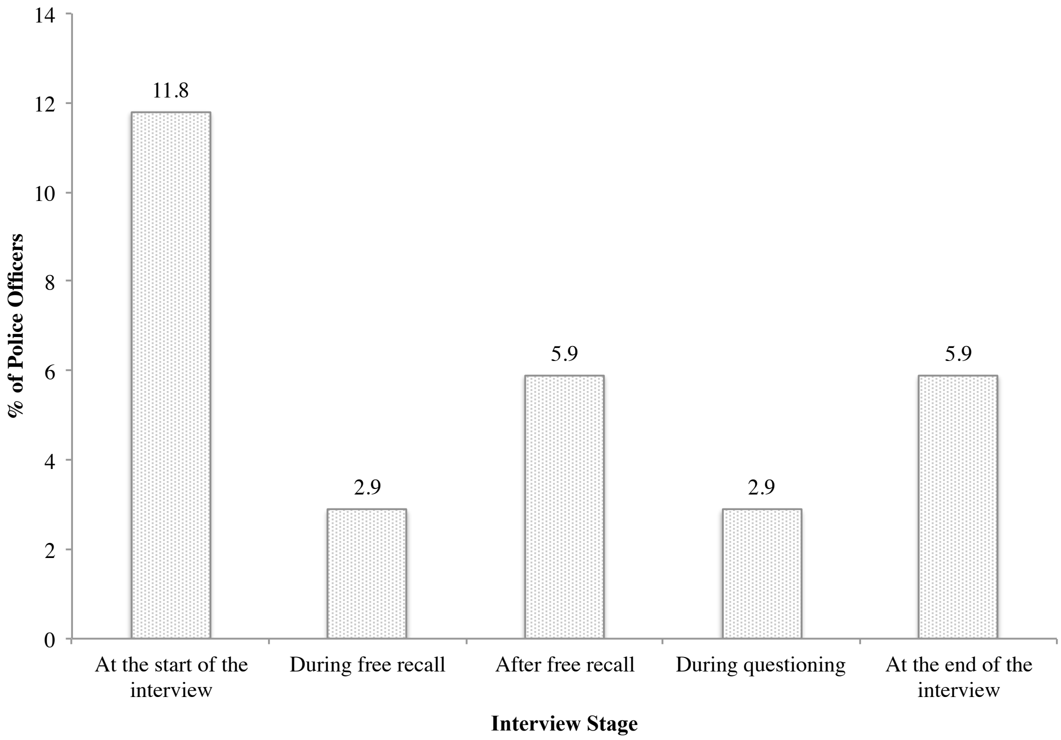

Figure 1.

Police officers' percentage response rate for the stages when drawing is used during investigative interviews with vulnerable witnesses.

Fifty-four respondents, 34 (82.9%) police officers and 20 intermediaries (57.14%), reported using drawing throughout interviews (as opposed to during particular interview phases). These responses were coded into categories according to the particular points throughout the interview that participants described. Twenty-six responses (48.1%) reported that they use drawing *generally throughout the interview*, whenever it is appropriate. For example, one intermediary stated that "during the interview I recommend it as and when it seems appropriate", while a police officer respondent claimed "As and when identified appropriate, no set rule." Seventeen respondents (31.5%) reported that they use drawing to *aid questioning and/or when key points require clarification*. For example, one intermediary claimed "during questioning when asked to describe location, witness could draw room layouts and also for description of stolen items, witness able to draw design on jewellery", while a police officer stated "throughout the interview when victim is explaining about a place location, or even drawing of what they have seen."

Table 3. *Police officers' and intermediaries' percentage response rate for the times when drawing is used during interviews with vulnerable witnesses.*

	Generally throughout entire interview	To aid questioning / clarify key points	Only when necessary for the interviewee	To aid sequencing of events
Police officers (*N* = 34)	52.9	29.4	8.8	0.0
Intermediaries (*N* = 20)	45.0	35.0	20.0	10.0
Total (*N* = 54)	48.1	31.5	14.8	3.7

Eight respondents reported that they use drawing *only when it is necessary for the interview*ee, such as when he or she is having difficultly verbally describing events. For example, one police officer stated that "first I build rapport and when the witness has started telling and I notice that he/she has problems/difficulties in explaining or recalling, I can suggest that he/she use drawing.", while an intermediary stated "at points where is clear the VW [vulnerable witness] is finding it difficult to verbally explain". Finally, two intermediaries (3.7%) reported that they use drawing at points when the interviews needs assistance in *sequencing events*. For example, "during the interview to help very young children sequence events or describe a room or place.” Table 3 displays the percentage responses for the occasions that respondents reported using drawing.

Respondents were asked to describe the drawing instructions that they provide to interviewees. Four police officers (11.8%) and one intermediary reported that the instructions provided *depended upon the witness' individual needs*, and responses were not elaborated upon. Six intermediaries (30.0%) stated that the interviewing officer provides drawing instructions. One intermediary (5%) reported that she does not provide instructions, as she is the person who draws based upon the account provided by the interviewee – “I do the drawing generally and show each drawing with an explanation of what it is e.g. ' you said you sat on the bed. Here you are on the bed'. Continue like this asking whether the picture goes before or after last drawn event and get witness to place picture in correct sequence on table. If witness draws it's usually a room plan or street plan.”

Eighteen respondents (33.3%) reported that they provide *general instructions* that allowed the interviewee to free draw. For example, three respondents stated “please draw everything that you can remember”, “draw what happened next” “picture in mind, draw everything can remember, take time, leave nothing out.” Instructions that encouraged the interviewee to draw particular objects, people or locations, were coded as ‘*specific instructions*’. Twenty 27 respondents (50%) described their instructions as being of a more specific nature, such as “draw the layout of the room”.

Fifteen participants (27.8%) stated that they ask interviewees to label or pinpoint the contents of their drawing. For example, one police officer reported “I would just ask for a basic drawing…to point out the location of objects in a room for example, i.e., the bed in relation to the door to the bedroom.”, while another stated “I would ask them to draw in as much detail as possible and to label different parts of the diagram. I would let them finish and then ask them questions based on the drawing." Two participants (3.7%) reported that they ask interviewees to draw on a body outline or map. For example, one intermediary stated "draw on a body outline 'show me where'." Figure 2 displays the types of instructions provided by practitioners as a function of professional role.

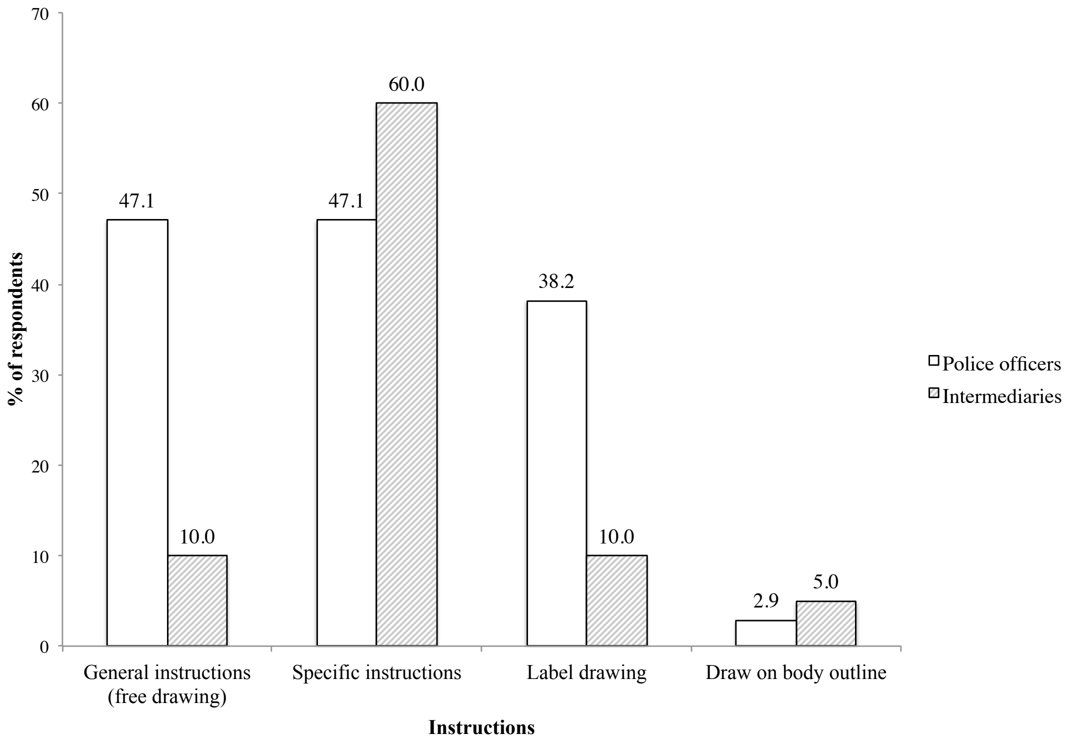

Figure 2.

Police officers' and intermediaries' percentage response rate for the instructions given when asking interviewees to draw during interviews.

Participants were asked to describe the reasons that they use drawing during police interviews. Fifty respondents (92.6%) who claimed to use drawing during interviews, described particular reasons for their use of drawing. These reasons were analysed and coded into five categories. Thirty-four respondents reported that they use drawing to *aid communication*. For example, a police officer stated that drawing is used "to enable a witness to explain something that they couldn't otherwise explain using verbal means." Seven respondents stated that drawing is used to *provide visual representation*. For example, an intermediary reported that drawing is used to "…provide visual representation for interviewing officer to check back information."

Fifteen respondents claimed that they use drawing to *assist with clarification / questioning*. For example, a police officer stated that s/he uses drawing "to assist in describing layouts." Thirteen respondents claimed that the reason they use drawing is to *enhance memory*. For example, a police officer stated that drawing "puts the interviewee back in that time/place. It tends to slow down things for them so that much of their recollection is better." Finally, six respondents stated that one of the reasons that they use drawing is to *focus attention*. For example, one intermediary stated that it is used "to help focus attention", while another intermediary stated that "when answering questions, less focus on them [the interviewee], possibly less intense and less eye contact." Table 4 displays police officers' and intermediaries' percentage responses for the categories relating to why drawing is used during interviews.

In addition to the categories outlined above, three intermediaries (17.6%) reported that they use drawing to aid witness' sequencing of events. One intermediary reported that drawing was used as a tool to build rapport, while another intermediary stated that drawing was used as a break activity. No police officers cited these factors as reasons for using this tool during investigative interviews.

Table 4. *Police officers' and intermediaries' percentage response rate for why drawing is used during investigative interviews with vulnerable witnesses.*

	Aid communication	Provide visual representation	Assist with clarification / questioning	Enhance memory	Focus attention
Police officers (*N* = 33)	66.7	6.1	36.4	27.3	9.1
Intermediaries (*N* = 17)	70.6	29.4	17.6	23.5	17.6
Total (*N* = 50)	68.0	14.0	30.0	26.0	12.0

Respondents who reported that they use drawing during investigative interviews, were asked to indicate on a five-point rating scale, how effective they believe drawing to be. A *t*-test was performed to investigate whether the perceived effectiveness of drawing varied as a function of profession. There was no statistically significant difference between the two professional groups, $t(59) = .791$, $p = .431$. To explore the data in more depth, Spearman's correlation coefficient was conducted. As one would expect, there was a strong positive relationship between the perceived effectiveness of drawing and the frequency of use of drawing, $r_s(53) = .704$, $p = .000$. Table 5 displays police officers' and intermediaries' percentage responses for perceived effectiveness of drawing during investigative interviews.

Table 5. *Police officers' and intermediaries' percentage response rate for perceived effectiveness of drawing during investigative interviews with vulnerable witnesses.*

	1 Not effective at all	2 Not very effective	3 Quite effective	4 Very effective	5 Always effective	Mean (*SD*)
Police officers (*N* = 33)	0.0	5.9	17.60	26.5	50.0	4.21 (.95)
Intermediaries (*N* = 22)	0.0	4.5	9.1	63.6	22.7	4.05 (.72)
Total (*N* = 55)	0.0	3.6	14.5	41.8	40.0	4.18 (.82)

Respondents (N = 54) were asked to indicate what age groups they believe drawing to be most effective for during investigative interviews (selecting all that apply). Age groups were divided into five categories. Seventeen respondents (31.5%) reported that drawing was effective for children aged less than 5 years old. Thirty-four respondents (63.0%) reported that drawing was effective for children aged between 5 and 11 years old, while 35 respondents (64.8%) stated that drawing was effective for children aged 12 to 17 years old. Seventeen respondents (31.5%) reported that drawing was effective for adults aged 18 to 64 years old. Similarly, 17 respondents (31.5%) reported that drawing was also effective for older adults aged over 65. Figure 3 displays the percentage responses for the age groups that drawing is perceived to be most effective for as a function of profession (police, N = 33; intermediaries, N = 21).

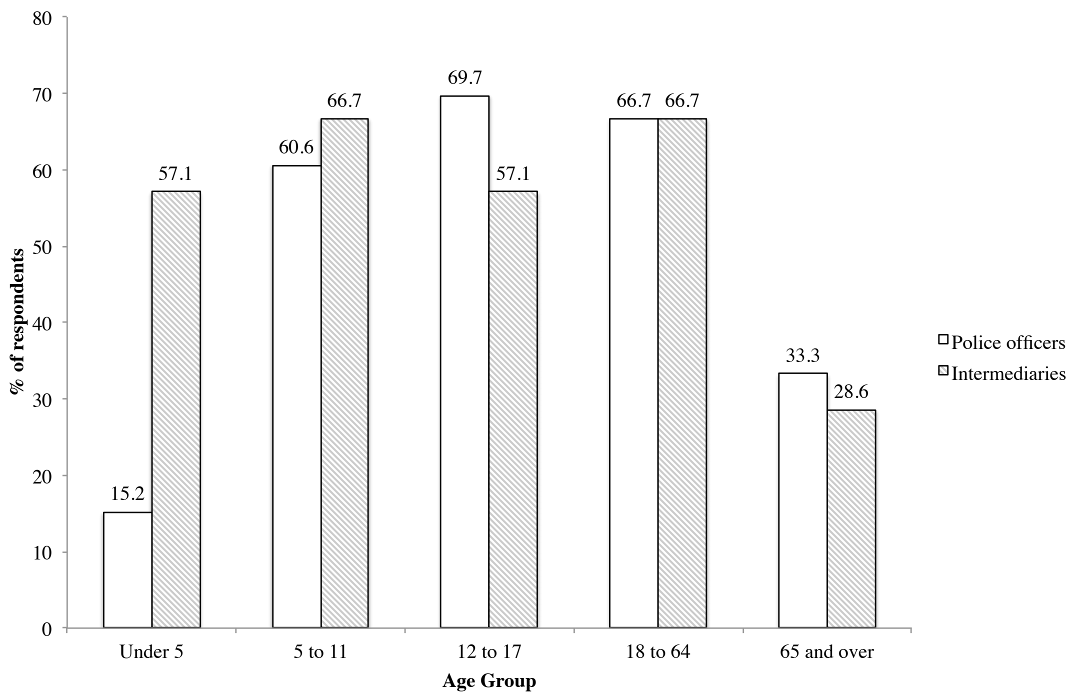

Figure 3. Police officers' and intermediaries' percentage response rate for age groups that drawing is most effective for.

Intermediaries who claimed that they use drawing when facilitating communication with vulnerable witnesses, were asked which groups of people they believe drawing to be most effective for (according to the specific conditions/vulnerabilities that these professionals specialise in). Table 6 displays intermediaries' (*N* = 27*)* percentage responses for the vulnerabilities that drawing is regarded to be most beneficial for during investigative interviews.

Table 6. *Intermediaries' percentage response rate for conditions / vulnerabilities that drawing is most effective for.*

Condition	%	*N*
Learning difficulties (mild)	81.5	22
Learning difficulties (moderate)	74.1	20
ASD	59.3	16
Language delay / disorder	55.6	15
ADHD	51.9	14
Learning difficulties (severe)	51.9	14
Asphasia / Dysphasia	33.3	9
Mental health issues	29.6	8
Brain and/or head injury	25.9	7
Deafness / hearing impairment	25.9	7
Selective / elective mutism	25.9	7
Phonological delay / disorder	22.2	6
Dystharsia / Dyspraxia	18.5	5
Fluency Difficulties	18.5	5
Physical disability	18.5	5
Voice disorders, including laryngectomy	18.5	5
Dementia	14.8	4
Neurological / other progressive disorders	14.8	4

Police officers were asked to state which groups of vulnerable witnesses (according to condition) they believed drawing to be most effective for. Twenty-one police officers responded to this question, with six officers (28.6%) stating that children benefit most from the use of drawing during interviews. Five police officers (23.8%) reported that the effectiveness of drawing *depends upon the witness and the circumstances*. For example, one police officer stated “each interviewee is different, keep an open mind and use sketch plans if you feel they are appropriate.”, while another reported “depends on circumstances.” Four police officers (19.0%) reported that drawing is effective with all vulnerable groups. For example, one police officer stated “anyone who it assists in describing something in interview.” Two police officers claimed that drawing is effective for *anybody with capacity to draw*. For example, one of these officers stated “all persons taken on their ability to sketch or draw regardless of group e.g. I can interview an eight year old who can draw a really good plan of a room, then interview a thirty year old educated working person who is unable to draw any reasonable representation so groups don't come into it, it is the ability of the witness.” Four police officers (19.0%) claimed drawing is most effective for people with learning disabilities. One police officer stated that drawing is most effective for people with autism (“with some autistic witnesses it assists in constructing a detailed chronological narrative”).

Nine respondents (16.7%) provided additional information about the perceived effectiveness of drawing. For example, an intermediary stated that “it depends on what is being drawn, who by, and when and why, but generally it has been an invaluable tool.” Another respondent claimed “drawing can be used at every level, from a mark on a body, to sophisticated diagram drawings of place/person/actions.” Also, an intermediary who earlier reported that she produces the drawings herself, stated that "it can get in the way of the fluency of an interview, interrupting the flow of question and answer or of thought process. Some events may be very tricky to draw, especially very detailed sexual imagery. Definitely a challenge for me as I don't draw well. Some witnesses e.g. ASD don't recognise the symbolism of a drawing e.g., a stick figure to represent a person, so there's no point using drawing. Emotions are difficult to convey through simplistic drawing."

Due to the nature of intermediaries contact with vulnerable witnesses (e.g., conducting communication assessments; assisting with court familarisation), this group were asked if they use drawing at any other stage when working with vulnerable people in the criminal justice system. Four intermediaries (14.8) stated that they use drawing during 'all stages' within their role, while one intermediary (11.1%) stated that she does not use drawing during any other stage. Twenty intermediaries specified the stages of the criminal justice process when they use drawing (as displayed in Figure 4).

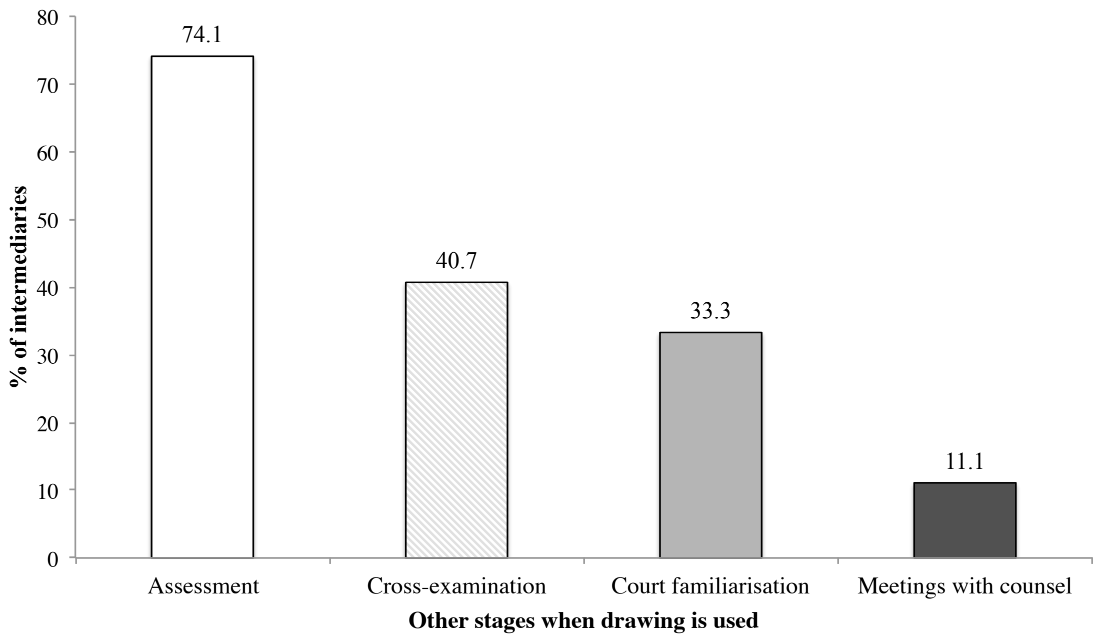

Figure 4. Intermediaries' percentage response rates for the stages when drawing is used.

Police officers and intermediaries were asked to explain the reasons why they do not use props or drawing (if applicable). One intermediary reported "it's not always necessary or appropriate." Another intermediary claimed "don't need it for assessment. Gets in the way of the court process as can be misconstrued as leading witness during cross examination", while another stated "not needed to yet." Police officers who reported that they do not use props or drawing, claimed that "the opportunity to use them has never presented itself, but I will/would use it if I believed they would be beneficial" and "I have not felt the need to, but I can see why in some cases they would be beneficial." One police officer stated "I would not use props, as it is unlikely that they would be available for use at court.", while another officer stated that "they can be a distraction."

2.8.5. Police Officers' Use and Perceptions of The Cognitive Interview

Thirty-two police officers (88.9%) reported that that they had used the CI technique with a victim or witness, with thirty of these officers (88.2%) reporting that they use the CI with vulnerable witnesses. Twenty-four officers (75.0%) also stated how often they use the CI. Of these, three (12.5%) reported that they used the cognitive interview 'rarely' with vulnerable witnesses. Three officers (12.5%) stated that they 'always' use the cognitive interview, 14 (58.3%) claimed to use the CI 'often', and 4 (16.6%) stated that they 'almost always' use the cognitive interview with vulnerable witnesses. No respondents reported that they never use the CI with vulnerable witnesses. The mean rating for how often the cognitive interview was used with vulnerable witnesses (on a scale of 1 to 5; 1 = never; 2 = rarely; 3 = often; 4 = almost always; 5 = always) was 3.29 (*SD* = .859). Figure 5 displays the percentage response for police officers use of the CI.

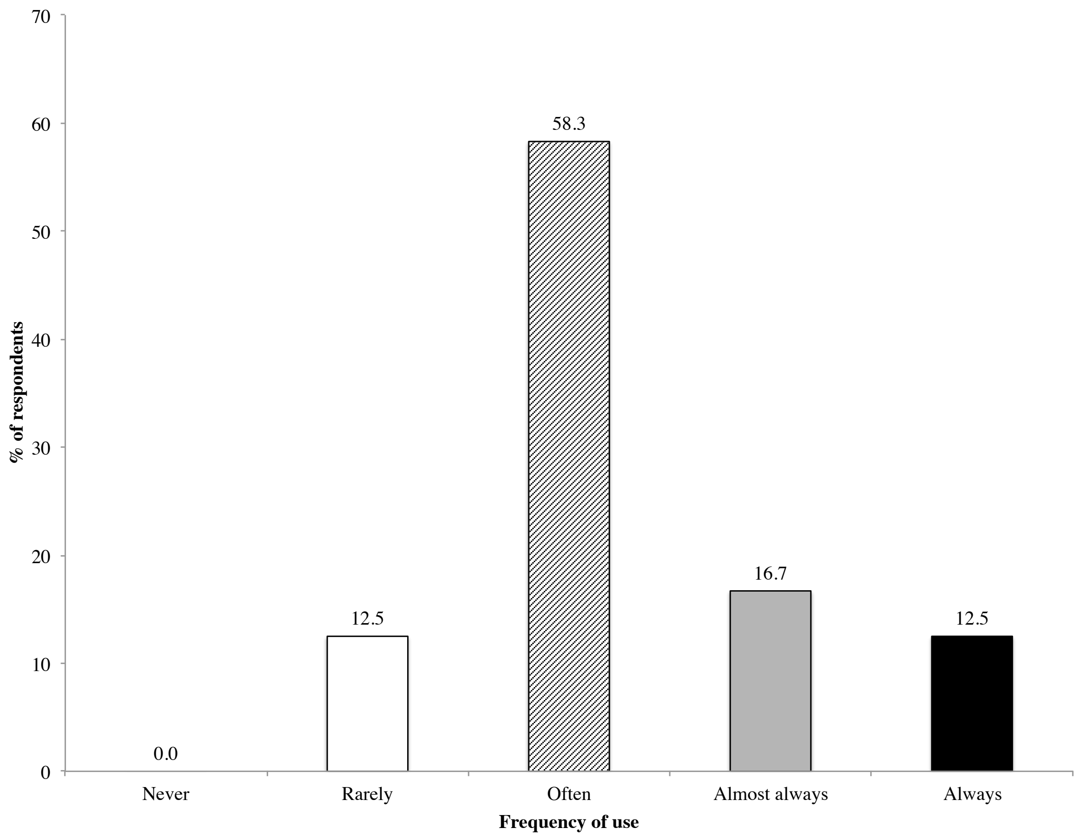

Figure 5. Police officers' percentage response rates for the frequency of use of the Cognitive Interview with vulnerable witnesses.

Officers were asked (on a scale of 1 to 5: 1 = not effective at all; 2 = not very effective; 3 = quite effective; 4 = very effective; 5 = extremely effective) to indicate how effective they believe the CI to be with vulnerable witnesses. Thirty officers responded to this question (93.8% of those who stated that they use the CI with vulnerable witnesses, responded to this question). Twelve officers (40.0%) reported the cognitive interview to be 'quite effective', with 17 officers (56.6%) claiming it to be 'very effective'. The remaining officer indicated that the CI was 'extremely effective' with vulnerable witnesses. No officers indicated that they believed the CI to be not effective with vulnerable witnesses. The mean rating for the perceived effectiveness of the CI with vulnerable witnesses was 3.63 (*SD* = .556). However, no significant relationship was found between the frequency of officers' reported use of the CI with vulnerable witnesses, and the perceived effectiveness of it, $r = .174$, $p = .451$. Figure 6 displays the percentage response for police officers' perceived effectiveness of the CI when used with vulnerable witnesses.

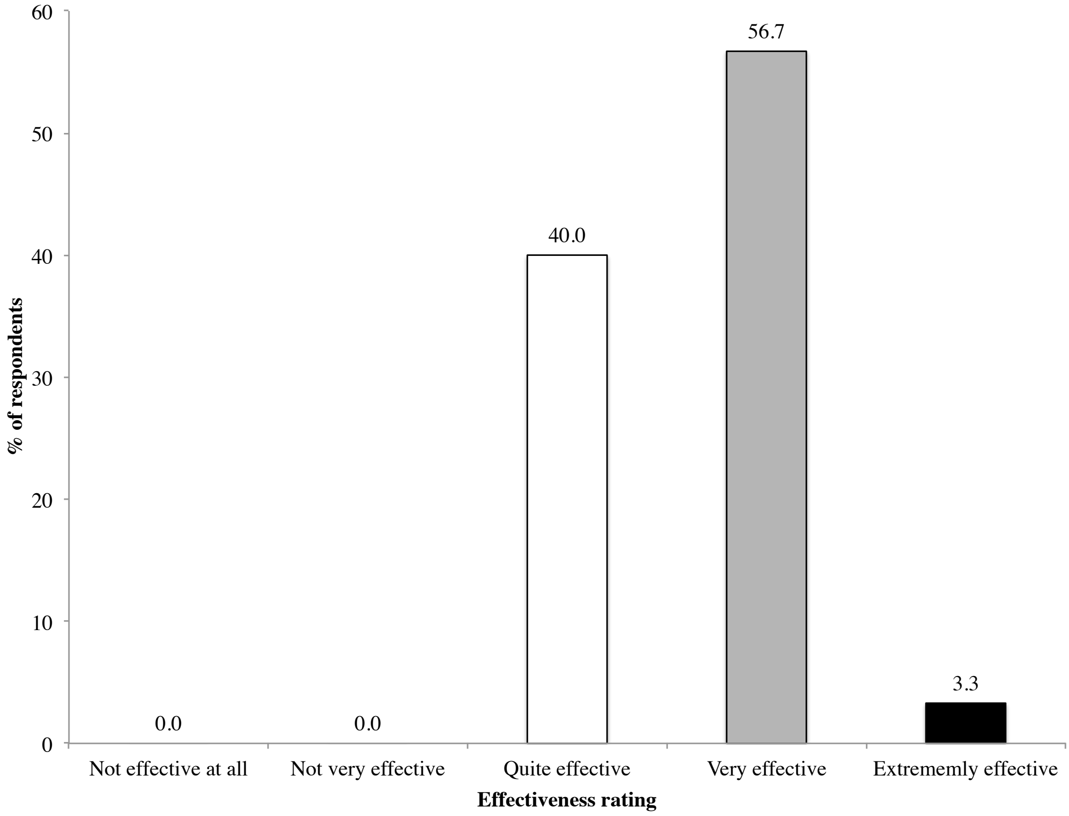

Figure 6. Police officers' percentage response rate for the perceived effectiveness of the Cognitive Interview with vulnerable witnesses.

Officers were asked to specify which age groups of vulnerable people (selecting all that apply) they believe the cognitive interview is most effective with. Thirty officers (93.8%) who reported that they use the CI with vulnerable witnesses responded to this question. Four officers (13.3%) claimed that the CI was effective with children aged under 5 years old, with 14 officers (46.6%) reporting it to be effective for those aged 5 to 11 years old. A further 23 officers (76.6%) reported the CI to be effective with children aged 12 to 17 years old. With regard to vulnerable adults, 27 police officers (90.0%) claimed that the CI was most effective for those aged 18 to 64, and 16 officers (53.3%) reported it to be effective for older adults aged over 65 years. Figure 7 displays police officers' percentage responses for the age groups that they believe the CI to be most effective for.

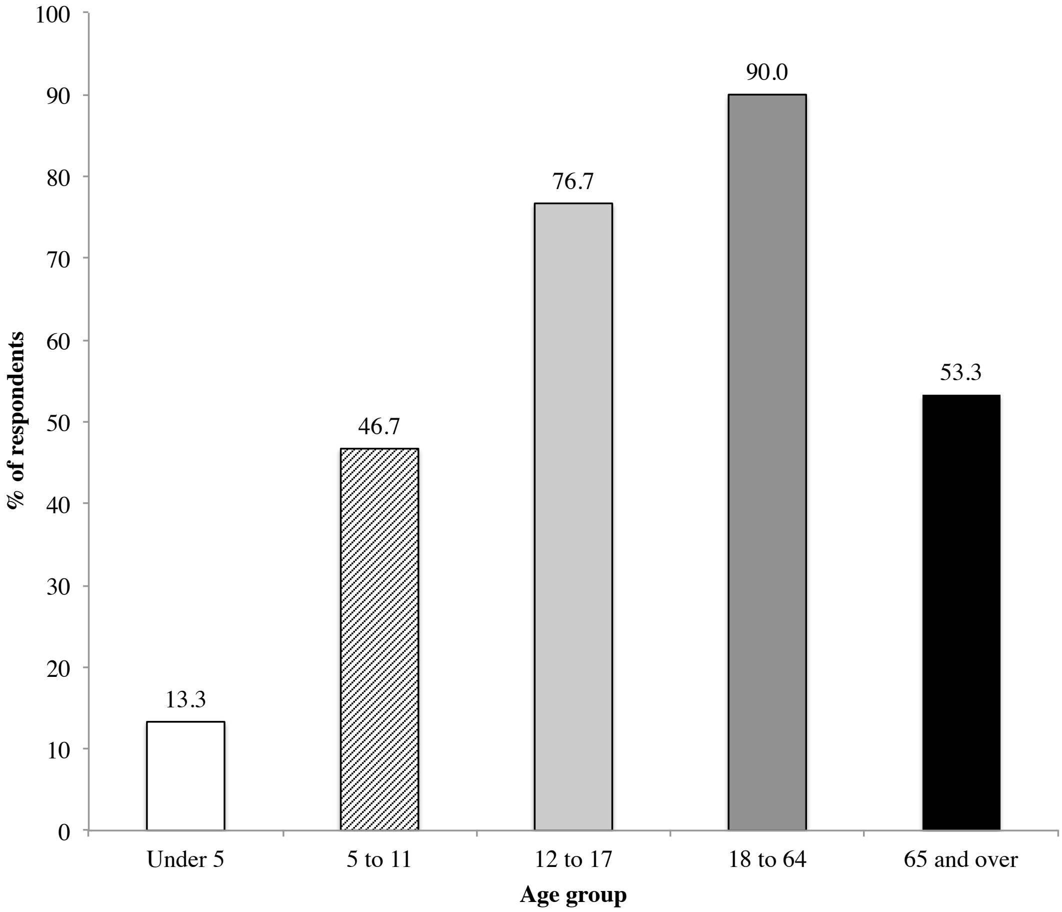

Figure 7. Police officers' percentage response rates for the age groups that drawing is perceived to be most effective for.

Officers were also asked if there were any other particular groups of people who the CI was effective for. Twenty-eight respondents (87.5%) who claimed to use the CI with vulnerable people responded to this question. Thirteen respondents (46.4%) claimed that they were unsure or unable to comment about which groups of vulnerable witnesses they believe the CI to be most effective for. Six police officers (21.4%) reported the CI to be most effective with children. The remaining respondents reported that the effectiveness of the CI with certain groups was dependent upon the interviewees' individual ability and circumstances. For example, one police officer stated "individuals which don't have short attention span, or where putting back into context wouldn't cause any anguish after interview." Another police officer stated, "subjects with well-developed self-concepts conforming to social norms, e.g. that lying, stealing, hurting, etc. are bad." One police officer commented "it will only work if the witness clearly understands the instructions and should be assessed in the witness preparation stage when dealing with a neutral topic." While another stated "as with sketch plans, you have to treat each case on its merits, what is good for one isn't for another."

Similarly, officers were asked if there were any groups that they believed the CI to be ineffective for. Fifteen respondents (41.7%) stated that the CI was ineffective for some groups. When asked to provide further information, 13 (86.7%) officers responded. Six officers (46.1%) stated that the CI was most ineffective with children, with five police officers (38.5%) reporting that the CI is most ineffective with people who do not have capacity to engage in the CI. For example, one officer stated that the CI was ineffective for "those with such a low intellectual ability that they would not understand the concept", while another officer simply stated "persons with limited attention." Two officers (14.2%) reported that the ineffectiveness of the CI is determined on an individual basis. For example, one officer claimed "probably, however, this would be an individual assessment", while the other stated "has to be assessed on individual basis."

Four officers (28.6%) noted that the CI was ineffective for people with learning disabilities and people with autism, while two officers (14.2%) reported that the CI was ineffective with elderly people. Finally, one police officer stated that the CI is ineffective with people who have physical disabilities, and another, reported that "following assessment by intermediary, if established [as] not suitable."

2.8.6. Intermediaries' Use and Perceptions of the Cognitive Interview

Intermediaries were asked about their experiences of facilitating communication during CIs. Twenty-four (85.0%) respondents reported that they had not facilitated communication during a CI with a vulnerable witness. Of the four intermediaries (14.3%) who had facilitated a CI, the mean number of CIs facilitated was 1 (SD = 0.00). Due to the small number of respondents who had facilitated a cognitive interview, only five intermediaries reported how effective they believed the procedure to be with vulnerable witnesses, with one respondent reporting that it was 'not effective at all', and four respondents reporting that it was 'quite effective' (M = 2.60, SD = .894). When intermediaries were asked which vulnerable groups they believe the cognitive interview to be most effective for, the response rate was zero. When asked for further comments about the perceived effectiveness and benefits of the use of the cognitive interview, four intermediaries responded. Three intermediaries stated that they were "not sure", with the remaining intermediary stating "too little experience [with this technique] to comment fairly."

2.9. Discussion

The study presented within this chapter is the first to explore practitioners' (police officers and intermediaries) perceptions and use of props during investigative interviews with vulnerable witnesses, with particular reference to the use of drawing. Further, practitioners' perceptions and use of the Cognitive Interview (CI) were explored. The following sections will discuss the prominent findings in turn.

2.9.1. Practitioners' Use of Communication Aids and Props

There was a consensus amongst practitioners that communication aids and props are utilised during investigative interviews with vulnerable people. Confirming the first prediction, it was apparent that drawing is a tool used frequently by both police officers and intermediaries, with no significant difference in perceived frequency of use between these two professional groups. Practitioner groups also perceived drawing as being 'very effective' with no significant between-group differences. As one might expect, ratings of effectiveness corresponded with reported use of drawing. That is, those who reported using drawing frequently, also regarded it as highly effective. Although the source of practitioners' knowledge about the use of drawing was not explored, it is reasonable to suggest that it is the recommendations outlined within ABE and RIPGM that have been fundamental in promoting the use of drawing across both groups. Particularly given that both the aforementioned publications are universally accepted as detailing 'gold standard' practice. That said, it is not necessarily the case that best practice advice for conducting investigative interviews is followed (Dando et al., 2008[a]; 2008[b]; 2009[b]), even when interviews are digitally recorded and so open to in-depth scrutiny. Hence, it appears likely that drawing is used largely because practitioners recognise its efficacy, which naturally promotes its use.

Practitioners demonstrated consensus in terms of the age groups that drawing was most effective with, and the specific groups that drawing might benefit during investigative interviews. Children *per se*, people with learning disabilities, and people with autism were listed as witness groups that respondents believed drawing is most effective with. This is not surprising given the previous research that has demonstrated the positive effects of drawing during investigative interviews. In particular, it is known that children produce significantly more correct information when they are asked to draw and describe an event that they have witnessed, as opposed to just verbally describing it (Salmon, 2001). The completeness and accuracy of accounts is also enhanced when children are asked to draw, provided that appropriate questioning methods are employed (Butler et al., 1995; Gross & Hayne, 1999, Salmon et al., 2003). Similarly, with regard to people with autism, drawing can increase access to memory stores (Barlow et al., 2011), with reduced risk of memory contamination (Strange et al., 2003).

Police officers and intermediaries may be aware of the memorial benefits of drawing because empirical research findings may be included in training packages, however, without further analysis of the training content provided to these groups, this assumption cannot be made, and thus should be explored. It may be the case that empirical data is not included, and if so, provision should be made to furnish practitioners with this knowledge. Additionally, there has been no research (to-date) that has examined practitioners' perceptions of autism and their ability to identify witnesses who have this condition. Moreover, this study did not ask respondents to elaborate upon their experiences of interviewing people with autism. It may be the case that some practitioners (particularly police officers) over or underestimated the number of persons with autism that they had interviewed. If this is the case, a carry-over effect may have occurred with regard to who officers perceive that drawing is effective for. While this factor may not be prominent to intermediaries (who are assigned to cases based upon their area of expertise), it is a factor that should be examined.

This study also explored practitioners' perceived use of drawing during investigative interviews with vulnerable groups (i.e., at what stages in the investigative process). Although no predictions were made, not surprisingly, professional group differences emerged in the stages that drawing is used; differences, which can be attributed to the various functions of each practical role, professional backgrounds, and training experience. For instance, police officers are not required to conduct a communication assessment prior to conducting an investigative interview with a vulnerable witness, thus they did not report to use drawing at this stage. Conversely, a communication assessment and the subsequent report that is produced after the assessment takes place, forms the foundations of the intermediary's recommendations to the interviewing officer (and court, if necessary). The communication assessment is therefore pivotal to intermediaries' role, thus providing an explanation as to why this group reports to use drawing during assessments.

Similarly, the police officers surveyed in this study had all received ABE interview training. As such, their reporting of when they use drawing corresponds with the phased approach of ABE. ABE interview training is not required of intermediaries before they begin to facilitate investigative interviews with vulnerable witnesses. In fact, it is not mandatory that intermediaries receive any investigative interview training at all. The interview knowledge that police officers have, in contrast to the lack of interviewing knowledge that intermediaries have demonstrated (Krähenbühl, 2011), is an important factor in explaining the differences between professionals' use of drawing.

Despite some professional group differences being observed with regard to the particular stages that drawing is used, there was a consensus that this tool is used generally throughout the interview, and that it was used to aid the process of questioning as and when necessary. This finding relates to practitioners' later comments concerning *why* they use drawing during interviews. For example, the overarching reasons cited by respondents, was that drawing aids communication and enhances memory.

Corresponding to the stages that drawing is utilised, the results from Study 1 indicate that both groups of practitioners provide specific instructions about what to draw, such as asking the interviewee to draw particular aspects of their account (e.g., 'please could you draw a map of the bedroom'). However, more police officers than intermediaries reported that they provide general instructions and encourage free drawing (e.g., 'please draw what happened'). Conversely, one intermediary reported that s/he produces the drawing herself and bases it upon the account provided by the witness. This statement of severely inappropriate practice may go some way to support the claim by Krähenbühl (2011) that intermediaries may lack understanding with regard to leading questions and questioning formats used within investigative interviews. Differences may also emanate from intermediaries' limited training and overall knowledge of interviewing strategies (Krähenbühl, 2011), as well as the difference in functions between the two professional groups, for example, police officers' requirement to gather reliable evidence.

With the exception of writing and drawing materials, differences between police officers' and intermediaries' use of particular props was evident. For instance, a greater proportion (54.2%) of intermediaries reported using 'cue / prompt cards' when compared to police officers, where only 2.9% of officers reported using this aid.

Similar findings were also revealed for the use of other communication tools such as timelines and calendars; post-it notes (topic cards); model furniture; and communication boards / charts. Most notably, intermediaries reported dolls as the second most used communication aid, with 66.7% reporting to use them. Interestingly, dolls were not reported as the second most common form of aid used by police officers, with only 17.6 reporting to use them during interviews. These results may suggest a relationship between empirical research findings and practice guidance concerning the use of dolls for police officers. For instance, numerous studies have reported that dolls are detrimental to the accuracy of children's recall when used during investigative interviews (Dickinson, Poole & Bruck, 2005). Further, ABE (2011) stipulates the importance of training when dolls are to be used during interviewing, emphasising that they should be used correctly and appropriately. Police officers lack of use of this communication aid, but greater use of writing and drawing materials, indicates a consensus between empirical research, best practice recommendations and actual police practice. The disparity between empirical research, interviewing guidance, and actual intermediary practice is, however, highlighted by these findings. Nonetheless, there is currently little practice guidance available for both police interviewers and intermediaries, regarding how best to use such props.

The use of communication aids such as drawing is at the discretion of the intermediary and interviewing police officer, and dependent upon individual expertise and experience. The findings of an intermediary's communication assessment with a vulnerable witness will also dictate recommendations regarding the use of communication aids. However, the Ministry of Justice does not stipulate the factors to be explored during the intermediary's communication assessment of a vulnerable witness. Although the RIPGM (2012) does suggest a structure for the communication assessment report, the use of particular communication aids is not discussed.

Alarmingly, Registered Intermediaries are not taught about 'best practice' when using communication aids during investigative interviews. It is reasonable to speculate that the cause for differences between police officers' and intermediaries' use of props during investigative interviews could be attributed to the lack of training that intermediaries receive on the topic of appropriate questioning during interviews, an issue previously highlighted by Krähenbühl (2011). However, this does not explain the commonality between police officers' and intermediaries use of writing and drawing materials, thus, the need for this factor to be further explored within future research is highlighted.

2.9.2. Practitioners' Use and Perceptions of the Cognitive Interview

The second aim of this study was to establish practitioners' perceptions and use of the CI when interviewing vulnerable witnesses. As predicted, officers reported that they used the CI with vulnerable witnesses. Moreover, they reported that they use the CI 'often' with vulnerable witnesses, and that it is 'very effective'. Nonetheless, a greater proportion of respondents reported that the CI is most effective with adults aged 18 to 64 years rather than with children and older adults. Additionally, officers reported the CI to be least effective for people with learning disabilities, autism and older adults. The findings from this study demonstrate some parallels with results presented by Wheatcroft et al. (2013), who suggested that officers rated the ECI as less useful when used with vulnerable witnesses such as children and adults with learning disability (in comparison to usefulness of the CI with typically developed adults). However, officers' overall rating of the effectiveness of the CI with vulnerable witnesses in the current study, contradicts these findings. To a certain degree, the current study assumed officers had sufficient knowledge of the CI in order to provide assessment of its effectiveness with particular groups. The results pertaining to officers' regular use of the CI with children under five years old (a group that ABE guidelines do not recommend application of the CI with), and officers perceived ineffective with persons who have learning disability, suggests that their understanding or knowledge may be somewhat flawed. If officers' understanding or application of the CI is misguided and/or their perception of autism and learning disability is misinformed, the results obtained in the current study, and in Wheatcroft et al. (2013) may need to be considered with caution. In order to understand the discrepancy between these results in more depth, police officers' overall understanding of the CI should be examined.

In contrast to the use and perceptions of the CI reported by police officers, as predicted, intermediaries' expressed a distinct lack of experience and knowledge of the CI. Most notably, the vast majority of intermediaries reported that they had never facilitated communication with a vulnerable witness during a CI, and were therefore unable to comment further on this subject. Interestingly, this finding does not correspond with police officers' reported use of the CI with vulnerable witnesses. Intermediaries' lack of ABE interview training renders them less likely to recommend the CI to interviewing officers when advising on effective communication, thus explaining the discrepancy between these two practice groups. Further, while the Youth Justice and Criminal Evidence Act 1999 provides provision for police officers to appoint a Registered Intermediary to facilitate communication during investigative interviews with vulnerable witnesses, this provision is not mandatory, thus may not be consistently exercised. It may be that interviewing officers are more likely to use the CI when an intermediary does not facilitate interviews, and vice versa.

2.9.3. Summary

Recruiting specialist interviewing officers and intermediaries was challenging, as demonstrated by the limited sample size obtained for this study. Similarly, these findings reflect only subjective interviewing practices. Upon investigation of objective data, for example, analysing video-recorded ABE interviews or ABE interview transcripts, a different picture may emerge. Despite these limitations, the findings from this study augment the previous research concerning police officers' use of the CI (Dando et al., 2008[b]; 2009[b]; Wheatcroft et al., 2013). Although it is understood that police officers do regularly use the CI, their perceptions of particular components (i.e., MRC) with specific witness groups such as people with autism, is not entirely clear. It may be the case that, as ABE recommends, some components are omitted from use with very young witnesses and witnesses with autism. Similarly, greater use and emphasis may be placed upon other components with these witnesses. Greater understanding of perceptions of practice would allow for the development of more bespoke investigative interview training that is tailored to police officers' and intermediaries' needs.

Importantly, these findings provide new insight into practitioners' use and perceptions of other interviewing techniques used with vulnerable witnesses, such as the use of communication tools and props, which goes some way to bridging the knowledge gap between empirical evidence and practice. For instance, this study has demonstrated that drawing is perceived as an effective interviewing tool, and one that is regularly used by both police officers and intermediaries during investigative interviews with vulnerable witnesses. It is clear from the findings that practitioners use drawing in different ways, with no consistent approach being apparent. The importance of establishing the ways in which this tool is most effective, and with which particular group(s) of vulnerable witnesses, is imperative in order to provide interviewers with empirically and theoretically sound practical guidance on this topic. Thus, the following chapters investigate how drawing can be systematically utilsed with vulnerable witnesses.

Chapter Three

The Efficacy of Sketch-Reinstatement of Context with Typically Developing Children and Adolescents

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3.1. Abstract

The primary aim of this study was to explore the efficacy of a developmentally appropriate recall technique with typically developing child and adolescent witnesses. Further, this study aimed to provide further insight into the effectiveness of the recall method currently advocated by best practice guidelines – Mental Reinstatement of Context. Employing a mock witness paradigm, 180 children (aged 5 to 16 years) viewed a film, and following a distractor task, each child and young person was interviewed using either: (i) Sketch Reinstatement of Context; (ii) Mental Reinstatement of Context; or (iii) no retrieval support (Control). The Sketch-Reinstatement of Context was most effective, improving remembering without a concomitant increase in intrusions, thereby significantly increasing recall accuracy when compared to MRC, and no retrieval support.

3.2. Introduction

Chapter 1 outlined the theoretical and empirical research concerning children and adolescents' retrieval of experienced events in forensic settings. More specifically, the previous two chapters outlined Achieving Best Evidence (ABE) guidelines include the use of the Cognitive Interview (CI), and also, the use of drawing. Study 1 explored the extent that these techniques are utilised by police officers and intermediaries. The current chapter begins with an evaluation of the most pertinent and currently used CI component – Mental Reinstatement of Context (MRC), before evaluating the use of drawing during investigative interviews. Study 2 is then reported, which extends the findings of Study 1 by exploring the efficacy of the novel drawing technique, Sketch Reinstatement of Context (Sketch-RC). Here, Sketch-RC is compared to the Mental Reinstatement of Context (MRC) technique with typically developing child and adolescent mock witnesses.

3.3. Empirical Evaluation of Mental Reinstatement of Context

The CI as a whole has been found to improve children's recall of events (e.g., Gentle et al., 2013; Holliday, 2003; Larsson & Lamb, 2009; McCauley & Fisher, 1995; Memon, Cronin, Eaves & Bull, 1995; Memon et al., 1996; Milne & Bull, 2003; Saywitz et al., 1992). The MRC component of the CI has been consistently applied within these studies. However, only a few studies to-date have examined the effectiveness of the MRC independently, despite previous research suggesting that police officers do not routinely apply all components of the CI during investigative interviews. Rather, it is evident that MRC is not one of the favoured CI components (Dando et al., 2009[b]; Kebbell et al., 1999; Wheatcroft et al., 2013). In contrast, empirical evidence suggests that MRC is the most powerful and effective mnemonic of the CI (Memon & Bull, 1991; Milne & Bull, 2002). Further, MRC is currently the only retrieval technique recommended by ABE guidelines that endeavours to provide memorial support to vulnerable witnesses. Thus establishing its effectiveness when used in isolation is important, in order to provide police officers with appropriate guidance to obtain best evidence.

Findings of the studies conducted thus far have produced mixed results regarding the efficacy of MRC when it is applied in absence of other CI mnemonics during interview procedures with child witnesses (to-date, no research has examined the efficacy of MRC with adolescent witnesses). As introduced in Chapter 1, a number of studies have revealed MRC to enhance children's recall when compared to standard interview protocols (e.g., Dietze & Thomson, 1993; Dietze et al., 2012; Hayes & Delamothe, 1997; Köhnken et al., 1999; McCauley & Fisher; 1995; Milne & Bull, 2003), and the benefits of using this technique have been observed both in terms of interactive and observed events (Dietze & Thomson, 1993; Dietze et al., 2012; Hammond, Wagstaff & Cole, 2006; Hayes & Delamothe, 1997).

Some studies employing MRC, however, have not revealed an increase in the amount of information recalled in interviews overall, rather, improved memorial performance has only been observed during the free recall stage (Hershkowitz, 2001; Hershkowitz, Orbach, Lamb, Sternberg & Horowitz, 2002). Conversely, other studies have only revealed an increase in correct information during the questioning phase (e.g., Milne & Bull, 2003). Contrary to the positive findings outlined, MRC has also been found to increase the amount of 'inaccurate facts' reported by typically developing children (McCauley & Fisher, 1995; Memon et al., 1997), thus being detrimental on episodic memory performance. Other studies have also failed to find a positive memorial effect of MRC with children (e.g., Darwinkel et al., 2014; Dietze et al., 2010; Memon et al., 1996; Milne & Bull, 2002).

There is a lack of understanding as to what exactly causes the MRC component to be beneficial in some studies, but not in others. Although a difference in the delay between the to-be-remembered event and interview is one factor that is suggested to impact upon the efficacy of the MRC (Akehurst et al., 2003), other factors are suggested to be more influential. For instance, the number and type of prompts used by interviewers during the free recall/free narrative account of interviews (Darwinkel et al., 2014). The use of a greater number of appropriate (non-suggestive/leading, open-ended) prompts that are salient to the witness, is likely to result in an increase of correct information recalled, thereby enhancing the positive effects of MRC. However, providing appropriate prompts, while simultaneously providing retrieval cues to witnesses is a difficult task for interviewers, and is demonstrated by their insufficient application of MRC (Dando et al., 2009[b]). Nonetheless, there are a number of factors that potentially render MRC as problematic for some witnesses.

First, MRC requires the interviewee to receive (understand), and then implement (apply) a series of complex instructions, which requires significant language processing capacity and unimpaired attention and concentration abilities (see Dando, 2013; Dietze, & Thomson, 1993). Incidentally, it has been suggested that children may have difficulty comprehending and applying the MRC instructions in a way that supports retrieval (Memon et al., 1996). Given the nature of MRC, that is, silently thinking about the event in question in order to reinstate context, it is difficult to measure the extent to which the mnemonic instructions are actually understood and applied. Nonetheless, asking children to reinstate context 'outloud', where it is clear that instructions have been received, did not result in a positive effect on memorial performance (Dietze et al., 2010). Moreover, this method does not ensure that the instructions have been applied in a way that supports retrieval, merely that the instructions have been attended to.

Second, yet most pertinent, the interviewee must be able to access memories based upon the verbal mnemonic instructions provided, in particular, the mnemonic instructions must correspond with the memory traces stored (Tulving & Thomson, 1973). The more that cues are compatible with metarepresentations and the event details, the greater is the probability of effective context reinstatement and memory retrieval (Tulving, 1979). Thus, the efficacy of MRC is heavily dependent upon comprehension of the instructions verbalised by the interviewer, as well as the salience of retrieval cues provided. At best, it is argued that MRC is cognitively demanding, thus consideration of alternative retrieval strategies should take place.

3.4. Empirical Evaluation of Drawing During Investigative Interviews

As outlined in Chapter 1, Section 1.10, research has found that children produce significantly more correct information when they are asked to draw and describe an event that they have witnessed, as opposed to just verbally describing it (Barlow et al., 2011; Butler et al., 1995; Gross & Hayne, 1998; 1999; Jolley, O'Kelly, Barlow & Jarrold, 2002; Salmon, 2001; Salmon et al., 2003; Wesson & Salmon, 2001). The completeness and accuracy of accounts is also enhanced when children are asked to draw, provided that appropriate questioning methods are employed (Butler et al., 1995; Gross & Hayne, 1999, Salmon et al., 2003).

The benefits of asking children to draw while recalling events are twofold. First, because much of the information that they encode is sensory and perceptual, child witnesses require a precise retrieval cue and memory store match (Ackerman, 1985; Bjorklund, 1987; Salmon 2001). Drawing allows children to generate their own retrieval cues; cues that are salient and child-led. Generating salient retrieval cues, as advocated by the principles of encoding specificity (Tulving & Thomson, 1973), can prompt recall of further details, while also aiding the structure of children's free recall narrative (Butler et al., 1995; Wesson & Salmon, 2001; Patterson & Hayne, 2011). Second, drawing can reduce the social pressure associated with interviewer-interviewee interactions due to the shift in focus to the drawing, rather than on the interviewee (Pipe & Salmon, 2009). Also, shifting the onus of responsibility from the interviewer to the child, builds upon the child's abilities (rather than limitations) by creating an environment in which the child can optimally report events (Barlow et al., 2011; Saywitz, 1995).

Sketch-Reinstatement of Context (Sketch-RC), a tool that employs the use of drawing, whilst also attempting to reap the benefits of MRC (as described in Chapter 1, section 1.10.1), has been found to benefit episodic recall in adults of various age ranges, including those aged 65 and over (Dando, et al., 2009[a]; Dando, 2013; Dando, Wilcock, Behnkle & Milne, 2011; Dando, Wilcock, Milne & Henry, 2009[c]), when compared to traditional MRC instructions and a control procedure (no retrieval support). The advantages of applying the Sketch-RC procedure with child and adolescent witnesses may stem from the following sources:

i) simplicity of the instructions. These simple instructions are less time-consuming for police officers to administer in comparison to the traditional MRC – providing a tool that is easy, yet effective, to apply will increase the likelihood of its use, given that current research that suggests the CI is not routinely used or applied correctly (Chapter 2; Dando et al., 2008[b]; 2009[b]);

ii) the simple and less cognitively demanding nature of the Sketch-RC technique increases the likelihood of children correctly processing and applying the instructions given by interviewers. That is, children are not required to complete several concurrent cognitive operations, hence increasing the likelihood of children correctly processing and applying the instructions given by interviewers; and

iii) responsibility for the creation of retrieval cues is transferred onto the witness, rather than being interviewer-led. This is important because incompatible retrieval cues are known to impair episodic retrieval performance (e.g., Schacter et al.,1998). Self-generated cues are likely to be more salient to the witness, as opposed to interviewer-generated ones. As such, drawing in these conditions can support retrieval and increase access to memory stores (Barlow et al., 2011), with reduced risk of memory contamination (Strange et al., 2003).

3.5. Aims of Study 2

As this chapter has outlined, recall abilities during MRC and drawing conditions have been empirically explored with young children (albeit, with mixed results from the former procedure), but no study has yet investigated the effects of the MRC mnemonic and drawing with adolescents, despite the social and communication needs that this group present (as outlined in Chapter 1, section 1.4). Correspondingly, no study has investigated the efficacy of the Sketch-RC technique with children and adolescents (i.e., people under the age of 18 – a population who are deemed vulnerable by virtue of age, therefore likely to be interviewed according to ABE guidelines). The current experiment therefore employs the use of drawing and examines Sketch-RC with various age groups of typically developing children and adolescents ranging from 5 to 16 years old, comparing this procedure to the currently used MRC mnemonic, and to no retrieval support. Based upon the theoretical and experimental literature outlined within Chapter 1 and within the current chapter, it was predicted that:

1. There will be a difference in the amount of information produced by younger and older children/adolescents, regardless of retrieval condition;
2. There will be a difference in recall performance of children and adolescents who are supported at retrieval with the Sketch-RC technique, when

compared to their peers who are provided with retrieval support in the form of MRC, and those who are provided with no retrieval support.

3.6. Method

3.6.1. Design

A between subjects design was employed with two independent variables. The first: interview, on three levels, i) Sketch-RC, ii) Mental Reinstatement of Context (MRC), and iii) Control. The second: age, on three levels: i) 5 to 7 year old children; ii) 8 to 11 year old children; and iii) 12 to 16 year old children and adolescents. The dependent variable was episodic memory performance as measured by the amount of information recalled, and whether that information was *correct*, *incorrect*, or *confabulated*, and *percentage accuracy*. The *type* of information recalled was also coded as *action*, *person* or *surrounding*.

3.6.2. Participants

One hundred and eighty (N = 180) typically developing children aged between 5 and 16 years participated in the research. The sample comprised of 89 males and 91 females, all of whom were recruited from one mainstream primary school and one mainstream secondary school in England. To minimise development and cognitive differences in memory performance (Gee & Pipe 1995), participants were matched within age groups according to chronological age: 5 to 7 years (N = 60); 8 to 11 years (N = 60) and 12 to 16 years (N = 60), and were then randomly assigned to an experimental condition according to these groups.

All children completed a receptive vocabulary test, namely, the British Vocabulary Picture Scale (BPVS-III), and a measure of performance reasoning using

Ravens Coloured Progressive Matrices (RCPM; Raven, Court, & Raven, 1999) – see rationale for selecting these particular measures in Chapter Four. The BVPS-III measures receptive vocabulary, and takes approximately 40 minutes to administer. BPVS-III requires the tester to say a word following which the child responds by selecting the picture (from four options) that best illustrates the word's meaning. The questions broadly sample words that represent a range of content areas such as actions, animals, toys and emotions, and parts of speech such as nouns, verbs or attributes, across all levels of difficulty. The purpose of administering the BVPS-III was to assess the participants' receptive (comprehension) vocabulary.

The RCPM measures a child's ability to make sense and meaning out of complex visual displays. Additionally, the ability to perceive new patterns and relationships, and to forge (largely non-verbal) constructs that make it easy to handle complexity is also measured. This test, which takes approximately 15 minutes to complete, requires children to look at a series of pictures that contain geometric figures. One piece is missing from each picture, and the child must select the missing piece from six possible answers.

The BPVS-III and RCPM were administered for two purposes: i) to serve as a distraction task between the event observation and interview, and ii) to ensure that each experimental group were functioning at comparable and typical levels. Although participants were matched according to chronological age, analysis of variance revealed that there were no significant developmental differences between experimental groups, all Fs < .445, all ps > .64. See Table 7 for mean age, and raw BPVS-III and RCPM scores.

Table 7. *Participants' age, BPVS-III and RCPM scores as a function of group, condition, and group X condition.*

	Age (years and months)		BPVS-III		RCPM	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	10 years 3 months	37.87 months	114.23	28.00	24.03	6.84
MRC (total)	10 years 2 months	36.85 months	114.23	30.90	24.13	7.78
Control (total)	10 years 4 months	37.75 months	111.83	30.97	21.10	7.56
5 to 7 years (total)	7 years 1 month	9.85 months	84.38	16.33	17.58	6.09
Sketch	7 years 1 month	9.64 months	87.30	13.28	17.80	5.66
MRC	7 years 0 months	10.79 months	80.85	18.45	16.95	6.09
Control	7 years 1 month	9.53 months	84.70	17.02	18.00	6.73
8 to 11 years (total)	9 years 9 months	10.97 months	111.45	19.77	24.45	5.33
Sketch	9 years 8 months	12.62 months	113.20	19.03	24.40	5.20
MRC	9 years 7 months	8.60 months	116.00	17.53	24.40	5.45
Control	9 years 9 months	11.85 months	105.15	21.85	24.55	5.61
12 to 16 years (total)	14 years 0 months	21.14 months	144.73	13.41	30.23	4.18
Sketch	14 years 1 month	21.14 months	142.20	17.56	29.90	2.97
MRC	13 years 11 months	26.85 months	146.35	7.42	31.05	4.06
Control	14 years 1 month	27.75 months	145.65	13.61	29.75	5.28

3.6.3. Retrieval Conditions

Each of the retrieval conditions were structured according to the current investigative interview model used in England and Wales, and Achieving Best Evidence advice (MOJ, 2011). Interviews comprised the same phases in the same order, as follows: (i) greet; (ii) rapport; (iii) explain; (iv) free recall; and (v) closure (see Figure 8).

	Retrieval Condition		
Phase	Sketch-RC	MRC	Control
Phase 1	Greet	Greet	Greet
Phase 2	Rapport	Rapport	Rapport
Phase 3	Explain	Explain	Explain
Phase 4: Recall Attempt 1	Sketch-RC and Free Recall	MRC and Free Recall	Free Recall Only
Phase 5: Recall Attempt 2	Questioning	Questioning	Questioning
Phase 6	Closure	Closure	Closure

Figure 8. Retrieval conditions and corresponding interview phases.

Interviews differed only in the *free recall* phase, where the experimental manipulation took place, and so it is the free recall procedure across conditions that is described below (see Appendix E for full interview protocol):

Sketch Reinstatement of Context (Sketch-RC)

The free recall component in this condition began with participants being supplied with drawing materials (pencils, erasers, and paper) and then being given drawing instructions (verbatim):

"What I would like you to do now, is draw about the video that you watched earlier. I would like you to draw as much as you can. It can be absolutely anything that you want, and anything that might help you to remember what happened. Also, if you can, I would like you to tell me what you're drawing, as you draw it."

Participants were allowed unlimited time to complete their drawing, and were able to use as many pieces of paper as they wished. Following the completion of each drawing/s the researcher waited silently for 10 seconds (to allow participants to add to/change their drawings), then when the participants had signaled that they had finished they were given the free recall retrieval instructions:

"I haven't seen the video that you watched, so I would like you to tell me everything that happened in it. Tell me everything that you remember. It is very important that you do not guess – only tell me what you really remember. It is okay to say when you don't know, or can't remember... Starting from the very beginning, tell me what happened on the video…"

Mental Reinstatement of Context

Participants were given the MRC instructions verbatim:

"In a moment, I am going to ask you to tell me what you remember about the video that you watched earlier, but before you start, I would like us to have some thinking time. As I talk to you, I would like you to think about each of the things I say, as I say them. Closing your eyes or looking at the wall may help you to think."

Following this introduction, MRC was then conducted (see Appendix F for full protocol). Upon completion, the same free recall instructions as in the Sketch-RC condition (verbatim) were implemented.

Control

Participants were given the free recall instructions (verbatim) as in the Sketch-RC and MRC conditions.

For all three conditions, participants were allowed unlimited time to explain what they could remember, and while they were doing so the researcher exhibited active listening, but did not interrupt the child. When the child stopped speaking, the researcher waited 10 seconds before asking the participant if he/she could remember anything else about the video, or wanted to add anything.

3.6.4. Procedure

Participants were all tested individually on school premises. The researcher (PhD candidate), a trained forensic interviewer conducted all interviews for this research, thus limiting the effects of interviewer variability. Written consent was provided by each participant's parent/guardian and from every head teacher at participating schools, prior to the researcher's arrival. Verbal consent (which was digitally recorded) was also gained from each child immediately prior to participating in the research.

Upon arrival, the researcher initially engaged each child in conversation about neutral events, unrelated to the research. During this time the researcher introduced herself, asked questions about the paintings displayed on the classroom walls, for example, and conversed about school related matters such as when break times were, and what the school dinners were like, etc.

Participants were introduced to the research study, and informed that the researcher was trying to learn how to help people to remember things. An example was given as follows: “for example, if you have seen something, and you want to tell somebody what you saw, I am interested in understanding how to help you to do that.” Participants were naïve to the aims and hypotheses of the study, but given the developmental and cognitive vulnerability of some participants (i.e., very young children) it was deemed important to provide enough information to allow them to give informed (verbal) consent. It was also explained to each child that their participation was not a school test, and that he/she did not have to take part, and could stop at any time and go back to their friends/classroom whenever they wished.

Each participant first viewed a stimulus film on a portable tablet computer, in a different room to where the retrieval would later take place (to avoid spontaneous environmental context reinstatement). Developed by Centrex (Central Police Training and Development Authority), the film portrays a non-violent criminal offence (a shop theft) and lasted 58 seconds. The film opens showing a road with numerous cars passing by, and local shops in the distance. The camera pans to show two people walking down the road and going into one of the shops. Approximately 20 seconds later, the same two people are seen running out of the shop, chased by a man (believed to be the shopkeeper). The video then ends. No event(s) that takes place inside the shop are shown to the viewer. The stimulus contains the following information items: 63 person-specific items; 19 action-specific items; and 64 scene-of-crime (surrounding-specific) items.

Participants then moved to a second room and completed two distractor tasks with the researcher: BVPS-III and RCPM, which took approximately one hour. Participants were randomly allocated to one of the three retrieval conditions and were individually interviewed according to condition (using the appropriate interview protocol, verbatim). Interviews were digitally recorded for later transcription and scoring.

3.6.5. Interview Coding

The audio-recorded interviews were transcribed and coded according to a scoring template technique (e.g., Memon et al., 1996). A comprehensive catalogue of information was assembled, totaling 145 items. Items recalled were only scored once. Each individual item recalled by participants was categorised as either (i) correct; (ii) incorrect (e.g., describing a person's hair colour as blonde instead of brown); or (iii) a confabulation (reporting a piece of information that was not present within the film). Each item recalled was further categorised as either person, action or surrounding information. Person information included all descriptive information associated with persons in the video (e.g., girl; boy; brown hair; jeans; trainers etc.). Action information concerned any actions carried out by persons in the video (e.g., walking; running; driving; laughing etc.), and surrounding information concerned environmental details (e.g., trees; road; shop; post-box etc.). Due to the content of the stimuli, that is, a long distance view of a crime scene where objects, per se, were not visible, 'object' information that was reported (i.e., items that the persons were holding) was collapsed into 'surrounding' information. Although the stimuli did not contain any sound, recall of any information relating to sounds was coded into the relevant category (e.g., details of conversations were considered to be 'person' information).

Percentage accuracy was considered, and determined by dividing the total number of correct items recalled by the total overall number of items recalled (i.e., correct + incorrect + confabulated). Additionally, the number of questions asked was scored. Questions were defined as specific probes for information (Wright & Holliday, 2007). For example, ‘You said that there was a shop; tell me about that shop… …Is there anything else that you want to tell me about the shop?’ Repeated or rephrased questions were only scored the first time they were asked.

To ensure reliability and consistency throughout the coding of interviews, 30 interviews (10 from each age group) were randomly selected for recoding by an independent coder who was blind to the aims and hypotheses of the research, but familiar with the template method of scoring used here. Cohen’s Kappa coefficients for agreement between raters for the overall amount of correct, incorrect, and confabulated recall were .714, .791 and .724, respectively, all at $p < .01$, indicating a good level of agreement between raters.

3.6.6. Coding of Drawings

All participants in the Sketch-RC condition completed a drawing (60 in total), which was coded and analysed (separately from verbal recall) as follows. Guided by the drawings produced and by the way in which recall performance was analysed, each of the individual items drawn was categorized as being person, action, surrounding, or other. The ‘other’ category was used for abstract items/elements of the children’s drawings (e.g., shapes, doodles, squiggles etc.). The number of items drawn in each of the categories was then summed. Items were only counted once and were not scored as correct, incorrect or confabulations, because the items drawn were representational and not information directly copied, but abstractions of what had been experienced. The quality and accuracy of the drawings was not considered. For example, if a participant had drawn two people, irrespective of the quality of the drawings, the drawer was awarded a score of two in the person category. Likewise, if the participant had drawn a road, a roundabout, and three shops, he/she was awarded a score of five in the surrounding category. Action information was defined as any drawn item/shape that indicated movement or action. For example, if a participant had drawn an arrow indicating the direction in which a person was moving, or had drawn a person running, he/she was awarded one mark for each action information item (the arrow, and running).

3.7. Analysis Approach

The number of questions asked within each interview was examined using analysis of variance (ANOVA), followed by post hoc tests (applying Bonferroni's correction) where appropriate. All interviews were conducted in accordance to ABE guidelines, thus comprising a phased approach, namely, free recall and questioning. As such, analysis of memorial performance was first considered in its entirety by combining recall in these phases and examining overall interview performance, including duration of interviews. Analysis then explored children's interview performance within the free recall and questioning phases.

Memorial performance was initially assessed by examining the total amount of information recalled. This was calculated by totalling the number of correct, incorrect and confabulated items reported. Using ANOVA, significant univariate findings were further examined with post hoc analyses (applying Bonferroni's correction) where appropriate. Eyewitness memorial performance is typically assessed in more depth by analysing correct item recall, incorrect item recall, and confabulations individually. However, these measures share a common conceptual meaning and they contribute, both in combination and individually, to understanding the efficacy of an episodic retrieval technique. Equally, the manipulations employed in this research are likely to affect eyewitness performance in more than one way, and hence need several criterion measures. As such, these performance measures have been considered in combination, as a linear composite variable using multivariate analyses (MANOVA) applying Pillai's Trace. Significant multivariate effects were further investigated by considering the univariate (ANOVA) results and Bonferroni *post hoc* test analyses.

Examining the type of information recalled during interviews is essential, however, it is also important to explore the impact that retrieval techniques have upon the overall accuracy of information recalled to ensure that increases in correct information recalled do not occur alongside increases in incorrect and confabulated information recalled. As such, ANOVA was used to examine the percentage accuracy of information recalled. Percentage accuracy was determined by dividing the total number of correct items recalled by the total overall number of items recalled (i.e., correct + incorrect + confabulated). Significant findings were examined using Bonferroni *post hoc* test analyses. Finally, ANOVA was also used to explore the number of items depicted in children's drawings, and a series of Pearson's correlation were applied to examine the relationship between the number of items drawn and children's recall performance.

Levene's test indicated that the assumption of variance had been violated for a number of performance measures. Transforming the data did not rectify this problem. As all sample sizes were equal throughout the analysis, the analysis approach is considered robust (Field, 2009; 2013; Zimmerman, 2004), and the *F*-tests are reported nevertheless.

3.8. Results

The results of this study are summarised in terms of overall interview performance, as well as free recall and questioning performance as a function of both age and condition. Due to the volume of results produced, the following sections report the key findings, only. For a full and detailed presentation of additional results, see Appendix G.

3.8.1. Overall Memorial Performance: Information Recalled

Multivariate analysis of the combination variable (correct + incorrect + confabulations) for information recalled throughout the entire interviews, revealed significant main effects of age group and conditions, F (6, 340) = 21.527, $p < .001$, $\eta_p^2 = .275$; F (6, 340) = 7.395, $p < .001$, $\eta_p^2 = .115$, respectively (see Table 8 for means and standard deviations). Consideration of the univariate ANOVAs revealed that the multivariate effect of age group emanated from the amount of correct, incorrect and confabulated information recalled, F (2, 171) = 57.184, $p < .001$, $\eta_p^2 = .401$; F (2, 171) = 3.533, $p = .031$, $\eta_p^2 = .040$; F (2, 171) = 8.205, $p < .001$, $\eta_p^2 = .088$, respectively.

Post hoc analyses show that, regardless of condition, children in the 12 to 16 age group, 95% CI [48.61, 55.93], recalled significantly more correct items than children aged 5 to 7, 95% CI [22.04, 29.03], and also, children aged 8 to 11, 95% CI [32.51, 39.49], all *p*s < .001. Similarly, children aged 8 to 11 recalled significantly more correct information than their peers aged 5 to 7, $p < .001$. With regards to confabulated items, children aged 12 to 16, 95% CI [2.033, 5.47], produced fewer confabulations than children aged 8 to 11, 95% CI [7.02, 10.45], $p < .001$. No significant differences in the amount of confabulated information were revealed between children aged 5 to 7, 95% CI [4.43, 7.87] and both groups aged 8 to 11, p = .112, and 12-16, p = .158. Despite a significant univariate result concerning incorrect information recalled, no significant difference between age groups was revealed.

Univariate analyses found that the significant multivariate effect of condition was attributed to amount of correct information recalled and confabulated items produced by participants, F (2, 171) = 6.563, p = .002, η_p^2 = .071; F (2, 171) = 5.725, p = .004, η_p^2 = .063, respectively. No significant effect of condition was revealed for incorrect information recalled, F = 2.514, p = .084. Post hoc analyses revealed that participants in the Sketch RC condition, 95% CI [38.89, 45.88], recalled significantly more correct information than those in the Control condition, 95% CI [29.82, 36.81], p = .001. No significant difference in the amount of correct information was found between participants in the MRC, 95% CI [34.44, 41.43] and both the Sketch RC, p = .232, and Control conditions, p = .200. With regards to confabulated information, children in the Sketch condition, 95% CI [2.28, 5.72] produced significantly less confabulated items that those in the MRC condition, 95% CI [6.42, 9.85], p = .003. No significant differences emerged between participants in the Control condition, 95% CI [4.78, 8.22] and those in the Sketch RC, p = .131, and MRC conditions, p = .558. No significant age group X retrieval condition interaction was found, F = 1.757, p = .053.

Table 8. *Means and standard deviations for correct, incorrect, and confabulated information recalled overall as a function of group, condition, and group X condition.*

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	42.38	16.85	5.02	3.28	4.00	4.31
MRC (total)	37.93	21.03	6.58	4.71	8.13	7.52
Control (total)	33.32	14.70	6.52	4.96	6.50	8.49
5 to 7 years (total)	25.53	11.51	5.48	4.28	6.15	8.30
Sketch	28.95	9.38	4.75	3.89	3.35	2.58
MRC	23.50	14.14	6.05	4.54	6.80	6.63
Control	24.15	10.25	5.65	4.49	8.30	12.23
8 to 11 years (total)	36.00	13.14	5.38	3.46	8.73	7.81
Sketch	39.85	13.03	4.90	3.02	6.40	6.00
MRC	33.50	11.91	5.00	3.33	11.55	9.76
Control	34.65	14.15	6.25	3.96	8.25	6.61
12 to 16 years (total)	52.10	17.74	7.25	5.16	3.75	3.70
Sketch	58.35	12.59	5.40	2.96	2.25	2.31
MRC	56.80	20.43	8.70	5.45	6.05	4.21
Control	41.15	14.51	7.65	6.19	2.95	3.27

Univariate analysis of the total amount (correct + incorrect + confabulated) of information recalled during the interview, revealed a significant effect of age, F (2, 171) = 26.778, $p < .001$, $\eta_p^2 = .238$. Post hoc analysis found that, regardless of condition, children aged 12 to 16, $M = 63.10$, $SD = 21.82$, 95% CI [58.15, 68.05] recalled the most amount of information overall, when compared to those aged 5 to 7, $M = 37.17$, $SD = 17.50$, 95% CI [32.22, 42.11], $p < .001$, and those aged 8 to 11, $M = 50.12$, $SD = 19.52$, 95% CI [45.17, 55.06], $p = .001$. Similarly, children aged 8 to 11 recalled significantly more information than children aged 5 to 7, $p = .001$. No significant effect of condition was found (Sketch-RC, *M* = 51.40, *SD* = 18.45, 95% CI [46.45, 56.35]; MRC, *M* = 52.65, *SD* = 26.65, 95% CI [47.70, 57.60]; Control, *M* = 46.33, *SD* = 20.79, 95% CI [41.39, 51.28], *F* = 1.782, *p* = .171. Similarly, no age group X condition interaction was revealed, *F* = 1.925, *p* = .108.

3.8.2. Overall Accuracy

Univariate analysis revealed significant effects of age and retrieval condition on overall accuracy, F (2, 171) = 16.284, $p < .001$, $\eta_p^2 = .160$; F (2, 171) = 12.323, $p < .001$, $\eta_p^2 = .126$, respectively (see Figure 9). Regardless of condition, participants aged 12 to 16, *M* = 83.18, *SD* = 8.24, 95% CI [79.39, 86.97] were significantly more accurate than children aged 5 to 7, *M* = 68.03, *SD* = 20.90, 64.24, 71.82], *p* < .001, and children aged 8 to 11, *M* = 72.84, *SD* = 15.43, 95% CI [69.05, 76.63], *p* = .001. No significant difference in accuracy was revealed between participants aged 5 to 7 and 8 to 11, *p* = .234.

Children in the Sketch-RC condition, *M* = 82.90, *SD* = 10.06, 95% CI [78.30, 85.88], were significantly more accurate overall, than children in both the MRC, *M* = 68.92, *SD* = 19.87, 95% CI [65.13, 72.71], *p* < .001, and Control conditions, *M* = 73.04, *SD* = 16.63, 95% CI [69.25, 76.83], *p* = .003. No difference in accuracy was found between children in the MRC and Control conditions, *p* = .394. Further, no significant age X retrieval condition interaction effect was found, *F* = .673, *p* = .612.

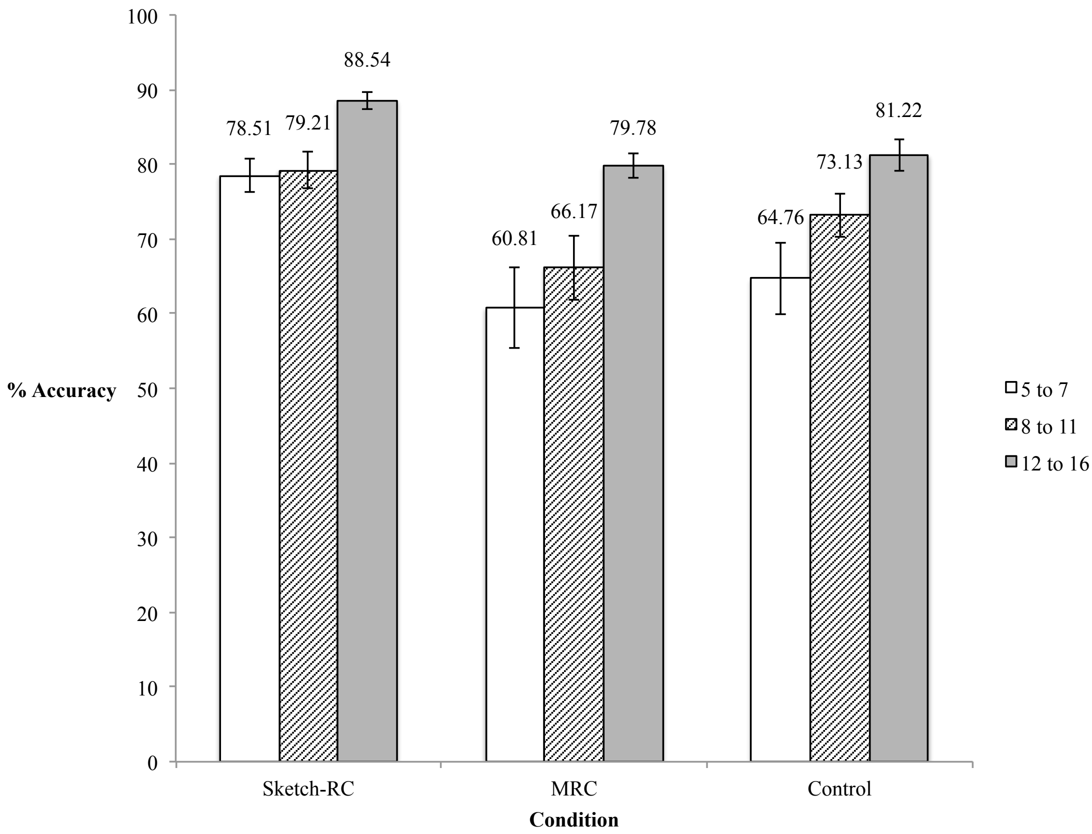

Figure 9. Overall percentage accuracy as a function of group and retrieval condition.

3.8.3. Free Recall Performance: Information Recalled

Interviews comprised two recall attempts: free recall and questioning. The following sections will report the key findings from each recall attempt in turn.

Multivariate analysis of the combination variable (correct + incorrect + confabulations) for information recalled throughout the free recall phase of interviews, revealed significant main effects of age group and conditions, F (6, 340) = 17.821, $p < .001$, $\eta_p^2 = .239$; F (6, 340) = 3.127, $p = .005$, $\eta_p^2 = .052$, respectively (see Table 9 for means and standard deviations). No significant age group X retrieval condition interaction was found, $F = 1.166$, $p = .305$.

Univariate analyses revealed that the multivariate effect of age emanated from the amount of correct and incorrect information recalled during the free recall phase,

F (2, 340) = 72.394, p < .001, η_p^2 = .458; F (2, 340) = 3.977, p = .021, η_p^2 = .044, respectively. Children aged 12 to 16, 95% CI [24.23, 27.67] recalled significantly more correct information than children aged 5 to 7, 95% CI [9.54, 12.99] and those aged 8 to 11, 95% CI [14.89, 18.34], all ps < .001. Further, children aged 8 to 11 also recalled more correct information during the free recall phase of interviews than children aged 5-7, p < .001. With regards to incorrect information, children aged 12 to 16, 95% CI [.89, 1.47], produced significantly more incorrect information than those aged 5 to 7, 95% CI [.36, .94], p = .031. No significant differences were found between children aged 8 to 11, 95% CI [.43, 1.00], and those in age groups 5 to 7, p = 1.00, and 12 to 16, p = .074. Further, no significant effect of age group was found on the amount of information that was confabulated during this phase, F = 1.052, p = .351.

Univariate analyses found that the significant multivariate effect of condition was attributed to amount of correct information recalled by participants, F (2, 171) = 7.036, p = .001, η_p^2 = .076. Regardless of age, participants in the Sketch-RC condition, 95% CI [18.54, 21.99], recalled significantly more correct information during the free recall phase of interviews than children in the Control condition, 95% CI [13.91, 17.36], p = .001. No significant differences emerged between children in the MRC, 95% CI [16.21, 19.66] and Sketch-RC, p = .182, MRC and Control conditions, p = .193. No effect of condition was found on the amount of incorrect or confabulated information produced, F = .406, p = .667; F = .408, p = .666, respectively.

Table 9. *Means and standard deviations for correct, incorrect, and confabulated items of information produced during the free recall phase as a function of group, condition, and group X condition.*

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	20.27	8.81	.77	1.06	.63	1.24
MRC (total)	17.93	10.86	.83	1.08	.88	1.74
Control (total)	15.63	7.57	.95	1.27	1.10	4.39
5 to 7 years (total)	11.27	4.64	.65	.84	1.30	4.44
Sketch	13.40	3.62	.45	.69	.70	1.34
MRC	9.10	4.35	.75	.85	1.20	2.17
Control	11.30	5.08	.75	.97	2.00	7.34
8 to 11 years (total)	16.62	6.84	.72	.99	.60	1.50
Sketch	19.10	7.38	.60	.82	.80	1.54
MRC	16.25	7.13	.60	.68	.50	1.40
Control	14.50	5.34	.95	1.36	.50	1.61
12 to 16 years (total)	25.95	9.12	1.18	1.43	.72	1.28
Sketch	28.30	7.37	1.25	1.41	.40	.68
MRC	28.45	9.80	1.15	1.50	.95	1.57
Control	21.10	8.42	1.15	1.46	.80	1.40

3.8.4. Free Recall Accuracy

Univariate analysis revealed a significant effect of age on the accuracy of information recalled during the free recall phase, F (2, 171) = 5.648, p = .004, η_p^2 = .062 (see Figure 10). Post hoc analysis revealed that children in the 5 to 7 age group, M = 84.40, SD = 23.34, 95% CI [80.28, 88.51], were significantly less accurate than children in both the 8 to 11 age group, M = 92.09, SD = 14.52, 95% CI [87.98, 96.21], p = .030, and children in the 12 to 16 age group, M = 93.65, SD = 6.53, 95% CI [89.54, 97.77], p = .006. No difference in accuracy was found between age groups 8 to 11 and 12 to 16, p =1.000. No effect of condition was found upon free recall accuracy, F = 2.808, p = .063. Similarly, no age group X condition was revealed, F = .961, p = .430.

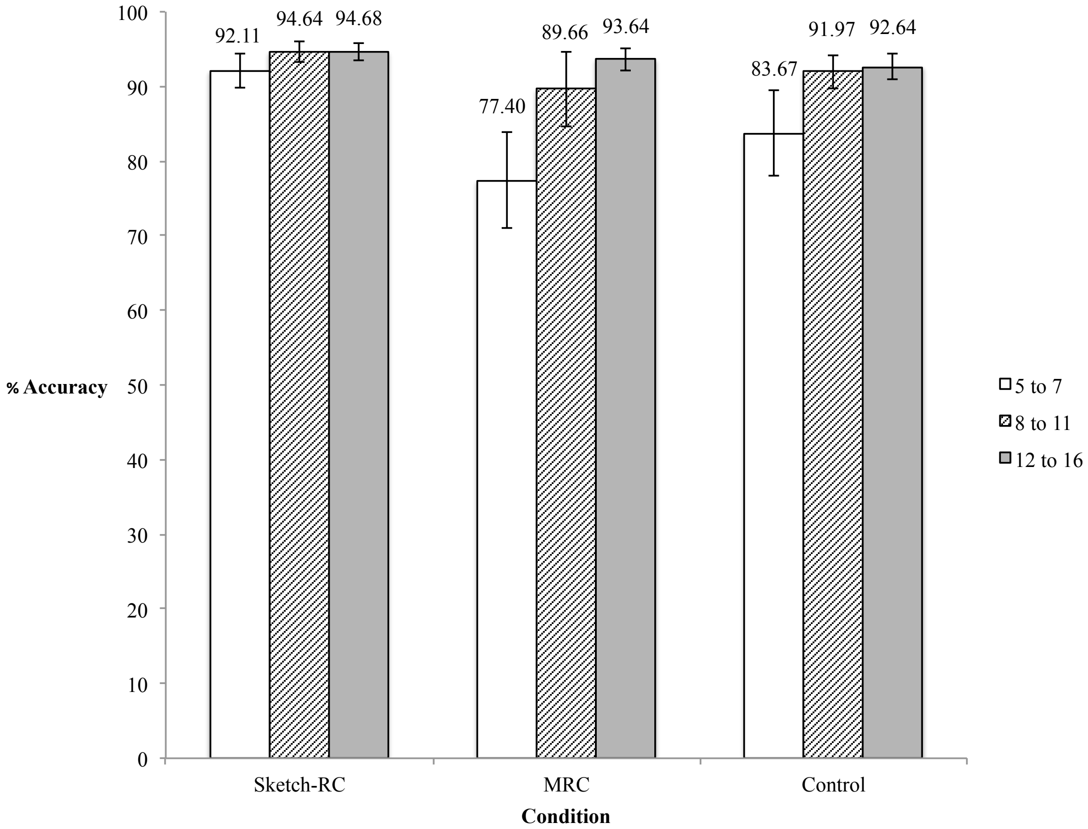

Figure 10. Free recall percentage accuracy as a function of group and retrieval condition.

3.8.5. Questioning Phase Performance: Information Recalled

Multivariate analysis of the combination variable (correct + incorrect + confabulations) for information recalled throughout the questioning phase of interviews, revealed significant main effects of age group and condition, F (6, 340) = 14.854, p < .001, η_p^2 = .208; F (6, 340) = 6.067, p < .001, η_p^2 = .097, respectively (see Table 10 for means and standard deviations). Further, a significant age group X retrieval condition interaction was found, F (12, 513) = 1.878, p = .035, η_p^2 = .042.

Univariate analyses revealed that the multivariate effect of age group emanated from the amount of correct and confabulated information recalled during the questioning phase, F (2, 171) = 22.891, $p < .001$, $\eta_p^2 = .211$; F (2, 171) = 13.928, $p < .001$, $\eta_p^2 = .140$, respectively. Children in the 12 to 16 age group, 95% CI [23.69, 28.61] recalled significantly more correct information than those in both the 5 to 7, 95% CI [11.81, 16.73] $p < .001$, and 8 to 11, 95% CI [16.92, 21.84] age groups, $p = .001$. Similarly, children aged 8 to 11 recalled more correct information than those aged 5 to 7, $p = .013$. With regard to confabulated information, children age 8 to 11, 95% CI [6.77, 9.50] confabulated more than children aged 5 to 7, 95% CI [3.48, 6.22] $p = .003$, and 12-16, 95% CI [1.67, 4.40] $p < .001$. No significant difference in the amount of confabulated information was found between children aged 5 to 7 and 12 to 16, $p = .196$. No effect of age was found upon the amount of incorrect information produced by participants during the questioning phase of interviews, $F = 2.337$, $p = .100$.

With regard to condition, univariate analyses revealed that the multivariate effect emanated from the amount of correct and confabulated information recalled during the questioning phase, F (2, 171) = 3.168, $p = .045$, $\eta_p^2 = .036$; F (2, 171) = 7.865, $p = .001$, $\eta_p^2 = .084$, respectively. Children in the Sketch-RC condition, 95% CI [19.66, 24.58], recalled significantly more correct information than those in the Control condition, 95% CI [15.22, 20.14], $p = .038$. No significant differences emerged between those in the MRC condition, 95% CI [17.54, 22.46], and participants in the Sketch-RC, $p = .694$, and Control conditions, $p = .571$. With regards to confabulated information, participants in the Sketch-RC condition, 95% CI [1.99, 4.73] confabulated less information than participants in the MRC condition, 95% CI [5.88, 8.62], $p < .001$. No difference was found between those in the Control condition, 95% CI [4.03, 6.77], and children in the Sketch-RC, $p = .118$, and MRC conditions, $p = .182$. Further univariate analysis revealed that there was no effect of condition upon the amount of incorrect information produced during the questioning phase, $F = 2.675$, $p = .072$.

Table 10. *Means and standard deviations for total correct, incorrect, and confabulated items of information recalled during the questioning phase as a function of group, condition, and group X condition.*

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	22.12	10.72	4.25	2.96	3.37	3.89
MRC (total)	20.00	12.26	5.75	4.17	7.25	7.41
Control (total)	17.68	9.49	5.57	4.44	5.40	5.39
5 to 7 years (total)	14.27	9.03	4.83	4.11	4.85	5.24
Sketch	15.55	7.72	4.30	3.60	2.65	2.16
MRC	14.40	11.31	5.30	4.49	5.60	6.17
Control	12.85	7.86	4.90	4.33	6.30	5.89
8 to 11 years (total)	19.38	8.51	4.67	3.13	8.13	7.42
Sketch	20.75	8.53	4.30	2.92	5.60	5.52
MRC	17.25	6.75	4.40	3.03	11.05	9.64
Control	20.15	9.95	5.30	3.48	7.75	5.62
12 to 16 years (total)	26.15	11.79	6.07	4.39	3.03	3.29
Sketch	30.05	10.53	4.15	2.37	1.85	1.93
MRC	28.35	13.36	7.55	4.37	5.10	4.09
Control	20.05	9.06	6.50	5.37	2.15	2.52

Children aged 12 to 16 in the Sketch-RC condition, 95% CI [25.791, 34.309], recalled more correct information during the questioning phase of interviews than children aged 5 to 7 in the Sketch-RC condition, 95% CI [11.291, 19.809], $p < .001$, and children aged 8 to 11 in the Sketch-RC condition, 95% CI [16.491, 25.009], p = .008. No significant difference in the amount of correct information recalled during this phase was found between children aged 5 to 7 in the Sketch-RC condition and children aged 8 to 11 in the Sketch-RC condition, p = .271. Children aged 12 to 16 in the MRC condition, 95% CI [24.091, 32.609], recalled significantly more correct information than children aged 5 to 7 in the MRC condition, 95% CI [10.141, 18.659], p < .001, and children aged 8 to 11 in the MRC condition, 95% CI [12.991, 21.509], p = .001. No significant difference in the amount of correct information recalled was found between participants aged 5 to 7 in the MRC condition and those aged 8 to 11 in the MRC condition, p = 1.000. No significant difference in the amount of correct information recalled was found between any age groups in the Control conditions, all ps > .054.

Children aged 12 to 16 in the MRC condition, 95% CI [5.840, 9.260], recalled significantly more incorrect information than children aged 8 to 11 in the MRC condition, 95% CI [2.690, 6.110], p = .033. No difference in the amount of incorrect information produced was found between children aged 5 to 7 in the MRC condition, 95% CI [3.590, 7.010], and children aged 8 to 11 in the MRC condition, p = 1.000, nor with those aged 12 to 16 in the MRC condition, p = .204. No significant differences in the amount of incorrect information produced was found between all age groups in the Control conditions, all ps > .580, nor between all age groups in the Sketch-RC conditions, all ps > 1.000.

Children aged 8 to 11 in the MRC condition, 95% CI [8.682, 13.418], produced significantly more confabulations than children aged 5 to 7 in the MRC condition, 95% CI [3.232, 7.968], p = .005, and children aged 12 to 16 in the MRC condition, 95% CI 2.732, 7.468], p = .002. No significant difference in confabulated information was found between children aged 5 to 7 in the MRC condition and children aged 12 to 16 in the MRC condition, $p = 1.000$. Children aged 12 to 16 in the Control condition, 95% CI [-.218, 4.518], recalled significantly fewer confabulations than children in the Control condition aged 5 to 7, 95% CI [3.932, 8.668], $p = .046$, and children in the Control condition aged 8 to 11, 95% CI 5.382, 10.118], $p = .004$. No significant difference in the amount of confabulated information was found between children aged 5 to 7 and children aged 8 to 11 in the Control condition, $p = 1.000$. No significant differences in the number of confabulated items emerged between all age groups in the Sketch-RC conditions, all *p*s > .085.

3.8.6. Questioning Phase Accuracy

Univariate analyses revealed a significant effect of age group and condition on the accuracy of information recalled, $F\ (2, 171) = 16.124, p < .001, \eta_p^2 = .159$; $F\ (2, 171) = 13.947, p < .001, \eta_p^2 = .140$, respectively (see Figure 11). Post hoc analysis shows that participants aged 12 to 16, $M = 74.71$, $SD = 11.80$, 95% CI [70.38, 79.05] were significantly more accurate during the questioning phase than children aged 5 to 7, $M = 57.67$, $SD = 23.07$, 95% CI [53.34, 62.00], and 8 to 11, $M = 62.31$, $SD = 17.65$, 95% CI [57.98, 66.64], both *p*s < .001. No difference in accuracy was found between children aged 5 to 7 and 8 to 11, $p = .411$.

With regard to condition, children in the Sketch-RC condition, $M = 73.75$, $SD = 13.38$, 95% CI [69.42, 78.08] were significantly more accurate during the questioning phase than those in both the MRC, $M = 57.58$, $SD = 21.63$, 95% CI [53. 25, 61.91], $p < .001$, and Control condition, $M = 63.36$, $SD = 18.91$, 95% CI [59.03, 61.91], $p = .003$. No difference in questioning phase accuracy emerged between children in the MRC and Control condition, $p = .192$. No significant age X condition interaction was revealed, $F = .477$, $p = .753$.

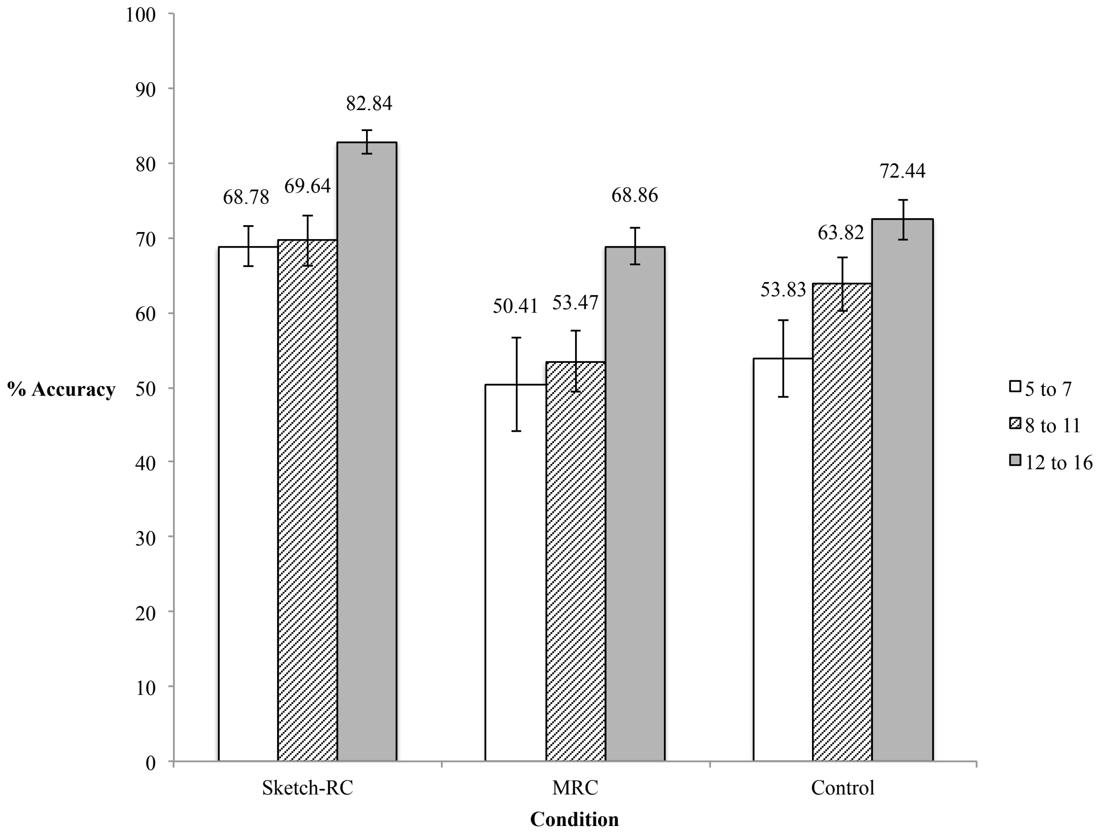

Figure 11. Questioning phase percentage accuracy as a function of group and retrieval condition.

3.8.7. Drawings Analysis

There was no significant difference between the three age groups for the total number of items drawn, or the number of items drawn in each of the four categories (see Table 11 for means and standard deviations), all *p*s > .111. For children aged 8 to 11 years, a significant positive correlation was found for the total number of items drawn and the total amount of correct information recalled throughout the interviews, $r(20) = .467$, $p = .038$. However, for children aged 5 to 7 years and children aged 12 to 16 years, the relationship was not significant, both *p*s > .390. The relationships between the types of items drawn (person; action; surrounding) and the types of correct information (person; action; surrounding) recalled in all age groups (5 to 7; 8 to 11; and 12 to 16 years) were also not significant, all *p*s > .089.

Table 11. *Means and standard deviations for information drawn as a function of age group.*

	Information drawn									
	Person		Action		Surroundings		Other		Total	
Group	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
5 to 7 years	2.55	1.40	.85	1.31	2.60	2.56	.85	1.46	6.75	3.84
8 to 11 years	2.65	.59	1.10	1.12	3.20	1.99	.00	.00	6.95	2.48
12 to 16 years	2.00	1.30	1.85	2.64	4.10	3.19	.70	1.81	8.65	5.42
Total	2.40	1.17	1.27	1.84	3.30	2.65	.52	1.37	7.45	4.11

3.9. Discussion

Using a mock witness paradigm, the efficacy of the Sketch-RC was investigated in comparison to another retrieval support method (the MRC mnemonic), and also, to a no retrieval support control condition. This section will discuss the results relative to a number of factors, namely: (i) correct, incorrect and confabulated information recalled; (ii) the accuracy of information recalled; and (iii) the items drawn by participants. These findings will be discussed across interview performance overall, as well as in relation to the specific retrieval phases of interviews as function of both age and retrieval condition.

3.9.1. Memorial Performance as a Function of Age

The findings support the first prediction that episodic recall performance is age dependent. In this study, younger children typically reported less information overall than older children, akin to what has consistently been reported in previous episodic recall research with children (e.g., Lamb et al., 2003; Myklebust & Bjorklund, 2010). In this instance, children performed according to developmental expectations. When examining the type of information recalled by children, the differences in the total amount of information recalled may be attributed to the higher number of correct items recalled. In this instance, children aged 12 to 16 years recalled significantly more correct information than their peers aged 5 to 7 years and 8 to 11 years. In combination, these measures contribute to the higher accuracy rate demonstrated by children and adolescents aged 12 to 16 years. Similar findings were also revealed in relation to the type of information recalled i.e., person, action and surrounding (see Appendix G for breakdown of results).

It is well established that the cognitive abilities of typically developing children improve over childhood, and are comparable to adults once adolescence is reached (Flavell, Miller & Miller, 1993). Further, the length, informativeness and complexity of children's accounts are also known to increase with age (Poole & Lamb, 1998; Schneider & Pressley, 1997). The findings from Study 2 support this notion, as evidenced by the higher number of questions asked of older children (questions guided purely by the information provided by interviewees during free recall), and the total amount of information recalled by older children. These factors may have ultimately contributed to the longer duration in interviews with older children (see Appendix G for breakdown of results). Regardless of this group of witnesses providing more detailed accounts, factors such as hormonal and social change during adolescence (Feldman & Elliott, 1990; Rutter & Rutter, 1993), render adolescents as a unique group with whom the use of appropriate interviewing techniques is just as vital as with younger children (Jack et al., 2014).

While no significant differences emerged for the amount of incorrect information recalled across the three age groups, children aged 8 to 11 confabulated more information than their peers throughout interviews in their entirety, and also during the questioning phase. The free recall phase of interviews did not reveal such results. However, clear differences in means were apparent for measures in this latter phase – significant differences which may have been eliminated by the high standard deviations produced. Such may have occurred as a result of the age-span and developmental differences of the sample (i.e., young children with an age span of three years, demonstrating high variability in recall performance), as also noted in previous research examining recall performance relative to age (e.g., Lamb et al., 2003; Myklebust & Bjorklund 2010).

Despite the questioning phase of interviews being led directly by information produced during the free recall phase (with only appropriate questioning strategies being applied, and no suggestive/leading questions being asked), the significant increase in confabulated information found across interview performance likely occurred as a result of MRC. Here, the results revealed a significantly higher amount of confabulated information produced by children aged 8 to 11 interviewed in this condition. This was not the case for children aged 8 to 11 years in the Sketch-RC or the Control conditions. The following section will now explore retrieval performance as a function of condition.

3.9.2. Memorial Performance as a Function of Condition

In support of the second prediction, and in line with previous research that has examined the Sketch-RC technique with adults (e.g., Dando 2013; Dando et al., 2009[a]; Dando, 2009[c]; Dando et al., 2011) differences in recall performance was evident between retrieval conditions for all three age groups. Overall, Sketch-RC improved children and adolescents' recall, without a concomitant increase in intrusions. That is, participants recalled more correct information, and less incorrect and confabulated information than their peers in the MRC and Control conditions, despite there being no significant differences in the duration of interviews or in the number of questions asked across conditions (see Appendix G). These positive effects ultimately resulted in children and adolescents in the Sketch-RC condition producing significantly more accurate information than their peers in both MRC and Control conditions, regardless of age. No significant difference in accuracy was found between children interviewed in the MRC and Control conditions. These findings not only include overall information accuracy, but also, accuracy in relation to person, action, and surrounding information recalled (see Appendix G for breakdown of these results).

The results suggest that the MRC mnemonic has no positive benefits upon recall of episodic information by children, similar to previous findings where MRC has been used without the application of other CI mnemonics, such as change temporal order or change perspective (e.g., Darwinkel, et al., 2014; Dietze, et al., 2010). Further, this conclusion may also be extended to adolescents – a group who has scarcely been the focus of investigative interviewing research, despite their unique stage of hormonal and social development (Jack et al., 2014). In fact, the results of Study 2 suggest that MRC is detrimental to accurate event recall, despite being applied with the 'report everything' instruction. While Milne and Bull (2002) found that this combination of instructions yielded positive results, Study 2 reveals a different conclusion, as evidenced by the amount of confabulated information produced by participants instructed to mentally reinstate the context of the to-be-remembered event and report everything. This may be because children had not successfully applied the MRC instructions due to the developmentally demanding nature of them. Alternatively, children may have attempted to apply the MRC instructions, but doing so may have caused retrieval interference (e.g., Craik, 1981; Torres, Flashman, O'Leary & Andreasen, 2001).

The success of the Sketch-RC technique may arise from a number of different avenues, all of which may contribute collectively. First, in contrast to MRC, Sketch-RC may alleviate demands on working memory, and may negate the need for the processing of numerous complex linguistic instructions. The instructions required by Sketch-RC, which are few and simple, appear to support a more effortful, more effective, but less cognitively demanding memory search for children, while also supporting conscious remembering. Second, and perhaps more pertinent, it is a flexible retrieval support strategy that allows spontaneous self-directed drawing, enabling children and adolescents to access their own contextual retrieval cues rather than being directed by the interviewer. More specifically, the process of drawing about to-be-remembered events, allows for children to produce salient, representational retrieval cues: as the drawing unfolds, children naturally talk about what they are creating, thereby, cuing the child to think about related episodic information (e.g., Salmon, 2001; Wesson & Salmon, 2001).

One may argue that it is the process of drawing, rather than the number of items drawn, that provides this retrieval level of support, particularly in light of the lack of significant correlations between number of items drawn and the *amount* of information recalled. While there was no significant difference across age groups regarding the number of items drawn, a significant correlation emerged for the number of items drawn and the total amount of *correct information* recalled by children aged 8 to 11. Significant correlations of these variables did not emerge for children aged 5 to 7 and adolescents aged 12 to 16. Interestingly, children aged 8 to 11 years confabulated more information (regardless of condition) than their younger and older peers (as discussed in the previous section). It may be the case that for children aged 8 to 11, the content of the drawings is acting as an external repository of items that may otherwise be forgotten, thus reducing the risk of information being incorrectly recalled, or as it appears, confabulated.

Although performance was not predicted as a function of interview phase, it is reasonable to expect that the use of the Sketch-RC would have increased accuracy during free recall due to the reduction of interviewer-led prompts, and the point at which Sketch-RC was applied (immediately prior to the free recall phase). However, an increase in accuracy only emerged for overall retrieval performance and recall produced during the questioning phase of interviews. Interestingly, while children interviewed in the Sketch-RC condition recalled significantly more information, no difference in accuracy was found during the free recall phase of interviews, that is, the phase that immediately followed the Sketch-RC component. While differences in percentage accuracy were apparent, the failure for these to reach statistical significance may be explained by the variance of recall performance, as evidenced by the relatively high standard deviations produced for this measure.

Previous research examining the effects of the Sketch-RC as a function of phase with typically developed adults also found no difference in accuracy during free recall (Dando et al., 2009[a]). In line with previous findings, it appears that the Sketch-RC demonstrates superiority as a function of overall interview performance (Dando et al., 2009[a]; 2009[c]). Yet in this study, the Sketch-RC also increased accuracy during the questioning phase of interviews, suggesting that that Sketch-RC produces a protective/consolidation effect, which has extended beyond free recall. This finding is particularly encouraging. The questioning phase of interviews is when inaccurate information is more likely to be produced; due in part to demand characteristics, and the risks associated with repeated recall attempts, particularly with children. Further, young children are known to produce less detailed responses when presented with open questions (e.g., Myklebust & Bjorklund, 2010), thus inevitably increasing the risk of closed questions being presented. Children interviewed in the Sketch-RC condition produced more correct information during free recall. It may be argued that this increase in correct information resulted in a carry-over effect into the questioning phase, where the questions posed to children were directed purely by the information produced in the free recall phase.

3.10. Summary

In sum, using the Sketch-RC as an alternative retrieval support method was found to significantly improve the accuracy of information recalled overall by typically developing children and adolescents. Providing children and adolescents aged 5 to 16 years with no retrieval support, or support in the form of MRC, significantly reduces the likelihood of more accurate accounts being produced during interviews compared with support via drawing. To further examine the support that Sketch-RC can offer, the following chapter explores its efficacy with young participants who have known memory deficits – children and adolescents with autism.

Chapter Four

The Efficacy of Sketch-Reinstatement of Context with Children and Adolescents with Autism

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4.1. Abstract

The primary aim of this study was to explore the efficacy of a developmentally appropriate drawing technique with child and adolescent witnesses who have a diagnosis of Autism Spectrum Disorder. Deficits in episodic free-recall memory performance have been reported in children with autism, yet best practice dictates that child witness/victim interviews commence with a free-recall account. No 'tools' exist to support children with autism to freely recall episodic information. Here, the efficacy of Sketch Reinstatement of Context (Sketch-RC) is compared with Mental Reinstatement of Context (MRC) and a no support control. Forty-five children viewed a stimulus film, and were interviewed using one of the aforementioned techniques. The Sketch-RC technique was most effective, improving accuracy of information recalled. This procedure offers a population-appropriate method for supporting free recall in criminal justice settings.

4.2. Introduction

The cognitive and behavioural characteristics that define autism, such as deficits in social functioning and communication; language delay; and social naivety, render this group of people particularly vulnerable members of society. This vulnerability is further increased because autism presents a unique memory profile, with strengths and weaknesses in various abilities (Bennetto et al., 1996; Boucher & Bowler, 2008). In particular, memory for personally experienced events is known to be impaired in this group (Boucher, 1981; Boucher & Lewis, 1989; Millward et al., 2000). Additionally, vulnerability is further exacerbated by virtue of age when considering autistic children. Typically developing children are known to report less information about events that they have experienced than their older peers (Lamb et al., 2003). However, a decrease in the amount of information reported is even greater in children who have autism (Bruck et al., 2007).

Research concerning vulnerability in the criminal justice system usually centres upon children who are typically developing, and in some instances, children and adults who have learning disabilities. Despite the increased vulnerability of people with autism as victims and witnesses of crime, no research has been conducted that has identified effective retrieval strategies for this population within forensic settings. Consequently, there is a dearth of empirically supported best practice guidance on how to interview victims and witnesses with autism in England and Wales. As with typically developing children, current ABE guidelines advocate the use of the CI with people who have autism (ABE, 2011). Although ABE recommends that the *change perspective* and *reverse temporal order* mnemonics are omitted when using the CI with this group of witnesses, there is currently no empirical research to support the use of other CI components, namely MRC. Rather, research conducted by Maras and Bowler (2010), found that, not only did the use of the CI increase the amount of incorrect details reported by adults with autism, it also reduced the overall accuracy of accounts when compared to the structured interview. The ineffectiveness of the CI, or rather, its detrimental effect on episodic recall, was suggested to emanate from the MRC mnemonic.

4.3. Empirical Evaluation of Mental Reinstatement of Context in Relation to Autism

As previously outlined, the primary function of MRC requires that interviewees engage in mental time travel by placing themselves back in an event that they have previously experienced. Previous research has indicated that people with autism have difficultly engaging in this task due to impaired autonoetic consciousness (Gardiner, 2001), as well as demonstrating a greater reliance upon recognising context, rather than actively remembering incidentally encoded context (Bowler et al., 2004; Bowler et al., 2008; Jordan & Powell, 1995). Furthermore, the premise of MRC assumes that memories of the physical and emotional context in which an event was experienced are bound together in an organised structure with multiple, readily accessible traces (Tulving, 1985).

Conversely, people with autism do not bind elements of an experience together in the same way that typically developed people do (Bowler et al., 1997; Gaigg et al., 2008). In particular, deficits in the organisation of memories have been established, namely, a failure to utilise categorical and relational features of information to aid recall (Bowler et al., 1997; Gaigg et al., 2008; Minshew & Goldstein, 1993). Deficits in source monitoring abilities are also apparent, for instance, recalling where and when information was learned (Bowler et al., 2004; Bennetto et al., 1996; Hala, Rasmussen & Henderson, 2005). Equally, concurrently processing the detailed linguistic instructions of MRC would prove problematic for those who may have difficulty with working memory tasks and processing verbal information (Goldstein, Minshew, & Siegel, 1994; Minshew & Goldstein, 1998; 2001). Impairments in working memory and verbal information processing have long been demonstrated in people with autism (Gabig, 2008). In theory, these factors would render MRC ineffective for people with autism.

As well as the memory deficits already outlined, diminished free recall ability is also a persistent characteristic of autism (Bennetto et al., 1996; Bowler et al., 1997; Gaigg, Gardiner & Bowler, 2008; Lind & Bowler, 2008). A reliance upon 'knowing' rather than 'remembering' information (Bowler et al., 2007), means that this population perform as well as their typically developed peers in cued-recall tasks, but underperform on free recall tasks where semantic memory systems cannot be utilised to a great extent. For example, McCrory et al. (2007) demonstrated that children with autism aged 11 to 14 years produced significantly less information during free recall conditions than their typically developing peers. However, performance during the questioning phase of interviews did not reveal any significant differences between groups. This suggests that a deficit in free recall ability of children with autism is less associated with impairments that occur during the encoding stage, causing information to be unavailable, but rather, a difference in retrieval strategies. Thus, impaired free recall memory performance appears to be caused by errors of omission, as opposed to errors of commission (Bruck et al., 2007).

MRC is a technique applied prior to the free recall stage of an investigative interview. It is intended to enhance the free recall process, and help interviewers to elicit the most accurate information from interviewees prior to questioning. However, as outlined in Study 2 (Chapter 3) of this thesis, enhanced free recall was not found when the MRC was used with typically developing children and adolescents. In fact, MRC actually reduced the accuracy of accounts by increasing the amount of incorrect and confabulated information produced. In previous research with typically developing children, MRC has created mixed results. Based upon the same developmental factors that render MRC ineffective with typically developing children, it is reasonable to expect MRC to produce similar negative outcomes with children who have autism. Moreover, in light of the aforementioned impairments that autism presents, as well as the findings of CI research with autistic adults (Maras & Bowler, 2010; 2012), MRC may prove to be even more ineffective with ASD children, or indeed, more detrimental than with typically developing children. Nonetheless, despite a reduction in information produced during free recall conditions, children with autism can still be informative witnesses, as long as they are provided with appropriate support that facilitates retrieval, inline with the Task Support Hypothesis (Bowler et al., 1997; McCrory et al., 2007).

4.4. Sketch-Reinstatement of Context in Relation to Autism

The benefits of using the Sketch-RC technique with typically developing children were considered to be threefold, centering upon: i) the simplicity of the instructions; ii) the less cognitively demanding nature, when compared to MRC; and iii) the generation of salient retrieval cues. However, the potential benefits of using this technique with children who have autism may be even greater. First, the Sketch-RC contains simple instructions that are less time-consuming for police officers to administer in comparison to the traditional MRC. Providing an evidenced-based tool that can support victims' and witnesses' recall during ABE interviews can go some way to address the lack of guidance in current ABE guidelines for the interviewing of people with autism. Further, providing a tool that is easy, yet effective to apply, will increase the likelihood of its use, given that current research suggests that the CI is not routinely used or applied correctly (Chapter 2; Dando et al., 2008[b]; 2009[b]). It is feasible to suggest that if the CI is incorrectly applied with typically developing people, it is extremely likely to also be incorrectly applied with people who have autism, due to the challenges associated with interviewing this vulnerable group.

Second, the simple and less cognitively demanding nature of the Sketch-RC technique increases the likelihood of children correctly processing and applying the instructions given by interviewers. If the processing of verbal instructions is a negative factor of the MRC procedure with typically developed children, this factor is likely to be exacerbated in children with autism, given their reliance upon visual rather than verbal styles of information processing (Goldstein et al., 1994). Similarly, children are not being asked to process relational information in order to access episodic memory stores (which is precisely what the MRC technique dictates). In contrast to item-specific memory processes (which are intact with autism), relational memory processes are known to be impaired in people with autism, particularly when environmental support for retrieval is not provided (Gaigg et al., 2008). The Sketch-RC encourages item-specific memory recall by asking individuals to 'draw what comes to mind', thus, resulting in elements of the episode being broken down and recalled as separate items, rather than encouraging retrieval based upon relational processing. Therefore, the demands of the task are reduced, which is likely to aid goal-directed remembering (de Jong, 2010).

Third, responsibility for the creation of retrieval cues is transferred onto the witness, rather than being interviewer-led. This is important because incompatible retrieval cues are known to impair episodic retrieval performance (e.g., Schacter et al., 1998). Importantly for children with autism, the Sketch-RC technique does not demand that witnesses mentally place themselves back in an experience. Rather, the technique encourages mental time travel by supporting an effortful search for salient, self-generated contextual cues, which the witness can immediately externalise but which remain available in the form of a visual record (which may also be used as evidence). As such, drawing can increase access to memory stores (Barlow et al., 2011), with reduced risk of memory contamination (Strange et al., 2003), while simultaneously providing appropriate and effective retrieval support in line with the Task Support Hypothesis (Bowler et al., 1997).

4.5. Aims of Study 3

The current experiment explores the efficacy of the Sketch-RC and MRC techniques with children aged 12 to 16 years old who have a diagnosis of autism. To date, no study has investigated the efficacy of MRC with children who have autism. Yet, age-related cognitive limitations (also found in typically developing children) are likely to be more pronounced with this population, thus, rendering MRC problematic. Further, specific impairments in episodic memory and free recall ability demonstrated by people with autism, are likely to have a greater impact upon event recall. In contrast, simplicity of the instructions, the visual processing style, relatively unimpaired drawing skills of this group, suggests that Sketch-RC may provide appropriate retrieval support. The following hypothesis is therefore presented: children supported at retrieval by the Sketch-RC technique will show improved recall performance compared to their peers in the MRC and control (no retrieval support) conditions.

4.6. Method

4.6.1. Design

A between-subjects design was employed with one independent variable: Interview, on three levels: i) Sketch-RC; ii) Mental Reinstatement of Context (MRC);

and iii) Control. The dependent variables were episodic memory performance as measured by the amount of verbal information recalled, and whether that information was correct, incorrect, or confabulated. Also, percentage accuracy was included. The *type* of information recalled was also coded as action, person or surroundings.

4.6.2. Participants

Forty-five children with a diagnosis of autism participated in this study (36 males and 9 females). All children were aged 12 to 16 years old (*M* = 14 years and 7 months; *SD* = 18.117 months). Children were recruited from four special education schools in England. School records indicated that all children had been given a formal diagnosis of ASD by an appropriately qualified clinician according to the assessment measures of the Autism Diagnostic Observation Schedule (ADOS), which confirmed that participants met DSM-IV-TR criteria for ASD.

This research compared the cognitive performance of individuals with autism across three interview conditions. Although children were recruited within one age group (12 to 16 years), the spectral nature of autism denotes heterogeneous levels of cognitive functioning that are likely to influence cognitive performance during the study. To limit the confounding effects of this heterogeneity, the verbal performance and nonverbal performance were measured using the British Picture Vocabulary Scale III (BPVS-III; Dunn, Dunn, Whetton & Burley, 1997), and Raven's Coloured Progressive Matrices (RCPM; Raven et al., 1999). BPVS-III scores were used to match (within five points of raw score) participants with autism to typically developing participants, and the RCPM scores were treated as a covariate, which takes account of ordinal differences in intelligence without risk of misclassification across groups. The RCPM score was not used to match groups because it does not measure intelligence in individuals with autism in the same way as it does in typically developing comparison groups, running the risk of overestimating the general intelligence of individuals with autism (see Mottron, 2004; Mottron & Burack, 2001). Analysis of age, BPVS and Ravens scores across interview conditions revealed no significant main effects, all *F*s < .1.783, all *p*s > .181. Participants' mean chronological age, BPVS scores, and RCPM scores across retrieval conditions are displayed below in Table 12.

Table 12. *Age, BPVS-III and RCPM mean raw scores for participants across interview conditions (N = 45).*

	Chronological Age (years and months)		BPVS-III		RCPM	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (*N* = 15)	14 years 1 month	18.63 months	118.73	22.96	22.67	7.98
MRC (*N* = 15)	14 years 7 months	18.11 months	120.00	28.39	25.47	9.86
Control (*N* = 15)	15 years 1 month	16.61 months	118.27	30.72	24.53	7.35

4.6.3. Retrieval Conditions and Procedure

The procedure used in this study was identical to that described in Study 2 (Chapter 3, Section 3.6). Namely, each of the retrieval conditions was structured according to the current UK investigative interview model and Achieving Best Evidence advice (MOJ, 2011). Interviews comprised the same phases in the same order, as follows: (i) greet; (ii) rapport; (iii) explain; (iv) free recall; and (v) closure. Interviews differed only in the *free recall* phase, where the experimental manipulation took place (Sketch-RC; MRC; Control).

4.6.4. Interview and Drawings Coding

An identical coding procedure to that described in Chapter 3, Section 3.6, was also applied within this study. To ensure reliability and consistency throughout the coding of interviews, 15 interviews (five from each experimental condition) were randomly selected for recoding by an independent coder who was blind to the aims and hypotheses of the research, but familiar with the template method of scoring used here. Cohen's Kappa coefficients for agreement between raters for the overall amount of correct, incorrect, and confabulated recall were .807, .754 and .814, respectively, all at $p < .001$, indicating a good level of agreement between raters. Further, participants in the Sketch-RC condition each produced a sketch (15 in total), which was coded and analysed (separately from verbal recall) as per the coding approach used in Study 2 (Chapter 3, Section 3.6).

4.7. Analysis Approach

The experimental hypotheses were investigated in an identical manner to the analytical approach detailed in Chapter 3, Section 3.7. However, due to heterogeneous levels of cognitive functioning of the participants (outlined in Section 4.6), Raven's Coloured Progressive Matrices scores were used as a covariate, thus multivariate analysis of covariance (MANCOVA) and analysis of covariance (ANCOVA) were conducted throughout, with post hoc test applied where appropriate. Further, ANCOVA was also used to explore the number of items depicted in children's drawings, and a series of Pearson's correlation were applied to examine the relationship between the number of items drawn and children's recall performance. Levene's test indicated that the assumption of variance had been violated for a number of performance measures. Transforming the data did not rectify this problem. As all sample sizes were equal throughout the analysis, the analysis approach is considered robust (Field, 2009; 2013; Zimmerman, 2004), and the *F*-tests are reported nevertheless. After controlling for Raven's Coloured Progressive Matrices scores, the following results emerged.

4.8. Results

The results are summarised in terms of overall interview performance, as well as free recall and questioning performance as a function of condition. Additionally, analysis of drawings created by participants will be presented. Due to the extent of data analyses and the volume of results produced, the following sections report the key findings, only. For a full and detailed presentation of additional results, please see Appendix H.

4.8.1. Overall Memorial Performance: Information Recalled and Accuracy

The means and standard deviations for the total amount and type of information recalled across retrieval conditions are displayed in Table 13. No significant effect of condition was found for the total amount of information recalled, $F = .069$, $p = .943$. Further, although there was a significant multivariate effect of condition for the combination variable (correct, incorrect and confabulations), F (6, 80) = 2.856, $p = .014$, $\eta^2 = .176$, univariate analysis found no significant effects of condition on the amount of correct, incorrect or confabulated information produced overall, all Fs < 2.406, all ps > .103.

Table 13. *Means and standard deviations for the total amount and type of information recalled overall across retrieval conditions.*

	Information Recalled							
	Correct		Incorrect		Confabulations		Total Recalled	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch-RC	26.67	11.93	2.93	2.15	1.53	1.81	31.13	14.51
MRC	23.27	23.22	5.20	6.47	5.20	4.77	33.67	29.41
Control	18.27	10.26	3.67	3.50	8.40	14.36	30.33	18.05

Univariate analysis revealed a main effect of condition on the percentage accuracy of information recalled overall (see Figure 12), F (2, 41) = 9.777, p < .001, η^2 = .323. Post hoc analysis showed that children with autism in the Sketch-RC condition, 95% CI [77.755, 98.958] were significantly more accurate than their peers in both the MRC, 95% CI [45.456, 66.613], p < .001, and Control condition, 95% CI [56.069, 77.150], p = .016. No significant difference in accuracy emerged between children interviewed in the MRC and Control condition, p = .480.

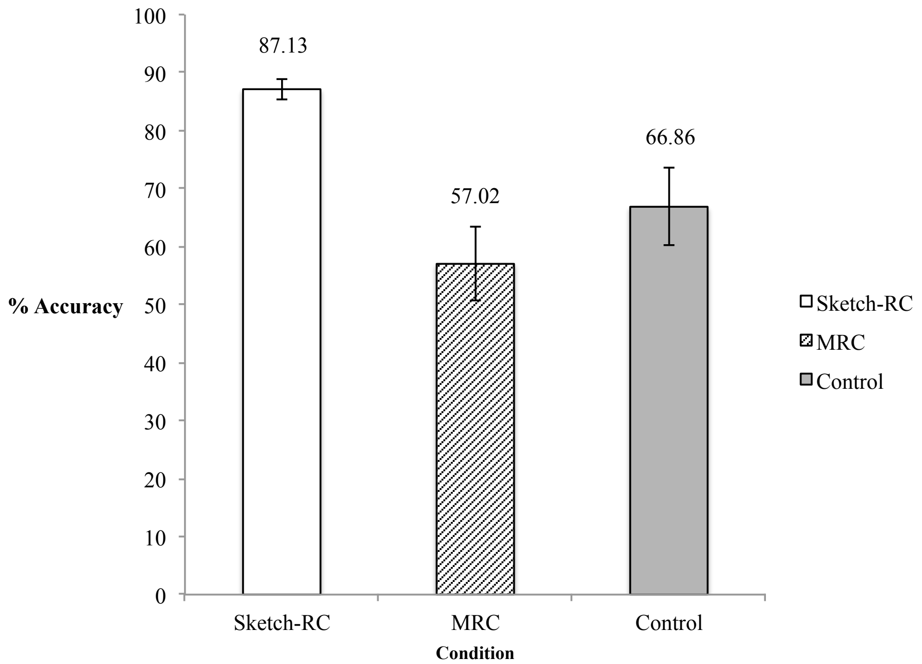

Figure 12. Overall percentage accuracy for information recalled across retrieval conditions.

4.8.2. Free Recall Performance: Information Recalled and Accuracy

The means and standard deviations for the total amount, and type of information recalled across retrieval conditions, are displayed in Table 14. No significant effect of condition was found for the total amount of information recalled, $F = .518$, $p = .599$. Further, although there was a significant multivariate effect of condition, $F\ (6, 80) = 2.947$, $p = .012$, $\eta^2 = .181$, univariate analysis found no significant effects of condition on the amount of correct, incorrect or confabulated information produced during the free recall phase, all Fs < 1.905, all ps > .162.

Table 14. *Means and standard deviations for the total amount and type of information produced across retrieval conditions during the free recall phase.*

	Information Recalled							
	Correct		Incorrect		Confabulations		Total Recalled	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch	15.27	7.11	.53	.74	.60	.91	16.40	7.86
MRC	12.40	11.81	1.60	2.29	1.27	2.09	15.27	13.44
Control	10.47	6.00	1.00	.93	2.20	3.53	13.67	6.75

Univariate analysis revealed a main effect of condition on the percentage accuracy of information produced during the free recall phase of interviews (see Figure 13), $F\ (2, 41) = 6.740$, $p = .003$, $\eta^2 = .247$. Post hoc analysis found that children with autism in the Sketch-RC condition, 95% CI [84.716, 106.518], were significantly more accurate than their peers in both the MRC, 95% CI [57.404, 79.158], $p = .003$, and Control condition, 95% CI [65.330, 87.006], $p = .044$. No significant difference in accuracy emerged between children interviewed in the MRC and Control condition, $p = .916$.

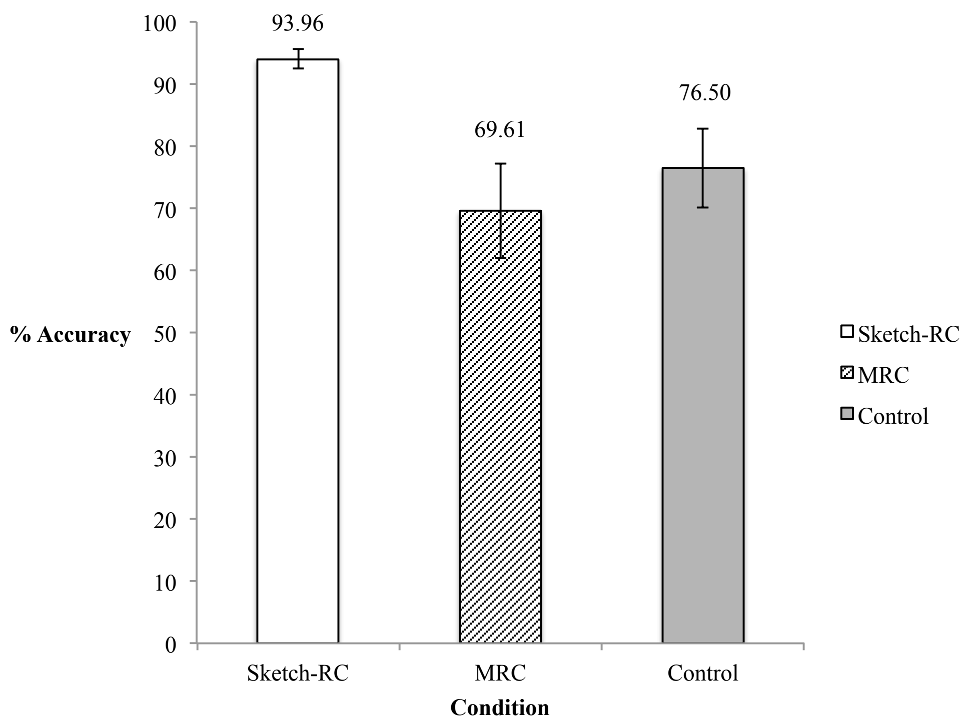

Figure 13. Percentage accuracy of information produced during the free recall phase.

4.8.3. Questioning Phase Performance: Information Recalled and Accuracy

The means and standard deviations for the total amount, and type of information recalled during the questioning phase are displayed in Table 15. No significant effect of condition was found for the total amount of information recalled during the questioning phase, $F = .143$, $p = .867$. Further, no significant multivariate effect of condition was revealed for the amount of correct, incorrect or confabulated information reported, all Fs < 1.603, all ps > .157.

Table 15. *Means and standard deviations for the total amount and type of information recalled across retrieval conditions during the questioning phase.*

	Information Recalled							
	Correct		Incorrect		Confabulations		Total Recalled	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch	11.40	7.34	2.40	1.88	.93	1.10	14.73	9.04
MRC	10.87	12.04	3.60	4.58	3.93	3.37	18.40	16.78
Control	7.80	5.81	2.67	3.27	6.20	11.09	16.67	13.37

Univariate analysis revealed a main effect of condition on the percentage accuracy of information produced during the questioning phase of interviews (see Figure 14), $F\ (2, 41) = 5.757$, $p = .006$, $\eta^2 = .219$. Post hoc analysis found that children with autism in the Sketch-RC condition, 95% CI [65.179, 92.903] were significantly more accurate than their peers in both the MRC, 95% CI [533.819, 61.483], $p = .007$, and Control condition, 95% CI [40.567, 68.132], $p = .044$. No significant difference in accuracy emerged between children interviewed in the MRC and Control condition, $p = 1.000$.

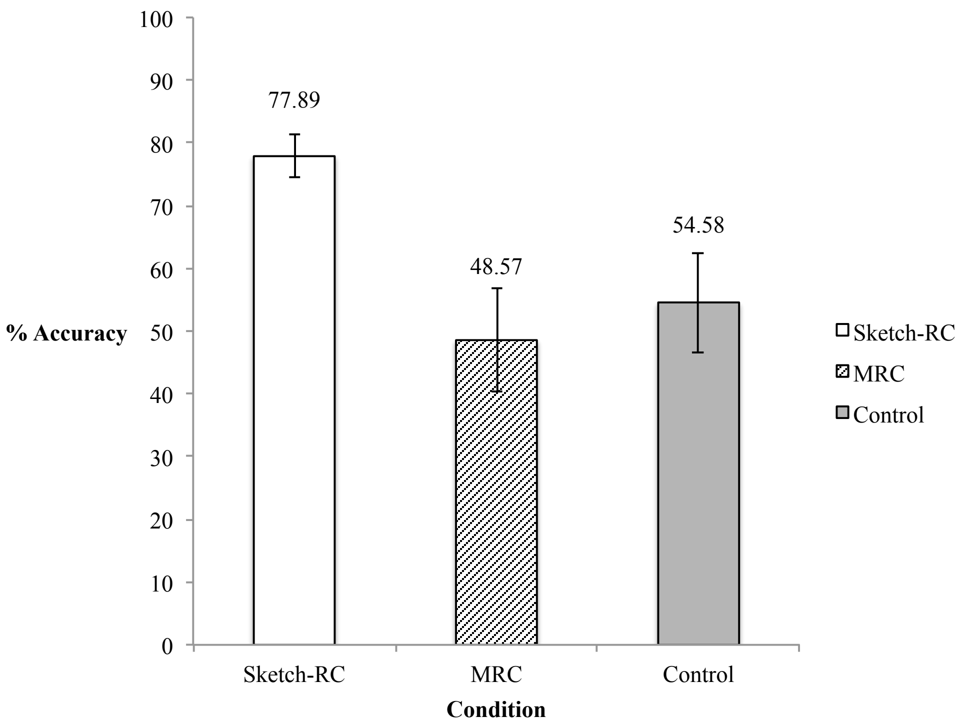

Figure 14. Percentage accuracy of information produced during the questioning phase.

4.8.4. Drawings Analysis

Drawings were analysed for the total number of items drawn, and the number of items drawn in each of the four information type categories (see Table 16 for means and standard deviations). A significant positive correlation was found for total number of items drawn and the total amount of correct information freely recalled, $r(15) = .585, p = .022$. The relationship between the types of items drawn (person; action; object; other) and the types of correct information recalled was also explored. A significant correlation was revealed between the amount of person information drawn and the total amount of correct person information recalled, $r(15) = .592, p = .020$. Similarly, a significant correlation for the amount of action information drawn and the total amount of correct action information recalled was also found, $r(15) = .681, p = .005$. No significant correlation was found for the amount of surrounding information drawn and the total amount of surrounding information recalled, $p = .328$.

Table 16. *Means and standard deviations for information drawn by children in the Sketch-RC condition.*

Information drawn									
Person		Action		Surroundings		Other		Total	
M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
2.33	1.11	1.00	1.69	6.80	6.87	1.00	2.83	11.13	8.25

4.9. Discussion

The current study involved children with a neurodevelopmental disorder known to impact upon episodic free recall performance. Using the mock witness paradigm, Study 3 investigated how to assist children with autism to recall event information using two support methods and a no support control. On the basis of the findings that emerged from Study 2, the eyewitness memory literature, and the somewhat limited, theoretical and applied literature concerning adults and children with autism, one encompassing hypothesis was offered, which will now be discussed with reference to the findings.

Children with autism offer unique challenges for researchers, in that they typically display greater variability in performance than is found with other populations. Despite this variability, and despite there being no significant difference in the volume of information produced or in the number of questions asked (see Appendix H), children in the Sketch-RC condition demonstrated improved recall accuracy, compared to both the MRC and no retrieval support (Control) conditions. Substantial mean performance differences across the three retrieval conditions for the amount of correct, incorrect or confabulated information recalled (e.g., increased correct information, and reduced incorrect and confabulated information), did not reach statistical significance as individual measures. It may be the case that the stimuli used in this study lacked complexity. For instance, the duration of the video was only one minute, reducing the amount of information available to encode, store and retrieve. However, these mean differences were clearly important, because they incrementally accumulated to significantly improve percentage accuracy for children with autism in the Sketch-RC condition, both within interviews in their entirety, and within interview phases.

The memorial benefits of Sketch-RC with these children and adolescents may emanate from the simple linguistic instructions that this technique dictates. Here, interviewees are not asked to rely solely upon verbal styles of processing, which can be problematic for this population (Minshew & Goldstein, 1998). Instead, they are encouraged to utilise their enhanced spatial abilities and visual processing style by depicting recall of events onto a picture (Eames & Cox, 1994; Lee & Hobson, 2006). Moreover, Sketch-RC does not require interviewees to engage in mental time travel, again, a process that people with autism demonstrate difficulty (Lind & Bowler, 2008).

Similarly, Sketch-RC does not require interviewees to engage their relational memory system. In contrast to MRC and to providing no retrieval support, children interviewed in the Sketch-RC condition may have benefitted from these simple instructions due to the item-specific memory system nature of this technique. That is, asking children to draw what they can remember, encourages them to process the individual details of an event, as demonstrated by the higher number of correct items recalled, and the increased accuracy by children in the Sketch-RC condition. Indeed, the process of drawing not only aided overall recall accuracy, but also, the accuracy of specific information recalled, namely, person, action and surroundings (see Appendix

H). The significance of increased person and action information recalled by children with autism, is highlighted by diminished social and person processing abilities identified in this population (American Psychiatric Association, 2000). Similarly, Maras and Bowler (2010; 2012) report diminished recall for person and action details when autistic adults were interviewed with the CI. Sketch-RC, however, appears to support retrieval of person and action information, results that are likely to be caused by the more salient nature and compatible retrieval cues that Sketch-RC offers.

The significant correlations between the amount of items drawn and the total amount of correct information verbally recalled, supports the notion that the process of drawing may enable children with autism to engage in a more strategic, perceptual search process, thus, compensating for retrieval deficits that are traditionally associated with this group and aiding goal-directive remembering (de Jong, 2010). Here, as children draw particular aspects of an event, they are more supported to refer to item-specific memory, as opposed to relational memory system (the latter, which, as outlined, is often impaired with this group), whilst simultaneously allowing children to engage in perceptual representation processes, rather than verbal processes to access episodic memories (Ben Shalom, 2003; Whitehouse, Maybery, Dirkin, 2006).

The positive memorial effects of drawing in the Sketch-RC condition, were apparent in the free recall phase of the interviews, an effect that carried over into the questioning phase of the interviews in this study. People with autism typically demonstrate impairments in their free recall ability and require appropriate retrieval support (Bennetto et al., 1996; Bowler et al., 1997; Gaigg et al., 2008; Lind & Bowler, 2008), a factor which may account for the increased duration of the free recall phase for children in the Control condition (see Appendix H). Here, freely recalling information took children with autism longer when they were not provided with retrieval support. Nonetheless, Sketch-RC increased accuracy during free recall compared to both the MRC and no retrieval support conditions. The questioning phase of witness interviews presents an increased risk of inaccurate information being generated, due in part, to demand characteristics, interviewer bias, and the risks associated with repeated recall attempts, particularly with children (Quas et al., 2007). However, as in Study 2, Sketch-RC resulted in increased accuracy during the questioning phase of interviews in Study 3. These results provide further support for the Task Support Hypothesis (Bowler et al., 1997), which argues that individuals with autism can utilise context, but they also highlight the need for developmentally appropriate task support tools.

The findings from Study 3 provide new insight into the efficacy of MRC with children who have autism. The literature concerning the memory profile of this population indicates that MRC would prove to be detrimental to children's recall compared with no appropriate task support. In line with previous research that has examined the efficacy of MRC with adults who have autism, this study has also demonstrated deleterious effects (Maras & Bowler, 2010; 2012). Here, MRC demonstrated an increase in incorrect and confabulated recall performance, ultimately resulting in decreased recall accuracy when compared to Sketch-RC. However, no significant difference in accuracy between children interviewed in the MRC and Control condition was found. This may be because children had not successfully applied the MRC instructions due to the developmentally demanding nature of them. Alternatively, children may have attempted to apply the MRC instructions, but doing so may have caused retrieval interference – a factor that is known to disrupt free recall performance (e.g., Craik, 1981; Flashman, O'Leary & Andreasen, 2001).

Nonetheless, the differences in incorrect and confabulated information recalled provides further weight for the argument that MRC is problematic for children and young people, both typically developing (as demonstrated in Chapter 3) and also, those with autism. Either way, the recommendation that the CI be used with extreme caution with the latter population (Maras & Bowler, 2010) is supported by these results.

4.10. Summary

In summary, the results of this study fall in line with the Task Support Hypothesis (Bowler et al., 1997). Namely, when children with autism are provided with appropriate support to retrieve information from memory, their recall performance is enhanced. Conversely, providing inappropriate retrieval support (i.e., in the form of MRC) or not providing any support at all, has detrimental consequences on the accuracy of recall. These findings have significant implications for the criminal justice system, where currently, no practical guidance is provided to investigators who interview witnesses with autism. Importantly, Studies 2 and 3 of this thesis have both revealed benefits of the Sketch-RC with vulnerable and developmentally unique populations, and provide evidence that drawing to remember is a practical tool that can be utilised by ABE interviewers. However, what is unclear is the extent to which Sketch-RC can aid recall performance of people with autism, in contrast to their typically developing peers. Study 4 of investigates exactly this by comparing memorial performance across populations.

Chapter Five

Examination of Episodic Recall Performance of Children with Autism and Typically Developing Children: A Comparison

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5.1. Abstract

The primary aim of this chapter was to further explore the episodic memory differences between child and adolescent witnesses with autism and a matched typically developing control group. Here, episodic recall performance was compared between groups and across three interview conditions: (i) Sketch Reinstatement of Context; (ii) Mental Reinstatement of Context; and (iii) a no-support control. The Sketch-RC technique was most effective, enabling participants with autism to perform on par with their typically developing peers.

5.2. Introduction

As discussed throughout Chapters 1 and 3, people with autism present with a unique memory profile of strengths and weaknesses. For example, memory for facts is relatively unimpaired (Bowler et al., 2007) as is cued-recall performance. Conversely, episodic memory and free recall performance is typically reduced (Boucher, 1981; Boucher & Lewis, 1989; Millward et al., 2000). These strengths and weaknesses have been determined by comparing performance as a function of mode of recall (e.g., cued recall and free recall), and across populations, comparing performance of people with autism to that of typically developed/developing people (Bruck et al., 2007; Maras & Bowler, 2010; 2012; McCrory et al., 2007). The majority of research studies that compare across both typical and atypical populations generally identify where specific impairments lie (Ben Shalom, 2009).

Understanding the etiology and nature of memorial impairments is vital in order to distinguish which witnesses may be most vulnerable, and which group of witnesses may require the most support during investigative interviews. However, although these impairments have been largely identified, research is yet to offer any empirically validated retrieval support techniques for people with autism, and so this population is currently disadvantaged in comparison to typically developing people when asked to recall witnessed events during an investigative interview. Supporting atypical people to perform as well as their typically developed/developing peers will ultimately contribute to the overall aim of achieving equal access to justice for all vulnerable witnesses and victims in England and Wales.

The previous two chapters have explored the efficacy of the Sketch-Reinstatement of Context (Sketch-RC) technique, first with typically developing children and adolescents, and then with children and adolescents with autism. The positive benefits of this tool have been demonstrated with both populations. Namely, drawing was found to increase the overall accuracy of children's accounts when compared to the traditional Mental Reinstatement of Context (MRC) technique and a no-retrieval-support (control condition). An increase in recall accuracy was also found during the questioning phase of interviews for both groups, and also, during the free recall phase for children with autism. Although it has not been suggested that children with autism are less accurate during free recall conditions than cued recall conditions, children with autism are known to produce significantly less information during free recall if they are not provided with appropriate retrieval support (Bowler et al., 1997; Bowler et al., 2008).

The Sketch-RC externally supported children with autism to produce more information than their peers in their respective conditions (MRC and Control), and importantly, this information was significantly more accurate. Although the total amount of information recalled did not reach statistical significance, increased information produced during this phase was accountable by the greater amount of correct information recalled, rather than an increase in incorrect or confabulated information (as was the case with MRC). The following cross-study analysis builds upon the findings from the previous two chapters by examining the efficacy of the Sketch-RC technique, comparing memorial performance across the two populations of interest in the thesis: typically developing children and children with autism.

As discussed in Chapters 1 and 4, diminished free recall ability is a persistent characteristic of autism (Bennetto et al., 1996; Bowler et al., 1997; Gaigg, Gardiner & Bowler, 2008; Lind & Bowler, 2008). Similarly, people with autism rely more upon visual rather than verbal styles of information processing (Goldstein et al., 1994), due to difficulties with working memory tasks and the processing of verbal information (Goldstein et al., 1994; Minshew & Goldstein, 1998; 2001), thus potentially rendering the complex verbal instructions dictated by MRC, as problematic for this population. Additionally, MRC requires the processing of relational information in order to access episodic memory stores. In contrast to item-specific memory processes (which are intact with autism), relational memory processes are known to be impaired in people with autism, due to a failure to utilise categorical and relational features of information to aid recall (Bowler et al., 1997; Gaigg et al., 2008; Minshew & Goldstein, 1993). This is particularly the case when environmental support for retrieval is not provided (Gaigg et al., 2008). While these factors are considered, to some extent, to affect young typically developing children's recall, these factors are likely to be exacerbated in children with autism.

The use of MRC with adults who have autism has been previously investigated (Maras & Bowler, 2010; 2012). Results suggested that typically developing adults were more accurate under MRC recall conditions than their intellectually matched peers who had a diagnosis of autism (Maras & Bowler, 2010). Although these findings might be applied, in part, to younger witnesses, no research to-date has compared typically developing children's recall with autistic children's recall following MRC. As such, little is known about whether or not children with autism under-perform in comparison to their typically developing peers, as is the case with adults. Nonetheless, it is reasonable to argue that MRC may be more detrimental for children with autism, in light of the unique memory profile that they present.

In summary, the Sketch-RC has proven to provide appropriate retrieval support for children with autism, enabling them to provide more information during free recall conditions and in line with the Task Support Hypothesis (Bowler et al., 1997). Similarly, typically developing children also appear to benefit from the Sketch-RC technique, with an increase in recall accuracy also being found. What has yet to be established is the extent that drawing can support children with autism to perform relative to their typically developing peers. What is also unclear, is the extent to which MRC is detrimental to children with autism, when compared to typically developing children. The following cross-study analysis aims to address this gap in knowledge.

5.3. Aims of Cross-Study Analysis

The current cross-study analysis explores the recall performance of children aged 12 to 16 years old who have a diagnosis of autism with a matched typically developing control group. Here we examine the relative benefits of Sketch-RC and MRC for these two groups of vulnerable witnesses. Using the data presented in Chapters 3 and 4, we present a cross-study analysis in order to provide an in depth understanding of memory performance between two groups of vulnerable witnesses. This is the first study to have isolated and investigated the effects of Sketch-RC and MRC with both autistic and typically developing children, but the literature to-date and the findings from Study 2 and Study 3 enable the following predictions to be made:

1) There will be a difference in the amount of information produced by typically developing children and children with autism, regardless of retrieval condition;
2) There will be a difference in recall performance of typically developing children and children with autism who are supported at retrieval with the Sketch-RC technique, when compared to their peers who are provided with retrieval support in the form of MRC, and those who are provided with no retrieval support.

5.4. Method

5.4.1. Design

A between-subjects design was employed with two independent variables. First, Interview, on three levels: i) Sketch Reinstatement of Context (Sketch-RC); ii) Mental Reinstatement of Context (MRC); and iii) Control. Second, Group, on two levels: i) Autism Spectrum Disorder (ASD); and ii) a matched typically developing group (Control). The dependent variable was episodic memory performance as measured by the amount of verbal information recalled, and whether that information was correct, incorrect, or confabulated. Further percentage accuracy was included. The *type* of information recalled was also coded as action, person or surroundings.

5.4.2. Sample

Data from 90 children and adolescents were used in this analysis (55 males and 35 females), 45 children with an autism diagnosis, and 45 typically developing children (a matched control group). The clinical status difference between the two groups indicates heterogeneous levels of cognitive functioning that are likely to influence the cognitive performance under study. To limit the confounding effects of this heterogeneity, the verbal performance and nonverbal performance of both groups were considered using the British Picture Vocabulary Scale III (BPVS-III; Dun, Dun, Whetton & Burley, 1997), and Raven's Coloured Progressive Matrices (RCPM; Raven, Court, & Raven, 1999) (as detailed in Section 3.6. and Section 4.6.). BPVS-III scores were used to match (within five points of raw score) autism participants to typically developing participants, and the RCPM scores as a covariate, which takes account of the ordinal differences in intelligence without risk of misclassification across groups.

The RCPM scores were not used to match groups because it does not measure intelligence in individuals with autism in the same way as it does in typically developing comparison groups, running the risk of overestimating the general intelligence of autism individuals (see Mottron, 2004; Mottron & Burack, 2001). Participants' mean chronological age, BPVS scores, and RCPM scores as a function of group, across retrieval conditions are displayed in Table 17 (below).

Table 17. *Age, BPVS-III and RCPM mean raw scores for autism and comparison typically developing group (TD) across interview conditions (N = 90).*

	Chronological Age (years and months)		BPVS-III		RCPM	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	12 years 0 months	35.50 months	119.53	22.56	24.47	6.68
MRC (total)	12 years 7 months	36.41 months	120.33	27.63	25.70	8.04
Control (total)	12 years 6 months	43.90 months	118.37	30.05	24.50	7.34
ASD (*N* = 45)	14 years 6 months	18.12 months	119.00	26.92	24.22	8.35
Sketch	14 years 1 month	18.63 months	118.73	22.96	22.67	7.98
MRC	14 years 6 months	18.12 months	120.00	28.39	25.47	9.86
Control	15 years 1 month	16.61 months	118.27	30.72	24.53	7.35
TD (*N* = 45)	10 years 2 months	34.95 months	119.82	26.64	25.56	6.12
Sketch	9 years 11 months	30.47 months	120.33	22.94	26.27	4.68
MRC	10 years 8 months	34.95 months	120.67	27.83	25.93	6.03
Control	9 years 11 months	40.49 months	118.47	30.44	24.47	7.59

5.4.3. Manipulation Analysis

Analysis of the BPVS and Ravens scores across participant groups, interview conditions, and as a function of interview X Group revealed no significant main effects, or interactions, all *F*s < .765, all *p*s > .397. A significant main effect of age emerged between the participant groups. Children with autism were significantly older than the matched typically developing group, $F(1, 84) = 80.476$, $p = < .001$. However, there were no significant main effects of age for interview condition, or interview X group interactions, *F*s < .608, all *p*s > .547.

5.5. Analysis Approach

The procedure used to collected data for this analysis is detailed in Chapter 3, Section 3.6. In summary, each of the retrieval conditions were structured according to the current UK investigative interview model and Achieving Best Evidence advice (MOJ, 2011). Interviews comprised the same phases in the same order, as follows: (i) greet; (ii) rapport; (iii) explain; (iv) free recall; and (v) closure. Interviews differed only in the free recall phase, where the experimental manipulation took place (Sketch-RC; MRC; Control).

As with Study 2 and Study 3, this cross-study explored the data in a number of ways (see Chapter 3, Section 3.7 for detailed outline). However, due to heterogeneous levels of cognitive functioning of the sample (outlined in Section 4.6), Raven's Coloured Progressive Matrices scores were used as a covariate, thus multivariate analysis of covariance (MANCOVA) and analysis of covariance (ANCOVA) were conducted throughout, with post hoc test applied where appropriate. Further, ANCOVA was also used to explore the number of items depicted in children's drawings, and a series of Pearson's correlations were applied to examine the relationship between the number of items drawn and children's recall performance.

Levene's test indicated that the assumption of variance had been violated for a number of performance measures. Transforming the data did not rectify this problem. As all sample sizes were equal throughout the analysis, the analysis approach is considered robust (Field, 2009; 2013; Zimmerman, 2004), and the *F*-tests are reported nevertheless. After controlling for Raven's Coloured Progressive Matrices scores, the following results emerged.

5.6. Results

The results of this study will be summarised in terms of overall interview performance, as well as free recall and questioning performance as a function of condition. Due to the extent of data analyses and the volume of results produced, the following sections report the key findings, only. For a full and detailed presentation of additional results, see Appendix I.

5.6.1. Overall Memorial Performance: Information Recalled

Univariate analysis revealed a main effect of group (ASD and Typically Developing), on the total amount of information recalled (see Figure 15), F (1, 83) = 24.373, $p < .001$, $\eta^2 = .227$. Regardless of condition, children with autism, M = 31.71, SD = 21.16, 95% CI [26.244, 38.447], recalled significantly less information overall than typically developed children, M = 54.44, SD = 21.25, 95% CI [47.708, 59.911]. There was no significant main effect of condition, or a group X retrieval condition interaction effect for the total amount of information recalled, both Fs < .250, both ps > .779.

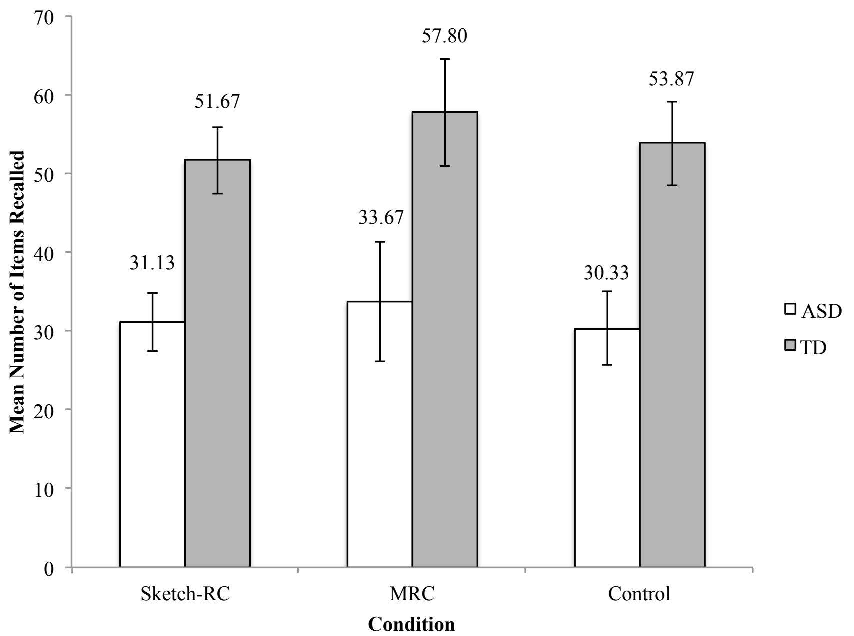

Figure 15. Total amount of information recalled (means and standard deviation) as a function of group and retrieval condition.

Memorial performance (means and standard deviations) as a function of group and condition are displayed in Table 18. Multivariate analysis of the combination variable (correct + incorrect + confabulations) for information recalled throughout the entire interviews, revealed significant main effects of group and retrieval condition, F (3, 81) = 9.763, $p < .001$, $\eta_p^2 = .266$; F (3, 164) = 4.203, $p = .001$, $\eta_p^2 = .133$, respectively. Separate univariate analysis revealed main effects of group (ASD and TD), on the amount of correct and incorrect information recalled, F (1, 83) = 28.113, $p < .001$, $\eta^2 = .253$; F (1, 83) = 7.442, $p = .008$, $\eta^2 = .082$, respectively. Regardless of condition, children with autism, 95% CI [2.526, 5.452], recalled significantly less incorrect information than typically developing children, 95% CI [5.370, 8.297]. Children with autism, recalled significantly less correct information, 95% CI [18.964, 27.850], than their typically developing peers, 95% CI [35.750, 44.636]. No significant main effect of group was revealed for the amount of confabulations reported, $F = 1.389$, $p = .242$.

Although a significant main effect of condition was found on the amount of confabulated information, F (2, 83) = 3.407, $p = .038$, $\eta^2 = .076$, post hoc analysis found no significant differences, all ps > .071. There was also no significant main effect of condition for the amount of correct and incorrect information recalled, all Fs >.196, all ps > .088. Further, no significant age group X retrieval condition interaction was found, $F = 1.307$, $p = .403$.

Table 18. *Means and standard deviations for the type of information recalled overall as a function of group and condition*.

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	34.60	15.72	3.73	2.45	3.07	4.98
MRC (total)	32.40	23.34	6.23	6.26	7.10	5.65
Control (total)	28.40	16.39	6.27	5.84	7.43	10.40
ASD (total)	22.73	16.20	3.93	4.43	5.04	9.05
Sketch	26.67	11.93	2.93	2.15	1.53	1.81
MRC	23.27	23.22	5.20	6.47	5.20	4.77
Control	18.27	10.26	3.67	3.50	8.40	14.36
TD (total)	40.87	16.79	6.89	5.57	6.69	5.78
Sketch	42.53	15.33	4.53	2.53	4.60	6.56
MRC	41.53	20.26	7.27	6.09	9.00	5.96
Control	38.53	15.20	8.87	6.62	6.47	3.99

5.6.2. Overall Accuracy

There was a significant main effect of retrieval condition on the overall percentage accuracy of information recalled, F (2, 83) = 15.018, p < .001, η^2 = .266. Further, a significant group X retrieval condition interaction emerged for percentage accuracy, F (2, 83) = 3.742, p = .028, η^2 = .083 (see Figure 16). Overall, participants in the Sketch-RC condition, M = 84.82, SD = 10.10, 95% CI [79.517, 90.838] were significantly more accurate than children in both the MRC, M = 64.34, SD = 19.75, 95% CI [57.980, 69.319], p < .001, and Control conditions, M = 69.82, SD = 19.67, 95% CI [64.484, 75.804], p = .001. There was no significant difference between the latter two conditions, p = .333.

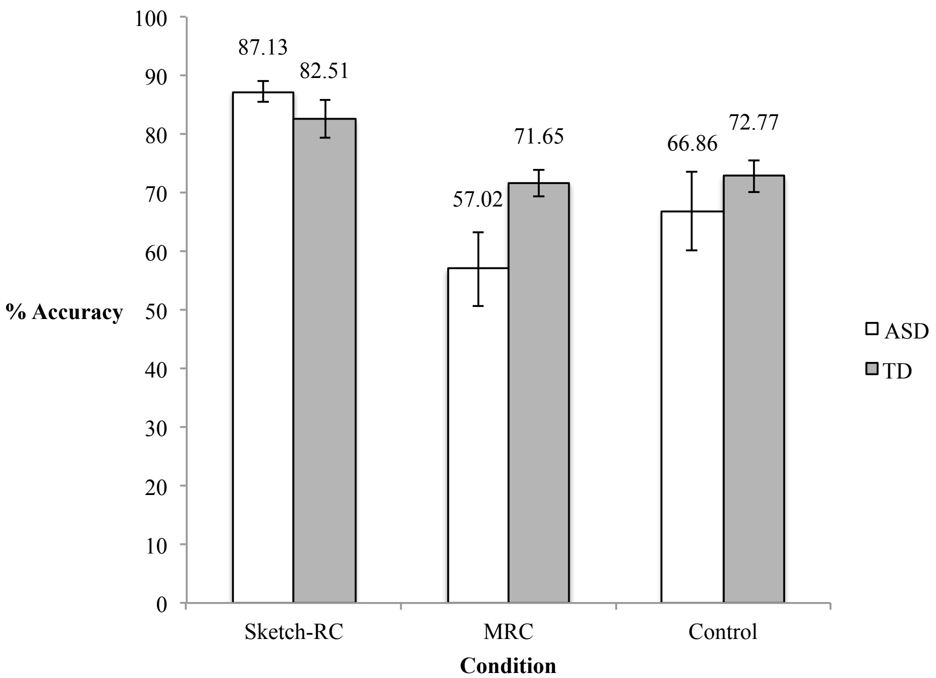

Figure 16. Overall percentage accuracy of information recalled as a function of group and retrieval condition.

Children with autism in the MRC condition, 95% CI [48.525, 64.535] were significantly less accurate than their matched typically developed peers in the MRC condition, 95% CI [62.754, 78.784], $p = .014$. No significant difference in accuracy was found between children with autism, 95% CI [80.941, 97.070] and typically developed children interviewed in the Sketch-RC condition, 95% CI [73.324, 89.375], $p = .187$. Also, no significant difference emerged between children with autism, 95% CI [59.154, 75.158] and typically developed children interviewed in the Control condition, $p = .297$. No significant main effect of group was found for percentage accuracy, $F = 1.611$, $p = .208$.

5.6.3. Free Recall Performance: Information Recalled

A significant effect of group was found for the total amount of information produced during the free recall phase of interviews (see Figure 17), F (1, 83) = 7.510, p = .008, η_p^2 = .083. Children with autism, M = 15.11, SD = 9.64, 95% CI [12.530, 18.414], recalled significantly less information than typically developing children, M = 21.58, SD = 11.37, 95% CI [18.275, 24.158]. No significant effect of condition was found for the total amount of information recalled, F = .776, p = .464. Similarly, no significant group X retrieval condition interaction emerged, F = .657, p = .521.

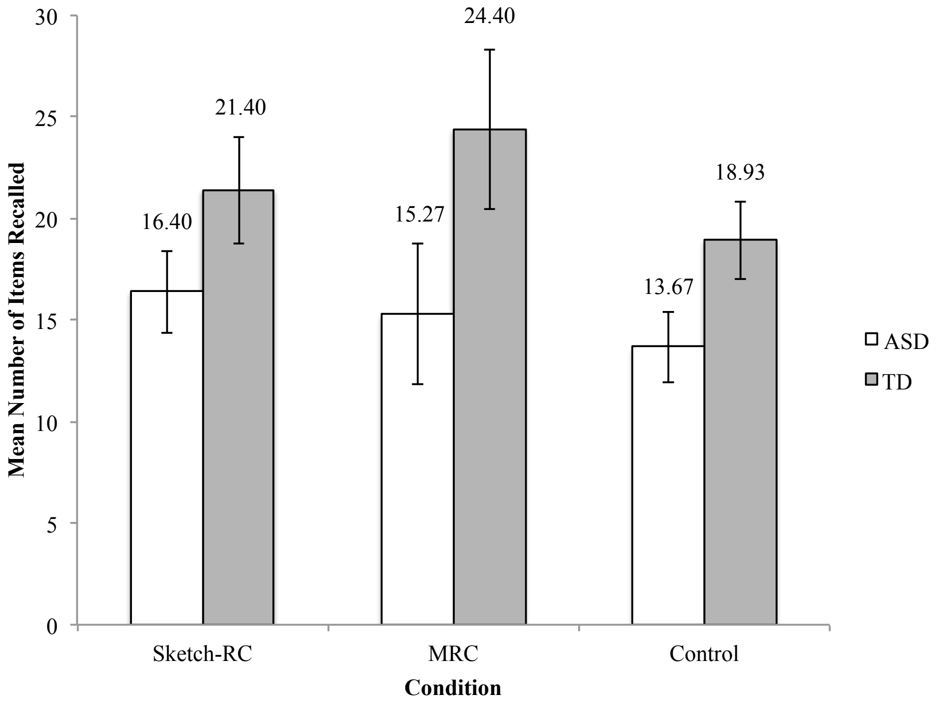

Figure 17. Total amount of information (means and standard deviation) produced during free recall as a function of group and retrieval condition.

Multivariate analysis of the combination variable (correct + incorrect + confabulations) for information recalled during the free recall phase of interviews, revealed significant main effects of age group and condition, F (3, 81) = 5.712, p = .001, η_p^2 = .175; F (6, 164) = 3.328, p = .004, η_p^2 = .109, respectively (see Table 19 for raw means and standard deviations). Separate univariate analysis revealed the main effect of group emanated from the amount of correct information recalled, F (1, 83) =

11.596, $p = .001$, $\eta^2 = .12$. Typically developing children recalled significantly more correct information, 95% CI [16.75, 21.87], than children with autism, 95% CI [10.53, 15.65]. There was a significant effect of retrieval condition on the amount of incorrect information recalled, $F(2, 83) = 4.437$, $p = .015$, $\eta^2 = .10$. Post hoc tests revealed that participants in the Sketch-RC recalled significantly fewer incorrect items of event information, 95% CI [-0.11, 0.99], than those in the MRC, 95% CI [1.38, 2.14], $p = .013$. There was no significant difference between Sketch-RC and Control, 95% CI [0.63, 1.72], $p = .189$, or between the MRC and Control conditions, $p = .876$.

Table 19. *Means and standard deviations for the type of information produced during the free recall phase as a function of group and condition.*

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	17.77	9.09	.43	.63	.70	1.02
MRC (total)	17.07	13.13	1.60	2.18	1.17	1.91
Control (total)	13.77	7.07	1.17	1.54	1.37	2.67
ASD (total)	12.71	8.71	1.04	1.52	1.36	2.46
Sketch	15.27	7.11	.53	.74	.60	.91
MRC	12.40	11.81	1.60	2.29	1.27	2.09
Control	10.47	6.00	1.00	.93	2.20	3.53
TD (total)	19.69	10.32	1.09	1.58	.80	1.33
Sketch	20.27	10.35	.33	.49	.80	1.15
MRC	21.73	13.08	1.60	2.13	1.07	1.79
Control	17.07	6.64	1.33	1.45	.53	.92

No significant main effect of group was found for the amount of incorrect or confabulated information recalled across the participant groups, all *F*s < 2.173, all *p*s

> .120. There were no significant main effects of condition for the amount of correct or confabulated information recalled, all *F*s < 1.677, all *p*s > .380. Further, no significant group X retrieval interaction emerged, $F = 1.200$, $p = .309$.

5.6.4. Free Recall Accuracy

A significant main effect of group and condition was found for the percentage accuracy of information produced during the free recall phase, $F(1, 83) = 9.139$, $p = .003$, $\eta^2 = .10$; $F(2, 83) = 7.375$, $p = .001$, $\eta^2 = .15$, respectively (see Figure 18). Typically developing children were significantly more accurate, $M = 91.34$, $SD = 8.94$, 95% CI [86.04, 95.43], than children with autism, $M = 80.02$, $SD = 24.24$, 95% CI [75.94; 85.32], respectively. Also, participants in the Sketch-RC were also significantly more accurate, $M = 93.92$, $SD = 6.14$, 95% CI [88.56, 100.04], than those in the MRC, $M = 79.70$, $SD = 24.00$, 95% CI [73.22, 84.71], $p = .001$, and Control conditions, $M = 83.43$, $SD = 19.65$, 95% CI [78.04, 89.52], $p = .035$, with no significant difference between the latter two conditions $p = .726$.

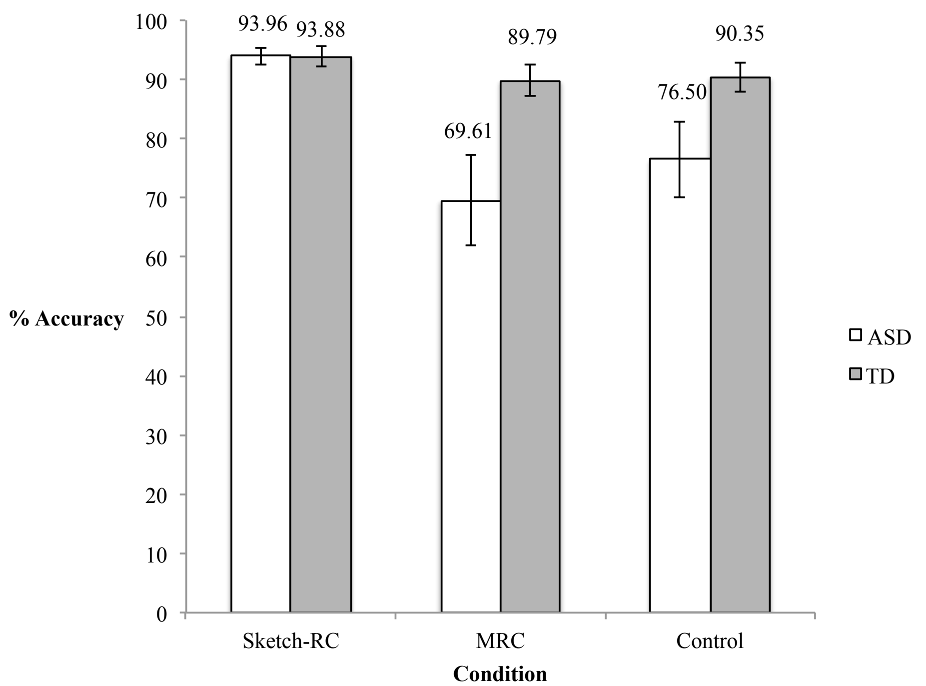

Figure 18. Free recall percentage accuracy as a function of group and retrieval condition.

A significant group X retrieval condition interaction effect emerged, F (2, 83) = 4.294, p = .017, η^2 = .094. Children with autism in the MRC condition, 95% CI [60.97, 77.20] were significantly less accurate than their typically developing peers in the MRC condition, 95% CI [80.72, 96.96], p = .001. Similarly, children with autism in the Control condition, 95% CI [68.71, 84.93] were also significantly less accurate than typically developed children in the Control condition, 95% CI [82.62, 98.85], p = .018. No significant difference in accuracy was found between children with autism interviewed in the Sketch-RC condition, 95% CI [87.80, 104.15] and typically developing children in the Sketch-RC condition, 95% CI [84.49, 100.76], p = .567.

5.6.5. Questioning Phase Performance: Information Recalled

Univariate analysis revealed a main effect of group (ASD and TD) for the total amount of information recalled during the questioning phase of interviews (see Figure 19), F (1, 83) = 31.807, p < .001, η^2 = .277.

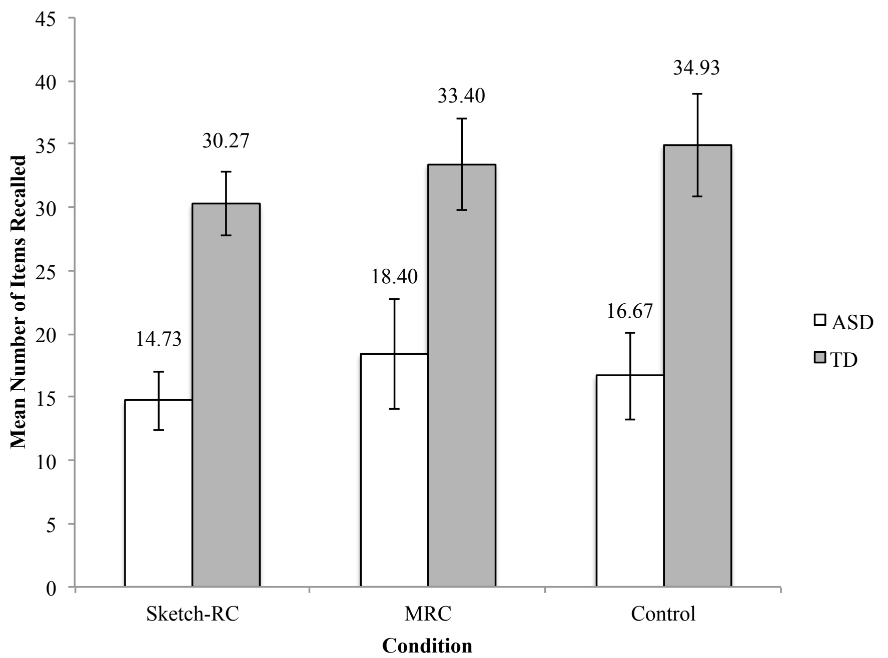

Figure 19. Total amount of information recalled (means and standard deviation) during the questioning phase as a function of group and retrieval condition.

Participants with autism, *M* = 16.60, *SD* = 13.22, 95% CI [12.962, 20.785] recalled significantly less information overall than typically developing children, *M* = 32.87, *SD* = 13.27, 95% CI [28.682, 36.505]. No significant main effect of condition was found for the total amount of information recalled during the questioning phase, $F = .557$, $p = .575$, nor was a significant group X retrieval condition interaction revealed, $F = .220$, $p = .803$.

Multivariate analysis of the combination variable (correct + incorrect + confabulations) for information recalled during the questioning phase of interviews, revealed significant main effects of age group and condition, $F(3, 81) = 11.730$, $p < .001$, $\eta_p^2 = .303$; $F(6, 164) = 2.687$, $p = .016$, $\eta_p^2 = .090$, respectively (see Table 20 for raw means and standard deviations).

Table 20. *Means and standard deviations for the type of information recalled during the questioning phase as a function of group and condition.*

	Total Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	16.83	9.45	3.30	2.44	2.37	4.51
MRC (total)	15.33	11.62	4.63	4.59	5.93	5.09
Control (total)	14.63	10.81	5.10	5.26	6.07	8.20
ASD (total)	10.02	8.75	2.89	3.39	3.69	6.92
Sketch	11.40	7.34	2.40	1.88	.93	1.10
MRC	10.87	12.04	3.60	4.58	3.93	3.37
Control	7.80	5.81	2.67	3.27	6.20	11.09
TD (total)	21.18	9.30	5.80	4.63	5.89	5.52
Sketch	22.27	8.25	4.20	2.65	3.80	6.05
MRC	19.80	9.60	5.67	4.52	7.93	5.81
Control	21.47	10.40	7.53	5.82	5.93	4.04

The multivariate effect of group emanated from the amount of correct and incorrect information recalled, F (1, 83) = 33.848, $p < .001$, $\eta^2 = .290$; F (1, 83) = 11.093, $p = .001$, $\eta^2 = .118$, respectively. Children with autism recalled significantly less correct, 95% CI [7.768, 12.866] and incorrect information, 95% CI [1.744, 4.123] than their typically developing peers, 95% CI [18.334, 23.432], 95% CI [4.566, 6.945], respectively, both *p*s < .001. No significant effect of group was found for the total amount of confabulations reported, $F = 3.279$, $p = .074$.

The significant multivariate effect of condition emanated from the amount of confabulated information recalled during the questioning phase of interviews, F (2, 83) = 3.688, $p = .029$, $\eta^2 = .082$. Despite this significant finding, post hoc analysis revealed no significant findings between groups, all *p*s > .05. Further, no significant main effects of condition were found for the amount of correct or incorrect information produced, $F = .618$, $p = .541$; $F = 1.590$, $p = .210$, respectively. No significant age group X retrieval condition interaction was found, $F = .874$, $p = .515$.

5.6.6. Questioning Phase Accuracy

A significant effect of condition was revealed for the accuracy of information recalled during the questioning phase of interviews (see Figure 20), F (2, 83) = 10.677, $p < .001$, $\eta^2 = .205$. Children interviewed in the Sketch-RC condition, M =76.95, SD = 14.84, 95% CI [69.429, 84.448], were significantly more accurate than participants in both the MRC, M = 54.16, SD = 24.85, 95% CI [45.975, 61.018] and Control, M = 58.17, SD = 23.22, 95% CI [50.980, 65.998], conditions, $p < .001$, and p = .003, respectively. No significant difference in percentage accuracy emerged between participants in the MRC and Control conditions, $p = 1.00$. Further, no significant effect of group was found for questioning phase percentage accuracy, F =

.906, $p = .344$, nor was a significant group X retrieval interaction revealed, $F = 1.278$, $p = .284$.

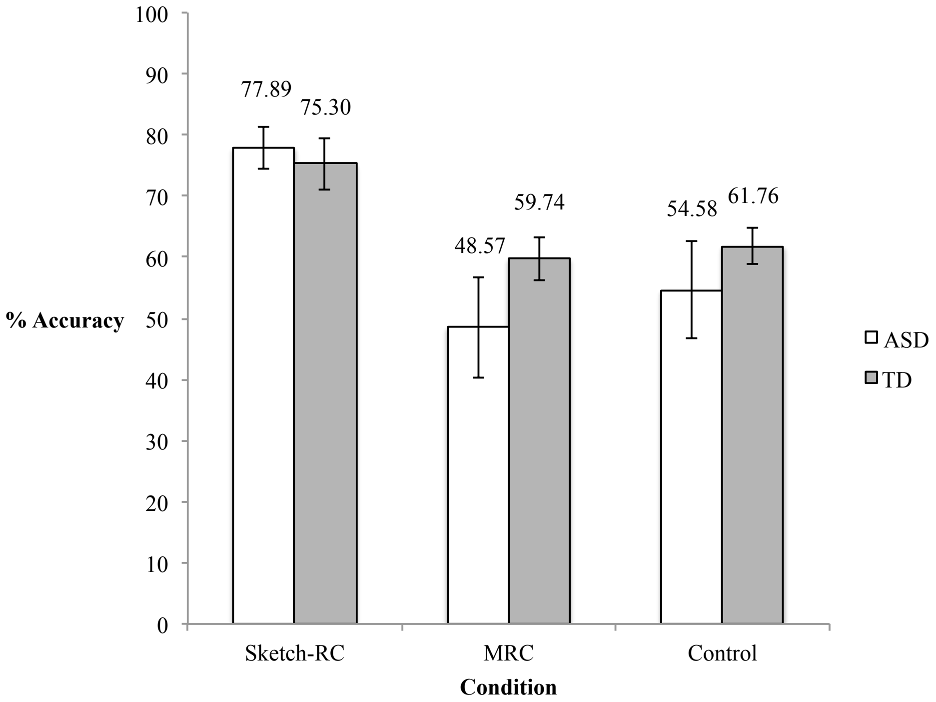

Figure 20. Questioning phase percentage accuracy of information recalled as a function of group and retrieval condition.

5.6.7. Drawings Analysis

Drawings were compared across groups (ASD; TD control group) for the number of items drawn, and the number of items in each of the four categories. There was no significant difference between the two groups for the total number of items drawn, or the number of items drawn in each of the four categories (see Figure 21), all *p*s > .329. As presented in Chapter 4, Section 4.8.4, a significant positive correlation was found for the total number of items drawn and the total amount of correct information recalled by children with autism, $r(15) = .585$, $p = .022$. However, for the matched typically developing control group, this relationship was not significant, $p = .791$. The relationship between the types of items drawn (person; action; object;

other) and the types of information recalled by the typically developing control group, were also not significant, all *p*s > .100. In contrast, significant correlations were found between the number of person items drawn and the amount of correct person information recalled by children with autism, as well as the number of action items drawn and the amount of correct action information recalled by these children (see Chapter 4, Section 4.8.4).

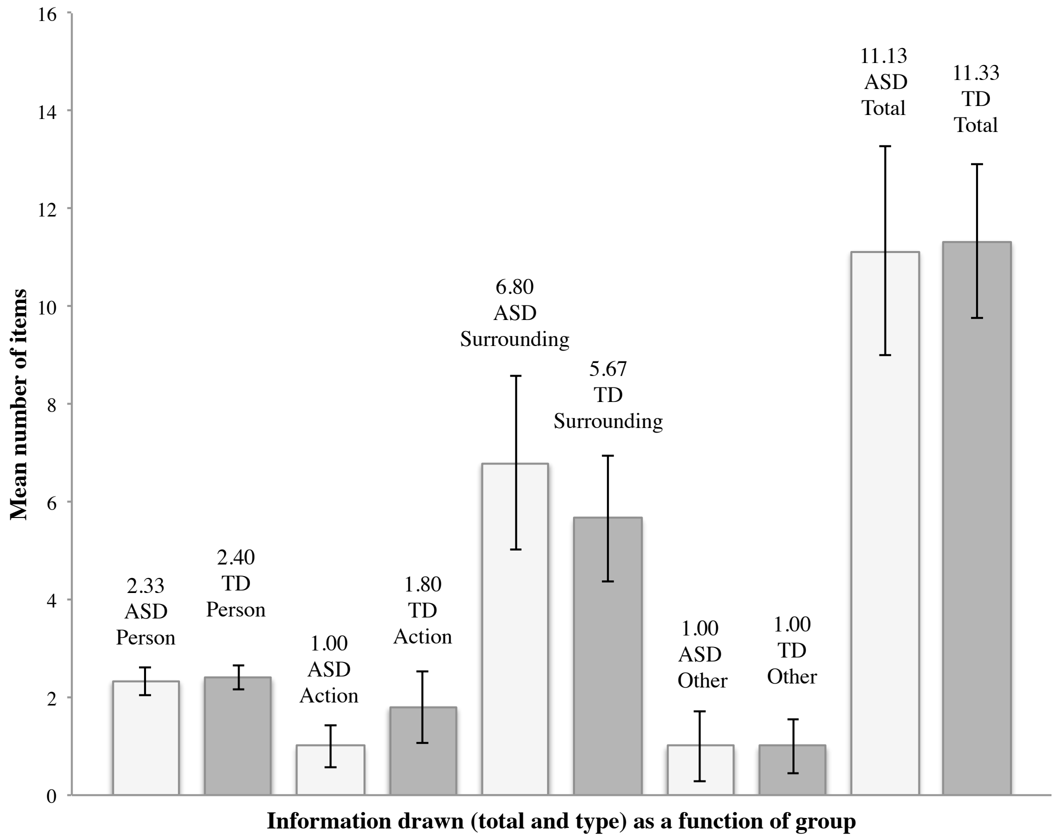

Figure 21. Mean number of items drawn as function of group.

5.7. Discussion

Using the data from mock witness studies reported in Chapters 3 and 4, this cross-study analysis compared memorial performance of children with autism and a matched typically developing control group across three interview conditions. The results will be discussed in turn with reference to recall performance as a function of group and retrieval condition.

5.7.1. Memorial Performance as a Function of Group

Children with autism recalled significantly less information overall than their typically developed peers, despite there being no significant difference in the number of questions asked of these two groups or in the duration of interviews (see Appendix I for results). In particular, children with autism recalled significantly fewer correct and incorrect items, but no significant difference in the amount of confabulations reported was found. The lower overall amount of episodic information recalled by participants with autism may emanate from an inability to fully engage in autonoetic consciousness, as described in Chapter 1, Section 1.6. In this context, children with autism have been found to successfully recall event-related *knowledge*, but often fail to demonstrate the ability to mentally relive experiences and relate knowledge to the context by which it was learned (Lind & Bowler, 2008). Consequently, episodic recall is frequently found to be lower in this population. Indeed, previous research has also demonstrated similar findings. For instance, Bruck et al., (2007) also found that children with autism recalled significantly less information than their typically developing peers. Despite differences in the amount of information produced, no differences in relation to accuracy have yet been revealed in this population (Bruck et al., 2007; McCrory et al., 2007), as was the case with the children interviewed in this study. As such, to some extent the findings in this cross-study analysis are unsurprising.

With regard to the free recall phase of interviews, children with autism recalled less information than their typically developing peers. Again, this is unsurprising. As well as the memory deficits already outlined, diminished free recall ability is also a persistent characteristic of autism (Bennetto et al., 1996; Bowler et al., 1997; Gaigg et al., 2008; Lind & Bowler, 2008). A reliance upon ‘knowing’ rather than ‘remembering’ information (Bowler et al., 2007), means that this population perform as well as their typically developed peers in cued-recall tasks, but underperform on free recall tasks where semantic memory systems cannot be utilised to a great extent.

In line with the findings from the current study, McCrory et al. (2007) also found that children with autism aged 11 to 14 years old produced significantly less information during free recall conditions than their typically developing peers. However, performance during the questioning phase of interviews did not reveal any significant differences between groups in the aforementioned study. Conversely, the results from the current cross-study analysis did in fact reveal a difference in the amount of information recalled by the two comparison groups during questioning. Here children with autism recalled less information during the questioning phase. The discrepancy between these findings and those of McCrory et al. (2007) may be attributed to the nature of questions asked in the current study. Here, questioning was guided purely by the information produced during free recall, where, as discussed, free recall performance of children with autism was below that of typically developing children. Thus, it is likely that reduced recall during questioning for our experimental group is a result of reduced recall during free recall. In comparison, questioning was controlled in the aforementioned study, and also included leading questions, examining suggestibility. As such, it is possible that this manner of questioning was comparable to that of cued-recall testing, where individuals with autism typically perform on par with matched controls (Gardiner et al., 2003).

5.7.2. Memorial Performance as a Function of Retrieval Condition

The findings outlined in this chapter have demonstrated that the MRC mnemonic and no retrieval support reduces the memorial performance of children with autism, compared to typically developing children. Indeed, a significant group X retrieval condition interaction revealed that children with autism interviewed in the MRC condition, were significantly less accurate than typically developed children interviewed in the MRC condition (both overall, and as a function of retrieval condition). These findings come as no surprise, particularly in light of the literature that implies MRC would be particularly problematic for children with autism. For instance, if the processing of verbal instructions is a negative factor of the MRC procedure with typically developed children, this factor is likely to be exacerbated in children with autism, given their reliance upon visual rather than verbal styles of information processing (Goldstein, et al., 1994).

MRC also requires interviewees to process relational information in order to access episodic memory stores. Relational memory processes are known to be impaired in people with autism, particularly when environmental support for retrieval is not provided (Gaigg, et al., 2008). Moreover, MRC demands that interviewees mentally place themselves back in time, which for children with autism, this is a factor known to be problematic (see Chapter 1, Section 1.6). Indeed, previous research has also demonstrated that MRC is particularly detrimental to the accuracy of recall for adults with autism, when compared to typically developing adults (Maras & Bowler, 2010; 2012).

Similarly, during free recall, children with autism interviewed in the Control condition, who were not supported at retrieval, also demonstrated decreased accuracy than their typically developing peers. Again, this finding comes as no surprise, given the reduced free recall ability of this population when they are not provided with appropriate retrieval support. The suggested deficits in free recall ability of children with autism is less associated with impairments that occur during the encoding stage, causing information to be unavailable, but rather, a difference in retrieval strategies. Consequently, impaired free recall memory performance appears to be caused by errors of omission, as opposed to errors of commission (Bruck et al., 2007). In line with this notion, the results from Study 4 suggest that when children with autism are interviewed with the Sketch-RC technique, their memorial performance is more comparable to that of their typically developing peers.

Analysis of the accuracy of information recalled (overall and as a function of retrieval condition), revealed no significant difference between children with autism and typically developing children when interviewed in the Sketch-RC condition. While Study 3 confirmed that memorial performance of children with autism can be enhanced with appropriate retrieval support, the findings from the current study provide further support for the theory that individuals with autism can perform on par with their typically developing peers when provided with appropriate retrieval support, thus confirming the Task Support Hypothesis (Bowler et al., 1997). As outlined in Chapter 1, section 1.6.1, Sketch-RC alleviates demands on working memory, and negates the need for numerous complex linguistic instructions. Difficulties following complex linguistic instructions, and impaired working memory have been reported in people with autism (Goldstein et al., 1994; Minshew & Goldstein, 1998; 2001). The Sketch-RC instructions are simple and few, and the technique allows children with autism to quickly execute the verbal instructions and also to externalise the task in the format of a drawing.

While there were no significant correlations found between the number of items drawn and the amount of correct information recalled by matched typically developing children, a significant correlation between these variables was revealed for children with autism. The process of drawing may enable children with autism to engage in a more strategic, perceptual search process, thus, compensating for retrieval deficits that are traditionally associated with this group. Here, as children draw particular aspects of an event, they are more supported to refer to item-specific memory, as opposed to relational memory system (the latter, which, as outlined in Chapter 4, is often impaired with this group), whilst simultaneously allowing children to engage in perceptual representation processes, rather than verbal processes to access episodic memories (Ben Shalom, 2003; Whitehouse et al., 2006).

Although no hypotheses were formulated with regard to the type of information recalled, children with autism consistently recalled less person, action and surrounding information than their peers (see Appendix I for full results). With the exception of person information, there were no group differences in the type of information that was confabulated. In this instance, children with autism confabulated more person information than their peers, and were also less accurate when reporting action information. Autism is typically associated with diminished social and person processing abilities (American Psychiatric Association, 2000; 2013). Similarly, Maras and Bowler (2010; 2012) reported diminished recall for person and action details, thus these findings come as no surprise.

Importantly, there were no overall differences in the recall accuracy of specific information (i.e., person and action), meaning that children with autism were as accurate as their typically developing peers. An exception to this consistent finding was the accuracy of surrounding information, where typically developed children were found to be more accurate than their peers with autism. One possible explanation for this is that children may attempt to compensate for diminished person and action recall at the expense of recall accuracy for surrounding information. Nonetheless, while not being comparable to typically developing children, Sketch-RC, however, appears to support retrieval of person, action *and* surrounding information (as demonstrated in Study 3), results that are likely to be caused by the more salient nature and compatible retrieval cues that Sketch-RC offers.

5.7.3. Summary

Children with autism face additional developmental and neurological challenges in comparison to their typically developing peers, which serve to further reduce episodic remembering. This study has provided further evidence of such challenges, by demonstrating that children with autism recall less information than typically developing children during episodic memory tasks, and that providing no retrieval support or retrieval support in the form of MRC, is further detrimental to recall. However, this study has shown that when appropriately supported, children with autism can perform at more typical levels in forensic interviews that commence with a free recall account (Bowler et al., 1997), as advocated in the format of ABE interviews. Retrieval support in the form of Sketch-RC improved performance as predicated by the Task Support Hypothesis, which indicates some level of failure at retrieval, as opposed to encoding or storage memory processes (Bowler et al., 2004). These findings and their implications will be further discussed in the concluding chapter.

Chapter Six

Discussion

6.1. Summary of the Thesis Aims and Theoretical Underpinnings

The main aim of the research reported in this thesis was to advance current understanding of eyewitness memory performance across two vulnerable populations: typically developing children, and children with autism. Further, for the first time, theoretically and empirically informed guidance is offered to front line practitioners who interview these two groups of vulnerable witnesses. Overall, this thesis presented the reader with the relevant theoretical arguments, supported by empirical studies relevant to the interviewing of children with and without autism in England and Wales. Based upon the current research, the proceeding chapters went on to explore and experimentally test the discussed interviewing approaches in more depth. The current chapter will examine the issues and theoretical implications of the studies reported in this thesis. Following such, these findings will then be consolidated, evaluated, and discussed with regard to implications for practice, and also, future directions for research.

6.2. Prominent Findings and Implications

6.2.1. Police Officers' and Intermediaries' Perceptions

The study presented within Chapter 2 explored practitioners' perceptions and use of special interviewing techniques. Particular focus was placed upon the use of drawing and the use of the CI with vulnerable witnesses. The findings of this study revealed a consensus amongst practitioners regarding the use of communication aids and props. Here, both police officers and intermediaries reported that they make regular use of such tools during investigative interviews with vulnerable witnesses. In particular, the use of drawing and writing materials was found to be the most common form of communication aid/prop used by practitioners.

Chapter 2 also revealed that police officers regularly use the CI with vulnerable witness, believing it to be 'very effective'. However, officers reported the CI to be least effective for people with learning disabilities, autism and older adults. The findings from this study demonstrated some parallels with results presented by Wheatcroft et al. (2013), where it was suggested that officers rated the CI as less useful when used with vulnerable witnesses such as children and adults with learning disability (in comparison to usefulness of the CI with typically developed adults). However, officers' overall rating of the effectiveness of the CI with vulnerable witnesses in the current study, contradicts these findings. Conversely, intermediaries' expressed a distinct lack of experience and knowledge of the CI.

While the findings from this study serve to enhance knowledge about practitioners' perceptions and use of special interview techniques, an area that was not explored was where practitioners had acquired their knowledge of special interview techniques. All police officers and intermediaries were trained in their respective roles to work with vulnerable witnesses, but it is unclear to what extent the use of drawing and the CI is included in interviewing training programmes. What is clear, however, is that the use of drawing and the CI is not included in current Registered Intermediary training, and this is evident in responses that depict (some inappropriate) use of drawing and no knowledge of the CI. Future research should address this issue and uncover where practitioners gain their knowledge of special interview techniques, and moreover, the contents training programmes that cover this subject, which will allow for appropriate training to be developed and delivered.

Similarly, while practitioners were asked about the number of people with autism that they had worked with, their knowledge and perceptions of autism were not explored in this thesis. Thus, it is unclear how accurate their perceptions are, not only in relation to how many witnesses with autism they had worked with, but also, how accurate their perception of special interview techniques with this group is. For example, it may be that some respondents had little or no understanding of autism, and thus, failed to identify witnesses with this condition, ultimately leading to practitioners underestimating how many interviews they had conducted. Indeed, this factor may be most prolific with police officers rather than intermediaries who are experts in communication (often with people who have conditions such as autism). It may therefore be the case that this issue affected their perceptions of who special interview techniques are and aren't most effective for. In order to enhance understanding of practitioners' current knowledge and to enable effective identification of vulnerable witnesses who have autism, comprehensive awareness training is necessary.

6.2.2. Sketch-Reinstatement of Context and Typically Developing Children

Study 2 (Chapter 3) employed a mock witness paradigm and investigated the efficacy of the Sketch-Reinstatement of Context (Sketch-RC) in comparison to the traditional mental reinstatement of context (MRC) technique, and a no retrieval support condition (Control). In line with previous research that has examined the completeness of children's episodic recall (Lamb et al., 2003; Myklebust & Bjorklund, 2010), it was clear that older children (those aged 12 to 16 years) produced more information overall than their younger peers (those aged 5 to 11 years old). This pattern of results was revealed throughout the entire duration of the interviews, as well as within the specific phases of the interviews i.e., free recall and questioning. With regard to the type of information recalled, older children also recalled more correct information than their peers. Again, this finding was revealed across interviews within their entirety, as well as within the particular interview phases. Interestingly, with the exception of the free recall phase, where children aged 12 to 16 years produced more incorrect information than their younger peers, no other significant differences emerged across age groups for the amount of errors made.

Similarly, significant differences in the amount of confabulated information recalled was only revealed for children aged 8 to 11 years, where this age group produced more confabulations than both their younger and older peers. This finding was not surprising, given that this period of child development (often referred to as 'middle childhood') is marked by significant cognitive and biological changes. In particular, children of this age group show advances in self-concept and self-awareness (linked to autonoetic consciousness, and discussed in Chapter 1). Indeed, while these cognitive advancements enable children to better retrieve information from memory, this period of childhood is also affected by the development of gist and verbatim memory systems. It may be the case that children aged 8 to 11 years were unable to distinguish between gist memory traces (general event representations) and verbatim memory traces (specific surface details of an event) (Dahl, Sonne, Kingo & Krøjgaard, 2013).

After examining children's recall as a function of age, Chapter 3 then explored recall as a function of the three retrieval conditions (Sketch-RC; MRC; Control). Overall, children interviewed in the Sketch-RC condition were significantly more accurate throughout interviews in their entirety, as well as during the free recall and questioning phase, when compared to children interviewed using the traditional MRC mnemonic and those who were provided with no retrieval support. Notably, children interviewed in the MRC condition, produced significantly more confabulated information than their peers interviewed in the Sketch-RC condition. No differences in accuracy were found between children interviewed in the MRC and Control conditions. In line with previous findings (e.g., Dietze & Thomson, 1993; Dietze et al., 2010; Hayes & Delamothe, 1997; Hershkowitz et al., 2001; Milne & Bull, 2002), this suggests that MRC (when used in isolation) is as effective as providing no retrieval support to young typically developing witnesses. Hence, Chapter 3 demonstrated the beneficial effect of the Sketch-RC technique for young, typically developing witness' episodic recall performance in an interview setting.

Indeed, as with all mock-eyewitness research, there are a number of limitations with study 2, most notably the lack of interviewer variability throughout conditions. It may be the case that interviewer performance (i.e., the use of appropriate questions) improved as a function of the number of interviews conducted. Further, the familiarity of the content of the stimuli may have affected the questions asked of interviewees, thus provoking observer-expectancy effects. Further analysis could explore interviewer performance and changes across time. Nonetheless, without controlling this factor, establishing whether differences in performance were a result of interviewer variability or interview condition, would have been difficult to distinguish.

6.2.3. Sketch-Reinstatement of Context and Autism

Chapter 4 investigated the efficacy of the Sketch-RC compared to the MRC, and a no retrieval support condition (Control) with children aged 12 to 16, diagnosed with autism spectrum disorder. This was the first empirical study to explore both the use of Sketch-RC, and also, the MRC CI mnemonic with this group of children. The prominent findings were that when children with autism are provided with retrieval support in the form of the Sketch-RC technique, the information that they reported was more accurate than their peers in both the MRC and Control conditions. Importantly, children interviewed using the Sketch-RC technique produced more correct information, and less incorrect and confabulated information throughout the interviews in their entirety. This pattern of findings was also revealed within both the free recall, and questioning phases of interviews of children with autism.

As with study 2, there are a number of methodological issues arising with the current study. Namely, a relatively small sample size was obtained, however, recruiting children with developmental conditions is challenging. Similarly, despite significant results in relation to recall accuracy, a number of null findings were also revealed in this particular study, the cause of which was attributed to the stimuli used in this research. The use of a relatively short (one minute in duration) event, lacking in complexity, inevitably reduces the amount of information available for encoding and subsequent retrieval. However, the use of such stimuli does, to some degree, represent some crimes that may be witnessed (i.e., public theft, where little event information is witnessed). Despite these limitations, the findings from study 3 provide important empirical evidence for the use of a more developmentally appropriate retrieval tool for use within criminal justice settings. Moreover, study 3 highlights previous concerns surrounding the use of MRC with people who have autism. Indeed, study 3 provides foundations for future research which can include a greater number of participants, and variability of to-be-remembered events.

6.2.4. Cross-Study Analysis

Chapter 5 extended upon the studies conducted in Chapters 3 and 4. Here, the efficacy of the Sketch-RC was examined across typically developing children and children with autism. Overall, children with autism produced significantly less information than their typically developing peers, but were able to produce information that was as accurate as their typically developing peers when provided with retrieval support in the form of Sketch-RC. However, accuracy significantly declined for children with autism when they were provided with retrieval support in the form of MRC, and no retrieval support. This significant finding emerged despite the fact that overall children with autism recalled far fewer correct information items and were significantly less accurate than typically developing children, results that largely concur with the limited literature concerning eyewitness memory in both children (McCrory et al., 2007; Roberts, 2002) and adults (Maras & Bowler, 2010; 2012; Maras, Gaigg & Bowler, 2012) with autism.

The issues identified within the two preceding studies of this thesis, such as (i) the nature of the to-be-remembered event; (ii) the delay between participants witnessing the event and being interviewed; and (iii) the lack of interviewer variability, are also applicable to the current study. Additionally, study 4 comprised of two participant groups: children and adolescents with autism and typically developing children and adolescents who were matched to the experimental group based upon performance in BPVS and Ravens measures. Indeed, while this matching strategy is considered appropriate and robust, including an additional control group who were matched according to chronological age may have provided further insight into the effects of Sketch-RC. Namely, it may be the case that this technique not only allows children with autism to perform on par with their developmentally matched peers (as was the case in study 4), but performance is enhanced to the extent that this group are able to perform on par with their chronologically matched peers, also.

6.3. Evaluation of Interviewing Techniques

6.3.1. The Efficacy of Mental Reinstatement of Context with Vulnerable Witnesses

The CI is an empirically and theoretically supported interview procedure when used with typically developing adults (e.g., Dando et al., 2009[a]; 2009[c]; Dando et al., 2011; Roebers, & McConkey, 2003; Memon et al., 1997); some vulnerable witness populations (e.g., older adults: Dando, 2013; Wright & Holliday, 2007); and adults with intellectual disability (Clarke, Prescott & Milne, 2013; Kebbell & Hatton, 1999; Milne et al., 1999). However, other empirical studies that have been outlined in this thesis, have produced somewhat mixed findings when the MRC mnemonic has been used with typically developing children. Some studies have found the procedure beneficial when compared to standard interview conditions that do not include context reinstatement (Dietze & Thomson, 1993; Dietze et al., 2010; Hayes & Delamothe, 1997; Hershkowitz et al., 2001; Milne & Bull, 2002), while others have failed to find a positive effect (e.g., Darwinkel et al., 2014; Dietze et al., 2010; Milne & Bull, 2002). Further, the research to-date (albeit, limited), also suggests that the CI is not only ineffective, but rather, detrimental to recall accuracy of adults with autism (Maras & Bowler, 2010; 2012). Despite the mixed findings produced by empirical literature, 88.2% of police officers surveyed as part of this thesis, reported that they often use the

CI with vulnerable witnesses, and that they perceive it to be very effective. However, drawing parallels with previous research (e.g., Wheatcroft et al., 2013), the CI was deemed by these officers to be less effective with particularly vulnerable witnesses, namely, very young children, and also, witnesses with autism.

The experimental studies presented in Chapters 3, 4, and the findings from Chapter 5, also failed to find positive memorial effects of MRC with vulnerable witnesses (including those with autism), when compared to the Sketch-RC. Crucially, MRC increased the number of confabulations reported by typically developing children, ultimately resulting in decreased recall accuracy. Although no significant difference in accuracy was found between children interviewed in the MRC and Control conditions, the differences in incorrect and confabulated information recalled provides further weight for the argument that MRC is problematic for children and young people, particularly those with autism. Indeed, the findings indicate that providing no retrieval support to vulnerable witnesses, may in fact be more appropriate than providing support in the form of MRC.

There is a lack of understanding as to what exactly causes the MRC component of the CI to be beneficial in some studies, but not in others. One potential cause for these inconsistent outcomes may be differences in how MRC is applied. For instance, the instructions used in Maras and Bowler (2010) were considerably long, complex and structured in present tense. In light of the known impairments concerning language processing, literal interpretation and autonoetic consciousness identified in people with autism, it may be that the cause for detrimental recall with MRC was not entirely related to the premise of MRC, but rather, the manner by which the instructions were presented. In contrast, the instructions provided to participants in Dietze et al (2010) were not particularly long or complex. While greater simplicity and shorter length may have enabled better understanding of the instructions, no positive effects emanated from MRC, thus there may not have been sufficient detail in which participants could extract appropriate and salient retrieval cues. Differences concerning the length and application of MRC are evident across all studies that have explored its efficacy. Perhaps to truly establish the effects of MRC, greater consistency across interviews is necessary. Similarly, the memorial benefits of MRC may be more pronounced when the CI is used in its entirety, as a homogenous process. That is, utilising more mnemonic components, rather than just MRC and the 'report' everything instruction. However, research indicates that officers do not routinely apply all components of the CI during practice (Dando et al., 2009[b]), thus developing tools that have both practical application *and* a sound theoretical basis, is of great importance if such tools are to be used in the real world to achieve desired effects.

The number and type of prompts used by interviewers during the free recall account of experimental studies, are another factor suggested to impact upon the mixed results produced by empirical research concerning MRC (Darwinkel et al., 2014). For example, an increase in the frequency of open prompts (those that are proven to produce the most accurate information from child witnesses) would likely cause an incremental increase in the production of accurate information. Similarly, the *type* of open prompts utilsed during interviews can also affect the quality and quantity of recall. Namely, a lack of 'open-ended depth' questions (e.g., 'Tell me more about the part where…?') following recall of specific event details may lead to less information being retrieved, akin to a lack of 'open-ended breadth' questions, such as 'What else happened?' (Powell & Snow, 2007).

Nonetheless, the cognitive and developmental demands of MRC are perhaps the most pertinent features of this interviewing technique. Due to developmental differences of vulnerable witnesses, and the variation in complexity of the MRC instructions, there is no 'one-size fits all approach' which can be applied universally. The following section will address these cognitive and developmental factors in turn.

6.3.1.1. Language Processing

In order for MRC to be effective, witnesses must be able to carefully listen to (receive), and adequately understand and implement (apply) a series of verbal mnemonic instructions in the manner that they are intended i.e., to support retrieval (Memon et al., 1996), thus, the MRC technique demands significant language processing capacity and concurrent processing abilities. Asking children to reinstate context out loud, goes some way in ensuring that they are listening to the instructions. However, previous research has demonstrated that despite context being reinstated out loud, MRC has still proven to be ineffective with typically developing children (Dietze, et al., 2010). Importantly, this method does not ensure that instructions have been processed adequately, merely that they have been attended to. If the processing of verbal instructions is a negative factor of the MRC procedure with typically developed children, it is reasonable to argue that this factor may be more pronounced in children with autism given the difficulties of following complex linguistic instructions, impaired working memory and concurrent processing abilities that have long been established in this group (Gabig, 2008; Goldstein et al., 1994; Joseph et al., 2005; Minshew & Goldstein, 1998; 2001).

6.3.1.2. Incompatible Retrieval Cues

MRC requires that the interviewee is able to access memories based upon the verbal mnemonic instructions provided, importantly, these mnemonic instructions must correspond with the memory traces stored (Tulving & Thomson, 1973). The more that cues are compatible with metarepresentations and the event details, the greater is the probability of effective retrieval (Tulving, 1979). MRC is thus dependent upon the relationship between context and events in order to aid recall, demanding the interviewee to form an integration of the verbal instructions with their visuo-spatial memory for the event in question (Kana, Keller, Cherkassky, Minshew & Just, 2006). One disadvantage of this is that it assumes memory traces can be accessed in the same manner with each witness. However, as previously noted for children with autism, the retrieval cues uniquely associated with the encoded event are likely to differ markedly to those of typically developing witnesses (initially used to develop MRC) due to the unique manner in which individuals with autism apparently bind event memories. Consequently, using MRC to access episodic memory stores may not be possible for some witnesses. Given that incompatible retrieval cues are known to impair episodic retrieval performance (e.g., Schacter et al., 1998), it could be argued that this is one potential cause for the ineffectiveness of MRC with some vulnerable populations.

The retrieval cues provided by interviewers when administering MRC are not only environment-centric, but they are centered on the time leading up to the event, rather than the event itself (e.g., travel to the to-be-remembered event; the event environment; the witness' feelings; the witness' senses etc.). Providing cues in this manner does not allow children to think about the event itself until after event retrieval has commenced. Because the MRC instructional cues are environment and context centric, they may lead witnesses to recall cue related information at first retrieval, to the detriment of person/perpetrator detail (person and action cues do not feature in the MRC instruction). Individuals with autism are known to have diminished social and person processing abilities (American Psychiatric Association, 2000; 2013), but because people are typically involved in a crime event, they are likely to be salient to those with autism, even though this may be to a lesser degree than with typically developing populations. Indeed, Maras and Bowler (2010; 2012) report diminished ASD recall for person and action details with the CI. Further, the results from the empirical studies presented within this thesis, correspond with these earlier findings.

Additionally, such instructions require interviewees to process relational information in order to access episodic memory stores. In contrast to item-specific memory processes (which are intact in people with autism), relational memory processes are known to be impaired in individuals with autism, particularly when environmental support for retrieval is not provided (Gaigg et al., 2008).

6.3.1.3. Autonoetic Consciousness and Concentration

MRC directs witnesses to place themselves back in an experience – an ability that relies upon autonoetic consciousness. For children to experience autonoetic consciousness, they must have explicit understanding that their memory of an event is indeed a memory – a representation of a past experience (Lind & Bowler, 2009; Nelson & Fivush, 2004; Welch-Ross, 2001). Impairments in this particular ability are not only well documented in children with autism (Bowler, et al., 2008; Happé, 1995, Jordan & Powell, 1995), but this ability is known to be age-dependent in typically developing children, also (Perner, 1991; Suddendoff & Whiten, 2001; Wimmer et al., 1998). Without the ability to form metarepresentations and to engage in mental time travel, not only is episodic memory limited (Lind & Bowler, 2008), but also, the efficacy of MRC is compromised. Finally, MRC demands unimpaired attention and concentration abilities. Fully applying this procedure typically takes in excess of 10 minutes, and so for both typically developing children and children with autism, it is at best cognitively demanding, and at worst, impossible. These factors, both individually and in combination, are likely to disrupt the cognitive processes involved in reconstructing and verbalising an episodic experience, thus decreasing episodic recall performanc when compared to the Sketch-RC technique.

6.3.2. The Efficacy of Sketch-Reinstatement of Context

The theoretical and empirical findings outlined, suggest that MRC does not necessarily provide effective access to memory stores for young witnesses, both with and without autism. Nonetheless, utilising the positive effects of the MRC mnemonic (that have long been demonstrated with adults), is possible for children if the mnemonic instructions are less cognitively demanding, and if the cues are more salient to the child's memory stores. The findings from the empirical studies presented in this thesis are clear, and demonstrate that the Sketch-RC procedure is an effective tool that supports episodic performance in both typically developing children and children with autism, markedly increasing performance with over 90% recall accuracy overall. What is not entirely clear, is why the process of drawing benefits recall to the extent that it does. It is not possible to attribute the cause of increased memorial performance to just one factor. Instead, a multitude of factors are potentially implicated. The following sections will discuss the attributes of this technique, and how they might go some way to explain the positive findings presented within the experimental chapters of this thesis.

6.3.2.1. Compatible Retrieval Cues

The success of the Sketch-RC technique with young witnesses may arise from it being a flexible retrieval strategy that allows spontaneous self-directed drawing. Incidentally, it allows children to create their own contextual retrieval cues rather than being directed by the interviewer, and thus accessing the particular memory store of interest. Indeed, Tulving (1974) maintains that limited episodic recall is not always a result of merely forgetting information, but rather, a consequence of inaccessibility to the particular memory store of interest. As noted in the previous section, this is particularly important for children with autism given that the retrieval cues uniquely associated with the encoded event are likely to differ to those of typically developing witnesses due to the unique manner in which individuals with autism bind event memories (Bowler et al., 1997; Gaigg et al., 2008); their reported deficits in source monitoring (Bowler et al., 2004; Bennetto et al., 1996; Hala et al., 2005); and failure to ustilise categorical and relational features of information to aid recall (Bowler et al., 1997; Gaigg et al., 2008; Minshew & Goldstein, 1993) . Further, unlike MRC, Sketch-RC does not demand that witnesses mentally place themselves back in an experience. This is a difficult task, not only for individuals with autism, but for very young typically developing children (Boucher & Lewis, 1989; Bowler et al., 2004; Bowler et al., 2008; Millward et al., 2000; Toichi, 2008).

Rather, Sketch-RC encourages mental time travel by supporting an effortful search for salient contextual cues, which the witness can immediately externalise, but which remain available in the form of visual record. Hence, the witness controls the type of cues accessed. Similarly, they are not being asked to process relational information in order to access episodic memory stores (precisely what the MRC technique dictates). The Sketch-RC encourages item-specific memory recall by asking individuals to 'draw what comes to mind', thus, resulting in elements of the episode being broken down and recalled as separate items, rather than encouraging retrieval based upon relational processing. Therefore, the demands of the task are reduced, which is likely to support goal-directed remembering (de Jong, 2010), while simultaneously providing retrieval support.

6.3.2.2. The Process of Drawing

Less exhaustive retrieval strategies are considered to be the most prominent factor in young children's reduced free recall performances, particularly when compared to older populations (Arnold & Lindsay, 2002; Barlow et al., 2011; Brainerd et al., 1990; Salmon, 2001). Imaging has been found to increase episodic first response in typically developing adult populations, and also, in children (Anderson, Dewhurst, Nash, 2012; Calabrese & Marucci, 2006). Drawing necessarily includes imaging, and so it may also be that drawing simply encourages a more effortful search through memory, thus, addressing age-related differences in retrieval strategies of typically developing children.

Correspondingly, deficits in free recall performance for children with autism have long been established, with these individuals recalling significantly less information than their typically developed peers in interview settings (Bruck et al., 2007; Maras & Bowler, 2010; 2012; McCrory et al., 2007). However, it has been suggested that individuals with autism compensate for deficits in episodic memory by relying on perceptual representations rather than verbal processes to access episodic memories (Ben Shalom, 2003; Whitehouse et al., 2006). Self-produced images may indeed serve to aid this compensatory process, while also falling in line with the Task Support Hypothesis (Bowler et al., 1997), which indicates that people with autism can be helped to perform at more typical levels when provided with appropriate support at retrieval.

As well as benefitting witnesses with autism, previous research has found that typically developing children's verbal recall can be improved when they are encouraged to draw at retrieval (Barlow et al., 2011), and unless directed otherwise, children draw subject matter and events that are most salient to them. In the case of the studies presented in this thesis, the process of drawing may have stimulated the children to talk about the episode in more detail. More specifically, the items they draw act as representational retrieval cues: as the drawing unfolds, children naturally talk about what they are producing (and hence the event), which cues the child to think about related episodic information (e.g., Salmon, 2001; Wesson & Salmon, 2001).

Respectively, the findings from Study 3, revealed a positive correlation between the number of correct items verbally recalled and the number of items drawn by children with autism. Although possible reasons for this finding were outlined within Chapter 4, Section 4.9, it may be the case that drawing acts as a predictor for episodic recall. Establishing whether or not the *number* of items drawn and the *quality* of the drawing, predicts the quality of verbalised episodic recall, would shed further light on the benefits of Sketch-RC.

As well as the episodic retrieval benefits that Sketch-RC offers, positive effects on the process of communication may also transpire. For instance, it may be possible that the process of drawing aids the communication for people who may struggle with the social dynamics of investigative interviews. The presence of a prop may encourage eye gaze to be averted in a socially acceptable way, thus addressing the impairments in reciprocal social interactions that often characterise people with autism (APA, 2000; 2013). Thus, drawing may not only aid recall, but may also act as a rapport building tool, and enable witnesses to feel more relaxed during the interview process (Poole & Dickinson, 2014), thus, more likely to communicate with interviewers. Indeed, in Study 1, practitioners consistently cited the communication benefits that drawing brings to interviews. Further, Sketch-RC technique encourages focus to be placed upon the drawing (at the very least, while the drawing is being created). This gives the witness stimuli other than the interviewer's face to engage with, which may in turn reduce cognitive load, especially for very young children, and for people with autism, where deficits in face processing are consistently reported with the latter group (Dawson, Webb & McPartland, 2005).

6.4. Implications for Practice

The Criminal Justice Joint Inspection (2014) recently published findings from a review into the interviewing of children in England and Wales. Here, it was detailed that there was poor compliance with Achieving Best Evidence guidelines. As such, police forces are advised to ensure that officers *do* comply with guidelines, and thereby, are provided with comprehensive recommendations of how to do this. Regardless, the interviewing of vulnerable witnesses in England and Wales is currently guided by these recommendations outlined in ABE. Overwhelmingly, ABE advises that careful preparation takes place before interviews, and that vulnerable witnesses are interviewed in a developmentally appropriate manner, by specially trained interviewers. The following sections outline ways in which ABE could address these key aims.

ABE currently recommends the use of special interviewing techniques, such as the CI when interviewing vulnerable witnesses. However, the findings of this thesis should suggest this recommendation be revisited because it runs counter to the findings reported in this thesis, and the empirical findings of other research that has investigated the efficacy off the CI, namely MRC, in laboratory conditions. ABE does suggest that some witnesses may not benefit from the use of specific components of the CI, namely, 'change perspective', which is deemed unsuitable for very young children, and individuals with autism due to the social and cognitive characteristics that punctuate autism spectrum disorder (namely, theory of mind deficits and literal interpretation – traits that may also be pertinent to very young, typically developing witnesses) (APA, 2000). That said, to date no research has investigated 'change perspective' with autistic individuals. Future research should address this gap in knowledge.

The appendices section of ABE provides practitioners with more information about the CI, specifically, the Enhanced Cognitive Interview (ECI). Here, the reader is guided through the recommended delivery and implementation of each CI component, all of which correspond to the phased interviewing approach that is central to ABE. Interviewers are suitably advised that not all components of the CI may be appropriate to some witnesses. Accordingly, interviewers are directed to consider: (i) *which* ECI components should be used; (ii) *when* such components should be used; and (iii) *how* these components should be presented. This section provides information about the purpose of MRC, but detail is somewhat limited. Although ABE does advise that interviewers should be specially trained before attempting to utilise MRC during interviews with vulnerable witnesses, it does not advise interviewers about which witnesses this component is most appropriate for, or rather, which witnesses it may not be appropriate for, despite inconsistencies in research findings.

In order for practitioners to be appropriately advised on the use of special interviewing techniques, the most referred to vulnerable witnesses guidance document (ABE) should incorporate additional empirical evidence concerning the usefulness and effectiveness of the CI. The evidence to-date that documents how MRC (when used in isolation without other CI mnemonics) can be detrimental to the accuracy of typically developing children's (e.g., Darwinkel et al., 2014; Dietze et al., 2010; 2012; Milne & Bull, 2002), and autistic individuals' eyewitness accounts (Maras & Bowler, 2010; 2012), should receive particular attention, given the impact that such may have upon the possibility of 'achieving best evidence'. Additionally, the evidence presented in this thesis, also corresponds with the aforementioned empirical findings. Specifically, MRC appears to be especially detrimental to the accuracy of younger children's recall, and particularly detrimental to the accuracy of recall by children and young people with autism. The cognitive and developmental factors that may contribute to these negative outcomes (as outlined within this chapter), should be noted, specifically as these may also affect the effectiveness of other CI components, and moreover, the interviewing process as a whole.

ABE also provides general guidance on the use of drawings and other communication aids. In its current form, ABE informs the reader of the potential benefits of using such aids, where particular reference is afforded to children's increased competence to demonstrate what happened, rather than to express in words. Further, ABE stipulates that communication aids may also allow for more detailed witness accounts, due to information being collected via two modes of communication ('show and tell'). The potential for retrieval cues is also considered – a factor that is pertinent to the free recall performance of vulnerable witnesses, particularly those with autism due to memorial impairments previously discussed.

Perhaps due to the lack of empirical research that has explored both the use of and the effectiveness of drawing with different groups of vulnerable witnesses (i.e., individuals with autism and people with learning difficulties), no specific guidance is provided by ABE about which groups of vulnerable witnesses these aids are particularly useful for. The experimental evidence presented in this thesis has demonstrated just how effective drawing is for both typically developing children and children with autism. Additionally, the data provided by practitioners about their perceptions and use of drawing with certain vulnerable groups, serves to provide a basis for which practical guidance can be produced and disseminated. Similarly, with the exception of 'sketch plans' being noted to be helpful when introduced during the MRC component of an ECI, current ABE guidance does not inform the reader of what stage during the interviewing process such aids should be introduced and utilised, or indeed, what instructions should be provided. The research presented in this thesis consistently used drawing during the free recall phase of interviews, and children were provided with simple and few instructions which were proven to be highly effective.

Practitioner guidance, and certainly, interviewer/intermediary training should equip practitioners with the knowledge of appropriate, yet effective ways of introducing and facilitating drawing during interviews. This is particularly pertinent, due to the variation in practice presented in Chapter 2, where one intermediary reported that she is in fact the person who produces the drawings, rather than this being an interviewee-led task. Without appropriate use, the potential for memory contamination, and consequently, unreliable evidence is a severe risk factor.

ABE also recommends that interviewers acquire the services of a Registered Intermediary when interviewing particularly vulnerable witnesses. However, this service is not utilised to the extent that it could be (Criminal Justice Joint Inspection, 2014). This may in part be due to the relative infancy of this provision. To-date, no empirical literature has examined the effect that intermediaries have upon the investigative interview process, more specifically, the effect that intermediaries have upon witness' recall and memorial performance is unknown. Nonetheless, the intermediary's role of facilitating communication during investigative interviews is not clearly illustrated within ABE, nor is it essential that officers are trained about how to effectively work with Registered Intermediaries during investigative interviews. These omissions perhaps render the provision of intermediaries as rather ambiguous to some officers, thus, leading one to question the consistency of their use across England and Wales.

Similarly, and rather worryingly, Registered Intermediaries currently receive no ABE interview training in preparation for their practical role. As such, intermediaries are not trained on the use of special interviewing techniques highlighted within ABE (i.e., the CI), and also, the appropriate use of drawing (as demonstrated by the data presented in Chapter 2). This is despite intermediaries being appointed to facilitate such methods. An absence of training about these topics, as well as the lack of empirical research in general concerning the efficacy of Registered Intermediaries during the interviewing of vulnerable witnesses, increases that likelihood that best practice is not adhered to.

The importance of adhering to best practice guidelines, and appropriately utilising the special techniques outlined within such guidelines is particularly pertinent when interviewing witnesses who are considered to be cognitively or developmentally limited (Walker, 1999). However, in its current form, ABE does not provide any further guidance on how to interview such witnesses. In particular, no guidance is provided about how to interview individuals with autism, despite this population's increased vulnerability to experiencing or witnessing crime. ABE simply provides information on the behavioural characteristics of autism, largely because research in the field of eyewitness testimony has not extended to this group of witnesses and so empirically validated retrieval support tools have yet to emerge.

Future revisions of ABE should endeavor to include more specific instructions with regard to the best ways to appropriately utilise special interview techniques with vulnerable witnesses. Further, such guidance should be incorporated into the training of practitioners. For example, Registered Intermediaries are not trained about the use of communication aids (such as drawing) during initial compulsory training, nor is this topic a compulsory continuing professional development requirement. Similarly, the extent to which police interview training across England and Wales, includes specific guidance on the use of communication aids, as well as the interviewing of people with autism, is unclear and should be explored. Moreover, ABE does not highlight the foundations of particular memory system, such as semantic and episodic memory, which are pertinent to crimes typically experienced by vulnerable witnesses (as discussed on pages 8 and 12 of this thesis). Incorporating theory, research and best practice guidance into training will ultimately enable practitioners to work better with particularly vulnerable victims and witness, thus enabling greater access to justice.

6.5. Strengths, Limitations and Future Directions

The findings presented in this thesis serve to enhance current understanding of interviewing practices in England and Wales, and provide a valuable contribution, not only to the theoretical and empirical literature on the subject of eyewitness memory, but they also have marked practical implications. However, as with all research, there are a number of strengths and limitations which apply here, and which also guide the course for future research. The following sections will examine each of these factors in turn, beginning with consideration of system variables, before discussing estimator variables (as outlined in Chapter 1, Section 1.3).

6.5.1. System Variables

In a number of ways, Chapter 2 presented the reader with unique and valuable insight into practitioners' perceptions and use of interviewing techniques for vulnerable witnesses. First, the use of drawing was explored with police officers and Registered Intermediaries. The findings of Chapter 2 provide the field of investigative interviewing with noteworthy understanding, not only of how this tool is utilised, but also, of the perceived effectiveness of its use with vulnerable witnesses. The results draw parallels with previous anecdotal evidence, where it has been suggested that drawing can be an effective interviewing tool (see Poole & Dickinson, 2014). Similarly, by demonstrating that this tool is highly regarded by practitioners, these results provide practice-based evidence to support current ABE guidance that promotes the use of drawing when interviewing vulnerable witnesses.

Second, although previous research had explored police officers' use of the CI with witnesses (e.g., Dando et al., 2008[b]; 2009[b]; Kebbell et al., 1999), only one study to-date has considered police officers perceptions of the CI with vulnerable witnesses

(Wheatcroft et al., 2013), but this latter study did not focus solely upon this group of witnesses. Rather, focus was placed upon a range of witness ‘categories’, largely adults. As such, insight into police officers’ perceptions of the CI when interviewing particular groups of vulnerable witnesses, namely, individuals with autism, was limited. Chapter 2 served to enhance current understanding of CI perceptions by asking respondents to identify which groups of vulnerable witnesses the CI is considered to be most and least effective for, and also, how often the CI is used with vulnerable groups.

Previous research has established that police officers use certain CI components more so than others when interviewing witnesses, and that use of particular components is significantly correlated with perceived effectiveness (Dando et al., 2008[b]; 2009[b]). Such may also be the case when interviewing officers use the CI with vulnerable witnesses. Understanding whether or not preferences for certain components do exist, and if so, why these preferences exist, will enable greater parity to be drawn between practice and research, while also enabling further understanding of police officers’ training needs.

The perceptions of other practitioners, namely, Registered Intermediaries, were also established in this thesis. Understanding intermediaries’ perceptions of special interviewing techniques is especially important, given their emerging role within the criminal justice system (OMahony, 2009), and their influence upon the communication methods used during investigative interviews with vulnerable witnesses. Chapter 2 highlighted the need for more improved interviewing training for this group, particularly due to their lack of knowledge concerning the CI. Absence of knowledge of the CI may undoubtedly impact upon intermediaries’ ability to effectively facilitate communication during interviews with vulnerable people, where this technique may be utilised.

One marked difficulty with conducting this manner of research is access and availability of specialist interviewing police officers and Registered Intermediaries. This is a pertinent limitation of Chapter 2 – the relatively small sample obtained, which makes generalising the findings to the wider population of investigative interviewers and Registered Intermediaries somewhat problematic. However, in light of the difficulty with gaining access to such practitioners, the findings of this research at least serve to form the foundations for future research that should endeavour, not only to gain a larger sample (where findings may be further exaggerated), but to explore the factors highlighted in Chapter 2 in more depth. For example, research could be extended to further examine practitioners' experiences of interviewing people with autism, particularly as this group of vulnerable witnesses were cited throughout practitioners responses to various survey questions. It is reasonable to suggest that given the current lack of guidance for interviewing people with autism, some police officers may feel ill equipped to conduct effective investigative interviews with this group, thus, compromising access to justice. Understanding 'what works' and 'what doesn't work' when interviewing vulnerable witnesses (from the perspective of practitioners), would further inform both empirical research needs, as well as potential practitioners training needs, thus enhancing evidence-based practice and practice-based evidence.

Similarly, there is a distinct lack of knowledge concerning the working relationship between police officers and Registered Intermediaries. Future research should first explore the role that intermediaries play when facilitating communication with vulnerable witnesses during investigative interviews, and how their involvement impacts upon the interviewing process. Understanding these factors both from an empirical perspective, as well as a practitioner perspective, will serve to identify the implications of appointing Registered Intermediaries in the criminal justice system. Without this data, it is currently impossible to understand to what extent intermediaries improve, or even hinder, police officers' ability to achieve best evidence, and also, how they may assist with special interviewing techniques such as the CI or drawing.

Overall, Chapter 2 has enhanced current understanding of practitioners use and perceptions of ABE recommended interviewing tools, while simultaneously highlighting the need for future research to explore interviewing practices in more depth. Further, Chapter 2 also emphasises the need to evaluate the training needs of practitioners to ensure that they are suitably equipped to interview vulnerable witnesses in a developmentally appropriate way.

The proceeding chapters extended on the findings from Chapter 2, by exploring the interview techniques investigated therein. Undoubtedly, variability exists between practitioners, their perceptions of practice, and their actual practice (Dando et al., 2008[a]). To address this within the experimental studies presented in this thesis, interviewer variability was strictly controlled by using just one trained interviewer throughout. Future work should vary the interviewer in order to establish whether or not similar effects of Sketch-RC are apparent. Additionally, exploring the possible effect of the presence of an intermediary during investigative interviews with vulnerable witnesses is also necessary. To-date, no empirical research has examined intermediaries' effect upon investigative interviews (at all), despite their significant involvement with the planning of interviews with vulnerable witnesses, and moreover, their role during the interviewing processes itself.

Understanding the impact of intermediaries' role on the accuracy of children's recall is imperative. Establishing this under controlled conditions with no retrieval support, would pave the way for further exploration of the use of intermediaries when the Sketch-RC and/or MRC techniques are applied. The possible cognitive demands of MRC may be relieved if intermediaries provide support with context reinstatement. Similarly, the effects of Sketch-RC may be further exaggerated, especially when one considers that drawing is a tool that is frequently used by these practitioners (as indicated in Chapter 2). As such, the need for further research is indeed highlighted.

Other interviewing variables could be further explored. For instance, examining and/or controlling for the number of questions and prompts delivered by interviewers in mock eyewitness studies. Controlling for this variable would enable empirical testing of the suggestion that differences in the quality and number of prompts is a cause for the mixed findings of MRC studies (Darwinkel et al., 2014). Equally, controlling for this variable could reduce the applicability of findings in practice, given that the number of questions and prompts are largely dependent upon the detail and amount of information recalled by witnesses, thus being a witness controlled variable, rather than an interviewer controlled one.

Similarly, as outlined throughout this thesis, particular witness groups (i.e., individuals with autism) require additional retrieval support due to deficits in free recall ability. Placing focus only upon open questions, which encourage free narrative responses, for instance, as a predictor of MRC, or indeed Sketch-RC efficacy, may prove to be problematic for this group. Nonetheless, in line with best practice guidelines, the number of open prompts delivered by interviewers is of paramount significance in determining both the quantity and quality of typically developing children's recall (Lamb et al., 2003). Indeed, previous research suggests that using drawing as a tool during interviews with children, leads to an increase in the number of open ended-questions and non-directive prompts delivered by interviewers (Patterson & Haynes, 2011; Wesson & Salmon, 2001). Establishing if Sketch-RC also encourages good interview practice, would serve to provide further support for its use with vulnerable witnesses.

Interviews in the experimental studies reported in this thesis were comprised of one interview. There is a growing body of evidence that highlights the effects of repeated interviews on children's memorial performance, albeit with mixed findings (see Goodman & Quas, 2008; Quas et al., 2007). Thus, establishing whether or not Sketch-RC is robust to this factor, would provide further evidence for its application in practice, particularly with vulnerable witnesses who may indeed need to be interviewed on more than one occasion. Similarly, the positive findings of the Sketch-RC studies presented in this thesis give weight for the need to investigate the efficacy of this tool within the sphere of other interviewing techniques, in addition to the traditional phased approach recommended by ABE guidelines.

Accordingly, ABE does promote other interviewing techniques, for example the International Evidence-Based Interviewing of Children (NICHD) Protocol, which has been consistently proven to be effective, not only with very young witnesses (Lamb et al., 2003; Hershkowitz, Lamb, Orbach, Katz & Horowitz, 2012), but also, with witnesses who have learning/intellectual disability (e.g., Brown, Lewis, Lamb & Stephens, 2012). Further research should consider incorporating Sketch-RC into the NICHD's protocol, as a means to provide additional retrieval support to children who may require it. This is particularly important due to NICHD's primary focus being on the use of open prompts, which as earlier described, may not be cognitively appropriate for witnesses with autism spectrum disorder. One of the main benefits of

Sketch-RC is its simplicity and flexibility. Applying Sketch-RC within the NICHD protocol is not only possible, but it may also prove to enhance the effectiveness of this protocol when used with certain groups of witnesses.

6.5.2. Estimator Variables

Previous research concerning eyewitness memory has typically taken the form of laboratory studies, where mock witnesses are exposed to a simulated event either by watching a video or taking part in staged live incident. This form of research is often criticised for its lack of ecological validity, primarily due to the absence of factors such as stress and anxiety, variables that are a common presence in the eyewitness experiences of children (Patterson & Hayne, 2011). Nonetheless, the advantages of laboratory-based research, is the level of scientific control exhibited throughout, and the opportunity to control estimator variables (to some extent). As outlined in Chapter 1, estimator variables relate to the characteristics of the individual witness, such as their memory for the event, their cognitive ability and developmental level – factors that investigators in the field cannot control (Wells, 1978). Acquiring control of estimator variables within laboratory research is vital in order to empirically and robustly test theories of eyewitness, and moreover, endeavor to apply the findings in a real world context. The following sections will discuss such variables relevant to this thesis, in turn, and consider how future research can further enhance understanding and best practice.

First, this thesis examined the effects of Sketch-RC with a wide age range of typically developing children and young people, and also children with autism aged 12 to 16. Future research should investigate the efficacy of Sketch-RC with other particularly vulnerable groups such as: (i) very young (under 5 years) typically developing children (Marchant, 2013); (ii) children (under 12 years) and adults on the autism spectrum (Browning & Caulfield, 2011); and indeed (iii) children and adults who have learning disability (Agnew et al., 2006). Similarly, while much research focusing upon individuals with autism typically concentrates on individuals with average intelligence (Hurley & Levitas, 2007; Matson & Shoemaker, 2009), research has long indicated that there is an overlap of autism and learning disability (Barack & Rutter, 1976), and that the latter group have different needs from those who present with autism *or* learning disability (Carminati, Gerber, Baud & Baud, 2007; Gilchrist 2001). Indeed, such needs do not only include communication, social and adaptive functioning, but also extend to episodic memory and recall performance, where eyewitness memory research should also take focus.

Second, the internal nature of the MRC technique means that we were unable to measure implementation (that is whether children did/attempted to do as they were instructed) other than by considering output performance. Further research investigating children's understanding of the MRC instructions is necessary, and would help shed light on this. Similarly, understanding the effects of the CI when more than one component (i.e., MRC) is applied, or even, when the CI is applied in its entirety with vulnerable witnesses, in particular, those with autism. Previous research with this population has focused only upon MRC. It may be the case, as in empirical studies involving typically developing children and people with learning disabilities (e.g., Milne et al., 1999; Milne et al., 2013; Robinson & McGuire, 2006), that the success of the CI is a product of it being applied in its full form, or at least the MRC mnemonic being utilized in combination with other CI mnemonics. Nonetheless, current practice guidelines do suggest that all components of the CI may not be appropriate for some vulnerable witnesses. Establishing which components work most effectively, without detriment to accuracy, is necessary.

Third, the Sketch-RC studies were conducted in conditions of intentional encoding, and so participants were able to concentrate on the stimulus event in a manner that does not typically occur in the real world. Furthermore, there was a relatively short delay between encoding and retrieval (one hour). Examining the efficacy of Sketch-RC in conditions of incidental encoding, and also with a longer delay between encoding a retrieval is necessary. Nonetheless, the children who participated in this research were unaware that they would later be asked to recall the event, and previous work using the Sketch-RC has found similar results in conditions of unintentional encoding, and with longer delays (e.g., Dando, 2013).

Fourth, the event that children witnessed in this research was both neutral and observational in nature, presented via video format. Previous research has found differences between children's recall in observed and participated events (Murachver, Pipe, Gordon, Owens & Fivush, 1996). This is particularly significant for individuals with autism, where they are known to recall more information when they observe events, rather than participate in them (Millward et al., 2000). Similarly, typically developing children's recall of real-life events is known to be superior to events witnessed via video (Thierry & Spence, 2004). While previous research has demonstrated the positive memorial effects of Sketch-RC in real-life events (Dando, 2013), future research should endeavour to understand the extent to which Sketch-RC may support recall of participated events. This is important, especially if this tool is to be used during investigative interviews concerning crimes where witnesses have been directly involved, and are indeed alleged victims rather than onlookers. Similarly, children's recall in the experiments presented in this thesis was based upon a single event. Future research should examine the efficacy of Sketch-RC in relation to repeated events, where it is known that such can impact upon the quality of children's recall (Powell & Thomson, 1996).

Understanding the efficacy of Sketch-RC when the event to be recalled is considered to be emotionally laden or traumatic, is also of key importance due to the nature of crimes that vulnerable people are commonly subject to (Marchant & Page, 1992), and also, the propensity for such to predict accurate and inaccurate event recall (Goodman, Quas, Batterman-Faunce, Riddlesberger & Huhn, 1994; La Rooy, Malloy & Lamb, 2011). Nonetheless, it is reasonable to suggest that utilising Sketch-RC in these circumstances may be more appropriate than asking children to mentally reinstate the context, which in itself could induce further trauma. Indeed, previous research has demonstrated the benefits of asking children to 'draw what happened' during interviews concerning sexual abuse (Katz & Hershkowitz, 2011), and also, when recalling emotionally laden events (Patterson & Hayne, 2011). Further, free drawing, has long been advocated by clinicians to facilitate communication about traumatic events such as being ill (Rae, 1991; Sourkes, 1991).

With regard to other estimator variables, the experimental studies presented in this thesis did not test for factors such as suggestibility. Suggestibility is widely considered to be a factor that can influence children's accuracy of event recall (Ceci & Bruck, 1993), thus there is a need to develop interviewing tools that not only minimise the risk of interviewers using poor practice, but equally, minimise the effects of suggestive questioning on vulnerable witnesses. Previous research has examined the extent that the CI can protect witnesses against suggestive questioning, and has yielded encouraging results (e.g., Milne & Bull, 2003). However, the extent to which drawing, in particular, Sketch-RC, also provides the same protective benefits, is unclear.

Correspondingly, Bruck et al. (2000), demonstrated that drawing leads children to recall true and false information better than their peers who did not draw. However, they also demonstrated that drawing increased children's acceptance of false reminders, thus implying that drawing, when used in this manner (i.e., as a rehearsal strategy combined with true and false verbal reminders), does not necessarily protect against children being suggestible. Whether or not this effect was caused by memory contamination or by children's propensity to acquiesce because of interviewer-bias (Quas et al., 2007), is unclear. However, for the purposes of the Criminal Justice System, Bruck et al.'s (2000) and McCrory et al.'s (2007) findings are severely limited because of the directive nature of the retrieval methods employed. That is, children were asked event specific questions, directing them to particular aspects of the to-be-remembered event, rather than being supported to freely retrieve items in such a manner so as to maximize the investigative and evidential value of the resultant information. The Sketch-RC technique is entirely different – it is non-directive and so is Criminal Justice appropriate. Here, children were asked to 'draw what comes to mind' / whatever aspects remind them of the event in question, rather than being directed on *what* to draw. Thus, Sketch-RC is intended to improve access to salient, witness-compatible retrieval cues in a non-interviewer-led manner. If anything, the findings from Bruck et al., and McCrory et al., highlight the importance of appropriate interview questioning strategies.

6.6. Conclusion

Research over the past 40 years has informed psychologists and scientists alike that the process of recalling an event is in fact a reconstruction. It is a reconstruction that is not only a reflection of the details encoded and stored from the experience of the event itself, but also, a reflection of system and estimator variables (Wells, 1978). Laboratory-based research combined with that of field studies, have afforded psychologists the ability to develop tools for which episodic memory can be elicited (Chae, 2010). However, the parity between research and practice still holds.

The issues examined and discussed throughout this thesis, emphasise the importance of providing a sterile and developmentally appropriate retrieval environment in order to elicit the highest quality reports of events. The findings presented here offer a number of unique practical and theoretical implications for the interviewing of typically developing vulnerable witnesses, and also, for a group of witnesses who have been largely overlooked by the criminal justice system – children with autism spectrum disorder. However, this thesis has demonstrated that when appropriately supported, typically developing children's recall can be enhanced. Moreover, children with autism can perform at more typical levels, again, when appropriately supported, thus access to justice can be increased.

Importantly, these findings demonstrate failure at retrieval level, rather than encoding or storage. In many respects, failure at retrieval is good news. It offers hope to those tasked with gathering information in forensic interviews, because the retrieval process is one system variable that *can* be managed to augment and scaffold memorial performance for vulnerable populations. The implementation and correct use of developmentally appropriate tools that address this particular system variable, will inevitably serve to address the purpose of ABE guidelines: to ensure that the justice system is fair and accessible, and that best evidence is achieved to the highest possible standard.

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Appendices

Appendix A: Practitioner Survey Information Sheet

Department of Psychology
Lancaster University
Fylde College
Lancaster
LA1 4YF

Invitation for you to take part in a survey investigating the use of communication tools during the criminal justice process

As a PhD student at Lancaster University and Intermediary for Triangle, I am conducting research with Dr Coral Dando (University of Wolverhampton) and Prof. Tom Ormerod (Surrey University). My work is focusing on the use of communication techniques by police officers and intermediaries during the criminal justice process, and how these techniques might help young people recall and communicate events that they have experienced. I am writing to ask you, as a police officer or intermediary, to participate in this research.

What does my participation involve?

Should you decide to take part, you will be required to complete a short survey. This should take no longer than 20 minutes to complete, but it may take less or more time, depending upon how much detail you choose to include in your responses. The information that you provide in the survey will be strictly confidential. No personally identifiable details that you provide will be disclosed throughout this research, nor in the subsequent thesis write-up and in any peer-reviewed publications that are produced from this study.

You do not have to take part in this research. Should you decide to take part, you may withdraw your participation (without stating a reason) up to two weeks following your participation. Should you decide to withdraw, your responses will be removed from the data set and destroyed. Two weeks after taking part, your responses will be included in the final data set.

This research approved by Lancaster University's Research Ethics Committee, and is being completed in accordance with the British Psychology Society Code of ethics: (http://www.bps.org.uk/system/files/documents/code_of_ethics_and_conduct.pdf).

Further Information

If you would like any further information, please contact me:

By email: m.mattison@lancaster.ac.uk or;

By telephone: 07815 724538.

Alternatively, you may contact my supervisors Dr. Coral Dando (cjdando@wlv.ac.uk) and Prof. Tom Ormerod (t.ormerod@surrey.ac.uk) and/or the Head of Psychology at Lancaster University, Prof. Charlie Lewis (c.lewis@lancaster.ac.uk).

Thank you for your assistance.

Michelle Mattison

Appendix B: Police Survey

Communication tools used by police officers

Section 1. About you and your experience of working with vulnerable people

1. How long have you been a police officer (in years/months)?

2. Which police service do you work for?

3. Other than initial recruitment training, please state which investigative interview courses you have attended.

4. On average, how many witness/victim interviews do you conduct?

Per week ____
Per month ____
Per year ____

5. Do you conduct Achieving Best Evidence (ABE) interviews with vulnerable witnesses?

□ Yes
□ No

6. If you do conduct ABE interviews, on average, how many ABE interviews do you conduct?

Per week ____
Per month ____
Per year ____

7. Do you conduct ABE interviews with children?

- □ **Yes**
- □ **No**

8. Do you conduct ABE interviews with vulnerable adults?

- □ **Yes**
- □ **No**

9. Have you ever conducted an interview with a victim/witness with Autism Spectrum Disorder (ASD)?

- □ **Yes**
- □ **No**

10. If 'yes' please specify the number of interviews that you have conducted with a victim/witness who has ASD?

______

11. Have you ever worked with an intermediary during an investigative interview?

- □ **Yes**
- □ **No**

12. If 'yes', please specify how many interviews you have conducted with the assistance of an intermediary?

_____

Section 2. Communication tools and props

13. Have you ever used any props or communication tools (e.g., drawing materials; photographs; symbols; dolls) to aid communication during an interview?

☐ **Yes**
☐ **No**

14. If 'yes', please describe any props or communication tools that you have used:

15. Please describe your reasons for using props/tools and the benefit(s) that they bring to the investigative interview process:

16. Have you ever used drawing during a police interview (i.e., asking the interviewee to sketch/draw)?

☐ **Yes**
☐ **No**

17. If 'yes', how often do you use drawing?

☐ Never
☐ Rarely
☐ Often
☐ Almost Always
☐ Always

18. **Please explain WHEN (during what stages) you use drawing during the interview? For example, at the beginning before rapport building, or throughout the entire interview?**

19. **Please explain HOW you use drawing during investigative interviews. For example, what do you say, and what instructions do you give the witness? Please describe the instructions that you provide.**

20. **Please explain why you use drawing during interviews?**

21. **Overall, how effective do you believe drawing to be during interviews?**

☐ Not effective at all
☐ Not very effective
☐ Quite effective
☐ Very effective
☐ Always effective

22. **Which age group(s) do you find drawing to be most effective for?**

☐ None
☐ Under 5
☐ 5 – 11
☐ 12 – 17
☐ 18 – 64
☐ Over 65

23. Please state which groups of vulnerable people (e.g., children, people with learning disabilities, people with autism) you believe drawing to be <u>most effective</u> for:

24. Please state which groups of vulnerable people (e.g., children, people with learning disabilities, people with autism) you believe drawing to be <u>least effective</u> for:

25. Please provide any additional comments about your use of drawing:

26. **If you do not use any props or drawing please explain your reason(s) why.**

Section 3. Use of the Cognitive Interview

27. Have you ever used the Cognitive Interview technique with a victim or witness?

□ Yes
□ No

28. If 'yes', how often do you use the Cognitive Interview technique when interviewing victims and witnesses?

- ☐ Never
- ☐ Rarely
- ☐ Often
- ☐ Almost Always
- ☐ Always

29. Do you use the Cognitive Interview technique with vulnerable witnesses?

□ Yes
□ No

30. If 'yes', how often do you use the Cognitive Interview technique when interviewing victims and witnesses?

- ☐ Never
- ☐ Rarely
- ☐ Often
- ☐ Almost Always
- ☐ Always

31. If you do use the Cognitive Interview with vulnerable witnesses, how effective do you believe it to be?

☐ Not effective at all
☐ Not very effective
☐ Quite effective
☐ Very effective
☐ Always effective

32. If applicable, please specify what age group(s) you believe the Cognitive Interview to be most effective for? Please tick all that apply:

☐ None
☐ Under 5
☐ 5 – 11
☐ 12 – 17
☐ 18 – 64
☐ Over 65

33. If applicable, please specify which group(s) of vulnerable people you believe the Cognitive Interview to be <u>most effective</u> for (e.g., children, adults, people with learning disabilities, people with autism):

34. Are there any groups of people that you believe the Cognitive Interview to be <u>least effective</u> for?

☐ Yes
☐ No

35. If 'yes' please state which groups:

Thank you for taking part in this study.

Your responses will be used to form a large data set. This data set will help us to understand more about the communication tools used by police officers, more specifically, the use and effectiveness of drawing during investigative interviews. Whilst responses to the questions in this research will be recorded, no personally identifiable information (e.g. name, police force) will be disclosed throughout this research.

Please do not hesitate to contact me, or a member of the team if you have any queries or concerns about this study. If you decide that you want to withdraw your data from the study (even after you have taken part), please contact me at m.mattison@lancaster.ac.uk no later than two weeks after you completed the survey. Should you wish to withdraw please state the date and approximate time that you completed the survey this will enable me to locate your data.

If you would like to receive a copy of the findings of this research project, please contact me by email at m.mattison@lancaster.ac.uk.

Your participation is very much appreciated – thank you

Appendix C: Intermediary Survey

Communication tools used by intermediaries

Section 1. About you and your experience of working with vulnerable people

1. Main occupation:

2. Length of time in current occupation (years/months):

3. Please list any previous occupation(s) or work experience that you believe to be relevant to your role as an intermediary:

4. How long have you worked as an intermediary? (years/months)

5. Which county or region(s) do you work as an intermediary?

6. Are you a Registered Intermediary or Non-Registered Intermediary? Please tick.

☐ Registered
☐ Non-Registered

7. Since becoming an intermediary, approximately how many cases have you worked on in total?

9. Of these cases, what percentage are with:

Victims and witnesses: ______

Defendants: ______

10. Please specify what age groups you work with as an intermediary? Please tick all that apply.

□ Under 5
□ 5 – 11
□ 12 – 18
□ Over 18
□ Over 65

11. Please specify which groups of vulnerable people you have worked with as an intermediary. Please tick all that apply.

□ Aphasia / Dysphasia
□ Autistic Spectrum Disorder
□ Brain and/or Head Injury
□ Deafness/Hearing impairment
□ Dementia
□ Dysarthria / Dyspraxia
□ Fluency Difficulties
□ Language Delay/Disorder
□ Learning Difficulties – Mild
□ Learning Difficulties – Moderate
□ Learning Difficulties - Severe
□ Mental Health Issues
□ Neurological and other progressive disorders
□ Phonological Delay / Disorder
□ Physical Disability
□ Selective/Elective Mutism
□ Voice Disorders, including laryngectomy

12. As an intermediary, have you ever facilitated communication during a police/investigative interview?

- ☐ **Yes**
- ☐ **No**

13. If 'yes', please state the number of interviews that you have facilitated:

____

14. Please list any investigative interviewing courses that you have attended:

Section2. Communication tools and props

15. As an intermediary, have you ever used any props or communication tools (e.g., drawing materials; photographs; symbols; dolls) to facilitate communication during an investigative interview?

- ☐ **Yes**
- ☐ **No**

16. If 'yes', please describe any props or communication tools that you have used:

17. Please describe your reasons for using these props/tools and the benefit(s) that they bring to the communication process:

18. Have you ever used drawing as a prop/tool during an investigative interview (i.e., asking the *interviewee* to draw)? (If ‘no’, please go to question 30).

- ◻ **Yes**
- ◻ **No**

19. If 'yes', how often do you use drawing?

- ◻ **Never**
- ◻ **Rarely**
- ◻ **Often**
- ◻ **Almost Always**
- ◻ **Always**

20. Please explain WHEN (during what stages) you use drawing during the interview? For example, at the beginning before rapport building, or throughout the entire interview?

21. Please explain HOW you use drawing during investigative interviews. For example, what do you say, and what instructions do you give the witness? Please describe the instructions that you provide.

22. Please explain why you use drawing during interviews?

23. Overall, how effective do you believe drawing to be during interviews?

- ☐ Not effective at all
- ☐ Not very effective
- ☐ Quite effective
- ☐ Very effective
- ☐ Always effective

24. Which age group(s) do you find drawing to be most effective for?

- ☐ None
- ☐ Under 5
- ☐ 5 – 11
- ☐ 12 – 17
- ☐ 18 – 64
- ☐ Over 65

25. Which group(s) of people to you find drawing to be most effective for? Tick all that apply.

Communication needs:

☐ Aphasia / Dysphasia
☐ Autistic Spectrum Disorder
☐ Brain and/or Head Injury
☐ Deafness/Hearing impairment
☐ Dementia
☐ Dysarthria / Dyspraxia
☐ Fluency Difficulties
☐ Language Delay/Disorder
☐ Learning Difficulties – Mild
☐ Learning Difficulties – Moderate
☐ Learning Difficulties - Severe
☐ Mental Health Issues
☐ Neurological and other progressive disorders
☐ Phonological Delay / Disorder
☐ Physical Disability
☐ Selective/Elective Mutism
☐ Voice Disorders, including laryngectomy

26. Please state which groups of vulnerable people (e.g., children, people with learning disabilities, people with autism) you believe drawing to be <u>least effective</u> for:

27. Do you use drawing with vulnerable witnesses during any other stage of the criminal justice process?

☐ **Yes**

☐ **No**

28. If 'yes', please state which stages:

29. Please provide any additional comments about your use of drawing:

30. If you do not use any props or drawing please explain your reason(s) why:

Section 3. Use of the Cognitive Interview

31. As an intermediary, have you ever facilitated communication during a 'Cognitive Interview'?

NB The Cognitive Interview is a technique that is sometimes included during police interviews with victims and witnesses. The police officer gives the interviewee verbal instructions to help 'mentally reinstate' the context of the event in question (e.g., "Close your eyes and think about what you could see; what you could hear; how you felt..." etc).

- ☐ **Yes**
- ☐ **No**

32. If ‘yes’, how often have you facilitated the Cognitive Interview technique during a police interview?

- ☐ **Never**
- ☐ **Rarely**
- ☐ **Often**
- ☐ **Almost Always**
- ☐ **Always**

33. How effective do you believe the Cognitive Interview to be for vulnerable?

- ☐ **Not effective at all**
- ☐ **Not very effective**
- ☐ **Quite effective**
- ☐ **Very effective**
- ☐ **Always effective**

34. If applicable, please specify what age group(s) you believe the Cognitive Interview to be most effective for? Please tick all that apply:

- ☐ **None**
- ☐ **Under 5**
- ☐ **5 – 11**
- ☐ **12 – 17**
- ☐ **18 – 64**
- ☐ **Over 65**

35. If applicable, please specify which group(s) of vulnerable people you believe the Cognitive Interview to be <u>most effective</u> for (e.g., children, adults, people with learning disabilities, people with autism):

36. Are there any groups of people that you believe the Cognitive Interview to be <u>least effective</u> for?

- ☐ **Yes**
- ☐ **No**

37. If 'yes' please state which groups:

Thank you for taking part in this study.

Your responses will be used to form a large data set. This data set will help us to understand more about the communication tools used by intermediaries, more specifically, the use and effectiveness of drawing during investigative interviews. Whilst responses to the questions in this research will be recorded, no personally identifiable information will be disclosed throughout this research.

Please do not hesitate to contact me, or a member of the team if you have any queries or concerns about this study. If you decide that you want to withdraw your data from the study (even after you have taken part), please contact me at m.mattison@lancaster.ac.uk no later than two weeks after you completed the survey. Should you wish to withdraw please state the date and approximate time that you completed the survey this will enable me to locate your data.

If you would like to receive a copy of the findings of this research project, please contact me by email at m.mattison@lancaster.ac.uk.

Your participation is very much appreciated – thank you.

Appendix D: Survey Coding Matrix

Coding Matrix

Question	Categories	Description	Example
Why use props?	Aid communication	Help witness describe event(s); assists with overall interviewing process.	*"To assist in communication and to make it easier to understand especially if I haven't been to the scene."* *"To aid to assist witness to describe a location/scene, what someone was wearing. Witness wanted to draw a picture."*
	Assist with clarification / questioning	Help interviewer to clarify answers to questions. Aid questioning	*"Drawing, timelines, body maps and toys used to assist VW's ability to explain, and IO to clarify and check back information."*
	Enhance memory	Improve recall; trigger memories; act as a retrieval cue.	*"The drawing is a good trigger for a witness when recalling from memory."* *"[props] allowed interviewee to communicate effectively and assisted in memory recall."*
	Focus attention	Enables witness to concentrate on the interview / questions.	*"Was useful as child would speak well if distracted with toys etc but if he had to focus solely on the questions put to him he answered poorly."* *"For some young children, drawing helps them focus."*
	Aid the value of the evidence	Provides a means of gaining more evidence.	*"Improved evidential value."* *"To assist in communication, and describing the location of assaults on a body. When recorded on video this is impactive and retains the integrity of the process."*
	Rapport building	Assists with the first process of the interview; enables child to relax with interviewer.	*"I use some for assessment purposes and some for rapport building. Some to initiate communication."*

Question	Categories	Description	Example
Stages when drawing is used.	Depends upon interviewing officer		
	Rapport building stage		
	During breaks in the interview		
	Start of the interview		
	During free recall		
	After free recall		
	During questioning		
	At the end of the interview		
	Generally throughout the interview		
	To aid questioning / clarify key points		
	Only when necessary for the interviewee	Difficultly verbally describing events.	*"First I build rapport and when the witness has started telling and I notice that he/she has problems/difficulties in explaining or recalling, I can suggest that he/she use drawing."* *"At points where is clear the VW [vulnerable witness] is finding it difficult to verbally explain."*
	To aid sequencing of events		*"During the interview to help very young children sequence events or describe a room or place."*

Question	Categories	Description	Example
Drawing instructions	Depends upon witness' individual needs	Witness dependent.	
	General instructions	Free drawing instructions.	*"Please draw everything that you can remember", "draw what happened next" "picture in mind, draw everything can remember, take time, leave nothing out."*
	Specific instructions	Draw particular objects, people or locations	*"Draw the layout of the room."*
	Label drawing	Identify parts of drawing with words written on the paper.	*"I would just ask for a basic drawing…to point out the location of objects in a room for example, i.e., the bed in relation to the door to the bedroom."* *"I would ask them to draw in as much detail as possible and to label different parts of the diagram. I would let them finish and then ask them questions based on the drawing."*
	Draw on a body outline	Practitioner provides body outline and asked witness to draw / write on it	
Reasons for using drawing	Aid communication	Help witness describe event(s); assists with overall interviewing process.	*"To enable a witness to explain something that they couldn't otherwise explain using verbal means."*
	Provide visual representation		*"Provide visual representation for interviewing officer to check back information."*
	Assist with clarification / questioning	Help interviewer to clarify answers to questions. Aid questioning	*"To assist in describing layouts."*
	Enhance memory	Improve recall; trigger memories; act as a retrieval cue.	*"Puts the interviewee back in that time/place. It tends to slow down things for them so that much of their recollection is better."*

	Focus attention	Enables witness to concentrate on the interview / questions.	*"When answering questions, less focus on them [the interviewee], possibly less intense and less eye contact."*
	Aid witness' sequencing of events		
Which groups drawing is effective for	Depends upon the witness and the circumstances	Interviewee dependent.	*"Each interviewee is different, keep an open mind and use sketch plans if you feel they are appropriate."*
	All groups	Any witness.	*"Anyone who it assists in describing something in interview."*
	Anybody with capacity to draw	Anybody who can draw (some vulnerable witnesses can't e.g., if physically disabled).	*"All persons taken on their ability to sketch draw regardless of group e.g. I can interview an eight year old who can draw a really good plan of a room, then interview a thirty year old educated working person who is unable to draw any reasonable representation so groups don't come into it, it is the ability of the witness."*

Appendix E: Full Interview Protocol

Interview protocol

1. **Greet**
   - Greet child, and thank him/her for coming to help today.

2. **Rapport Building**
   - Ask child some questions about school; what they've been doing in class; what they're doing on the evening.

3. **Explain**
   - Show child information letter that was given out at school;
   - Remind them that they took it home and mum or dad read it;
   - Explain that my job is to listen carefully to children, and that I need their help with some jobs;
   - Explain what jobs are;
   - Explain that jobs aren't a school test, and that the child doesn't have to take part if they don't want to; going back to class is absolutely fine.

4. **Free Recall**
   - Explain to the child that you would like to do some talking about the video that they watched earlier:
   - "In a moment I am going to ask you to tell me what you remember about the film that you watched earlier on the iPad… But there are some important things that I need you to know…"
   - "I have never seen that film, so you must tell me EVERYTHING that you can remember about it, even the little things… BUT it is really important that you DON'T GUESS – if you can't remember, that's okay, you can just say 'I can't remember'.
   - "So, starting from the very beginning, tell me about the film that you watched…"
   - Listen and don't interrupt;
   - Use encouraging prompts "a ha… mmm hmm"

- While listening note down the main topics, in the order they are verbalised in bullet point fashion in a notebook – these will be used in the questioning phase;
- Wait until child has finished talking, then wait a further 10 seconds – if no more is forthcoming then say;
- *"Is there anything else that you can remember about the film?"*
- Thank the child for telling you what he/she remembered.

5. Questioning

- Explain that you have written down some things that were said;
- Explain that you would like to ask some questions about those things;
- Ask one question about each main topic mentioned by the participant during free recall, order guided by interviewee's free recall
- For example, *"You told me that you saw a girl and a boy… Tell me what you remember about that girl."*

6. Closure

- "Just before we finish is there anything else that you would like to tell me about the video?"
- "Do you have any questions for me?"
- "Thank you for helping me with those jobs. You have been really, really helpful."

Appendix F: Mental Reinstatement of Context Protocol

Mental Reinstatement of Context Protocol

"In a moment I am going to ask you to tell me what you remember about the video that you watched on the iPad, but before you start I would like to spend some time helping you to remember as much as you can… As I talk to you I would like you to think about each of the things I say, as I say them… Closing your eyes or looking at a blank wall may help you to think… To begin I would like you to try to think back to when you saw the video…"

Five second pause…

"Thinking really hard, just as you would do if you had lost something and were trying to remember the last time you saw it…"

Five second pause…

"Think about earlier today…"

Five second pause…

"What had you been doing this morning… Who had you seen or spoken to…"

Five second pause…

"Think about what had you been doing just before coming up to see the video on the iPad…"

Five second pause…

"Now I would like you to think about the place where you watched the video…"

Five second pause…

“Try and get a picture of that place in your mind…”

Five second pause…

“What did it look like? ...Did you smell anything…”

Five second pause…

“…or did you notice anything about it…”

Five second pause…

“Think about where things were in the place that you watched the video…”

Five second pause…

“Think about where the iPad was…”

Five second pause…

“…And where you sat to watch the video…”

Five second pause…

“Try to remember if anyone else was there with you…”

Five second pause…

“Where they were sitting...”

Five second pause…

“What were they doing…”

Five second pause…

"Think about whether you spoke to anyone…"

Five second pause…

"Now think about how you felt as the video started…"

Five second pause…

"What did you think you were going to see…"

Five second pause…

"Now think about the video…"

Five second pause…

"Think about what you saw on the video…"

Five second pause…

"When you feel ready, I would like you to tell me everything that you can remember about what happened on the video, starting from the beginning…"

Appendix G: Study 2 Additional Results

Number of Questions

Univariate analysis revealed a significant effect of age group on the number of questions asked, F (2, 171) = 12.595, $p < .001$, $\eta_p^2 = .128$. Post hoc analysis revealed that significantly more questions were asked in interviews with children aged 12 to 16 years old, 95% CI 12.446, 13.987, than in interviews with children aged 5 to 7 95% CI 10.063, 11.604, and 8 to 11 years, 95% CI 10.029, 11.571, both ps < .001. No significant effect of condition was found for the number of questions asked, nor was a significant age group X retrieval condition revealed, both Fs < .856, both ps > .429. Figure 22 displays the mean number of questions made during interviews.

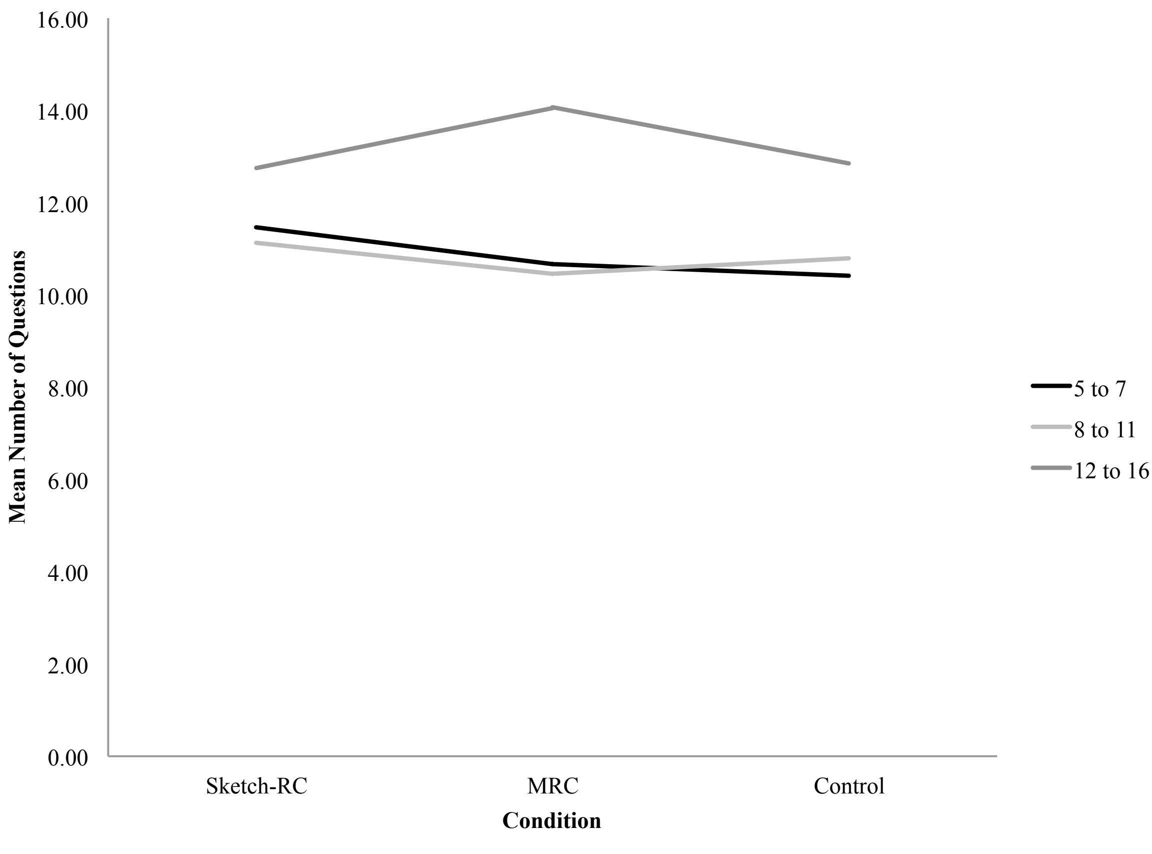

Figure 22. Mean number of questions as a function of age group and retrieval condition.

Overall Interview Performance

Interview Duration

Univariate analysis revealed a significant effect of age group, *F* (2, 171) = 4.683, *p* = .010, η_p^2 = .052, and condition on the overall duration of interviews, *F* (2, 171) = 47.954, *p* < .001, η_p^2 = .359. Post hoc analysis found that the duration of interviews for children aged 5 to 7 (*M* = 7.26 minutes, *SD* = 3.19 minutes), was significantly shorter than the interviews of children aged 12 to 16 (*M* = 8.47 minutes, *SD* = 3.17 minutes), *p* = .012. There was no significant difference in the duration of interviews for children aged 8 to 11 (*M* = 7.45 minutes, *SD* = 2.45 minutes), and those aged 5 to 7 and 12 to 16, both *p*s > .080. With regards to condition, the duration of interviews was significantly shorter for children interviewed in the Control condition (*M* = 5.24 minutes, *SD* = 1.41 minutes), than those interviewed in the Sketch-RC (*M* = 9.03 minutes, *SD* = 2.28 minutes), and MRC conditions (*M* = 9.31, *SD* = 3.17), both *p*s < .001, with no significant difference in duration between the latter two conditions, *p* = .929. No significant age group X condition interaction was found, *F* = .602, *p* = .662.

Type of Information Recalled Overall

Information recalled by participants (correct; incorrect; confabulations) was divided into category types (person; action; items and surroundings) and a series of univariate analyses were conducted. Tables X, Y and Z respectively display the means and standard deviations for memory performance as a function of age group, retrieval condition and group X retrieval condition.

Person Information Recalled Overall

Univariate analysis of the total amount (correct + incorrect + confabulated) of person information revealed a significant effect of age group, F (2, 171) = 3.40, p = .036, η_p^2 = .038 (see Figure 23). Regardless of condition, participants aged 5 to 7, M = 14.68, SD = 8.67, 95% CI [12.56, 16.80] recalled significantly less person specific information than children aged 8 to 11, M = 18.40, SD = 9.13, 95% CI [16.28, 20.52], p = .046. No significant differences were found between groups aged 5 to 7 and 12 to 16, M = 17.73, SD = 6.94, 95% CI [15.61, 19.86], p = .139. Similarly, no significant difference was found between age groups 8 to 11 and 12 to 16, p = 1.000. Further, no significant effect of retrieval condition was found for the total amount of person specific information recalled, F = .157, p = .854, nor did a significant group X retrieval condition interaction emerge, F = 1.145, p = .337.

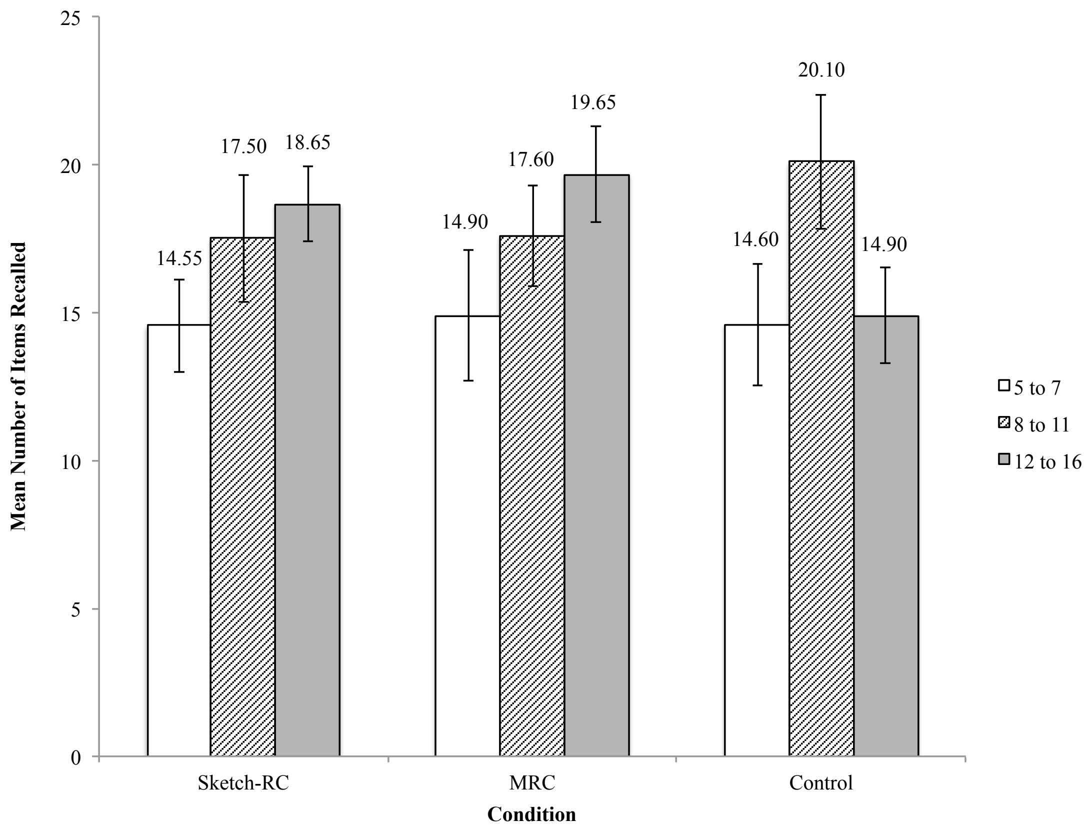

Figure 23. Total amount of person information recalled as a function of group and retrieval condition.

A significant main effect of group was also found for correct, F (2, 171) = 7.807, $p = .001$, $\eta_p^2 = .084$ and confabulated person information produced, F (2, 171) = 7.337, $p = .001$, $\eta_p^2 = .079$ (see Table 21 for means and standard deviations). Regardless of retrieval condition, children aged 5 to 7, 95% CI [7.51, 10.13] recalled significantly less correct person specific information, than children aged 8 to 11, 95% CI [9.97, 12.59] $p = .028$ and 12 to 16, 95% CI [11.14, 13.76], $p < .001$. No significant difference for the amount of correct person information recalled was found between children aged 8 to 11 and 12 to 16, $p = .647$.

Children aged 12 to 16, 95% CI [.98, 2.65], confabulated less person specific information than children aged 8 to 11, 95% CI [3.27, 4.93], $p = .001$. No significant differences emerged between children aged 5 to 7, 95% CI [2.00, 3.67] and their respective groups aged 8 to 11, $p = .106$, and 12 to 16, $p = .272$. No significant effect of age group was revealed for incorrect person information recalled, $F = 3.906$, $p = .549$.

Univariate analysis found a significant effect of condition on the amount of confabulated person items reported, F (2, 171) = 4.253, $p = .016$, $\eta_p^2 = .047$. Regardless of age group, participants in Sketch-RC condition, 95% CI [1.17, 2.83], produced less confabulated information than those in the MRC condition, 95% CI [2.90, 4.57], $p = .013$. No differences were found between the Control group, 95% CI [2.18, 3.85] and both the Sketch-RC, $p = .272$, and MRC retrieval conditions, $p = .695$. No significant effect of retrieval condition was found with regards to correct or incorrect person specific information recalled, both Fs < 2.733, both ps > .068. No significant age group X retrieval condition interactions were revealed across all dependent variables, all Fs = 1.145, all ps = .337.

Table 21. *Means and standard deviations for correct, incorrect, and confabulated person information recalled as a function of group, condition, and group X condition.*

	Person Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	12.12	5.53	2.78	2.26	2.00	2.70
MRC (total)	10.18	4.93	3.47	2.70	3.73	3.65
Control (total)	10.25	5.63	3.27	2.67	3.02	3.72
5 to 7 years (total)	8.82	4.74	3.03	2.82	2.83	3.85
Sketch	10.00	4.58	2.95	2.93	1.60	1.96
MRC	8.25	4.90	3.60	2.96	3.05	4.05
Control	8.20	4.76	2.55	2.61	3.85	4.79
8 to 11 years (total)	11.28	5.57	3.02	2.45	4.10	3.76
Sketch	11.50	5.56	2.60	2.21	3.40	3.69
MRC	10.00	4.66	2.65	2.30	4.95	4.19
Control	12.35	6.38	3.80	2.75	3.95	3.39
12 to 16 years (total)	12.45	5.34	3.47	2.38	1.82	2.09
Sketch	14.85	5.49	2.80	1.51	1.00	1.38
MRC	12.30	4.60	4.15	2.70	3.20	2.26
Control	10.20	5.09	3.45	2.65	1.25	1.86

Univariate analysis revealed a significant effect of group and condition on the percentage accuracy of person information recalled, F (2, 171) = 4.508, p = .012, η_p^2 = .050; F (2, 171) = 13.099, p < .001, η_p^2 = .133 (see Figure 24). Regardless of condition, children aged 5 to 7, M = 61.53, SD = 22.87, 95% CI [56.98, 66.08] were significantly less accurate than those aged 12 to 16, M = 70.84, SD = 13.94, 95% CI [66.29, 75.39], p = .014. No difference was found between children aged 5 to 7 and 8 to 11, M = 63.58, SD = 18.93, 95% CI [59.03, 68.13], p = 1.000. Similarly, no difference emerged between age groups 8 to 11 and 12 to 16, p = .081.

Regardless of age group, children in the Sketch-RC condition, *M* = 74.49, *SD* = 15.14, 95% CI [69.94, 79.04] were significantly more accurate than children in both the MRC, *M* = 58.18, *SD* = 20.19, 95% CI [53.63, 62.73], $p < .001$, and Control condition, *M* = 63.28, *SD* = 18.60, 95% CI [58.73, 67.83], $p = .002$. No difference in person specific information accuracy emerged between children in the MRC and Control conditions, $p = .359$.

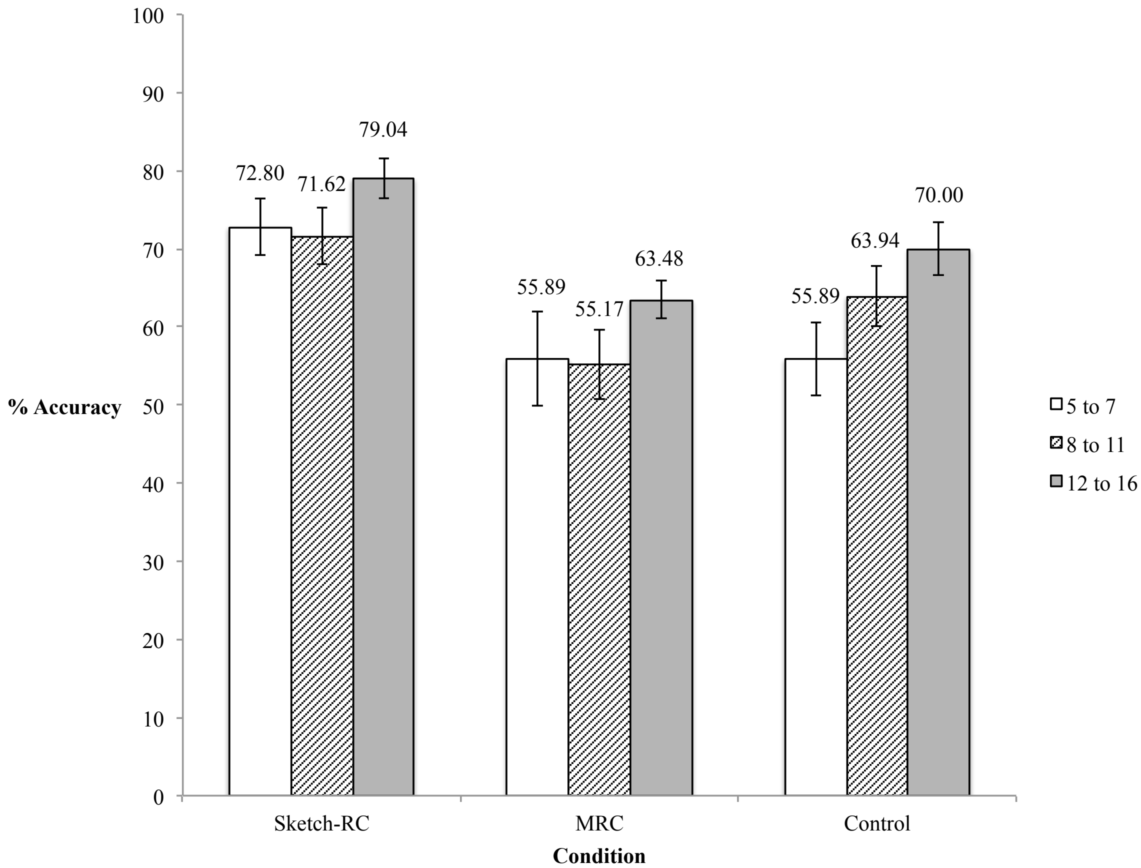

Figure 24. Percentage accuracy of person information recalled as a function of group and retrieval condition.

Action Information Recalled Overall

Univariate analysis revealed significant main effects of age group and condition on the total amount of action information recalled, $F(2, 171) = 25.584$, $p < .001$, $\eta_p^2 = .230$; $F(2, 171) = 5.116$, $p = .007$, $\eta_p^2 = .056$ (see Figure 25). Participants aged 5 to 7, *M* = 10.35, *SD* = 5.24, 95% CI [8.61, 12.09] recalled significantly less action information than their peers in age groups 8 to 11, *M* = 15.93, *SD* = 7.85, 95% CI [14.19, 17.67] and 12 to 16, *M* = 19.18, *SD* = 8.02, 95% CI [17.44, 20.93], all *p*s < .001. Further, participants aged 8 to 11 recalled significantly less action information than participants aged 12 to 16, $p = .030$. Regardless of age group, participants in the Control condition, *M* = 12.87, *SD* = 6.46, 95% CI [11.12, 14.61] recalled significantly less action information than participants in both the MRC condition, *M* = 16.55, *SD* = 9.69, 95% CI [14.81, 18.29] $p = .011$, and participants in the Sketch-RC condition, *M* = 16.05, *SD* = 7.08, 95% CI [14.31, 14.61], $p = .035$. No differences emerged between the Sketch RC and MRC conditions, $p = 1.000$.

A significant group X interaction was found for the total amount of action information recalled (see Figure 25), F (4, 171) = 3.014, $p = .020$, $\eta_p^2 = .066$. Children aged 5 to 7 in the Sketch-RC condition, 95% CI [7.030, 13.070] recalled significantly less action information than children aged 8 to 11, 95% CI [14.380, 20.420], $p = .003$, and children aged 12 to 16 in the Sketch-RC condition, 95% CI [17.680, 23.720], $p < .001$. No significant difference was found for the amount of action information recalled by children aged 8 to 11 and 12 to 16 in the Sketch-RC condition, $p = .387$. Children aged 5 to 7 in the MRC condition, 95% CI [6.980, 13.020] also recalled significantly less action information than children aged 8 to 11, 95% CI [13.730, 19.770], $p = .006$, and children aged 12 to 16 in the MRC condition, $p < .001$. Further, children aged 8 to 11 in the MRC condition also recalled significantly less action information than children aged 12 to 16 in the MRC condition, $p = .015$. No significant differences were found between all age groups who were interviewed in the Control condition, all *p*s > .524.

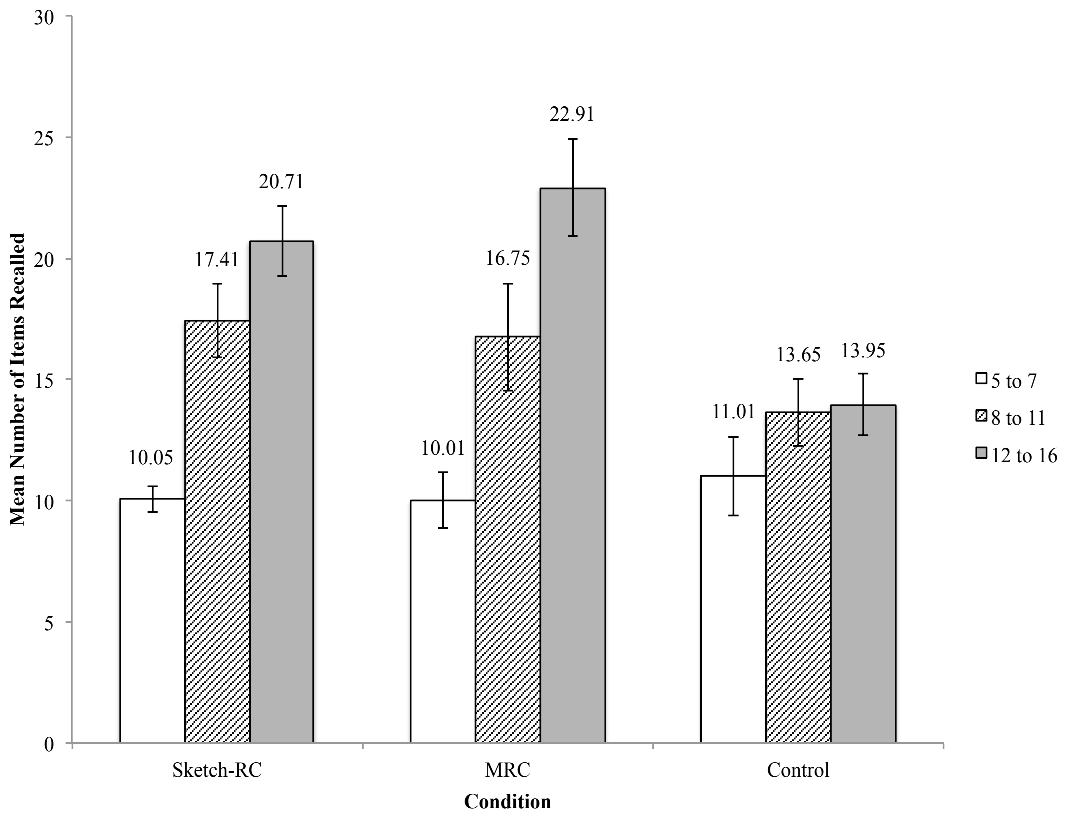

Figure 25. Total amount of action information recalled as a function of group and retrieval condition.

A significant effect of group was revealed for the amount of correct, F (2, 171) = 47.030, $p = .001$, $\eta_p^2 = .355$ and confabulated action information recalled, F (2, 171) = 5.160, $p = .007$, $\eta_p^2 = .057$ (see Table 22 for means and standard deviations). Regardless of retrieval group, participants aged 5 to 7, 95% CI [6.28, 8.99] recalled significantly less correct action information than those aged 8 to 11, 95% CI [11.05, 13.76] and 12 to 16, 95% CI [15.69, 18.41], all ps < .001. Further, participants aged 8 to 11, recalled significantly less correct action information than children aged 12 to 16, $p < .001$. With regards to confabulated action information, children aged 8 to 11, 95% CI [1.94, 3.39] produced more confabulations than their peers aged 12-16, 95% CI [.25, 1.72], $p = .005$. No significant differences emerged between participants aged 5 to 7, 95% CI [1.09, 2.55] and 8 to 11, $p = .320$, nor between those aged 5 to 7 and 12 to 16, $p = .341$. No significant effect of age group was revealed for incorrect action information recalled, $F = .837$, $p = .435$.

Table 22. *Means and standard deviations for correct, incorrect, and confabulated action information recalled as a function of group, condition, and group X condition.*

	Action Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	14.17	6.41	.73	1.01	1.15	1.62
MRC (total)	12.77	8.34	1.15	1.51	2.63	3.28
Control (total)	10.15	4.83	1.03	1.35	1.68	3.56
5 to 7 years (total)	7.63	3.64	.90	1.36	1.82	3.35
Sketch	8.90	2.47	.35	.59	.80	1.32
MRC	6.70	4.28	1.20	1.51	2.10	2.20
Control	7.30	3.74	1.15	1.63	2.55	5.15
8 to 11 years (total)	12.40	5.58	.87	1.10	2.67	3.50
Sketch	14.70	5.79	.80	.83	1.90	2.17
MRC	11.65	5.80	.95	1.36	4.15	4.58
Control	10.85	4.57	.85	1.10	1.95	2.98
12 to 16 years (total)	17.05	7.28	1.15	1.45	.98	1.52
Sketch	18.90	5.90	1.05	1.36	.75	.91
MRC	19.95	8.35	1.30	1.69	1.65	1.98
Control	12.30	4.86	1.10	1.33	.55	1.32

A significant main effect of condition was also found for the amount of correct, $F(2, 171) = 8.818$, $p < .001$, $\eta_p^2 = .093$, and confabulated action specific information produced, $F(2, 171) = 4.112$, $p = .018$, $\eta_p^2 = .046$. Regardless of age group, participants in the Sketch RC condition, 95% [12.81, 15.52], recalled significantly more correct action-specific information than those in the Control condition, 95% CI [8.79, 11.50], $p < .001$. Further, participants in the MRC condition, 95% CI [11.41, 14.12] also recalled more correct action-specific information than those in the Control condition, p = .023. No differences emerged between the Sketch RC and MRC conditions, p = .971. Similarly, participants in the Sketch-RC condition, 95% CI [.42, 1.88], produced significantly less confabulated information, than those in the MRC condition, 95% CI [1.90, 3.37], p = .016. No differences emerged between participants in the Control condition, 95% CI [.95, 2.42], and those in both the Sketch RC, p = .931, and MRC conditions, p = .215. No significant effect of retrieval was found with regards to incorrect action information recalled, F = 1.613, p = .202.

A significant group X retrieval condition interaction emerged for the amount of correct action items recalled, F (4, 171) = 101.481, p = .008, η_p^2 = .077. Participants aged 12 to 16 in the Sketch-RC condition, 95% CI [16.553, 21. 247] recalled significantly more correct action items than children in the Sketch-RC condition aged 5 to 7, 95% CI [6.553, 11.247], p < .001, and aged 8 to 11, 95% CI [12.353, 17.047], p = .040. Children aged 8 to 11 in the Sketch-RC condition also recalled significantly more correct action information than children aged 5 to 7 in the Sketch-RC condition, p = .002. Children aged 12 to 16 in the MRC condition, 95% CI [17.603, 22.297] recalled significantly more correct action information than children aged 5 to 7, 95% CI [4.353, 9.047] and children aged 8 to 11 in the MRC condition, 95% CI [9.303, 13.997], both ps < .001. Further, children aged 8 to 11 in the MRC condition, also recalled significantly more correct action information than their peers aged 5 to 7 in the MRC condition, p = .011. Children aged 12 to 16 in the Control condition, 95% CI [9.953, 14.647] recalled significantly more correct action information than children aged 5 to 7 in the Control condition, 95% CI [4.953, 9.647], p = .010. No significant difference in the amount of correct action information recalled was found between children aged 8 to 11 in the Control condition, 95% CI [8.503, 13.197] and those aged 5 to 7 and 12 to 16 in the Control condition, both *p*s > .109. No significant group X condition interaction was found for incorrect or confabulated information, both *F*s < 1.368, both *p*s > .247.

Main effects of age group and condition were found for the percentage accuracy of action information recalled, $F\ (2, 171) = 10.349$, $p < .001$, $\eta_p^2 = .108$; $F\ (2, 171) = 9.248$, $p < .001$, $\eta_p^2 = .098$ (see Figure 26). Regardless of condition, children aged 12 to 16, *M* = 89.55, *SD* = 10.79, 95% CI [84.72, 94.39] were significantly more accurate than those aged 5 to 7, *M* = 73.92, *SD* = 73.92, 95% CI [69.09, 78.76], $p < .001$ and children aged 8 to 11, *M* = 79.97, *SD* = 19.22, 95% CI [75.13, 84.80], $p = .019$. No significant difference emerged between participants aged 5 to 7 and 8 to 11, $p = .248$.

The accuracy of action information was significantly greater for those interviewed in the Sketch-RC condition, *M* = 88.61, *SD* = 12.06, 95% CI [83.78, 93.45] when compared to the MRC condition, *M* = 73.71, *SD* = 24.88, 95% CI [68.88, 78.55], $p < .001$. No differences in accuracy emerged between the Control condition, *M* = 81.12, *SD* = 21.38, 95% CI [76.28, 85.95] and both the Sketch-RC, $p = .096$ and MRC conditions, $p = .102$. No group X retrieval condition interaction emerged for the accuracy of action information reported, $F = 2.109$, $p = .082$.

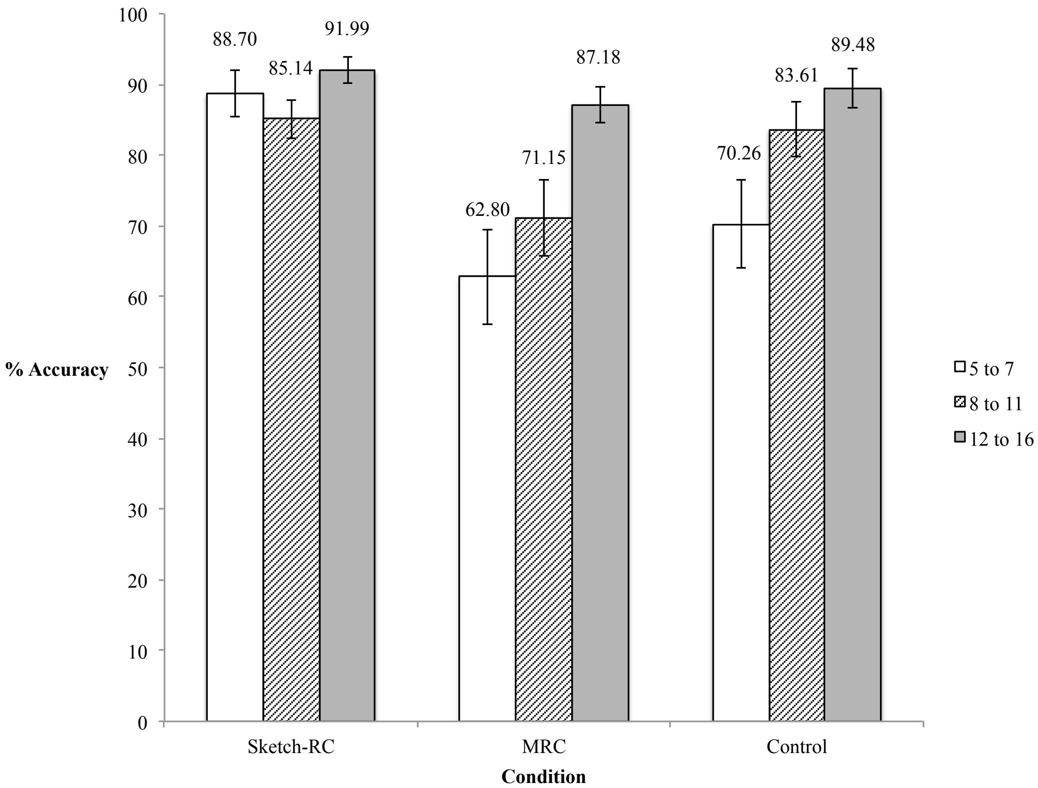

Figure 26. Percentage accuracy of action information recalled as a function of group and retrieval condition.

Surrounding Information Recalled Overall

A significant main effect of age group was found for the total amount of surrounding information recalled, F (2, 171) = 42.422, p < .001, η_p^2 = .332 (see figure 27). Regardless of retrieval condition, participants aged 5 to 7, M = 12.13, SD = 6.89, 95% CI [9.92, 14.34] and 8 to 11, M = 15.78, SD = 7.56, 95% CI [13.57, 17.99] recalled significantly less surrounding information, than those aged 12 to 16, M = 26.18, SD = 10.95, 95% CI [23.97, 28.39], all ps < .001. No significant differences were found between groups aged 5 to 7 and 8 to 11, p = .067. Further, no significant effect of condition was found, F = .739 p = .479, nor was a significant age group X retrieval condition revealed, F = .961, p = .430.

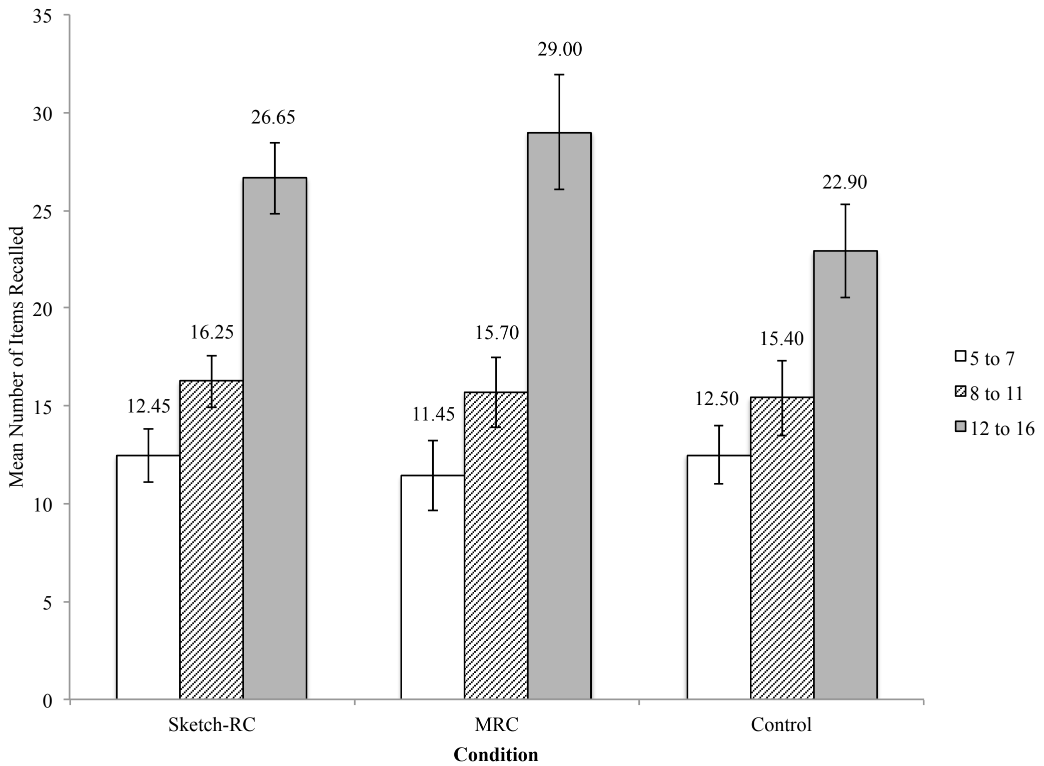

Figure 27. Total amount of surrounding information recalled as a function of group and retrieval condition.

Significant main effects of group were found for the amount of correct, F (2, 171) = 64.890, $p < .001$, $\eta_p^2 = .431$, incorrect, F (2, 171) = 5.294, $p = .006$, $\eta_p^2 = .058$, and confabulated surrounding information recalled, F (2, 171) = 3.358, $p = .037$, η_p^2 = .0.38 (see Table 23 for means and standard deviations). Regardless of retrieval condition, participants aged 12 to 16, 95% CI [20.87, 24.33] recalled more correct details than participants aged 5 to 7, 95% CI [7.35, 10.81] and 8 to 11, 95% CI [10.59, 14.05] both *p*s < .001. Further, participants aged 8 to 11 also recalled more correct surrounding information than those aged 5 to 7, $p = 0.30$. With regards, to incorrect surrounding information, participants aged 5 to 7, 95% CI [1.00, 2.09], produced less than children aged 12 to 16, 95% CI [2.08, 3.18], $p = .020$. Additionally, participants aged 8 to 11, 95% CI [.95, 2.05], also recalled less incorrect information than children aged 12 to 16, $p = .013$. No significant difference in the amount of incorrect information recalled by children aged 5 to 7 and 8 to 11 was found, $p = 1.000$. In terms of confabulated surrounding information, children aged 8 to 11, 95% CI [1.42, 2.52] made more confabulations than those aged 12 to16, 95% CI, [.40, 1.49], $p = .031$. No significant differences emerged between participants aged 5 to 7, 95% CI [.95, 2.05] and 8 to 11, $p = .709$, and between groups aged 5 to 7 and 12 to 16, $p = .490$.

Univariate analysis revealed a significant effect of retrieval condition for the amount of correct, F (2, 171) = 3.394, $p = .036$, $\eta_p^2 = .038$, and confabulated surrounding information produced, F (2, 171) = 3.768, $p = .025$, $\eta_p^2 = .0.42$. Regardless of age group, participants in the Sketch-RC condition, 95% CI [14.37, 17.83], recalled more correct surrounding information than those in the Control condition, 95% CI [11.19, 14.65], $p = .033$. No difference between the Sketch-RC and MRC, 95% CI [13.25, 16.71] was revealed, $p = 1.000$. Further, no significant difference was found between the MRC and Control condition in relation to correct surrounding recall, $p = .292$.

Despite finding a significant univariate effect of condition on the amount of confabulated surrounding information recalled, post hoc analysis revealed no significant differences between participants in the three retrieval conditions, all ps > .050. No significant effect of retrieval condition was found for the amount of incorrect information produced, $F = 1.708$, $p = 184$. No significant group X retrieval condition interactions were found across all item and surrounding variables, all Fs < 1.353, all ps > 252.

Table 23. *Means and standard deviations for total correct, incorrect, and confabulated surrounding information recalled as a function of group, condition, and group X condition.*

	Surrounding Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	16.10	8.71	1.50	1.54	.85	1.09
MRC (total)	14.98	10.33	1.97	2.34	1.77	2.40
Control (total)	12.92	7.51	2.22	2.62	1.80	2.65
5 to 7 years (total)	9.08	5.37	1.55	1.90	1.50	2.47
Sketch	10.05	5.40	1.45	2.06	.95	1.23
MRC	8.55	6.41	1.25	1.52	1.65	2.43
Control	8.65	4.22	1.95	2.09	1.90	3.31
8 to 11 years (total)	12.32	5.74	1.50	1.31	1.97	2.44
Sketch	13.65	5.20	1.50	1.15	1.10	1.17
MRC	11.85	5.46	1.40	1.31	2.45	3.02
Control	11.45	6.52	1.60	1.50	2.35	2.62
12 to 16 years (total)	22.60	9.00	2.63	2.97	.95	1.42
Sketch	24.60	7.64	1.55	1.32	.50	.76
MRC	24.55	10.49	3.25	3.23	1.20	1.44
Control	18.65	7.66	3.10	3.67	1.15	1.81

Significant effects of group and condition were found for the percentage accuracy of surrounding information recalled, F (2, 171) = 10.401, $p < .001$, $\eta_p^2 = .108$; F (2, 171) = 4.085, $p = .018$, $\eta_p^2 = .046$ (see Figure 28). Regardless of retrieval condition, participants aged 12 to 16, *M* = 87.85, *SD* = 9.88, 95% CI [83.36, 92.33] were significantly more accurate than children aged 5 to 7, *M* = 73.24, *SD* = 23.26, 95% CI [68.76, 77.73], $p < .001$, and those aged 8 to 11, *M* = 79.51, *SD* = 17.54, 95% CI [75.03, 83.99], $p = .031$. No difference in surrounding information accuracy was found between participants aged 5 to 7 and 8 to 11, $p = .158$.

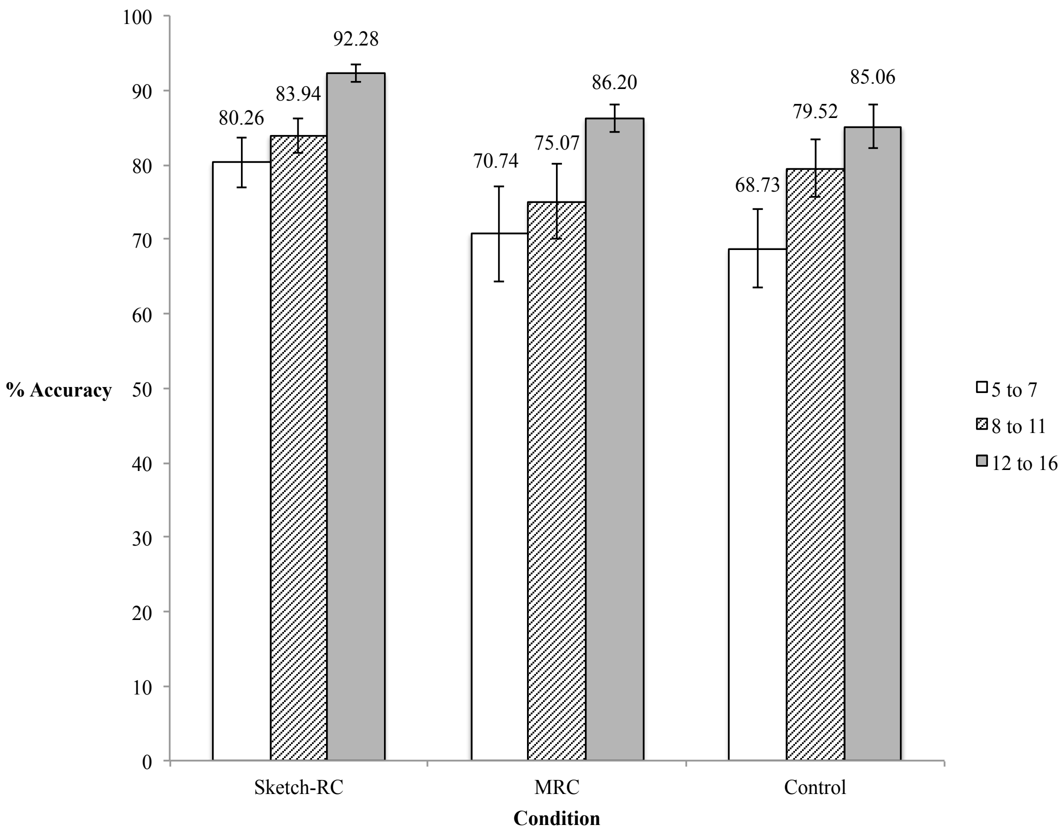

Figure 28. Percentage accuracy of item and surrounding information recalled as a function of group and retrieval condition.

Further, regardless of age group, participants in the Sketch-RC, $M = 85.49$, $SD = 11.92$, 95% CI [81.01, 89.97], were significantly more accurate than those in the MRC, $M = 77.34$, $SD = 22.19$, 95% CI [72.85, 81.82] condition, $p = .032$. No difference was found between children in the Control condition, $M = 77.77$, $SD = 22.18$, 95% CI [73.29, 82.25] and those in either the Sketch-RC or MRC conditions, both ps > .052. Further, no significant group X retrieval condition interaction emerged, $F = .307$, $p = 8.73$.

Free Recall Performance

Free Recall Duration

The duration of the free recall phase of interviews was analysed (excluding the duration of the Sketch-RC task and MRC task, which took place immediately prior to free recall). Analysis of variance revealed no significant effect of age group or condition on the duration of the free recall phase of interviews. Similarly, no significant age group X condition interaction was revealed, all *F*s < 1.698, all *p*s > .186. Despite these findings not reaching significance, differences in the mean duration of the free recall phase were apparent. For instance, the free recall duration of interviews with children aged 8 to 11 years (*M* = 78.117 seconds, *SD* = 37.199 seconds), was shorter than the free recall phase for children aged 5 to 7 (*M* = 85.783 seconds, *SD* = 83.164 seconds) and 12 to 16 years (*M* = 93.237 seconds, *SD* = 35.907 seconds). Similarly, the duration of the free recall phase of interviews for children in the Sketch-RC condition (*M* = 76.136 seconds, *SD* = 25.386 seconds), was shorter than the free recall phase of interviews for children in the MRC (*M* = 95.550 seconds, *SD* = 89.396 seconds) and Control conditions (*M* = 85.167 seconds, *SD* = 29.448 seconds).

Total Amount of Information Produced During Free Recall

Univariate analysis of the free recall amount (correct + incorrect + confabulated) of information recalled during the interview, revealed a significant effect of age group and condition, F (2, 171) = 50.787, $p < .001$, $\eta_p^2 = .373$; F (2, 171) = 3.611, $p = .029$, $\eta_p^2 = .041$, respectively (see Figure 31). Post hoc analysis found that children aged 12 to 16, *M* = 27.85, *SD* = 10.17, 95% CI [25.78, 29.92] recalled significantly more information during the free recall phase, compared to children aged

5 to 7, *M* = 13.22, *SD* = 6.70, 95% CI [11.15, 15.29] and 8 to 11, *M* = 17.93, *SD* = 7.78, 95% CI [15.87, 20.00], both *p*s < .001. Similarly, children aged 8 to 11 recalled more information than children aged 5 to 7, *p* = .005.

With regards to condition, children in the Sketch-RC condition, *M* = 21.67, *SD* = 9.41, 95% CI [19.59, 23.74] recalled significantly more information during the free recall phase, than those in the Control condition, *M* = 17.68, *SD* = 9.65, 95% CI [15.62, 19.75], *p* = .024. No significant differences emerged between children in the MRC, *M* = 19.65, *SD* = 11.52, 95% CI [17.58, 21.72] and both the Sketch-RC, *p* = .526, and Control conditions, *p* = .559. No significant age group X condition was found, *F* = 2.198, *p* = .071.

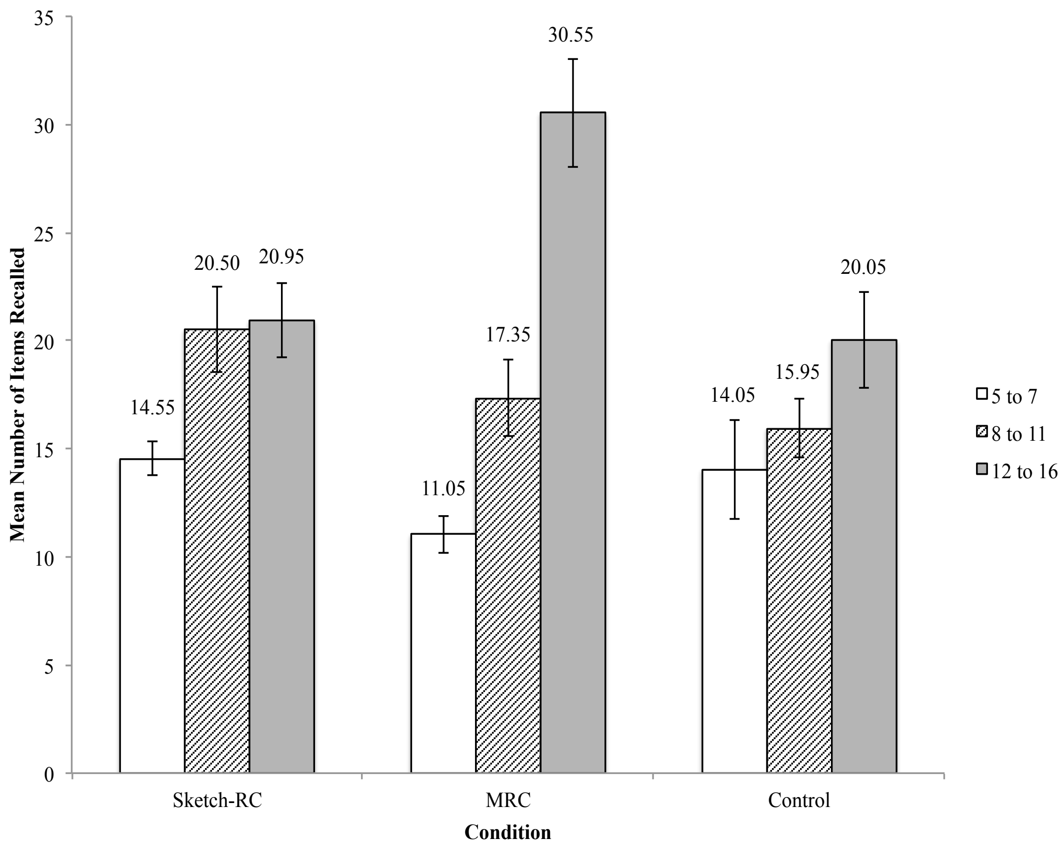

Figure 29. Total amount of information produced during the free recall phase as a function of group and retrieval condition.

Type of Information Produced During the Free Recall Phase

Person Information Recalled

Univariate analysis of the total amount (correct + incorrect + confabulated) of person information recalled during the free recall phase, revealed a significant effect of age group, F (2, 171) = 7.119, p = .001, η_p^2 = .077 (see Figure 30). Post hoc analysis revealed that children aged 5 to 7, M = 3.12, SD = 2.15, 95% CI [2.52, 3.72] produced significantly less person information in the free recall phase of interviews than those aged 12 to 16, M = 4.65, SD = 2.69, 95% CI [4.05, 5.25], p = .001. Similarly, children aged 8 to 11, M = 3.43, SD = 2.10, 95% CI [2.83, 4.03], also produced less information than their older peers aged 12 to 16, p = .015. No significant differences emerged between children aged 5 to 7 and 8 to 11, p = 1.000. No significant effect of retrieval condition was found, F = .383, p = .682. Also, no age group X condition interaction emerged, F = .540, p = .706.

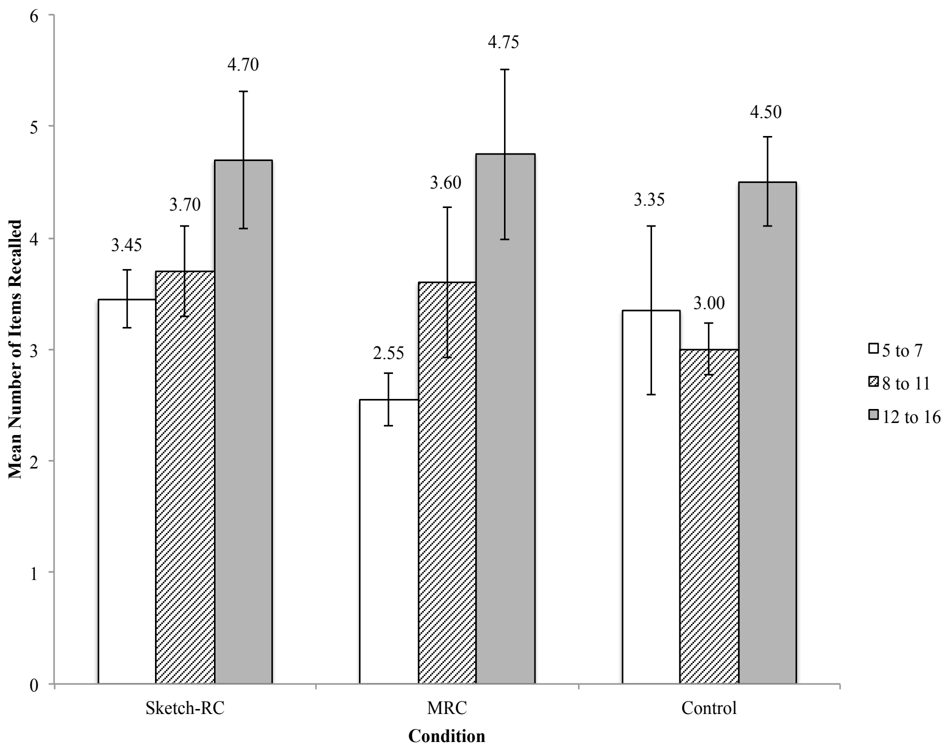

Figure 30. Total amount of person information produced during the free recall phase as a function of group and retrieval condition.

Univariate analysis revealed a significant main effect of age group on the correct person information recalled, F (2, 171) = 14.768, $p < .001$, $\eta_p^2 = .147$ (see Table 24 for means and standard deviations). Regardless of retrieval condition, children aged 5 to 7, 95% CI [1.93, 2.74] recalled significantly less person information during the free recall phase, than those aged 12 to 16, 95% CI [3.49, 4.31], $p < .001$. Similarly, children aged 8 to 11, 95% CI [2.53, 3.34] recalled significantly less correct person information than those aged 12 to 16, $p = .003$. No significant differences were found between children aged 5 to 7 and 8 to 11, $p = .122$. No significant effect of age group was revealed for incorrect or confabulated person specific information, $F = .842$, $p = .433$; $F = .260$, $p = .771$, respectively. Further, no significant effect of condition was found for the amount of correct, incorrect or confabulated person information recalled during the free recall phase, all Fs < 2.957, all ps > .055.

Table 24. *Means and standard deviations for correct, incorrect, and confabulated items of person information produced during free recall as a function of group, condition, and group X condition.*

	Person Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	3.45	1.73	.038	.67	.12	.42
MRC (total)	2.95	2.03	.40	.67	.28	.78
Control (total)	2.77	1.28	.43	.59	.42	1.87
5 to 7 years (total)	2.33	1.12	.45	.57	.33	1.84
Sketch	3.05	1.10	.35	.59	.05	.22
MRC	1.95	.99	.50	.51	.10	.45
Control	2.00	.92	.50	.61	.85	3.13
8 to 11 years (total)	2.93	1.61	.32	.47	.18	.65
Sketch	3.20	1.47	.30	.47	.20	.62
MRC	3.10	2.25	.30	.47	.20	.70
Control	2.50	.76	.35	.49	.15	.67
12 to 16 years (total)	3.90	1.97	.45	.83	.30	.72
Sketch	4.10	2.29	.50	.89	.10	.31
MRC	3.80	2.22	.40	.94	.55	1.05
Control	3.80	1.36	.45	.69	.25	.55

Univariate analysis found a significant effect of age group on the accuracy of person information produced during the free recall phase, F (2, 171) = 3.888, p = .022, η_p^2 = .043 (see Figure 31). Children aged 12 to 16, M = 87.56, SD = 16.96, 95% CI [81.54, 93.58] were significantly more accurate during the free recall phase when reporting person specific information, than those aged 5 to 7, M = 75.66, SD = 28.74, 95% CI [69.64, 81.67], p = .019. No differences in accuracy were revealed between participants aged 5 to 7 and 8 to 11, M = 83.06, SD = 24.72, 95% CI [77.04, 89.07], p = .263, nor between children aged 12 to 16 and 8 to 11, p = .894. No significant effect of retrieval condition was found, $F = 2.847$, $p = .061$. Further, no significant age group X retrieval condition interaction emerged, $F = .1.456$, $p = .218$.

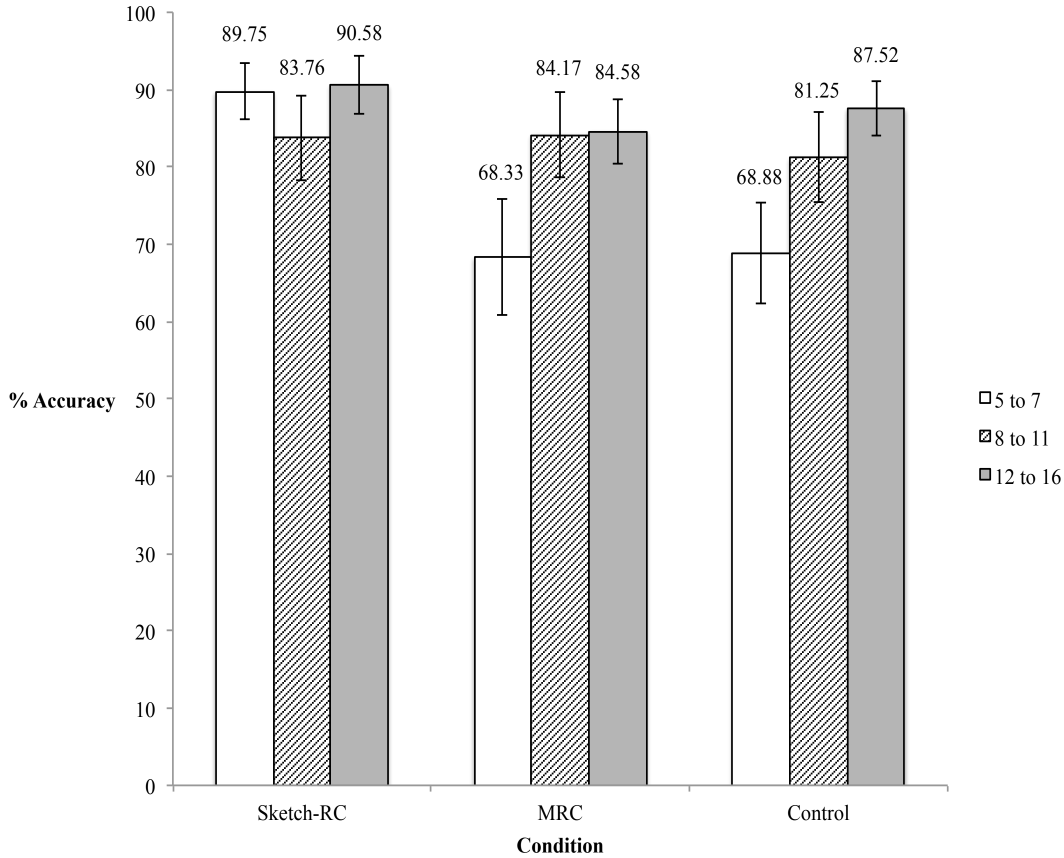

Figure 31. Percentage accuracy of person information recalled during the free recall phase as a function of group and retrieval condition.

Free Recall: Action Information

Univariate analysis of the total amount (correct + incorrect + confabulated) of action specific information recalled during the free recall phase, revealed a significant effect of age group and retrieval condition, F (2, 171) = 40.425, $p < .001$, $\eta_p^2 = .321$; F (2, 171) = 6.888, $p = .001$, $\eta_p^2 = .075$, respectively. Further, a significant age group X condition was revealed, F (4, 171) = 3.518, $p = .009$, $\eta_p^2 = .076$ (see Figure 32). Post hoc analysis found that children aged 12 to 16, $M = 12.98$, $SD = 5.26$, 95% CI [11.93, 14.04] recalled significantly more action information than those aged 5 to 7, $M = 6.18$, *SD* = 3.25, 95% CI [5.13, 7.24], and also, those aged 8 to 11, *M* = 9.42, *SD* = 4.44, 95% CI [8.36, 10.47], all *p*s < .001. Further, children aged 8 to 11 also recalled significantly more action information than those aged 5 to 7, *p* = < .001. With regards to condition, those in the Sketch-RC, *M* = 10.87, *SD* = 4.90, 95% CI [9.81, 11.92] recalled more action specific information during this phase than those in the Control, *M* = 8.07, *SD* = 4.41, 95% CI [7.01, 9.12] condition, *p* = .001. No significant differences were found between participants in the MRC condition, *M* = 9.65, *SD* = 5.82, 95% CI [8.59, 10.71], and those in both the Sketch-RC, *p* = .329, and Control conditions, *p* = .114.

Children aged 5 to 7 in the Sketch-RC condition, 95% CI [5.321, 8.979] recalled significantly less action information during the free recall phase of interviews than children aged 12 to 16 in the Sketch-RC condition, 95% CI [12.471, 16.129], *p* < .001, and children aged 8 to 11 in the Sketch-RC condition, 95% CI [9.321, 12.979], *p* = .008. No significant difference emerged between children aged 8 to 11 and those aged 12 to 16 in the Sketch-RC condition, *p* = .052. Children aged 12 to 16 in the MRC condition, 95% CI [13.171, 16.829] recalled significantly more action information than children aged 5 to 7, 95% CI [3.221, 6.879] and 8 to 11, 95% CI [7.071, 10.729] in the MRC condition, both *p*s < .001. Children aged 8 to 11 in the MRC condition also recalled more action information than their peers aged 5 to 7 in the MRC condition, *p* = .011. Children aged 12 to 16 in the Control condition, 95% CI [7.821, 11.479] recalled significantly more action information than children aged 5 to 7 in the Control condition, 95% CI [4.521, 8.179], *p* = .038. No significant differences emerged for the amount of action information recalled by children aged 8 to 11 in the Control condition, 95% CI [6.371, 10.029] and those aged 5 to 7 or 12 to 16 in the Control condition, both *p*s > .479.

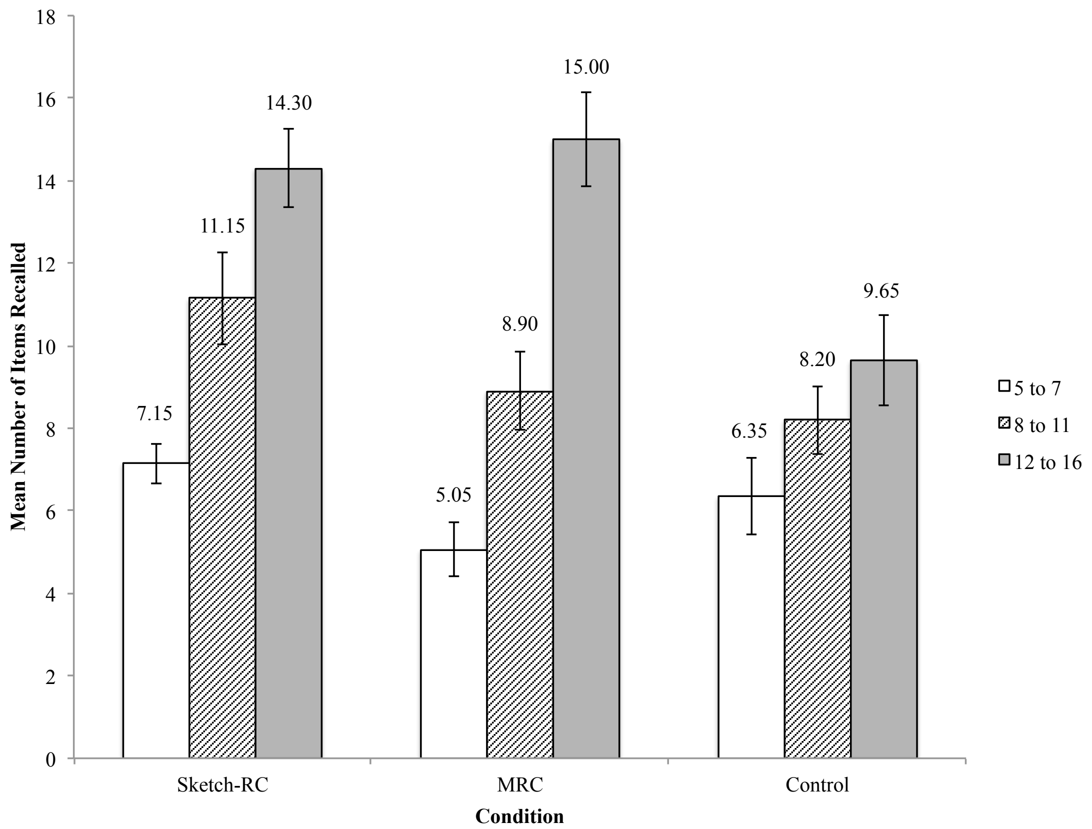

Figure 32. Total amount of action information produced during free recall as a function of group and retrieval condition.

Univariate analysis revealed a main effect of age group on the amount of correct and incorrect action information recalled, F (2, 171) = 48.501, p < .001, η_p^2 = .362; F (2, 171) = 4.109, p = .018, η_p^2 = .046, respectively (see Table 25 for means and standard deviations). Post hoc analysis revealed that children aged 12 to 16, 95% [11.37, 13.29] recalled more correct action specific information than those in both the 5 to 7, 95% CI [4.55, 6.48] and 8 to 11, 95% CI [7.90, 9.83] age groups, all ps < .001. Similarly, children aged 8 to 11 recalled more correct information than those aged 5 to 7, p < .001. With regards to incorrect action specific information recalled during the free recall phase, children aged 5 to 7, 95% CI [-.07, .24] produced significantly less than children aged 12 to 16, 95% CI [.25, .55], p = .014. No significant difference in the amount of incorrect action information was found between children aged 8 to 11, 95% CI [.08, .34], and those aged 5 to 7, $p = .592$, and those aged 12 to 16, $p = .400$. No significant effect of age group was found with regards to confabulated action information produced during the free recall phase, $F = 1.255$, $p = .288$.

Table 25. *Means and standard deviations for correct, incorrect, and confabulated action information produced during free recall as a function of group, condition, and group X condition.*

	Action Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	10.30	4.56	.20	.66	.37	.82
MRC (total)	9.00	5.72	.32	.65	.33	.71
Control (total)	7.42	3.97	.20	.51	.45	1.80
5 to 7 years (total)	5.52	2.82	.08	.33	.58	1.79
Sketch	6.70	2.25	.05	.22	.40	.75
MRC	4.25	2.65	.20	.52	.60	.94
Control	5.60	3.07	.00	.00	.75	2.90
8 to 11 years (total)	8.87	4.03	.23	.56	.32	.87
Sketch	10.50	4.19	.15	.49	.50	1.10
MRC	8.45	4.08	.25	.44	.20	.52
Control	7.65	3.42	.30	.73	.25	.91
12 to 16 years (total)	12.33	5.07	.40	.81	.25	.63
Sketch	13.70	4.01	.40	1.00	.20	.52
MRC	14.30	4.91	.50	.89	.20	.52
Control	9.00	4.66	.30	.47	.35	.81

Univariate analysis revealed a significant effect of condition on the amount of correct action information recalled, $F(2, 171) = 8.705$, $p < .001$, $\eta_p^2 = .092$. Post hoc analysis revealed that those in the Sketch-RC, 95% CI [9.33, 11.27] condition recalled more correct action information than those in the Control condition, 95% CI [6.45, 8.38], $p < .001$. No differences in the amount of correct action specific information produced during the free recall phase were revealed between those in the Sketch-RC and MRC, 95% CI [8.034, 9.97] conditions, $p = .186$. Further, no differences were found between the MRC and Control conditions, $p = .070$. No significant effect of condition was found with regards to incorrect or confabulated action specific information produced during the free recall phase, $F = .743$, $p = .477$; $F = .146$, $p = .865$, respectively.

A significant group X retrieval condition was revealed, F (4, 171) = 4.060, $p = .004$, $\eta_p^2 = .087$. Children aged 12 to 16 in the Sketch-RC condition, 95% CI [12.027, 15.373] recalled significantly more correct action information than children aged 5 to 7, 95% CI [5.027, 8.373], $p < .001$ and 8 to 11 in the Sketch-RC condition, 95% CI [8.827, 12.173], $p = .025$. Children aged 8 to 11 in the Sketch-RC condition also recalled significantly more correct action information than children aged 5 to 7 in the Sketch-RC condition, $p = .005$. Children aged 12 to 16 in the MRC condition, 95% CI [12.627, 15.973] recalled significantly more correct action information than their peers aged 5 to 7, 95% CI [2.577, 5.927], and 8 to 11 in the MRC condition, 95% CI [6.777, 10.123], both *p*s < .001. Children aged 8 to 11 in the MRC condition recalled significantly more than children aged 5 to 7 in the MRC condition, $p = .002$. Children aged 12 to 16 in the Control condition, 95% CI [7.327, 10.673] recalled significantly more correct action information than children aged 5 to 7 in the Control condition, 95% CI [3.927, 7.237], $p = .015$. No significant differences emerged between children aged 8 to 11 in the Control condition, 95% CI [5.977, 9.323] and those aged either 5 to 7 or 12 to 16 in the Control condition, both *p*s > .267. Further, no significant group X retrieval condition interaction was found for the incorrect or confabulated information recalled, both *F*s < .839, both *p*s > .356.

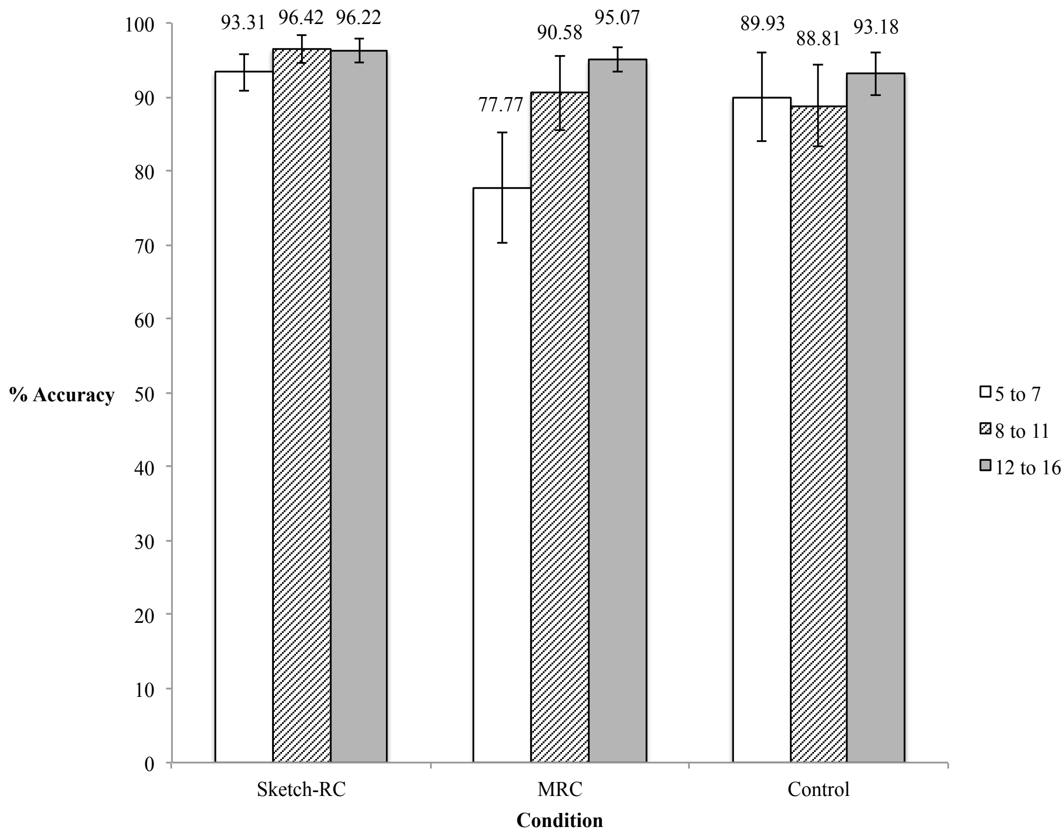

Figure 33. Percentage accuracy of action information produced during the free recall phase as a function of group and retrieval condition.

Univariate analysis found no significant effects of age group or condition on the accuracy of action specific information produced during the free recall phase of interviews, $F = 2.453$, $p = .089$; $F = 2.255$, $p = .108$. Similarly, no significant age group X condition interaction was found, $F = 1.094$, $p = 3.61$ (see Figure 33 for group X retrieval accuracy).

Free Recall: Surrounding Information

Univariate analysis of the total amount (correct + incorrect + confabulated) of surrounding specific information recalled during the free recall phase, revealed a significant effect of age group, F (2, 171) = 53.727, $p < .001$, $\eta_p^2 = .386$ (see Figure

34). Post hoc analysis revealed that children aged 12 to 16, *M* = 10.22, *SD* = 4.69, 95% CI [9.31, 11.12] recalled more surrounding information than those aged 5 to 7, *M* = 3.92, *SD* = 2.45, 95% CI [3.01, 4.82] and 8 to 11, *M* = 5.08, *SD* = 3.09, 95% CI [4.18, 5.99], both *p*s < .001. No significant differences were found between children aged 5 to 7 and 8 to 11, *p* = .219. No significant effect of condition was found for the total amount of surrounding specific information recalled during the free recall phase, *F* = .869, *p* = .421. Similarly, no age group X condition interaction was revealed, *F* = .962, *p* = .430.

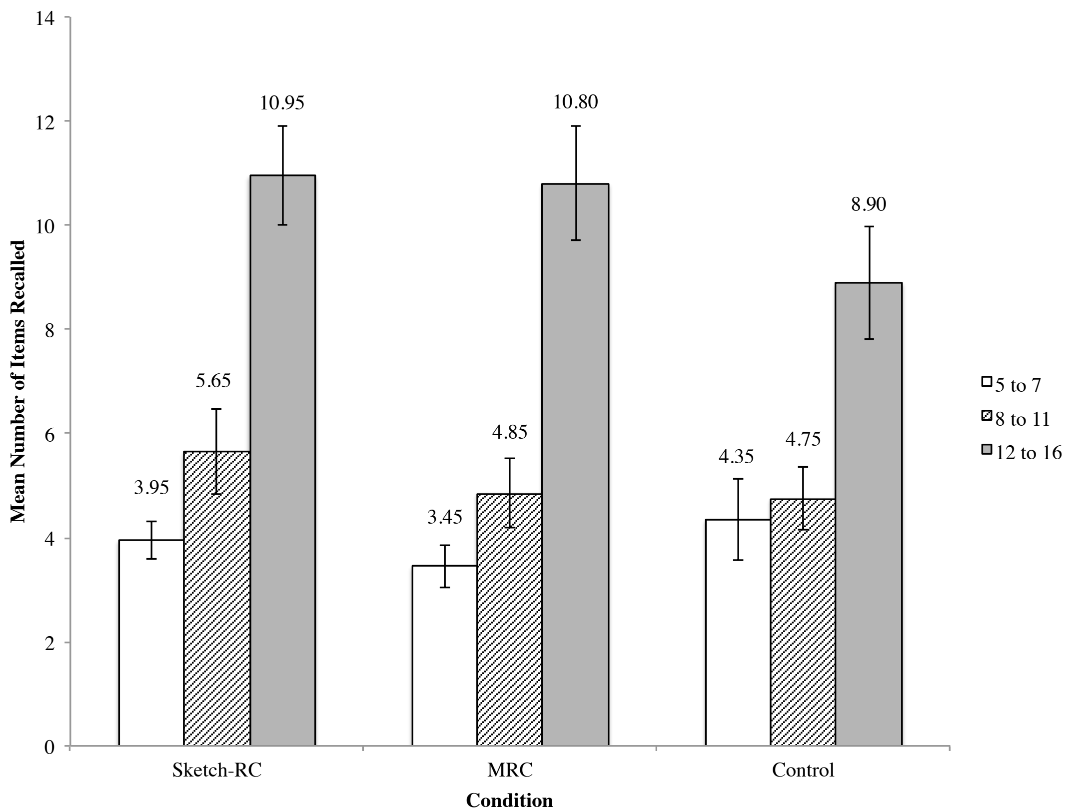

Figure 34. Total amount of surrounding information produced during the free recall phase as a function of group and retrieval condition.

Univariate analysis revealed a significant main effect of age group on the amount of correct surrounding information recalled, F (2, 171) = 66.998, $p < .001$, η_p^2

= .439 (see Table 26 for means and standard deviations). Children aged 12 to 16, 95% CI [8.92, 10.51] recalled significantly more correct surrounding information than children aged 5 to 7, 95% CI [2.62, 4.21] and children 8 to 11, 95% CI [4.02, 5.61], all *p*s $< .001$. Further, children aged 8 to 11, recalled more correct information than those aged 5 to 7, $p = .046$. No significant different differences between age groups were found in relation to incorrect or confabulated information recalled, $F = .772$, $p = .140$; $F = 2.183$, $p = 116$. Further, no effect of condition was found for correct, incorrect or confabulated surrounding information recalled, all *F*s < 1.741, all *p*s $> .205$, nor were any significant group X condition interactions revealed, all Fs < 1.167, all *p*s $> .327$.

Table 26. *Means and standard deviations for correct, incorrect, and confabulated surrounding information produced during free recall as a function of group, condition, and group X condition.*

	Surrounding Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	6.52	4.23	.18	.43	.15	.44
MRC (total)	5.98	4.15	.12	.37	.27	.90
Control (total)	5.45	3.63	.32	.91	.23	.89
5 to 7 years (total)	3.42	1.88	.12	.45	.38	1.17
Sketch	3.65	1.60	.05	.22	.25	.64
MRC	2.90	1.92	.05	.22	.50	1.40
Control	3.70	2.08	.25	.72	.40	1.35
8 to 11 years (total)	4.82	2.80	.17	.72	.10	.35
Sketch	5.40	3.10	.15	.49	.10	.31
MRC	4.70	2.90	.05	.22	.10	.45
Control	4.35	2.39	.30	1.13	.10	.31
12 to 16 years (total)	9.72	4.29	.33	.66	.17	.52
Sketch	10.50	4.10	.35	.49	.10	.31
MRC	10.35	4.39	.25	.55	.20	.52
Control	8.30	4.22	.40	.88	.20	.70

Univariate analysis revealed a significant effect of age group on the accuracy of surrounding information produced during the free recall phase of interviews, F (2, 171) = 3.942, p = .021, η_p^2 = .044 (see Figure 35). Children aged 12 to 16, *M* = 96.12, *SD* = 6.19, 95% CI [91.50, 100.72] were significantly more accurate than those aged 5 to 7, *M* = 87.42, *SD* = 25.89, 95% CI [82.81, 92.04], *p* = .028. No difference in accuracy was revealed between participants aged 5 to 7 and 8 to 11, *M* = 94.58, *SD* = 16.38, 95% CI [89.97, 99.19], *p* = .095. Further, no difference emerged between children aged 8 to 11 and those aged 12 to 16, *p* = 1.000. No effect of condition on accuracy was found, $F = 1.302$, $p = .275$. Similarly, no significant age group X condition interaction was found, $F = .557$, $p = 694$.

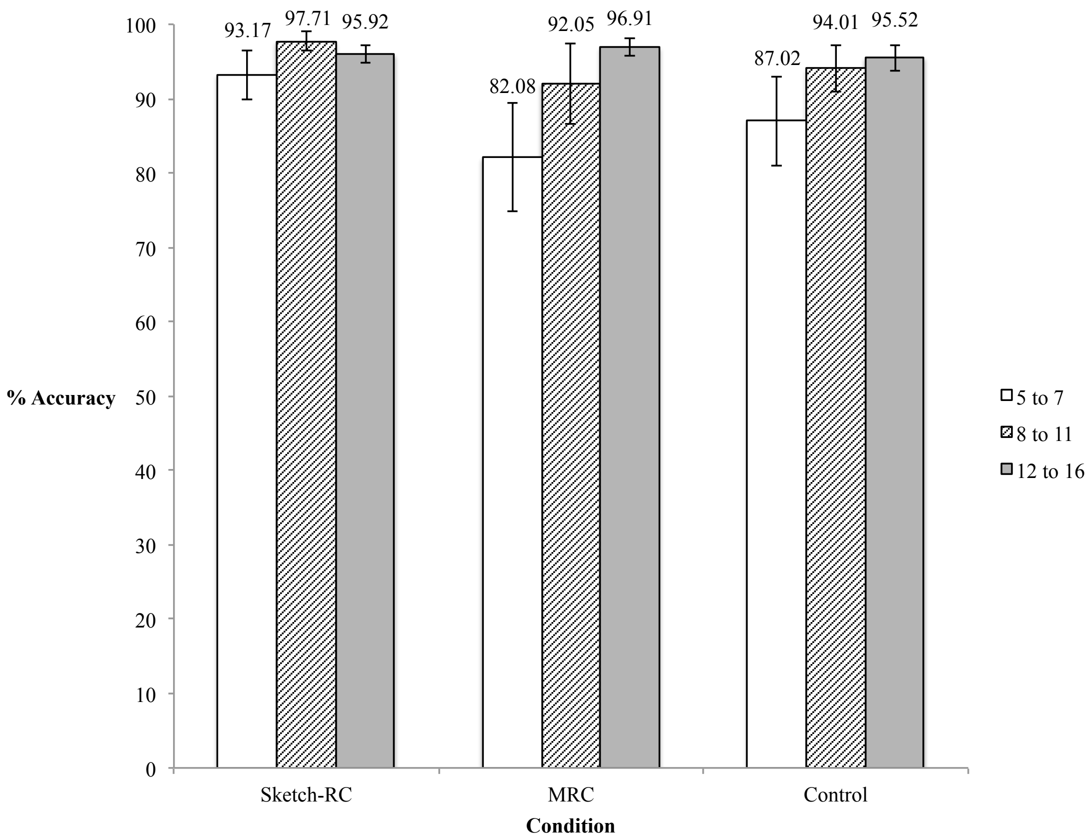

Figure 35. Percentage accuracy of surrounding information produced during the free recall phase as a function of group and retrieval condition.

Questioning Phase Performance

Duration

Univariate analysis revealed a significant effect of age group for the questioning phase duration, F (2, 171) = 8.351, $p < .000$, $\eta_p^2 = .089$. The questioning phase for children aged 5 to 7 years (M = 3.34 minutes, SD = 1.47 minutes) was significantly shorter than the questioning phase for children aged 12 to 16 (M = 4.51 minutes, SD = 1.58 minutes), $p < .001$. No significant difference was revealed for the questioning phase duration of children aged 8 to 11 (*M* = 4.06 minutes, *SD* = 1.30 minutes) and those aged 5 to 7 and 12 to 16, both *p*s > .054.

No significant main effect of condition was found for the duration of the questioning phase, *F* = 2.482, *p* = .087, nor was a significant age group X condition revealed, *F* = 1.487, *p* = .205). However, mean differences in duration were apparent between conditions. For instance, the duration of the questioning phase for children interviewed in the MRC condition (*M* = 4.34 minutes, *SD* = 2.24 minutes), was longer than the questioning duration for children interviewed in the Sketch-RC (*M* = 4.06 minutes, *SD* = 1.22 minutes) and Control conditions (*M* = 3.52 minutes, *SD* = 1.29 minutes).

Total Amount of Information Recalled During the Questioning Phase

Univariate analysis of the amount (correct + incorrect + confabulated) of information recalled during the questioning phase of interviews, revealed a significant effect of age group, F (2, 171) = 9.445, $p < .001$, $\eta_p^2 = .099$ (see Figure 36). Children in the 5 to 7 age group, *M* = 23.95, *SD* =14.50, 95% CI [20.19, 27.70] recalled significantly less information than children in both the 8 to 11, *M* = 32.18, *SD* = 14.68, 95% CI 28.43, 35.94], *p* = .008 and 12 to 16 age groups, *M* = 35.25, *SD* = 15.22, 95% CI [31.47, 39.00], *p* < .001. No difference was found between children aged 8 to 11 and 12 to 16, *p* = .767. No effect of condition was revealed, *F* = 1.418, *p* = .245. Similarly, no significant age group X condition interaction was found, *F* = 1.231, *p* = .299.

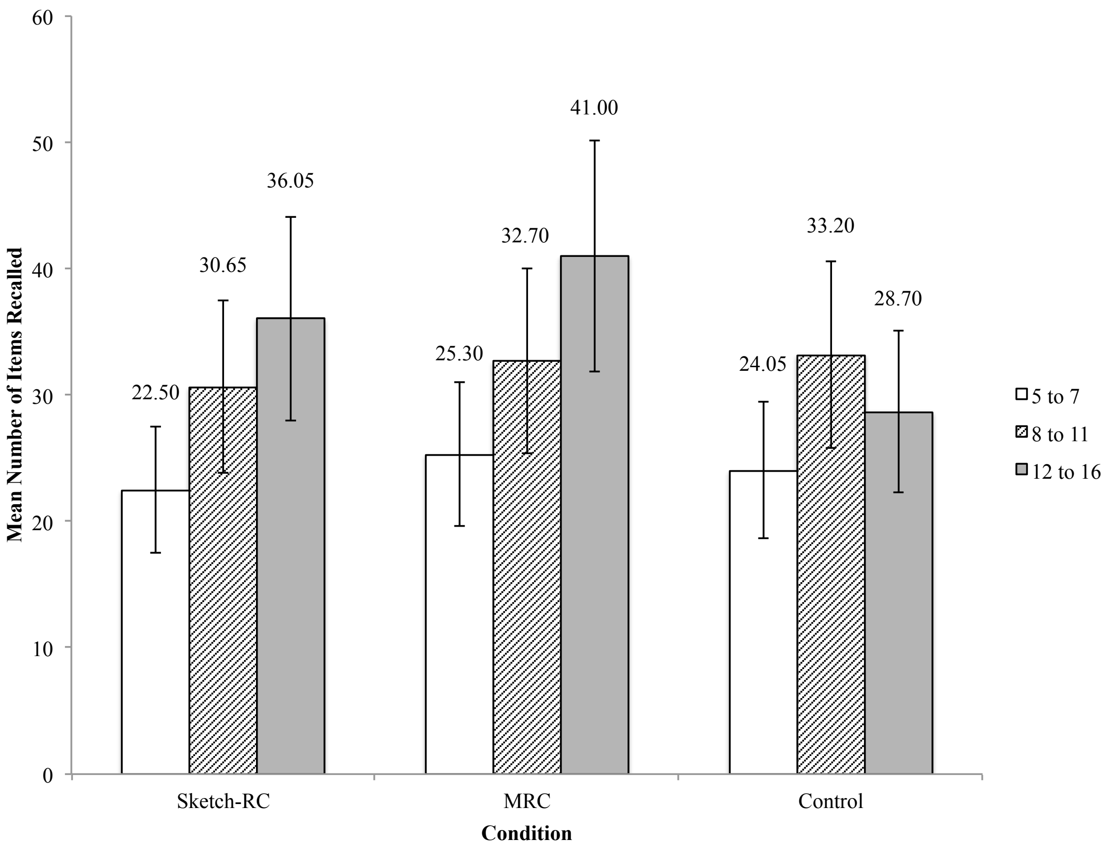

Figure 36. Total amount of information recalled during the questioning phase as a function of group and retrieval condition.

Type of Information Recalled During the Questioning Phase

Person Information Recalled

Univariate analysis of the total amount (correct + incorrect + confabulated) of person specific information recalled during the questioning phase, revealed no significant effects of age group or retrieval condition, $F = 2.892$, $p = .058$; $F = .222$, $p = .801$, respectively (see figure 37). Similarly, no age group X retrieval condition interaction effect was revealed, $F = 1.470$, $p = .213$.

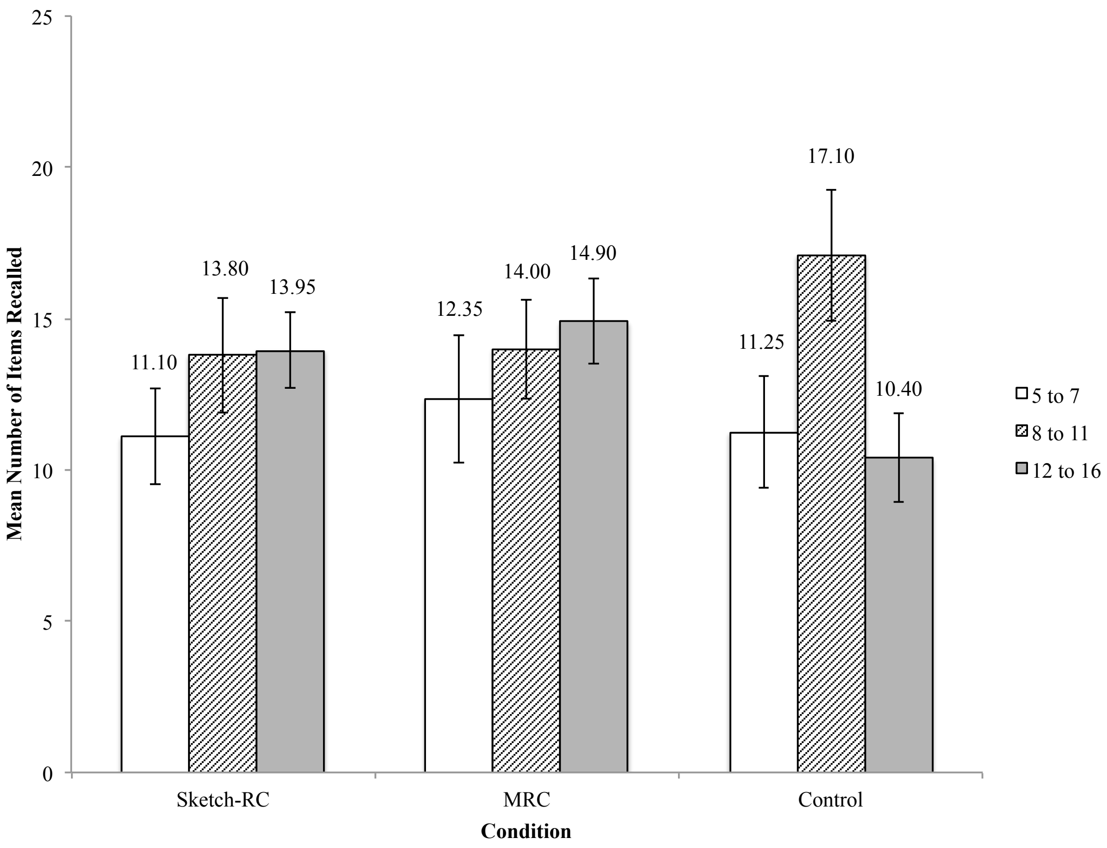

Figure 37. Total amount of person information recalled during the questioning phase as a function of group and retrieval condition.

Univariate analysis revealed a significant effect of group on the amount of correct and confabulated person information recalled, F (2, 171) = 3.466, p = .033, η_p^2 = .740; F (2, 171) = 10.213, p < .001, η_p^2 = .107, respectively (see Table 27 for means and standard deviations). Regardless of condition, children aged 8 to 11, 95% CI [3.171, 4.662] made significantly more confabulations than children aged 5 to 7, 95% CI [1.755, 3.245], p = .026, and children aged 12 to 16, 95% CI [.771, 2.262], p < .001. No significant difference in the amount of person confabulations was found between children aged 5 to 7 and 12 to 16, p = .202. Despite a significant univariate effect of age group on the amount of correct person information recalled, post hoc analysis did not reveal any significant differences between groups, all *p*s > .054. No effect of age group was found on the amount of incorrect information recalled by participants, $F = .514$, $p = .599$.

Table 27. *Means and standard deviations for correct, incorrect, and confabulated items of person information recalled during the questioning phase as a function of group, condition, and group X condition.*

	Person Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	8.67	4.99	2.40	2.22	1.88	2.60
MRC (total)	7.23	4.25	3.07	2.56	3.45	3.65
Control (total)	7.48	5.34	2.83	2.50	2.60	2.82
5 to 7 years (total)	6.48	4.36	2.58	2.70	2.50	3.12
Sketch	6.95	4.43	2.60	2.82	1.55	1.93
MRC	6.30	4.26	3.10	2.86	2.95	4.10
Control	6.20	4.56	2.05	2.42	3.00	2.87
8 to 11 years (total)	8.35	5.11	2.70	2.47	3.92	3.63
Sketch	8.30	4.67	2.30	2.23	3.20	3.59
MRC	6.90	4.38	2.35	2.37	4.75	4.17
Control	9.85	5.95	3.45	2.72	3.80	3.07
12 to 16 years (total)	8.55	5.00	3.02	2.12	1.52	1.85
Sketch	10.75	5.29	2.30	1.53	.90	1.21
MRC	8.50	4.01	3.75	2.34	2.65	2.11
Control	6.40	4.85	3.00	2.25	1.00	1.62

Univariate analysis revealed a main effect of retrieval condition on the confabulated person information recalled, $F(2, 171) = 4.315$, $p = .015$, $\eta_p^2 = .048$. Post hoc analysis revealed that children in the Sketch-RC condition, 95% CI [1.14, 2.63] confabulated less person specific information during questioning that children in the MRC condition, 95% CI [2.71, 4.19], $p = .011$. No significant differences were found between those in the Control condition, 95% CI [1.86, 3.35] and both the MRC and Sketch-RC conditions, both *p*s > .252. Further, no significant effect of condition was found for the amount of correct and incorrect person specific information produced during the questioning phase of interviews, $F = 1.156$, $p = .212$; $F = 1.170$, $p = .313$, respectively. No significant group X retrieval condition interactions were found across all three person information types, all *F*s < 2.364, all *p*s > .055.

Univariate analysis found a significant effect of age group and condition on the accuracy of person specific information produced during the questioning phase of interviews, F (2, 171) = 5.372, $p = .005$, $\eta_p^2 = .059$; F (2, 171) = 7.323, $p = .001$, $\eta_p^2 = .079$, respectively (see Figure 38). Post hoc analysis found that, regardless of condition, children aged 12 to 16, $M = 64.91$, $SD = 19.30$, 95% CI [58.98, 70.85], were significantly more accurate than those in the 5 to 7 age group, $M = 51.36$, $SD = 27.36$, 95% CI [45.43, 57.29], $p = .005$. No significant differences were found between participants in the 8 to 11 age group, $M = 55.36$, $SD = 24.55$, 95% CI [49.43, 61.29] and those in both the 5 to 7 and 12 to 16 age group, both *p*s > .066. Regardless of age group, participants in the Sketch-RC condition, $M = 65.18$, $SD = 21.69$, 95% CI [59.25, 71.11] were significantly more accurate than participants in the MRC condition, $M = 48.93$, $SD = 24.76$, 95% CI [43.00, 54.86], $p = .001$. No significant differences were found between those in the Control condition, $M = 57.52$, $SD = 24.58$, 95% CI [51.59, 63.45] and participants in both the Sketch-RC, $p = .219$, and MRC conditions, $p = .134$. No significant age group X condition was found, $F = .535$, $p = .711$.

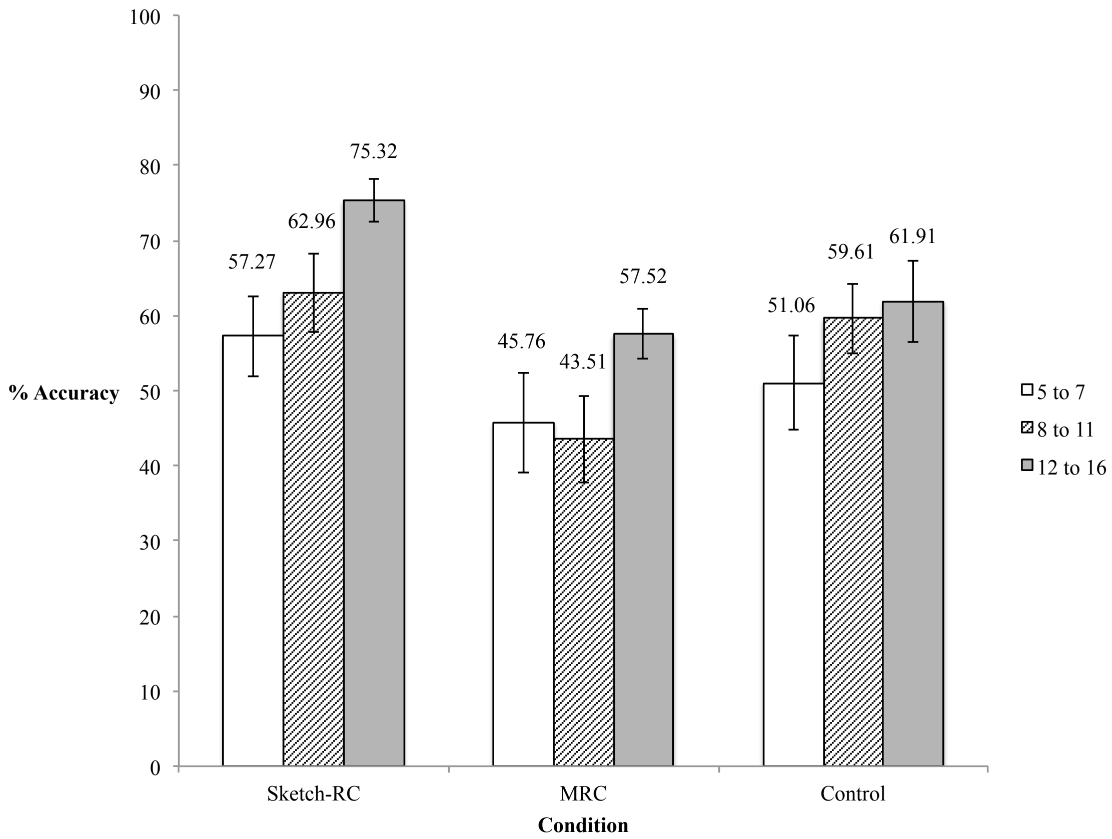

Figure 38. Percentage accuracy of person information recalled during the questioning phase as a function of group and retrieval condition.

Questioning Phase: Action Information Recalled

Univariate analysis of the total amount (correct + incorrect + confabulated) of action specific information recalled during the questioning phase, revealed significant main effects of age group and condition, F (2, 171) = 5.517, p = .007, η_p^2 = .057; F (2, 171) = 3.966, p = .021, η_p^2 = .044, respectively (see Figure 39). Post hoc analysis found that participants in the 5 to 7 age group, M = 4.17, SD = 3.81, 95% CI [3.06, 5.28] recalled significantly less information that those in both the 8 to 11, M = 6.52, SD = 5.16, 95% CI [5.41, 7.63] p = .011, and 12 to 16 age groups, M = 6.20, SD = 4.22, 95% CI [5.09, 7.31], p = .034. No significant difference in the amount of action specific information recalled was found between children aged 8 to 11 and those aged

12 to 16, $p = 1.000$. With regards to condition, participants in the Control condition, $M = 4.80$, $SD = 3.73$, 95% CI [3.69, 5.91] recalled significantly less information that children in the MRC group, $M = 6.90$, $SD = 5.38$, 95% CI [5.79, 8.01], $p = .027$. No differences emerged between the Sketch RC, $M = 5.18$, $SD = 4.10$, 95% CI [4.08, 6.29] and both the MRC and Control conditions, both *p*s > .096. No significant age group X retrieval condition interaction was revealed, $F = 1.182$, $p = .320$.

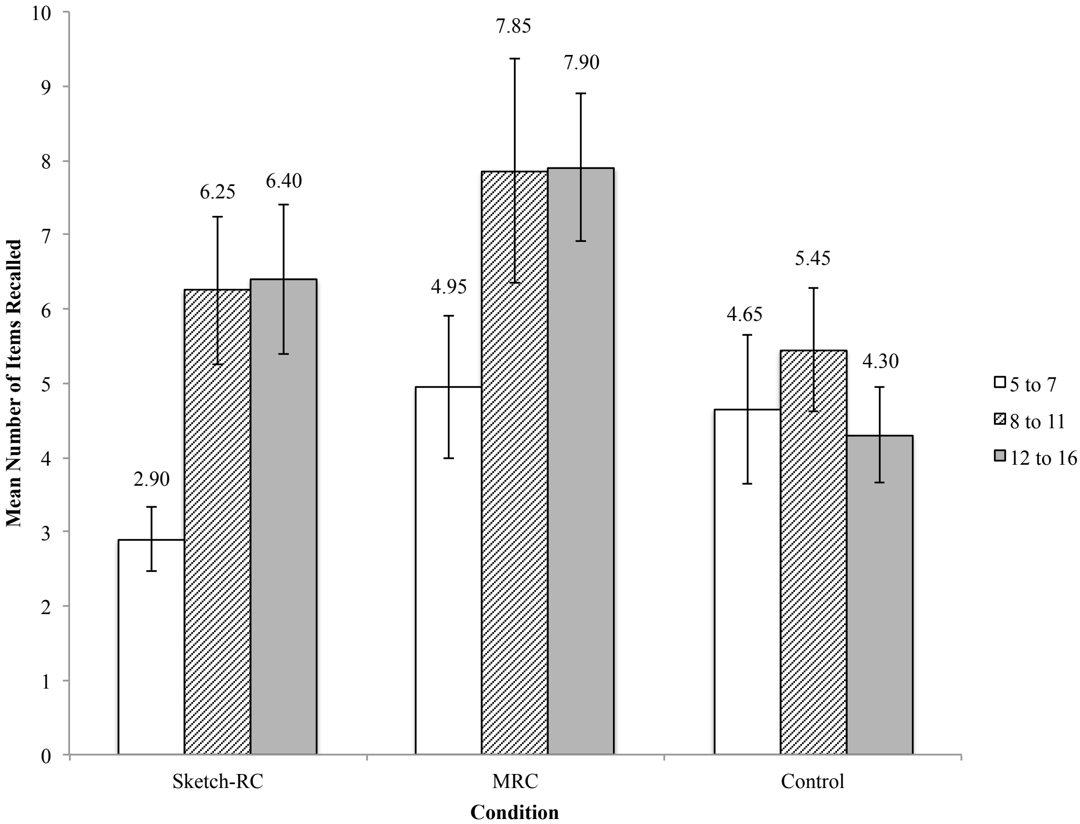

Figure 39. Total amount of action information recalled during the questioning phase as a function of group and retrieval condition.

Univariate analysis revealed a significant effect of age group on the correct and confabulated action information recalled, F (2, 171) = 11.075, $p < .001$, η_p^2 = .115; F (2, 171) = 41.106, $p = .001$, $\eta_p^2 = .088$, respectively (see Table 28 for means and standard deviations). Participants in the 5 to 7 age group, 95% CI [1.35, 2.89] recalled significantly less correct action information that their peers in both the 8 to 11 group, 95% CI [2.76, 4.31], $p = .034$, and the 12 to 16 age group, 95% CI [3.95, 5.49], $p < .001$. No difference was found between participants aged 8 to 11 and 12 to 16, $p = .102$. With regards to confabulations, children aged 8 to 11, 95% CI [1.78, 2.92] confabulated significantly more action specific information during the questioning phase, than those aged 5 to 7, 95% CI [.67, 1.80] $p = .020$, and 12 to 16, 95% CI [.17, 1.30], $p < .001$. No significant difference in the amount of action information confabulated was found between children aged 5 to 7 and children aged 12 to 16, $p = .663$. No significant effect of age group was found on the amount of incorrect action information recalled during the questioning phase of interviews, $F = .430$, $p = .651$.

Univariate analysis revealed a significant effect of retrieval condition on the amount of confabulated action information recalled, $F\ (2, 171) = 7.324$, $p = .001$, $\eta_p^2 = .079$. Post hoc analysis revealed that participants in the MRC condition, 95% CI [1.73, 2.87] confabulated more action information than those in both the Sketch-RC, 95% CI [.22, 1.35], $p = .001$, and Control conditions, 95% CI [.67, 1.80], $p = .029$. No significant difference in the amount of confabulations recalled was found between children interviewed in the Sketch-RC and Control conditions, $p = .812$. No effect of condition were found upon correct and incorrect action information that was recalled during the questioning phase of interviews, $F = 2.573$, $p = .079$; $F = 1.499$, $p = .226$. Further, no significant group X retrieval condition interactions were found for all action information types, all Fs < 2.175, all ps > .074.

Table 28. *Means and standard deviations for correct, incorrect, and confabulated action information recalled during the questioning phase as a function of group, condition, and group X condition.*

	Action Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	3.87	3.47	.53	.75	.78	1.26
MRC (total)	3.77	3.60	.83	1.26	2.30	3.24
Control (total)	2.73	2.38	.83	1.20	1.23	2.10
5 to 7 years (total)	2.12	2.36	.82	1.36	1.23	2.02
Sketch	2.20	1.67	.30	.57	.40	.68
MRC	2.45	3.05	1.00	1.52	1.50	2.04
Control	1.70	2.20	1.15	1.63	1.80	2.63
8 to 11 years (total)	3.53	2.95	.63	.84	2.35	3.25
Sketch	4.20	3.85	.65	.75	1.40	1.85
MRC	3.20	2.46	.70	1.08	3.95	4.51
Control	3.20	2.35	.55	.69	1.70	2.20
12 to 16 years (total)	4.72	3.70	.75	1.04	.73	1.33
Sketch	5.20	3.86	.65	.88	.55	.69
MRC	5.65	4.34	.80	1.20	1.45	1.96
Control	3.30	2.34	.80	1.06	.20	.52

Univariate analysis found a significant effect of age group and condition on the accuracy of action specific information recalled during the questioning phase of interviews, F (2, 171) = 10.801, $p < .001$, $\eta_p^2 = .112$; F (2, 171) = 3.936, $p = .021$, $\eta_p^2 = .044$, respectively (see Figure 40). Post hoc analysis revealed that participants aged 12 to 16, *M* = 75.80, *SD* = 28.53, 95% CI [67.14, 84.45] were significantly more accurate than children aged 5 to 7, *M* = 47.38, *SD* = 41.24, 95% CI [38.72, 56.03], $p < .001$, and 8 to 11, *M* = 57.51, *SD* = 32.74, 95% CI [48.86, 66.16], $p = .011$. No significant difference in action specific accuracy was found between participants aged

5 to 7 and 8 to 11, *p* = .311. Further, regardless of age, participants in the Sketch-RC condition, *M* = 69.84, *SD* = 33.76, 95% CI [61.19, 78.49] were significantly more accurate than those in the MRC condition, *M* = 52.91, *SD* = 35.96, 95% CI, [44.26, 61.56], *p* = .021. No differences in accuracy were found between the Control condition, *M* = 57.93, *SD* = 37.70, 95% CI [49.28, 66.59] and both the Sketch-RC, *p* = .169, and MRC conditions, *p* = 1.000. No significant age group X condition was found, *F* = 1.182, *p* = .321.

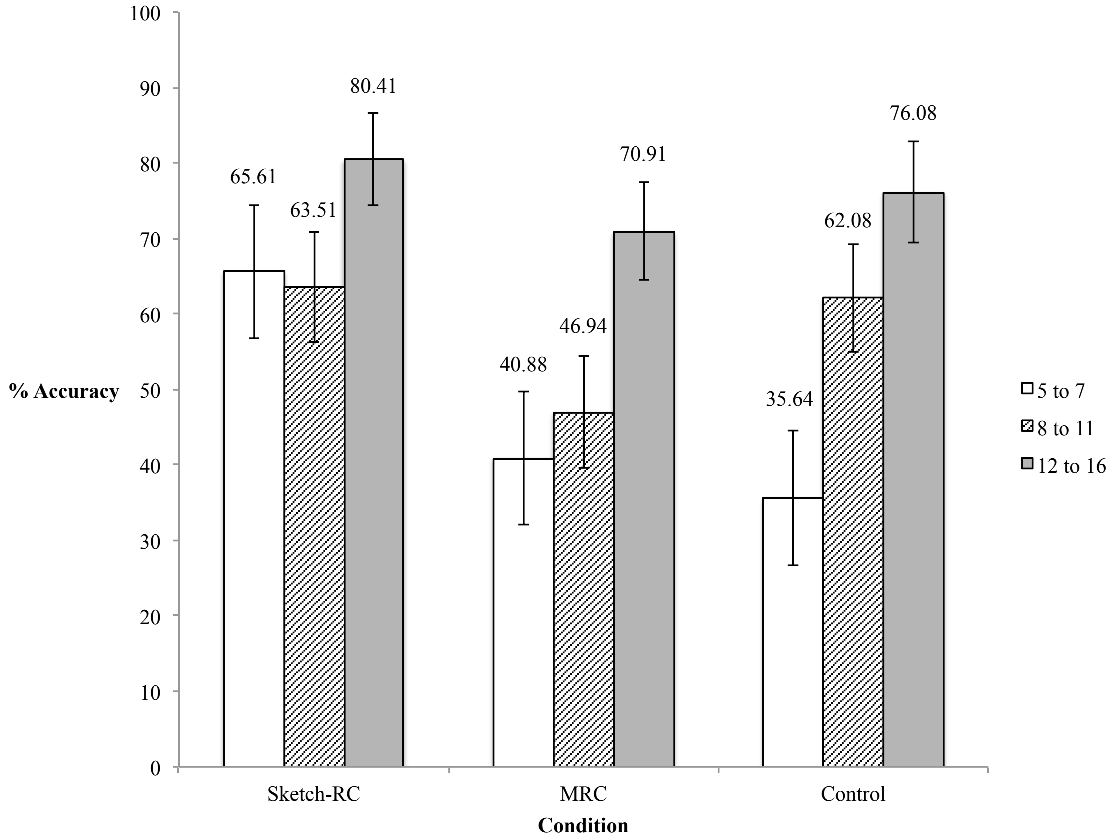

Figure 40. Percentage accuracy of action information recalled during the questioning phase as a function of group and retrieval condition.

Questioning Phase: Surrounding Information Recalled

Univariate analysis of the total amount (correct + incorrect + confabulated) of surrounding specific information recalled during the questioning phase, revealed a significant main effect of age group, F (2, 171) = 19.480, p < .001, η_p^2 = .186 (see figure 41). Post hoc analysis found that participants in the 12 to 16 age group, M = 15.97, SD = 8.67, 95% CI [14.19, 17.74] recalled significantly more information that those in both the 5 to 7 age group, M = 8.22, SD = 5.74, 95% CI [6.45, 9.99] and the 8 to 11, M = 10.70, SD = 5.89, 95% CI [8.93, 12.47], both ps < .001. No significant difference in terms of the amount of surrounding information recalled was found between participants aged 5 to 7 and 8 to 11, p = .155. No significant effect of condition was revealed, F = .625, p = .537. Further, no age group X retrieval condition interaction was revealed, F = .630, p = .642.

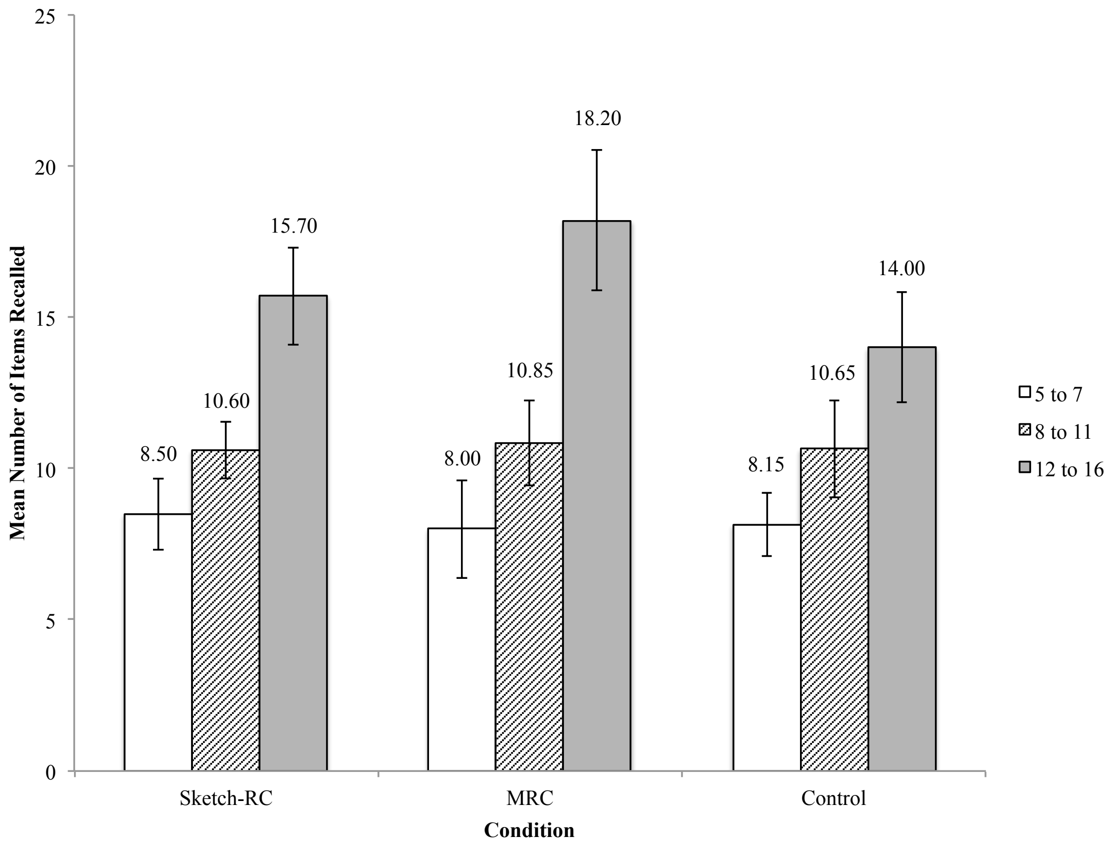

Figure 41. Total amount of surrounding information recalled during the questioning phase as a function of group and retrieval condition.

Univariate analysis revealed a significant effect of age group on the amount of correct, F (2, 171) = 29.474, $p < .001$, $\eta_p^2 = .256$, incorrect, F (2, 171) = 4.400, $p = .014$, $\eta_p^2 = .049$, and confabulated surrounding information recalled during the questioning phase, F (2, 171) = 5.467, $p = .005$, $\eta_p^2 = .060$ (see table 29 for means and standard deviations). Post hoc analysis revealed that participants in the 12 to 16 age group, 95% [11.52, 14.25] recalled significantly more correct surrounding specific information during the questioning phase than children in both the 5 to 7 age group, 95% CI [4.30, 7.03] and 8 to 11 age group, 95% CI [6.14, 8.86] both *p*s < .001. No difference in the amount of correct information was found between groups aged 5 to 7 and 8 to 11, $p = .187$.

In terms of incorrect information recalled during the questioning phase, participants aged 12 to 16, 95% CI [1.80, 2.80] produced significantly more incorrect surrounding information than children aged 8 to 11, 95% CI [.83, 1.83], $p = .023$. No significant differences were found between children aged 5 to 7, 95% CI [.933, 1.93], and those aged 8 to 11 and 12 to 16, both *p*s = > .050. Participants aged 12 to 16, 95% CI [.32, 1.25] confabulated less surrounding information during the question phase than participants in the 8 to 11 age group, 95% CI [1.39, 2.34], $p = .004$. No differences emerged between children aged 5 to 7, 95% CI [.65, 1.95] and those aged 8 to 11, $p = .080$, and those aged 12 to 16, $p = .966$.

Table 29. *Means and standard deviations for correct, incorrect, and confabulated surrounding information recalled during the questioning phase as a function of group, condition, and group X condition.*

	Surrounding Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	9.58	6.03	1.32	1.40	.70	1.03
MRC (total)	9.00	7.10	1.85	2.12	1.50	1.14
Control (total)	7.47	5.13	1.90	2.40	1.57	2.21
5 to 7 years (total)	5.67	4.52	1.43	1.80	1.12	1.68
Sketch	6.40	4.31	1.40	1.90	.70	1.13
MRC	5.65	5.59	1.20	1.47	1.15	1.57
Control	4.95	3.52	1.70	2.03	1.50	2.16
8 to 11 years (total)	7.50	4.12	1.33	1.23	1.87	2.44
Sketch	8.25	3.82	1.35	1.04	1.00	1.17
MRC	7.15	3.48	1.35	1.35	2.35	3.03
Control	7.10	4.99	1.30	1.34	2.25	2.59
12 to 16 years (total)	12.88	7.04	2.30	2.66	.78	1.26
Sketch	14.10	6.76	1.20	1.15	.40	.68
MRC	14.20	8.33	3.00	2.81	1.00	1.17
Control	10.35	5.37	2.70	3.29	.95	1.70

Univariate analysis revealed a significant effect of retrieval condition on the amount of confabulated surrounding information produced during this phase, F (2, 171) = 4.130, p = .018, η_p^2 = .046. Post hoc analysis found that participants in the Sketch-RC condition, 95% CI [.23, 1.17] produced significantly less confabulations than those in the Control condition, 95% CI [1.09, 2.04], p = .032. No significant differences were found between those in the MRC condition, 95% CI [1.03, 1.96], and participants in the Sketch-RC and Control conditions, both *p*s > .055. No effects of condition were found on the amount of correct and incorrect information produced, F

= 2.504, p = .085; F = 1.628, p = .199. Further, no significant group X condition interactions were revealed, all Fs < 1.766, all ps > .138.

Univariate analysis found significant effects of age group and condition upon the accuracy of surrounding specific information produced during the questioning phase, F (2, 171) = 10.691, p < .001, η_p^2 = .111; F (2, 171) = 2.168, p = .045, η_p^2 = .036, respectively (see figure 46). Post hoc analysis revealed that participants aged 12 to 16, M = 82.31, SD = 13.86, 95% CI [76.19, 88.43] were significantly more accurate than children aged 5 to 7, M = 62.06, SD = 31.62, 95% CI [55.95, 68.18], p < .001, and children aged 8 to 11, M = 71.69, SD = 23.23, 95% CI [65.58, 77.81], p = .049.

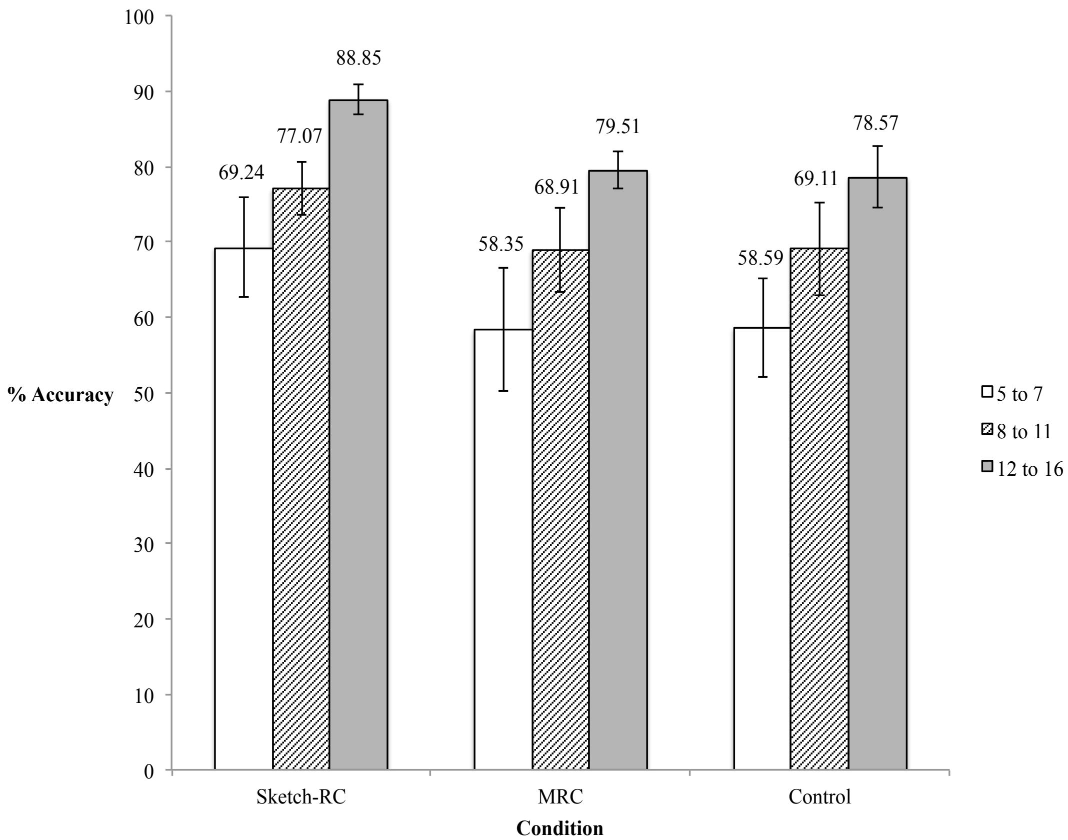

Figure 42. Percentage accuracy of surrounding information recalled during the questioning phase.

No difference in accuracy was found between children aged 5 to 7 and 8 to 11, $p = .088$. With regards to condition, despite univariate analysis revealing a significant effect, no significant differences emerged between conditions upon post hoc analyses, all *p*s > .088. Further, no significant age group X condition interaction was found, $F = .026$, $p = .99$.

Appendix H: Study 3 Additional Results

Number of Questions

More questions were asked of children in the MRC condition, 95% [CI 8.931, 13.069], than in the Sketch RC, 95% CI [8.731, 12.869], and Control, 95% CI [8.531, 12.669], conditions. However, univariate analysis revealed no significant effect of condition, $F = .038$, $p = .963$. Figure 43 displays the mean number of questions asked within each retrieval condition.

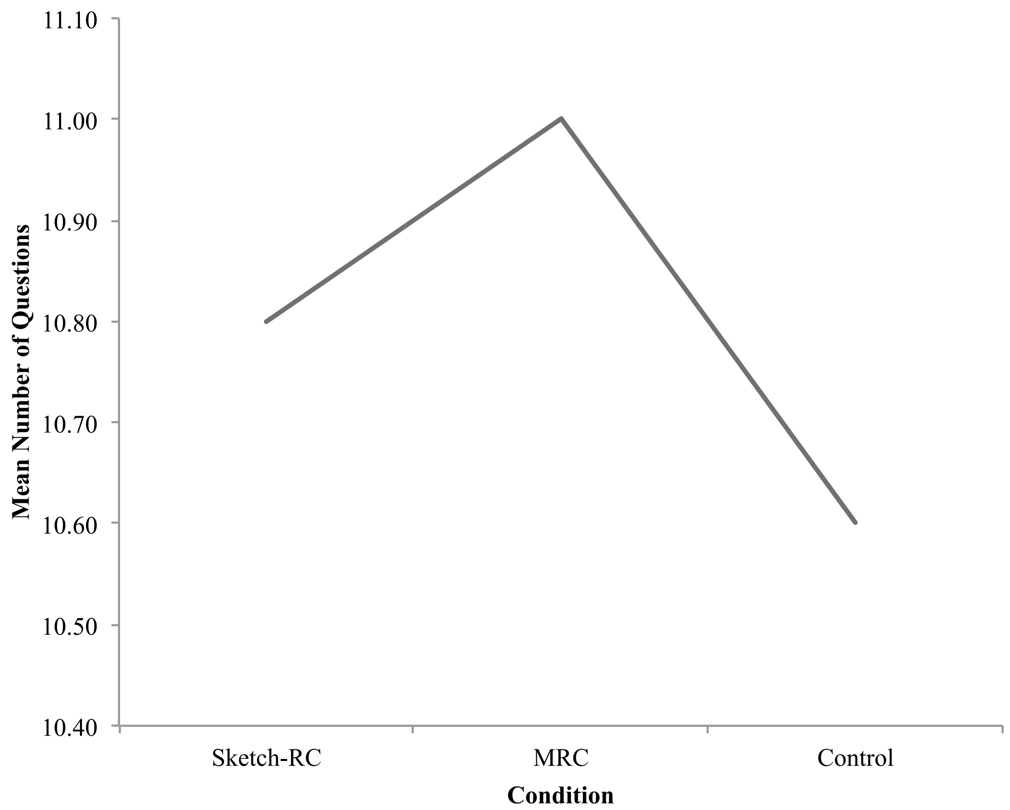

Figure 43. Mean number of questions as a function of group and retrieval condition.

Interview duration

The duration of interviews for children in the Control condition ($M = 6.17$ minutes, $SD = 3.48$ minutes) was shorter than that for children interviewed in the

Sketch-RC condition (*M* = 8.38 minutes, *SD* = 3.48 minutes) and MRC condition (*M* = 8.15 minutes, *SD* = 2.06 minutes). However, univariate analysis revealed no significant effect of condition on the overall duration of interviews, $F = 2.178$, $p = .078$.

Person Information Recalled Overall

A significant effect of condition was found on the overall percentage accuracy of person information recalled (see figure 44), $F(2, 41) = 5.159$, $p = .010$, $\eta^2 = .201$. Posthoc analysis revealed that children with autism interviewed in the Sketch-RC condition, 95% CI [62.171, 93.044] were significantly more accurate than those interviewed in both the MRC, 95% CI [30.801, 61.608], $p = .018$, and Control conditions, 95% CI [33.491, 64.187], $p = .033$. No significant difference in accuracy was found between children interviewed in the MRC and Control conditions, $p = 1.000$.

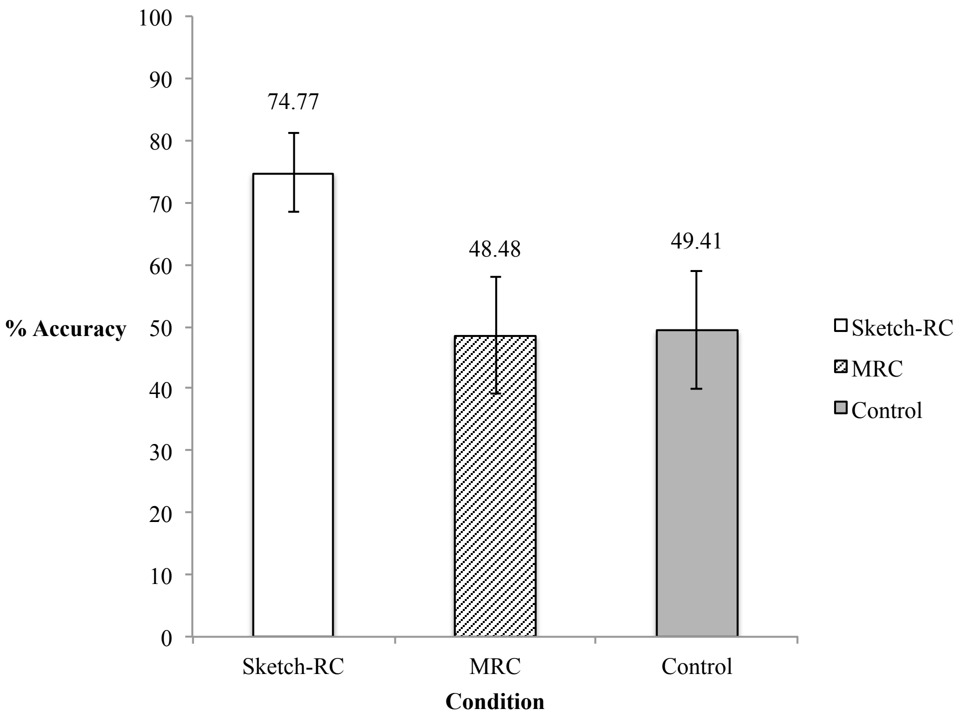

Figure 44. Percentage accuracy of person information recalled overall across retrieval conditions.

The means and standard deviations for the total amount and type of person information recalled across retrieval conditions are displayed in Table 30. No significant effect of condition was found for the total amount of person information recalled overall, $F = .641$, $p = .532$. Similarly, despite observed differences in means for correct, incorrect and confabulated person information, no significant effect of condition was revealed, all *F*s < 1.935, all *p*s > .157.

Table 30. *Means and standard deviations for person information recalled across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Person						
Correct	6.67	3.67	6.67	7.89	4.80	5.13
Incorrect	1.47	1.25	2.00	2.51	1.20	2.11
Confabulations	.27	.59	1.47	2.72	.87	1.36
Total Recalled	8.40	4.76	10.13	10.43	6.87	6.66

Action Information Recalled Overall

A significant main effect of condition was found for the accuracy of action information recalled (see Figure 45), $F(2, 41) = 8.539$, $p = .001$, $\eta^2 = .294$. Children with autism interviewed in the Sketch-RC condition, 95% CI [76.828, 105.690] were significantly more accurate than children with autism interviewed in both the MRC, 95% CI [38.881, 67.681], $p = .002$, and Control conditions, 95% CI [42.582, 71.278],

p = .005. No significant difference in accuracy was found between children interviewed in the MRC and Control conditions, p = 1.000.

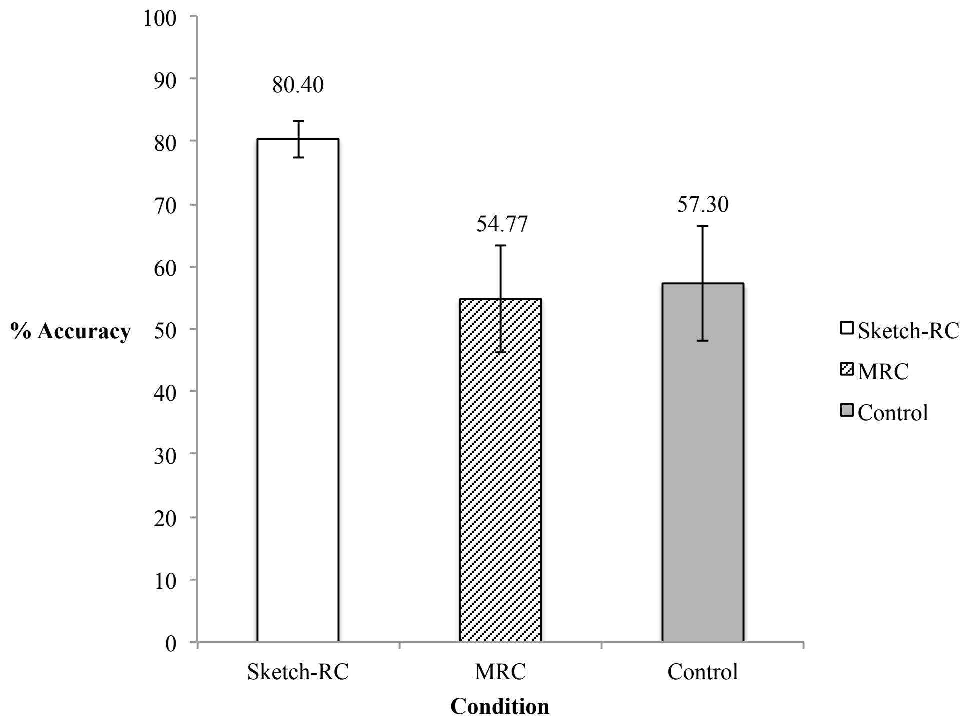

Figure 45. Percentage accuracy of action information recalled overall across retrieval conditions.

The means and standard deviations for the total amount and type of action information recalled across retrieval conditions are displayed in Table 31. No significant effect of condition was found for the total amount of action information recalled overall, F = .538, p = .588. Similarly, despite observed differences in the means for correct, incorrect and confabulated action information, no significant effect of condition was revealed, all Fs < 2.971, all ps > .062.

Table 31. *Means and standard deviations for action information recalled across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Action						
Correct	9.27	4.10	6.93	7.44	5.33	4.27
Incorrect	.53	.83	1.13	1.77	.80	1.42
Confabulations	.80	1.15	1.60	1.92	2.47	3.89
Total Recalled	10.60	4.88	9.67	9.08	8.60	5.84

Surrounding Information Recalled Overall

A significant main effect of condition was found for the accuracy of surrounding information recalled overall (see Figure 46), F (2, 41) = 6.635, p = .003, η^2 = .245. Children interviewed in the Sketch-RC condition, 95% CI [76.585, 100.983] were significantly more accurate than children interviewed in the MRC condition, 95% CI [45.679, 70.024], p = .002. No significant differences in accuracy were found between children interviewed in the Control condition, 95% CI [57.386, 81.643] and those interviewed in both the Sketch-RC condition, p = .088, and MRC condition, p = .533.

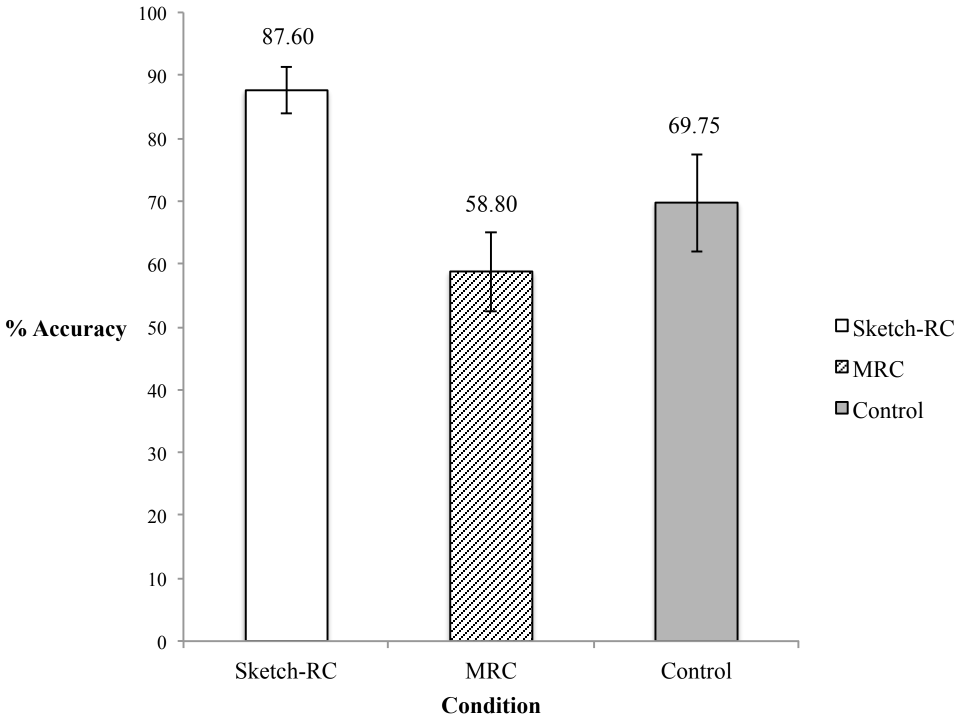

Figure 46. Percentage accuracy of surrounding information recalled overall across retrieval conditions.

The means and standard deviations for the total amount and type of surrounding information recalled across retrieval conditions are displayed in Table 32. No significant effect of condition was found for the total amount of surrounding information recalled, $F = .193$, $p = .825$. Further, despite differences in the means of correct, incorrect and confabulated surrounding information recalled, no significant effects of condition emerged, all Fs < 2.424, all ps > .101.

Table 32. *Means and standard deviations for surrounding information recalled across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Surroundings						
Correct	10.73	6.03	9.67	8.67	8.13	3.91
Incorrect	.93	1.10	2.07	2.69	1.67	1.45
Confabulations	.47	.92	2.13	1.73	5.07	9.77
Total Recalled	12.13	6.97	13.87	10.93	14.87	11.35

Free Recall Performance

The duration of the free recall phase of interviews was analysed (excluding the duration of the Sketch-RC task and MRC task, which took place immediately prior to free recall). Univariate analysis revealed a significant effect of condition on the free recall duration of interviews, F (2, 42) = 8.119, p = .001, η_p^2 = .279. Post hoc analysis found that the free recall duration for children interviewed in the Control condition (M = 123.667 seconds, SD = 48.282 seconds) was significantly longer, than the free recall durations for children interviewed in both the Sketch-RC (M = 81.200 seconds, SD = 25.785 seconds), p = .009, and MRC conditions (M = 73.400 seconds, SD = 32.561 seconds), p = .002. There was no significant difference between the free recall duration for children interviewed in the latter two conditions, p = 1.000.

Free Recall: Person Information

The means and standard deviations for the total amount, and type of person information recalled across retrieval conditions, are displayed in Table 33. No significant effect of condition was found for the total amount of person information recalled during the free recall phase of interviews, $F = .698$, $p = .503$. Similarly, despite observed differences in means for correct, incorrect and confabulated person information, no significant effect of condition was revealed, all *F*s < 1.496, all *p*s > .236.

Table 33. *Means and standard deviations for person information produced during free recall across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Person						
Correct	2.80	1.61	3.07	3.22	2.07	2.12
Incorrect	.13	.35	.47	.83	.27	.46
Confabulations	.00	.00	.40	1.06	.33	.82
Total Recalled	2.93	1.67	3.93	3.90	2.67	2.47

A significant effect of condition was found on the free recall accuracy of person information recalled (see figure 47), $F\ (2, 41) = 5.987$, $p = .005$, $\eta^2 = .226$. Post hoc analysis revealed that children with autism interviewed in the Sketch-RC condition, 95% CI [77.166, 110.553] were significantly more accurate than those interviewed in both the MRC, 95% CI [42.557, 75.872], $p = .016$, and Control conditions, 95% CI [41.668, 74.863], $p = .012$. No significant difference in accuracy was found between children interviewed in the MRC and Control conditions, $p = 1.000$.

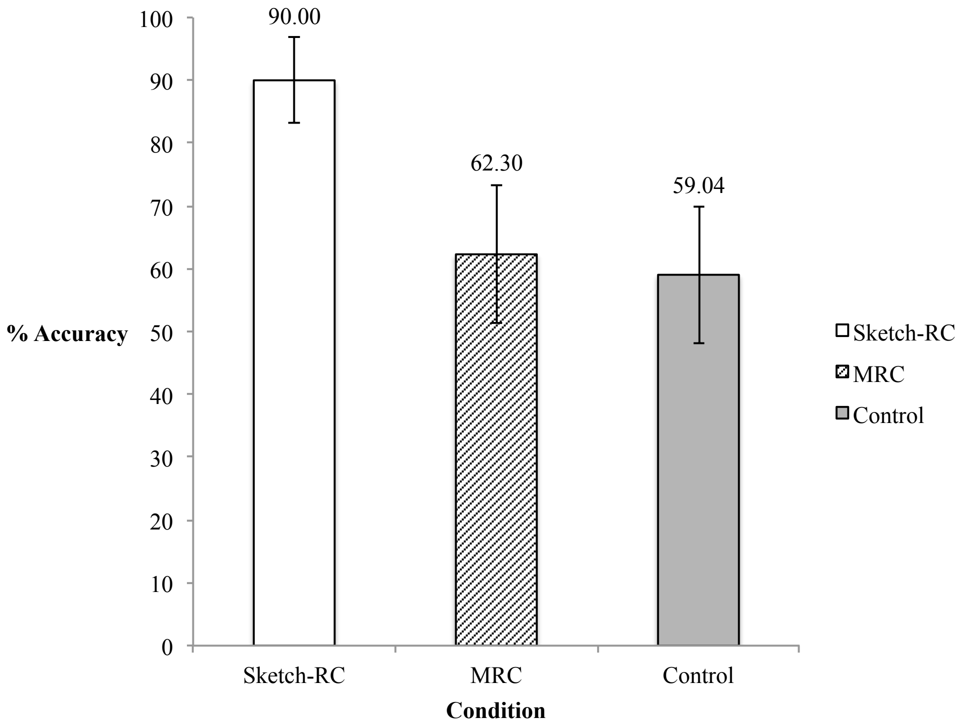

Figure 47. Percentage accuracy of person information produced during the free recall phase.

Free Recall: Action Information

A significant main effect of condition was found for the total amount of correct action information recalled (see table 34), F (2, 41) = 3.905, p = .028, η^2 = .160. Children with autism interviewed in the Sketch-RC condition, 95% CI [5.093, 8.957] recalled significantly more correct action information than children with autism interviewed in the Control condition, 95% CI [1.421, 5.263], p = .028. No significant difference was found between children interviewed in the MRC, 95% CI [2.505, 6.361] and both the Sketch-RC and Control conditions, both ps > .190.

Table 34. *Means and standard deviations for action information produced during free recall across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Action						
Correct	6.73	3.79	4.67	4.92	3.40	2.95
Incorrect	.20	.41	.60	1.06	.07	.26
Confabulations	.47	.74	.33	.82	.33	.90
Total Recalled	7.40	4.10	5.60	5.76	3.80	3.14

The means and standard deviations for the total amount, and type of action information recalled across retrieval conditions, are displayed in Table 34. No significant effect of condition was found for the total amount of action information produced during the free recall phase of interviews, $F = 3.163$, $p = .053$. Further, despite observed differences in the means for incorrect and confabulated action information, no significant effects of condition were revealed, both Fs < 2.366, both ps > .107. Similarly, no significant effect of condition was found on the free recall accuracy of action information, $F = 1.739$, $p = .188$ (see Figure 48 for percentage accuracy).

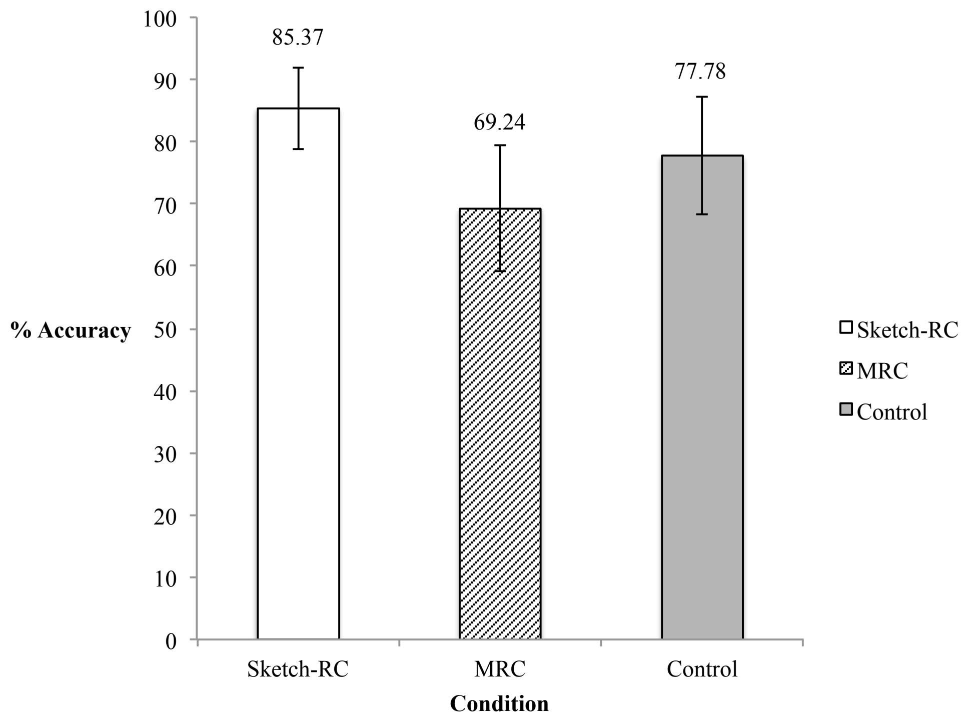

Figure 48. Percentage accuracy of action information produced during the free recall phase.

Free Recall: Surrounding Information

The means and standard deviations for the total amount, and type of surrounding information recalled across retrieval conditions, are displayed in Table 35. A significant main effect of condition was found for the amount of confabulated surrounding information produced during the free recall phase of interviews, F (2, 41) = 3.420, p = .042, η^2 = .143. Children interviewed in the Sketch-RC condition, 95% CI [-.681, .915] produced significantly less surrounding confabulations than children interviewed in the Control condition, 95% CI [.743, 2.330], p = .044. No significant difference was found between children interviewed in the MRC condition, 95% CI [-.250, 1.343] and children interviewed in both the Sketch-RC, p = 1.000, and Control conditions, p = .247.

Table 35. *Means and standard deviations for surrounding information produced during free recall across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Surroundings						
Correct	5.73	3.56	4.67	4.25	5.00	2.73
Incorrect	.20	.41	.53	.92	.67	1.05
Confabulations	.13	.35	.53	.64	1.53	2.50
Total Recalled	6.07	3.81	5.73	4.57	7.27	4.15

No significant effect of condition was found for the total amount of surrounding information reported during the free recall phase, $F = .596$, $p = .556$. Further, despite differences in the means of correct and incorrect surrounding information recalled, no significant effects of condition emerged, both *F*s < 1.150, both *p*s > .327.

A significant main effect of condition was found for the accuracy of surrounding information recalled during the free recall phase of interviews (see figure 49), $F\ (2, 41) = 6.078$, $p = .005$, $\eta^2 = .229$. Children interviewed in the Sketch-RC condition, 95% CI [84.564, 108.607] were significantly more accurate than children interviewed in both the MRC condition, 95% CI [56.486, 80.478], $p = .006$, and Control condition, 95% CI [62.911, 86.816], $p = .040$. No significant differences in accuracy were found between children interviewed in the MRC and Control conditions, $p = 1.000$.

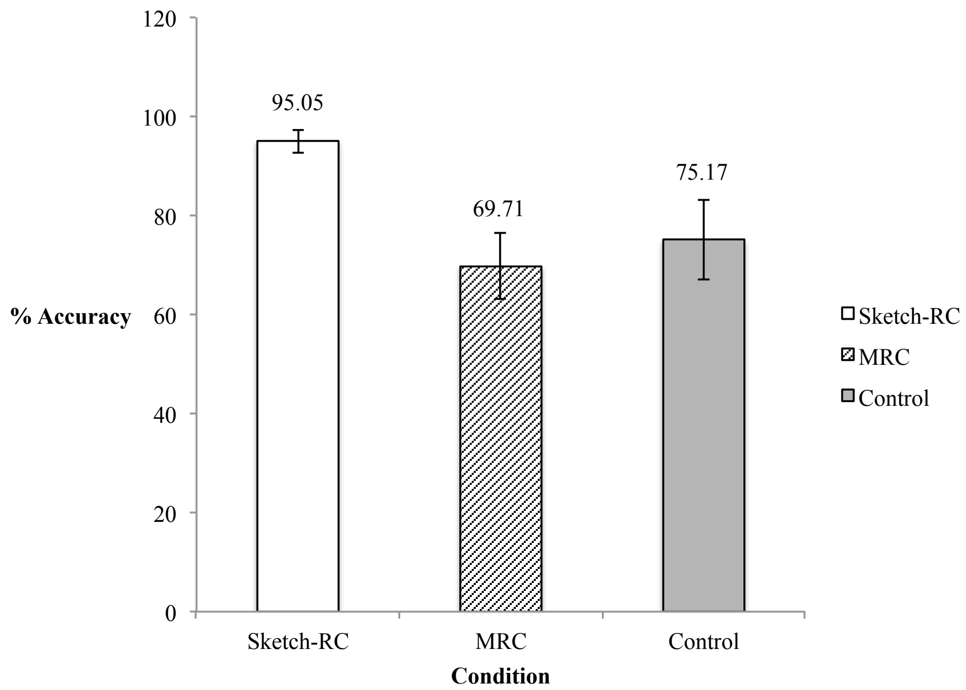

Figure 49. Percentage accuracy of surrounding information produced during the free recall phase.

Questioning Phase Performance

Univariate analysis revealed no significant effect of condition on the questioning phase duration of interviews, $F = .217$, $p = .806$. However, mean differences were apparent. For instance, the duration of the questioning phase for children in the Control condition ($M = 4.13$ minutes, $SD = 2.03$ minutes) was longer than that for children interviewed in the Sketch-RC condition ($M = 3.53$ minutes, $SD = 1.39$ minutes) and MRC condition ($M = 3.45$ minutes, $SD = 2.12$ minutes).

Questioning Phase: Person Information Recalled

The means and standard deviations for the total amount, and type of person information recalled across retrieval conditions, are displayed in Table 36. No significant effect of condition was found for the total amount of person information recalled during questioning, $F = .521$, $p = .598$. Similarly, despite observed differences in means for correct, incorrect and confabulated person information, no significant effects of condition were revealed, all *F*s < 1.637, all *p*s > .207.

Table 36. *Means and standard deviations for person information recalled during questioning across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Person						
Correct	3.87	3.02	3.60	5.08	2.73	3.69
Incorrect	1.33	1.23	1.53	1.95	.93	1.94
Confabulations	.27	.59	1.07	1.94	.53	.83
Total Recalled	5.47	3.94	6.20	6.99	4.20	4.83

A significant effect of condition was found for the accuracy of person information recalled during the questioning phase (see figure 50), $F(2, 41) = 4.070$, $p = .024$, $\eta^2 = .166$. Posthoc analysis revealed that children with autism interviewed in the Sketch-RC condition, 95% CI [51.623, 87.175] were significantly more accurate than those interviewed in the MRC condition, 95% CI [20.010, 55.485], $p = .046$. No significant difference in accuracy was found between children interviewed in the Control condition, 95% CI [21.735, 57.082], and those interviewed in both the Sketch-RC and MRC conditions, both *p*s > .061.

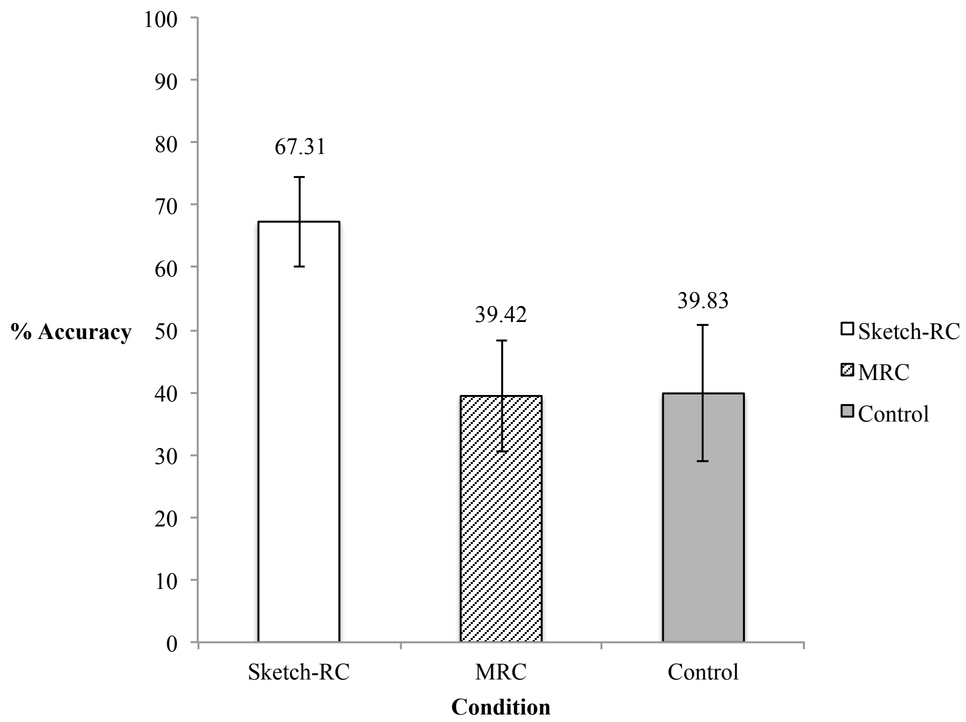

Figure 50. Percentage accuracy of person information produced during the questioning phase.

Questioning Phase: Action Information Recalled

The means and standard deviations for the total amount, and type of surrounding information recalled across retrieval conditions, are displayed in Table 37. No significant effect of condition was found for the total amount of action information produced during the free recall phase of interviews, $F = .587$, $p = .560$. Further, despite observed differences in the means for correct, incorrect and confabulated action information recalled, no significant effects of condition were revealed, all Fs < 2.392, all ps > .104.

Table 37. *Means and standard deviations for action information recalled during questioning across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Action						
Correct	2.53	1.81	2.27	2.87	1.93	2.05
Incorrect	.33	.62	.53	.92	.73	1.44
Confabulations	.33	.62	1.27	1.49	2.13	3.68
Total Recalled	3.20	2.31	4.07	3.75	4.80	4.63

A significant main effect of condition was found for the accuracy of action information recalled during questioning (see figure 51), F (2, 41) = 5.252, p = .009, η^2 = .204. Children with autism interviewed in the Sketch-RC condition, 95% CI [55.697, 95.942] were significantly more accurate than children interviewed in both the MRC, 95% CI [18.754, 58.912], p = .037, and Control conditions, 95% CI [13.969, 53.983], p = .015. No significant difference was found between children interviewed in the MRC and Control conditions, p = 1.000.

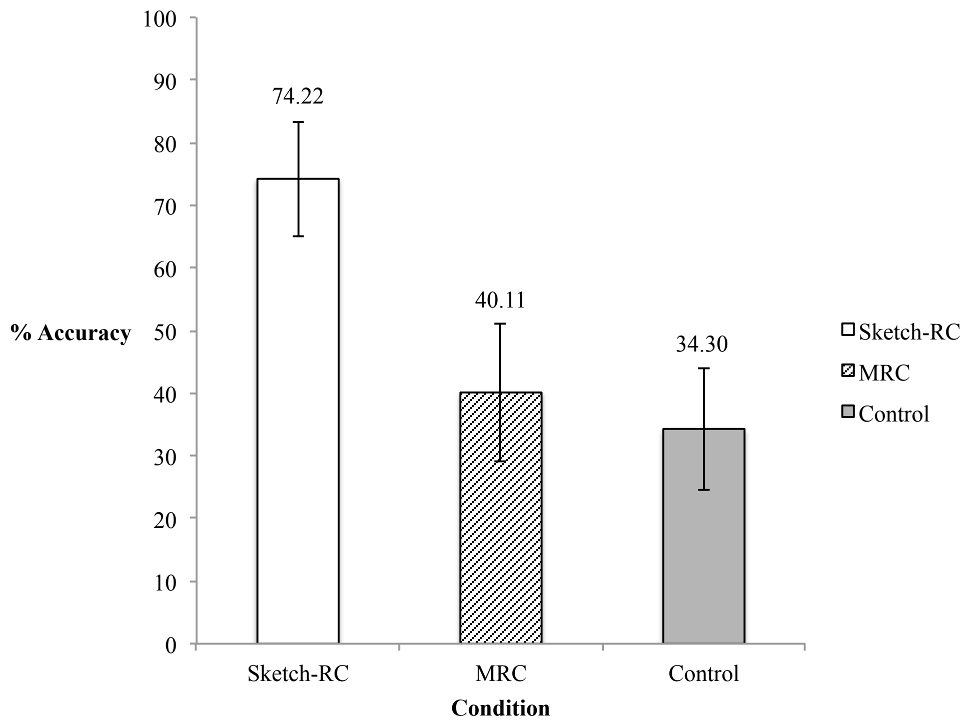

Figure 51. Percentage accuracy of action information produced during the questioning phase.

Questioning Phase: Surrounding Information Recalled

Despite differences between the means (see figure 52 and table 38), no significant effect of condition was found for the total amount of surrounding information recalled or the accuracy of surrounding information recalled during the questioning phase, both Fs < .1.277, both ps > .290. Further, despite differences in the means of correct, incorrect and confabulated surrounding information recalled, no significant effects of condition emerged, all Fs < 1.851, all ps > .170.

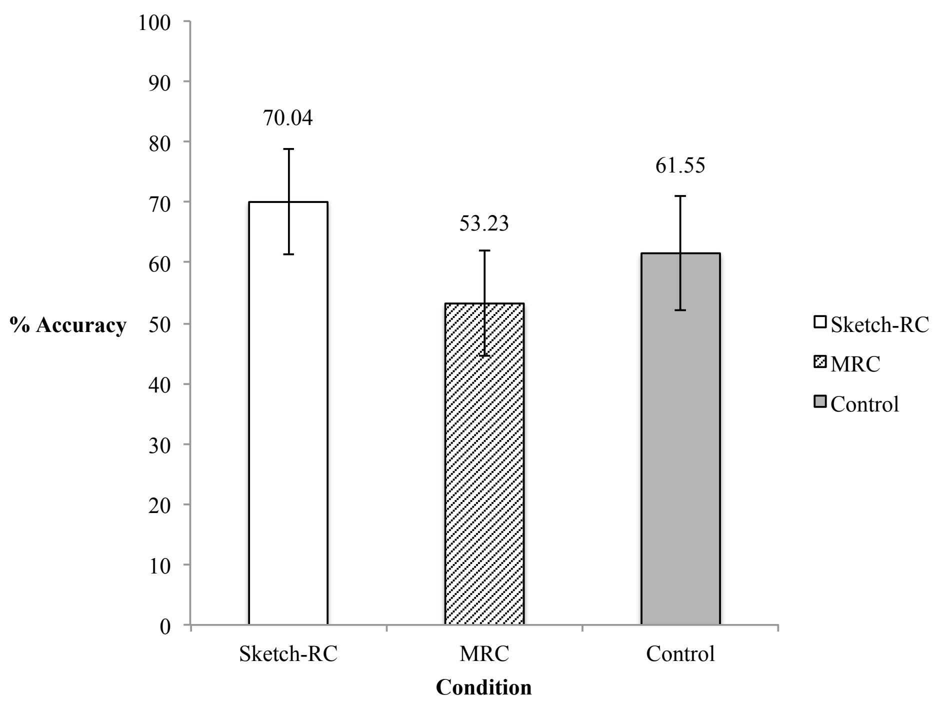

Figure 52. Percentage accuracy of surrounding information produced during the questioning phase.

Table 38. *Means and standard deviations for surrounding information recalled during questioning across retrieval conditions.*

	Condition					
	Sketch		MRC		Control	
Information type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Surroundings						
Correct	5.00	4.00	5.00	4.99	3.13	2.36
Incorrect	.73	1.03	1.53	1.96	1.00	1.36
Confabulations	.33	.62	1.60	1.40	3.53	7.73
Total Recalled	6.07	4.69	7.47	5.55	7.67	7.91

Appendix I: Cross-Study Additional Analysis

Number of Questions

More questions were asked of children in the ASD group, 95% CI [9.893, 11.870], than in the TD group, 95% CI [10.263, 12.240]. However, univariate analysis revealed that this difference was not significant, $F = .276$, $p = .601$. Similarly, fewer questions were asked of children in the Control condition, 95% CI [9.606, 12.023], than in the Sketch-RC, 95% CI [10.010, 12.427], and MRC, 95% CI [9.956, 12.378], conditions, yet these differences did not reach significance, $F = .131$, $p = .877$. Additionally, no significant group X retrieval condition interaction was found, $F = .006$, $p = .994$. Figure 53 displays the mean number of questions asked as a function of group and retrieval condition.

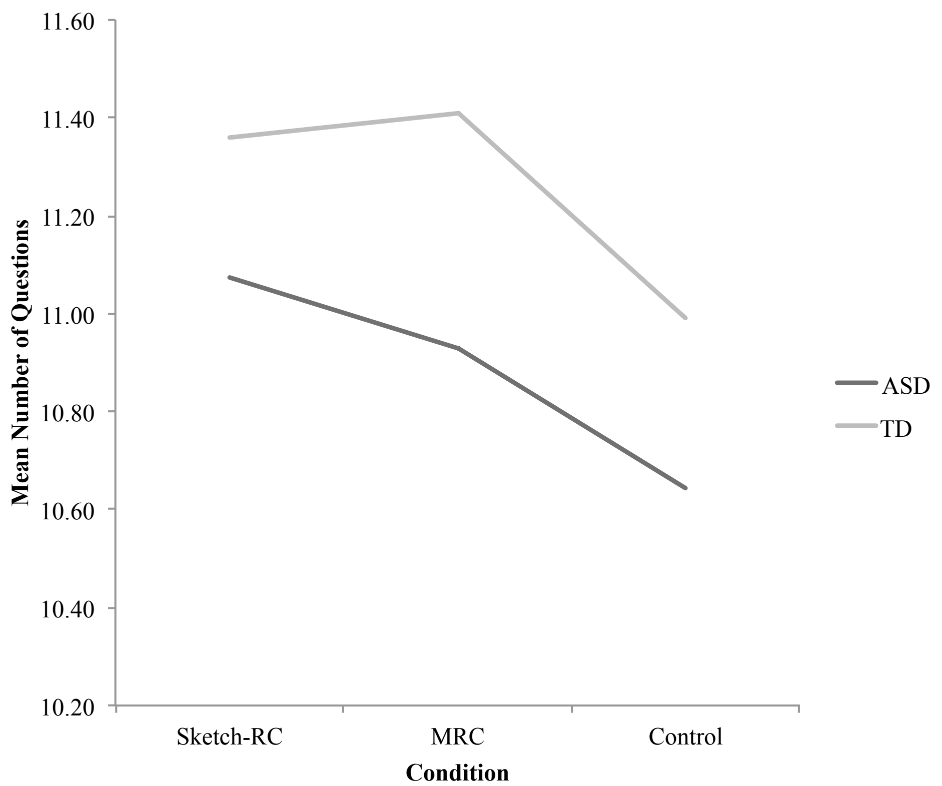

Figure 53. Mean number of questions as a function of group and retrieval condition.

Interview Duration

Univariate analysis revealed a significant effect of condition on the overall duration of interviews, F (2, 84) = 13.635, $p < .001$, $\eta_p^2 = .245$. Post hoc analysis found that the duration of interviews for children interviewed in the Control condition (*M* = 5.58 minutes, *SD* = 2.15 minutes) was significantly shorter than the duration of both the Sketch-RC (*M* = 9.05 minutes, *SD* = 3.15 minutes) and MRC conditions (*M* = 8.57 minutes, *SD* = 2.16 minutes), both *p*s < .001. No significant difference in duration was found between the latter two conditions, $p = 1.000$. No significant effect of group was found on the durations of interviews, $F = .997$, $p = .321$, although the duration of interviews of ASD children (*M* = 7.43 minutes, *SD* = 3.04 minutes) was shorter than that of the TD group (*M* = 8.16 minutes, *SD* = 2.53). No significant group X condition was revealed, $F = 1.264$, $p = .288$.

Person Information Recalled

A significant main effect of group (ASD; TD) emerged for the total amount of person information recalled (see figure 54), F (1, 83) = 34.986, $p < .001$, $\eta^2 = .297$. Regardless of condition, children with autism, *M* = 8.47, *SD* = 7.60, 95% CI [6.321, 10.849] recalled significantly less person information overall than typically developed children, *M* = 18.24, *SD* = 7.61, 95% CI [15.863, 20.390]. No significant effect of condition was revealed, $F = .273$, $p = .762$. Similarly, no significant group X retrieval was found, $F = .797$, $p = .454$.

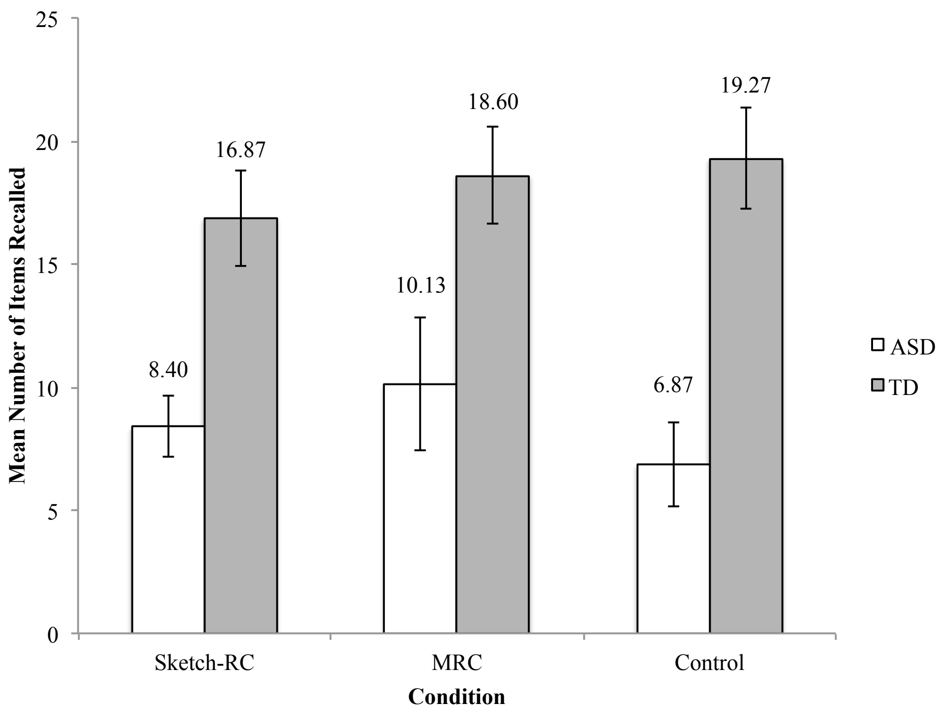

Figure 54. Total amount of person information recalled (means and standard deviation) as a function of group and retrieval condition.

A significant main effect of group (ASD; TD) also emerged for the amount of correct, incorrect and confabulated person information recalled, F (1, 83) = 24.122, $p < .001$, $\eta^2 = .225$; F (1, 83) = 12.263, $p = .001$, $\eta^2 = .129$; F (1, 83) = 17.979, $p < .001$, $\eta^2 = .178$, respectively (see table 43 for raw means and standard deviations). Post hoc analysis revealed that children with autism, 95% CI [4.630, 7.695] recalled significantly less correct person information than typically developing children, 95% CI [9.994, 13.059], regardless of condition. Children with autism, 95% CI [.850, 2.308] recalled significantly less incorrect information than typically developing children, 95% CI [2.669, 4.128]. Regardless of condition, children with autism, 95% CI [.062, 1.624] also made significantly fewer person confabulations than typically developed children, 95% CI [2.421, 3.982]. No significant effect of group emerged for percentage accuracy, $F = 1.695$, $p = .197$.

Table 43. *Raw means and standard deviations for correct, incorrect and confabulated person information recalled as a function of group and condition.*

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	9.33	4.83	2.10	2.02	1.20	2.87
MRC (total)	8.77	6.63	2.73	2.86	2.87	3.17
Control (total)	8.43	6.29	2.63	2.87	2.00	2.44
ASD (total)	6.04	5.81	1.56	2.00	.87	1.82
Sketch	6.67	3.67	1.47	1.25	.27	.59
MRC	6.67	7.89	2.00	2.51	1.47	2.72
Control	4.80	5.13	1.20	2.11	.87	1.36
TD (total)	11.64	4.56	3.42	2.81	3.18	3.29
Sketch	12.00	2.26	2.73	2.46	2.13	3.85
MRC	10.87	4.37	3.47	3.09	4.27	3.04
Control	12.07	5.22	4.07	2.87	3.13	2.77

A significant main effect of retrieval condition emerged for the amount of confabulated person items recalled, F (2, 83) = 3.168, p = .047, η^2 = .071. Regardless of group, children in the Sketch-RC condition, 95% CI [.230, 2.140] confabulated significantly fewer items than children in the MRC condition, 95% CI [1.939, 3.852], p = .041. No significant differences emerged between participants in the Sketch-RC and Control conditions, 95% CI [1.032, 2.941], p = .723, nor between participants in the MRC and Control conditions, p = .554. No significant effect of retrieval condition emerged for the amount of correct or incorrect information recalled, F = .273, p = .762; F = .526, p = .593, nor for the total amount of person information recalled, F =

.313, p = .732. Similarly, no significant group X retrieval condition interactions were revealed in relation to person information recalled, all Fs < 1.090 and ps >.341

A significant effect of condition was found for the percentage accuracy of person information recalled (see figure 55), F (2, 83) = 8.857, p < .001, η^2 = .176. Children in the Sketch-RC condition, M = 75.41, SD = 20.32, 95% CI [67.584, 84.399] were significantly more accurate than their peers in both the MRC, M = 53.52, SD = 26.88, 95% CI [43.994, 60.835], p = .001, and Control conditions, M = 56.02, SD = 27.70, 95% CI [48.140, 64.954], p = .005. No significant difference in percentage accuracy emerged for the latter two conditions, p = 1.00. Further, no effect of group was found, F = 1.695, p = .197, nor was a significant group X retrieval condition interaction revealed, F = 1.090, p = .341.

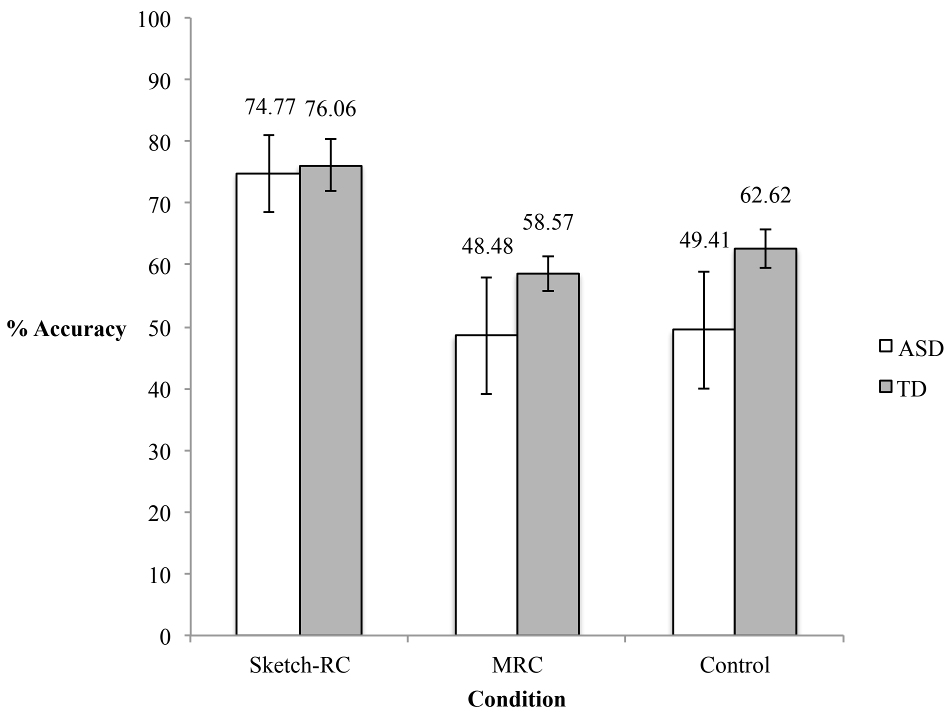

Figure 55. Percentage accuracy of person information recalled as a function of group and retrieval condition.

Action Information Recalled

A significant main effect of group was found for the total amount of action information recalled (see figure 56), F (1, 83) = 22.347, p < .001, η^2 = .212. Regardless of condition, participants with autism, M = 9.62, SD = 9.73, 95% CI [7.773, 11.900] recalled significantly less action information than typically developed children, M = 17.00, SD = 7.67, 95% CI [14.723, 18.849]. No significant effect of condition was found for the amount action information recalled, F = .862, p = .426, nor was a significant group X retrieval condition interaction revealed, F = .190, p = .827.

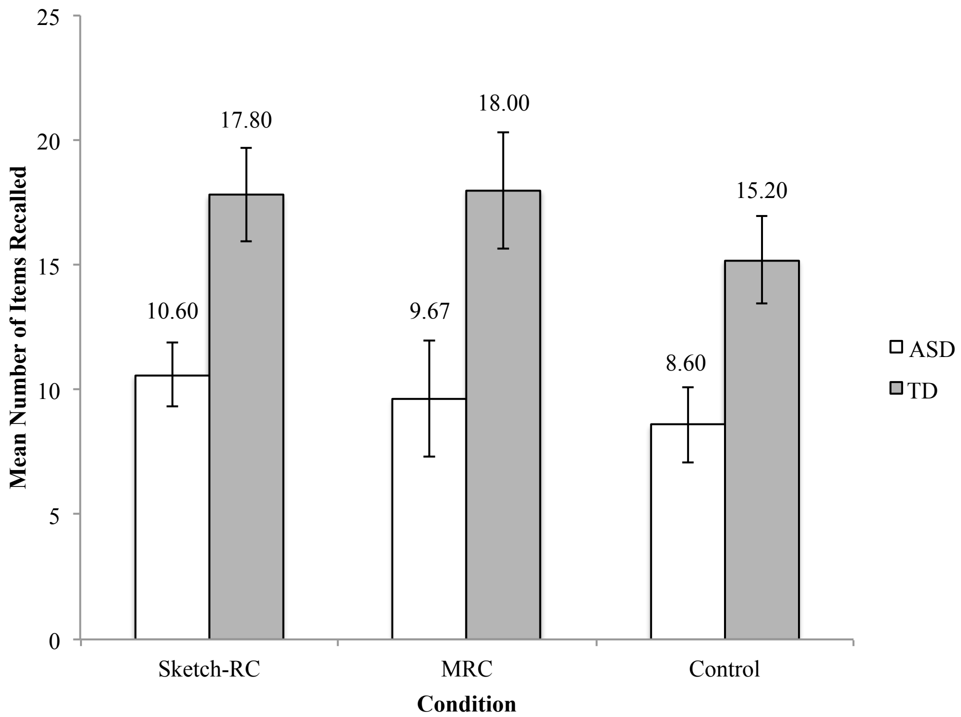

Figure 56. Total amount of action information recalled (raw means and standard deviation) as a function of group and retrieval condition.

Significant main effects of group and condition emerged for the amount of correct action information recalled, F (1, 83) = 24.135, p < .001, η^2 = .225; F (2, 83)

= 3.487, p = .035, η^2 = .078, respectively (see table 44 for raw means and standard deviations). Post hoc analysis found that, regardless of condition, children with autism, 95% CI [5.755, 9.100] recalled significantly fewer correct action items than their matched, typically developed peers, 95% CI [11.611, 14.956]. Yet regardless of group, children in the Sketch-RC condition, 95% CI [10.346, 14.437] recalled significantly more correct action information than children in the Control condition, 95% CI [6.534, 10.624], p = .031. No significant differences emerged between children in the Sketch-RC and MRC, 95% CI [8.047, 12.145], p = .357, nor between those in the MRC and Control condition, p = .903.

No significant effects of group or condition were found for the amount of incorrect or confabulated information recalled, all Fs < 2.479, all ps >.142. No significant group X retrieval interactions were found for all other action information variables, all Fs < 1.947, all ps > .149.

Table 44. *Means and standard deviations for correct, incorrect and confabulated action information recalled as a function of group and condition.*

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	12.23	6.39	.67	.88	1.30	1.92
MRC (total)	10.40	8.69	1.20	1.47	2.23	2.11
Control (total)	8.43	5.32	1.37	1.77	2.10	3.07
ASD (total)	7.18	5.61	.82	1.39	1.62	2.62
Sketch	9.27	4.10	.53	.83	.80	1.15
MRC	6.93	7.44	1.13	1.77	1.60	1.92
Control	5.33	4.27	.80	1.42	2.47	3.89
TD (total)	13.53	6.94	1.33	1.46	2.13	2.21
Sketch	15.20	7.00	.80	.94	1.80	2.39
MRC	13.87	8.68	1.27	1.16	2.87	2.17
Control	11.53	4.44	1.93	1.94	1.73	2.02

A significant main effect of group was found for the percentage accuracy of action information recalled (see figure 57), F (1, 83) = 5.911, p = .017, η^2 = .066. Children with autism, M = 67.16, SD = 32.51, 95% CI [61.470, 74.439] were significantly less accurate than their typically developing peers, M = 79.99, SD = 16.37, 95% CI [72.704, 85.673] when recalling action specific information. A significant main effect of retrieval condition was also found, F (2, 83) = 10.213, p < .001, η^2 = .197. Regardless of group, children in the Sketch-RC condition, M = 87.40, SD = 12.78, 95% CI [79.978, 95.837] were significantly more accurate than children in both the MRC, M = 64.46, SD = 27.79, 95% CI [55.543, 71.427], p < .001, and Control conditions, M = 68.86, SD = 29.84, 95% CI [61.393, 77.251], p = .004. No significant difference in the percentage accuracy of action information was found between the latter two conditions, p = .913.

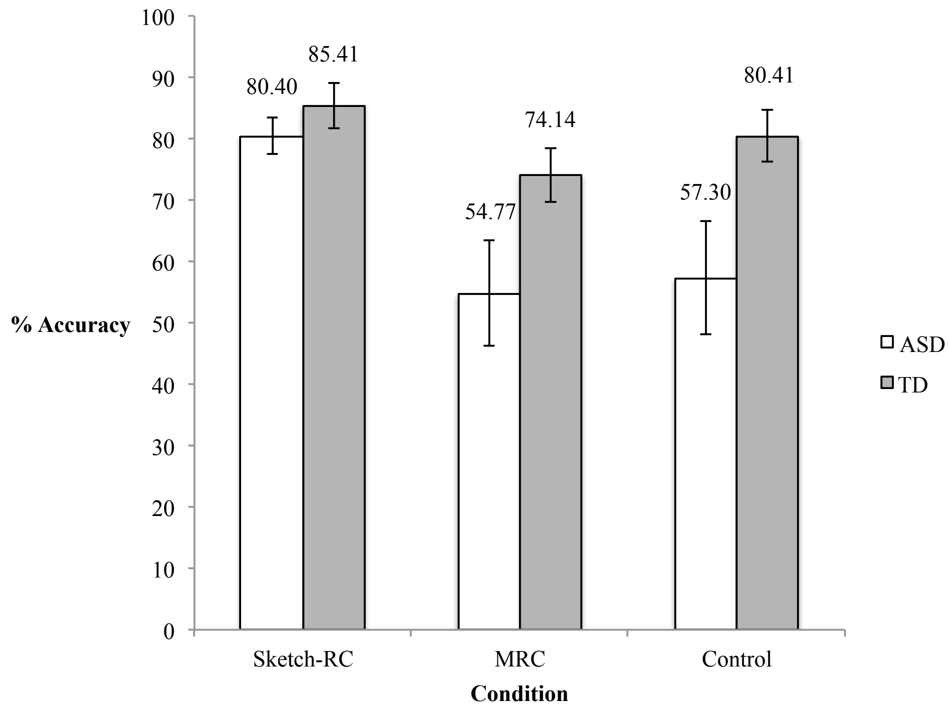

Figure 57. Percentage accuracy of action information recalled as a function of group and retrieval condition.

Further, a significant group X retrieval condition was found for percentage accuracy of action specific information, F (2, 83) = 4.524, p = .014, η^2 = .098 (see figure 57). Children with autism interviewed in the MRC condition, 95% CI [42.864, 65.292] were significantly less accurate than typically developing children, 95% CI [61.665, 84.120] interviewed in the MRC condition, p = .021. Similarly, children with autism interviewed in the Control condition, 95% CI [46.518, 68.938] were significantly less accurate when recalling action specific information than their typically developing peers interviewed in the Control condition, 95% CI [69.705, 92.127], p = .005. No significant difference in action information accuracy was found between children with autism, 95% CI [80.761, 103.355] and typically developing children, 95% CI [72.515, 95.000] interviewed in the Sketch-RC condition, p = .306.

Surrounding Information Recalled

A significant main effect of group (ASD; TD) emerged for the total amount of surrounding information recalled (see figure 58), F (1, 83) = 5.449, p = .022, η^2 = .062. Regardless of condition, children with autism, M = 13.62, SD = 9.79, 95% CI [10.935, 16.914] recalled significantly less surrounding information overall than typically developed children, M = 19.20, SD = 11.01, 95% CI [15.908, 21.887]. No significant effect of condition was found for the total amount of surrounding information recalled, F = .608, p = .547, nor was a significant group X retrieval condition interaction effect revealed, F = .288, p = .751.

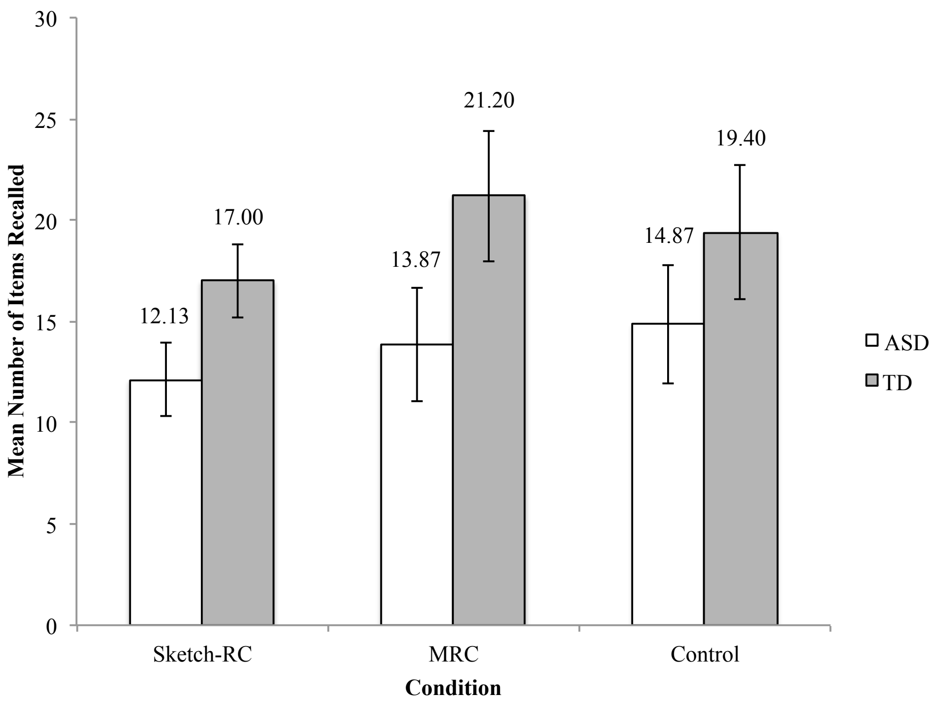

Figure 58. Total amount of surrounding information recalled (means and standard deviation) as a function of group and retrieval condition.

A significant main effect of group was found for the amount of correct surrounding information recalled, F (1, 83) = 14.226, p < .001, η^2 = .146 (see table 45 for raw means and standard deviations). Post hoc analysis found that children with autism, 95% CI [7.745, 11.888] recalled significantly less correct surrounding specific information than typically developing children, 95% CI [13.312, 17.455]. No significant main effect of group emerged for the amount of incorrect or confabulated surrounding information recalled, F = .967, p = .328; F = 1.604, p = .209, respectively. Similarly, no significant main effect of condition was found for the amount of correct, incorrect or confabulated information recalled, all Fs < 3.094, all ps > .051. Further, no significant group X retrieval condition interaction effects emerged, all Fs < 1.635, all ps > .201.

Table 45. *Means and standard deviations for correct, incorrect and confabulated surrounding information recalled as a function of group and condition*.

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	13.03	7.03	.97	1.16	.57	1.01
MRC (total)	13.23	9.45	2.30	3.21	2.00	2.17
Control (total)	11.53	8.03	2.27	3.11	3.33	7.12
ASD (total)	9.51	6.44	1.56	1.89	2.56	5.94
Sketch	10.73	6.03	.93	1.10	.47	.92
MRC	9.67	8.67	2.07	2.69	2.13	1.73
Control	8.13	3.91	1.67	1.45	5.07	9.77
TD (total)	15.69	8.61	2.13	3.33	1.38	1.93
Sketch	15.33	7.39	1.00	1.25	.67	1.11
MRC	16.80	9.10	2.53	3.74	1.87	2.59
Control	14.93	9.66	2.87	4.14	1.60	1.72

A significant main effect of group was found the percentage accuracy of surrounding information recalled, F (1, 83) = 7.405, p = .008, η^2 = .082. Percentage accuracy was significantly lower for autism children, M = 72.05, SD = 26.22, 95% CI [67.035, 78.018] than it was for typically developing children, M = 83.65, SD = 12.97, 95% CI [77.684, 88.667]. A significant main effect of condition was also found, F (2, 83) = 8.121, p = .001, η^2 = .164. Post hoc analysis revealed that children in the Sketch-RC condition, M = 88.18, SD = 13.05, 95% CI 81.769, 95.199] were significantly more accurate than children in both the MRC, M = 70.29, SD = 22.34, 95% CI [62.982, 76.433], p = .001, and the Control condition, M = 75.08, SD = 23.58, 95% CI [68.646, 82.076], *p* = .022. No significant difference was found between the latter two conditions, *p* = .722. See figure 59 for group accuracy means.

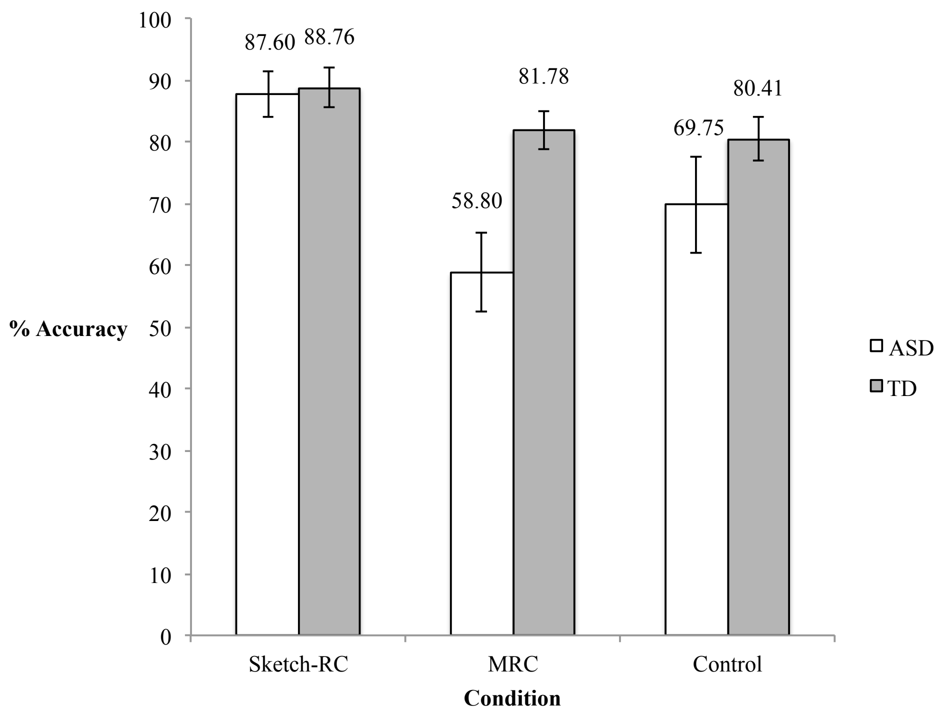

Figure 59. Percentage accuracy of surrounding information recalled as a function of group and retrieval condition.

A significant group X retrieval condition interaction effect emerged for the overall accuracy of surrounding information recalled, F (2, 83) = 3.151, p = .048, η^2 = .071. Children with autism in the MRC condition, 95% CI [48.889, 67.882] were significantly less accurate than typically developing children in the MRC condition, 95% CI [71.522, 90.538], *p* = .001. No significant difference emerged between children with autism, 95% CI [79.622, 98.756] and typically developing children in the Sketch-RC, 95% CI [78.259, 97.299] nor between typically developing, 95% CI [71.222, 90.210] and children with autism, 95% CI [60.513, 79.499] in the Control conditions, *p* = .116.

Free Recall Performance

Duration

The duration of the free recall phase of interviews was analysed (excluding the duration of the Sketch-RC task and MRC task, which took place immediately prior to free recall). Univariate analysis revealed a significant effect of condition on the free recall duration of interviews, F (2, 84) = 3.182, p = .047, η_p^2 = .070. Post hoc analysis found that the free recall duration of Sketch-RC interviews (*M* = 79.10 seconds, *SD* = 24.85 seconds), was significantly shorter than the free recall duration of the Control condition interviews (*M* = 103.63 seconds, *SD* = 41.87 seconds), p = .046. No significant difference in free recall duration was found between MRC interviews (*M* = 87.33 seconds, 50.07 seconds) and both the Sketch-RC and Control interviews, both *p*s > .310. No significant effect of group emerged, nor did a significant group X condition interaction, both *F*s < 3.182, both *p*s > .501. However, mean differences revealed that free recall duration of interviews with ASD children (*M* = 92.76 seconds, *SD* = 42.30 minutes) was longer than free recall duration of TD children (*M* = 87.29 seconds, *SD* = 40.28 seconds).

Free Recall: Person Information

No significant main effects of group or condition were found for the amount of correct, incorrect, confabulated, or the total number of person items recalled, all *F*s < 2.519, all *p*s > .087. All group X condition interactions for person information recalled were not significant, all *F*s < 2.449, all *p*s > .093. Memorial performance (raw means and standard deviations) as a function of age group and condition are displayed in table 46.

Table 46. *Means and standard deviations for correct, incorrect, confabulated, and total amount of person information produced during free recall as a function of group and condition*.

	Total Recalled							
	Correct		Incorrect		Confabulations		Total	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	3.07	1.55	.17	.38	.13	.51	3.37	1.67
MRC (total)	3.47	3.29	.53	.94	.43	.97	4.43	4.43
Control (total)	2.43	1.79	.50	.63	.20	.61	3.13	2.09
ASD (total)	2.64	2.40	.29	.59	.24	.77	3.18	2.82
Sketch	2.80	1.61	.13	.35	.00	.00	2.93	1.67
MRC	3.07	3.22	.47	.83	.40	1.06	3.93	3.90
Control	2.07	2.12	.27	.46	.33	.82	2.67	2.47
TD (total)	3.33	2.29	.51	.79	.27	.69	4.11	3.15
Sketch	3.33	1.50	.20	.41	.27	.70	3.80	1.61
MRC	3.87	3.42	.60	1.06	.47	.92	4.93	4.99
Control	2.80	1.37	.73	.70	.07	.26	3.60	1.59

A significant main effect of condition emerged for the percentage accuracy of person information recalled (see figure 60), F (2, 83) = 5.842, p = .004, η^2 = .19. Participants in the Sketch-RC condition, M = 89.83, SD = 22.58, 95% CI [80.892, 100.340], were significantly more accurate when recalling person information than those in both the MRC, M = 72.82, SD = 33.51, 95% CI [61.559, 81.038], p = .020, and Control conditions, M = 68.44, SD = 34.40, 95% CI [59.440, 78.887], p = .008, with no significant difference between the latter two conditions, p = .981. No significant effect of group was found for the accuracy of person information, F = 3.541, p = .063. Further, no significant group X retrieval group interaction was revealed, F = 2.449, p = .093.

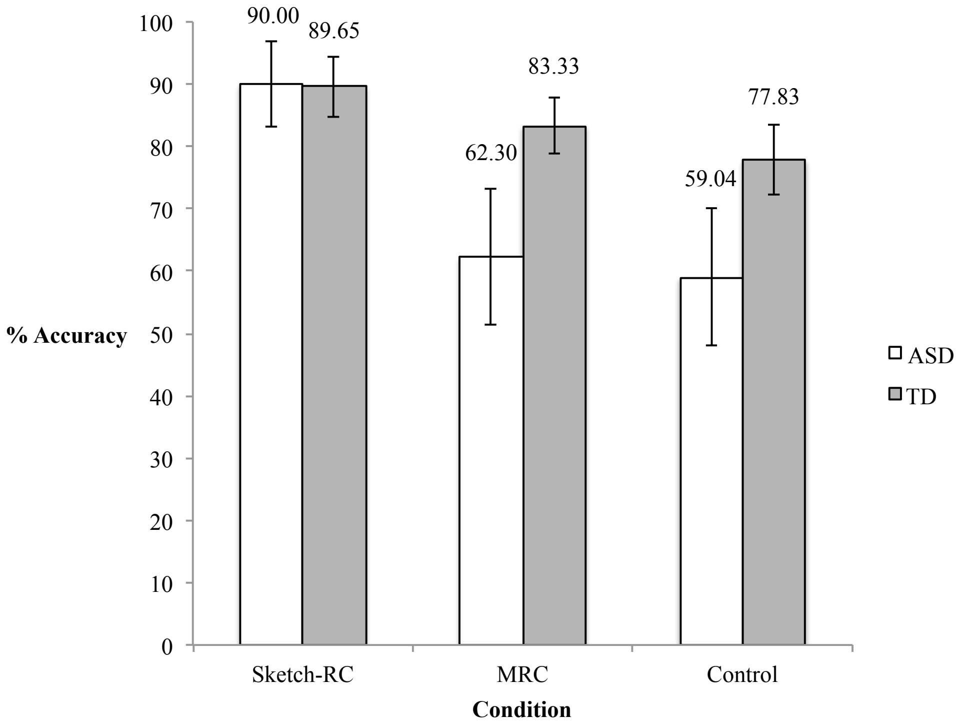

Figure 60. Percentage accuracy of person information produced during free recall as a function of group and retrieval condition.

Free Recall: Action Information

Significant mains effect of group and condition emerged for the total amount of action information recalled (see figure 61), F (1, 83) = 20.789, $p < .001$, $\eta^2 = .200$; F (2, 83) = 3.442, $p = .037$, $\eta^2 = .077$, respectively. During the free recall phase, children with autism, $M = 4.93$, $SD = 4.12$, 95% CI [4.384, 7.140] recalled significantly fewer items of action information than their typically developing peers, $M = 9.71$, $SD = 5.23$, 95% CI [8.860, 11.616]. Further, participants in the Sketch-RC condition, $M = 8.87$, $SD = 5.28$, 95% CI [7.884, 11.254] recalled significantly more action information during the free recall phase than children interviewed in the Control condition, $M = 5.80$, $SD = 3.96$, 95% CI [4.743, 8.112], $p = .031$. No significant differences emerged between children interviewed in the MRC condition, $M = 7.30$, $SD = 6.01$, 95% CI [6.316, 9.691] and both the Sketch-RC and Control conditions, both *p*s > .579. No significant group X retrieval condition interaction emerged, $F = .383$, $p = .683$.

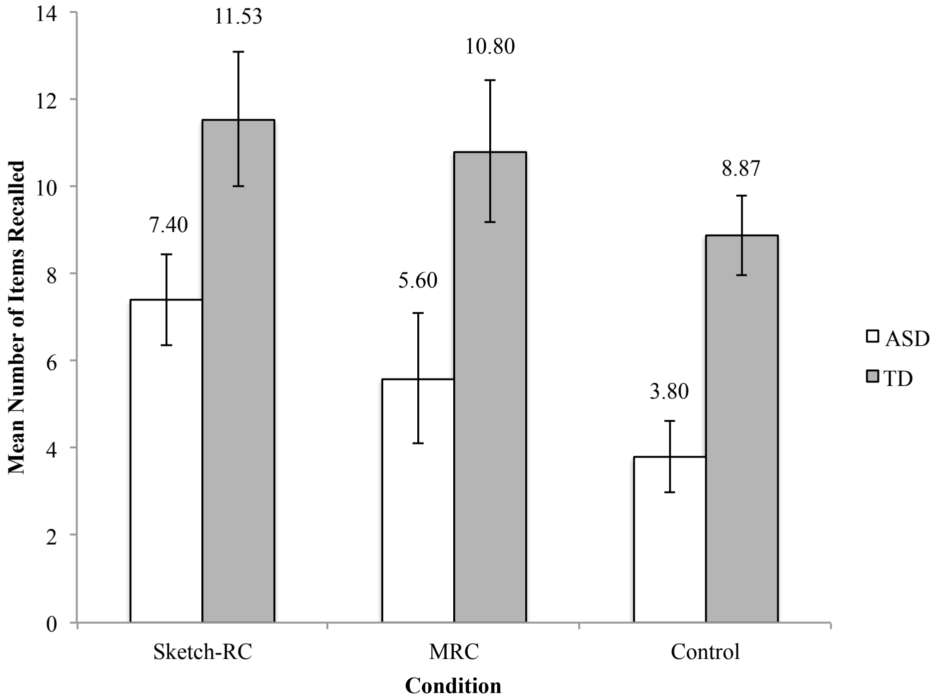

Figure 61. Total amount of action information produced during free recall as a function of group and retrieval condition.

A significant main effect of group was revealed for the amount of correct action information recalled, $F(1, 83) = 24.571$, $p < .001$, $\eta^2 = .21$ (see table 47 for means and standard deviations). Children with autism, 95% CI [3.862, 6.364] recalled significantly fewer correct action information items, than typically developed children, 95% CI [8.281, 10.783], $p < .001$. No significant effect of group was found for the amount of incorrect or confabulated action items reported, both *F*s <.063, both *p*s > .803.

Table 47. *Means and standard deviations for correct, incorrect and confabulated action information produced during free recall as a function of group and condition*.

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	8.87	5.28	.13	.35	.47	.82
MRC (total)	7.3	6.05	.60	1.00	.30	.70
Control (total)	5.80	3.96	.20	.61	.33	.84
ASD (total)	4.93	4.12	.29	.70	.38	.81
Sketch	6.73	3.79	.20	.41	.47	.74
MRC	4.67	4.92	.60	1.06	.33	.82
Control	3.40	2.95	.07	.26	.33	.90
TD (total)	9.71	5.23	.33	.77	.36	.77
Sketch	11.00	5.81	.07	.26	.47	.92
MRC	9.93	6.05	.60	.99	.27	.59
Control	8.20	3.39	.33	.82	.33	.82

A significant main effect of condition was found for the amount of correct, F (2, 83) = 4.076, p = .020, η^2 = .089, and incorrect action information recalled, F (2, 83) = 1.849, p = .032, η^2 = .80. Participants in the Sketch-RC recalled significantly more correct action information, 95% CI [7.451, 10.510], than those in the Control, 95% CI [4.375, 7.434], p = .018. There was no significant difference between the Sketch-RC and MRC, 95% CI [5.549, 8.614], or the Control and MRC conditions, both *p*s >.628. Participants in the Sketch-RC condition recalled significantly fewer items of incorrect action information, 95% CI [-.125, .396], than those in the MRC, 95% CI [.338, .857], p = .045. There was no significant difference between the Sketch-RC and the Control, 95% CI [-.059, .603], or between the Control and MRC conditions, both *p*s >.110. No significant effect of condition was found for the number of confabulated action items recalled, $F = .282$, $p = .755$. Further, no significant group X condition interactions emerged across all action information variables recalled during this phase of interviews, all Fs < .842, all ps > .442.

A significant main effect of group was found for the percentage accuracy of action information (see figure 62), $F(1, 83) = 6.695$, $p = .011$, $\eta^2 = .075$. Children with autism, $M = 77.46$, $SD = 34.31$, 95% CI [71.428, 85.595], were significantly less accurate when recalling action information than typically developing children, $M = 92.62$, $SD = 14.31$, 95% CI [84.487, 98.654], $p = .011$. No significant effect of condition was found for the accuracy of person information recalled, $F = 2.196$, $p = .118$. Further, no significant group X interaction emerged, $F = .824$, $p = .442$.

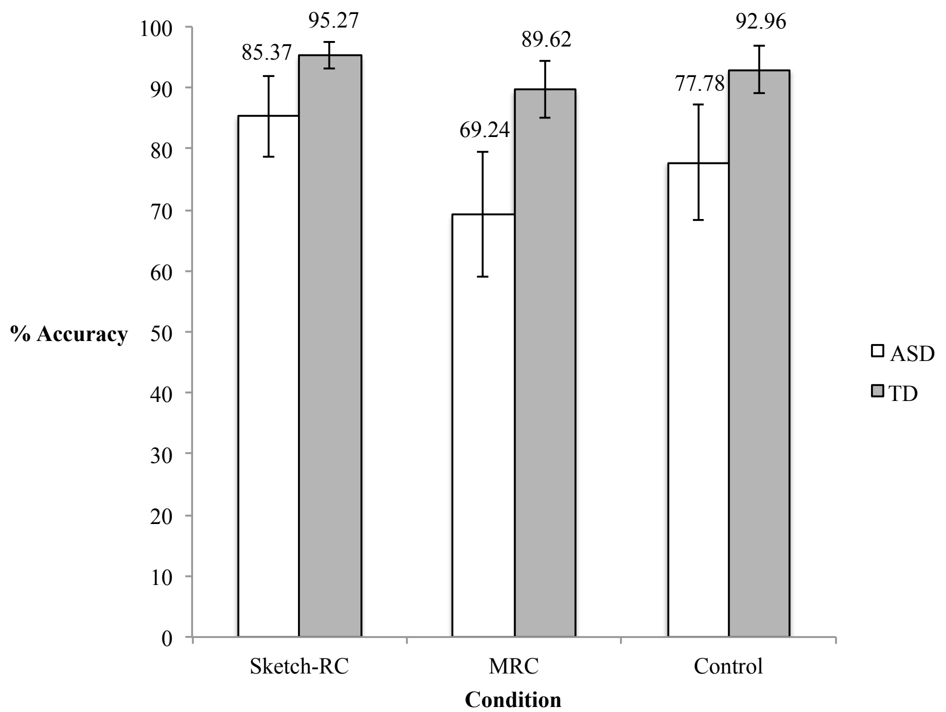

Figure 62. Percentage accuracy of action information produced during free recall as a function of group and retrieval condition.

Free Recall: Surrounding Information

Univariate analysis revealed significant main effects of group and condition on the amount of confabulated surrounding information recalled (see table 48 for raw means and standard deviations), F (1, 83) = 5.355, p = .023, η^2 = .16; F (2, 83) = 3.191, p = .046, η^2 = .71. Children with autism confabulated significantly more surrounding information, 95% CI [.397, 1.006], than typically developing children, 95% CI [-.155, .514], p = .023. Further, participants in the Sketch-RC condition, 95% CI [-.310, .508] recalled significantly fewer surrounding confabulations than those interviewed in the Control condition, 95% CI [.423, 1.241], p = .041. No significant differences were found between children in the MRC, 95% CI [.026, .845], and those in both the Sketch-RC and Control conditions, both ps > .532. All other effects of group on surrounding information recalled were non-significant, all Fs < 2.469, all ps > .215.

A significant group X condition emerged for the amount of confabulated surrounding information recalled, F (2, 83) = 3.209, p = .045. Children with autism in the Control, 95% CI [.951, 2.110], condition confabulated more than typically developing children in Control condition, 95% CI [-.446, .716], p = .001. No significant difference emerged between children with autism, 95% CI [-.456, .709] and typically developed children, 95% CI [-.509, .651] in the Sketch-RC condition, p = .894. Similarly, no significant difference was found between children with autism in the MRC condition, 95% CI [-.043, 1.113] and typically developing children in the MRC condition, 95% CI [-.245, .916], p = .630. All other effects of condition on surrounding information recalled were not significant, all Fs < 1.560, all ps > .216. All other group X condition interactions for surrounding information recalled were non-significant, all Fs < 2.449, all ps > .093.

Table 48. *Means and standard deviations for total, correct, incorrect and confabulated surrounding information produced during free recall as a function of group and condition.*

	Information Recalled							
	Correct		Incorrect		Confabulations		Total	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	5.83	3.74	.13	.35	.10	.31	6.07	3.82
MRC (total)	6.30	5.05	.47	1.11	.43	.68	7.20	5.65
Control (total)	5.53	3.19	.47	.86	.83	1.90	6.87	3.95
ASD (total)	5.13	3.51	.47	.84	.73	1.59	6.36	4.15
Sketch	5.73	3.56	.20	.41	.13	.35	6.07	3.81
MRC	4.67	4.25	.53	.92	.53	.64	5.73	4.57
Control	5.00	2.73	.67	1.05	1.53	2.50	7.27	4.15
TD (total)	6.64	4.41	.24	.83	.18	.49	7.07	4.89
Sketch	5.93	4.04	.07	.26	.07	.26	6.07	3.97
MRC	7.93	5.39	.40	1.30	.33	.72	8.67	6.38
Control	6.07	3.62	.27	.59	.13	.35	6.47	3.83

Univariate analysis revealed significant main effects of group and condition on the accuracy of surrounding information recalled (see figure 63), F (1, 83) =11.884, p = .001, η^2 = .15; F (2, 83) = 5.505, p = .006, η^2 = .24, respectively. Children with autism, *M* = 79.98, *SD* = 26.03, 95% CI [74.991, 85.979], were significantly less accurate when recalling surrounding information than their typically developing peers, *M* = 94.49, *SD* = 12.34, 95% CI [88.487, 99.475], p = .001. Participants in the Sketch-RC condition, *M* = 95.86, *SD* = 9.16, 95% CI [89.461, 102.897] were significantly more accurate when recalling surrounding information than those in both the MRC, *M* = 81.67, *SD* = 23.95, 95% CI [74.328, 87.785], p = .007, and Control conditions, *M* = 84.17, *SD* = 25.41, 95% CI [77.747, 91.182], p = .049, with no significant difference between the latter two conditions, p = 1.000.

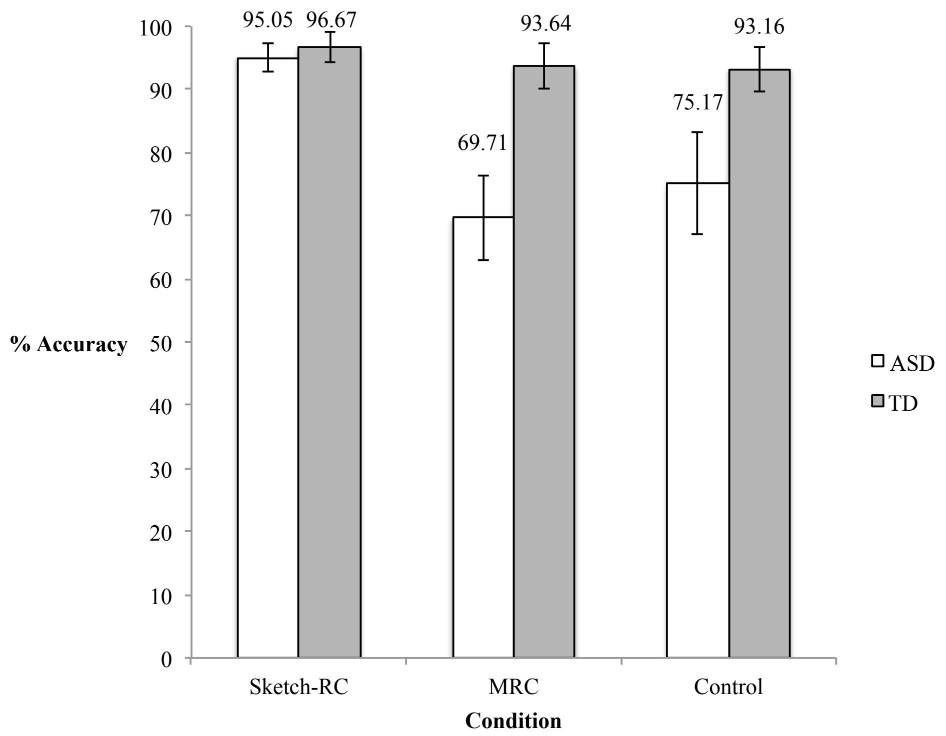

Figure 63. Percentage accuracy of surrounding information produced during free recall as a function of group and retrieval condition.

A significant group X retrieval condition interaction was also revealed for the accuracy of surrounding information recalled, F (2, 83) = 3.644, p = .030, η^2 = .081. Children with autism in the MRC, M = 69.71, SD = 26.12, 95% CI [59.772, 78.772], and Control conditions, M = 75.17, SD = 31.32, 95% CI [65.945, 84.940], were significantly less accurate than typically developing children in the MRC, M = 93.64, SD = 14.15, 95% CI [83.328, 102.984], p = .001, and Control conditions, M = 93.16, SD = 13.54, 95% CI [83.988, 102.988], p = .009, when recalling surrounding information. No significant differences emerged between children with autism and typically developing children in the Sketch-RC condition, M = 95.05, SD = 9.23, 95% CI [87.170, 106.312], M = 96.67, SD = 9.34, 95% CI [86.092, 105.141], respectively, p = .869.

Questioning Phase Performance

Duration

The duration of the questioning phase of interviews was examined. Univariate analysis revealed no significant main effects of group or condition, both *F*s <.1.142, both *p*s > .288. Similarly, no significant group x condition interaction was found, $F = .660$, $p = .519$. However, mean differences were apparent, where the questioning phase of interviews with ASD children ($M = 3.57$ minutes, $SD = 1.57$) were found to be shorter than the questioning phase of interviews with TD children ($M = 4.21$ minutes, $SD = 1.30$ minutes). Additionally, mean differences in questioning duration were also apparent with regards to the condition that children were interviewed in. For instance, the questioning phase for Sketch-RC interviews ($M = 3.59$ minutes, $SD = 1.22$) was shorter than both the MRC interviews ($M = 4.15$ minutes, $SD = 2.00$ minutes) and the Control interviews ($M = 4.13$ minutes, $SD = 1.50$).

Questioning Phase: Person information

A significant main effect of group (ASD; TD) emerged for the amount of person information recalled (see figure 64), $F(1, 83) = 42.301$, $p < .001$, $\eta^2 = .338$. Post hoc analysis revealed that children with autism, $M = 5.29$, $SD = 5.35$, 95% CI [3.465, 7.184], recalled significantly less person information overall than their typically developing peers in all conditions, $M = 13.98$, $SD = 6.90$, 95% CI [12.083, 15.802]. No significant effect of retrieval condition was found, $F = .078$, $p = .925$, nor did a significant group X retrieval condition emerge, $F = 1.116$, $p = .332$.

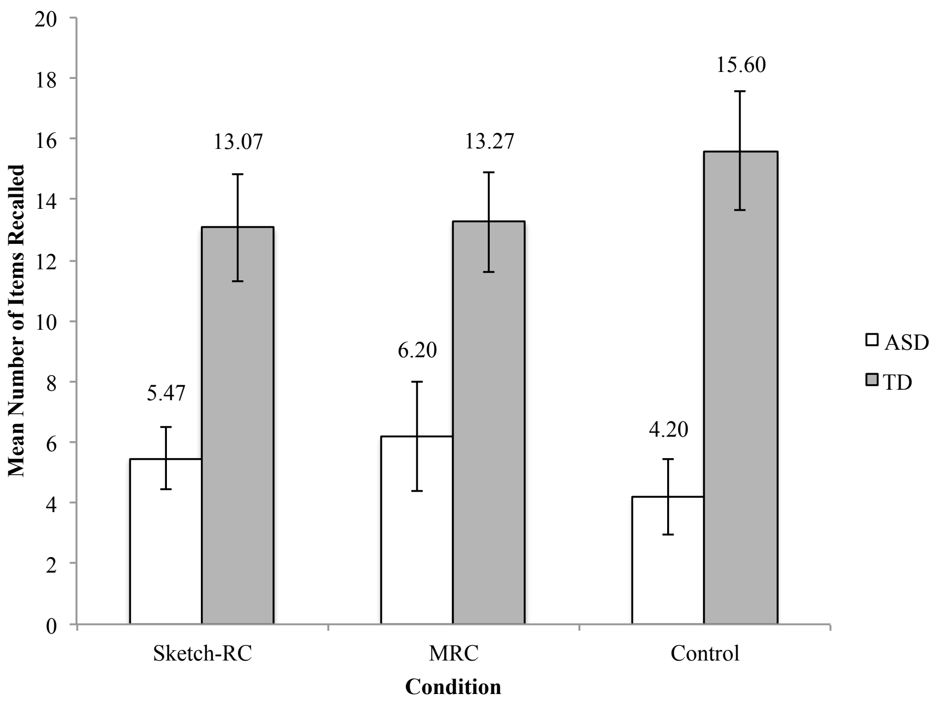

Figure 64. Total amount of person information recalled during questioning as a function of group and retrieval condition.

Significant main effects of group also emerged for the amount of correct, F (1, 83) = 30.843, $p < .001$, $\eta^2 = .271$, incorrect, F (1, 83) = 12.034, $p = .001$, $\eta^2 = .127$ and confabulated person information recalled, F (1, 83) = 20.442, $p < .001$, $\eta^2 = .198$ (see table 49 for means and standard deviations). Post hoc analysis revealed that children with autism, 95% CI [2.228, 4.664], 95% CI [.630, 1.935] recalled significantly fewer correct and incorrect person items during the questioning phase than typically developed children, 95% CI [7.047, 9.483], 95% CI [2.243, 3.548], respectively. Further, children with autism, 95% CI [-.117, 1.326] made significantly fewer person confabulations than their matched typically developed peers, 95% CI [2.207, 3.650].

Table 49. *Means and standard deviations for correct, incorrect and confabulated person information recalled during questioning as a function of group and condition*.

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	6.27	4.14	1.93	2.03	1.07	2.80
MRC (total)	5.30	4.82	2.20	2.38	2.43	2.76
Control (total)	6.00	5.34	2.13	2.53	1.80	2.40
ASD (total)	3.40	3.96	1.27	1.72	.62	1.28
Sketch	3.87	3.02	1.33	1.23	.27	.59
MRC	3.60	5.08	1.53	1.95	1.07	1.94
Control	2.73	3.69	.93	1.94	.53	.83
TD (total)	8.31	4.20	2.91	2.52	2.91	3.21
Sketch	8.67	3.74	2.53	2.50	1.87	2.82
MRC	7.00	4.02	2.87	2.64	3.80	2.83
Control	9.27	4.74	3.33	2.53	3.07	2.79

No significant effect of condition was found for the amount of correct, incorrect or confabulated person information recalled, all *F*s < 2.482, all *p*s > .090. Further, no significant group X condition interactions were revealed, all *F*s < 1.145, all *p*s > .323.

A significant main effect of retrieval condition was found for the percentage accuracy of person information (see figure 65), F (2, 83) = 5.878, p = .004, η^2 = .124. Children in the Sketch-RC condition, *M* = 66.66, *SD* = 26.10, 95% [56.605, 77.666] were significantly more accurate than children in the MRC condition, *M* = 43.46, *SD* = 29.93, 95% CI [32.000, 53.095], *p* = .005 and children in the Control condition, *M* = 47.93, *SD* = 33.40, 95% CI [37.839, 58.899], p = .042. No significant difference in percentage accuracy of person information recalled was found between children in the

MRC and Control conditions, $p = 1.000$. No significant effect of group was found for the accuracy of person information recalled during the questioning phase, $F = 1.008$, $p = .318$, nor was a significant group X retrieval condition interaction revealed, $F = 1.046$, $p = .356$.

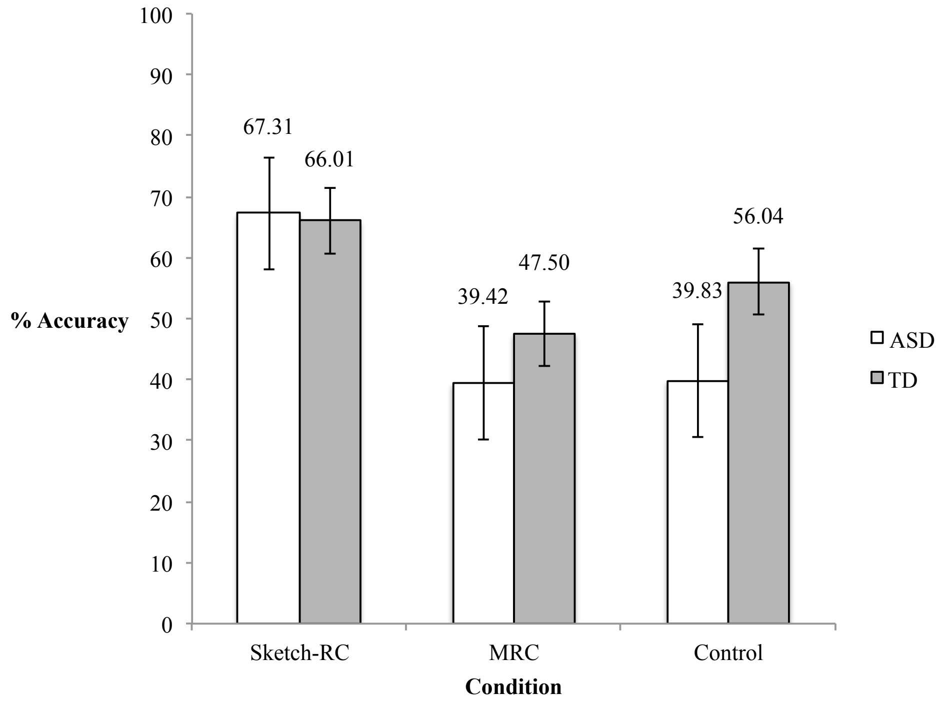

Figure 65. Percentage accuracy of person information recalled during questioning as a function of group and retrieval condition.

Questioning Phase: Action Information

A significant main effect of group (ASD; TD) emerged for the total amount of action information recalled (see figure 66), $F(1, 83) = 8.725$, $p = .004$, $\eta^2 = .095$. Post hoc analysis revealed that children with autism, $M = 4.02$, $SD = 3.67$, 95% CI [2.900, 5.250] recalled significantly less action specific information than typically developing children, $M = 6.60$, $SD = 4.16$, 95% CI [5.373, 7.723]. No significant effect of condition emerged, $F = .426$, $p = .654$, nor was a significant group X retrieval condition found, $F = .325$, $p = .723$.

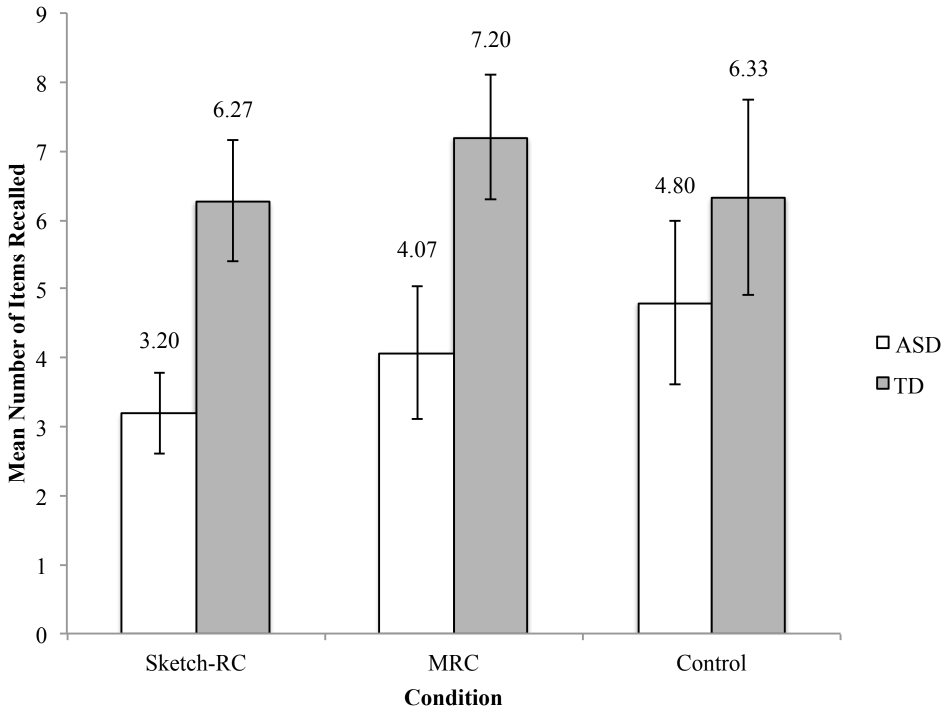

Figure 66. Total amount of action information recalled during questioning as a function of group and retrieval condition.

A significant main effect of group also emerged for the amount of correct action information recalled, F (1, 83) = 6.200, p < .015, η^2 = .070 (see table 50 for means and standard deviations). Posthoc analysis found that children with autism, 95% CI [1.505, 3.125] recalled significantly fewer correct action specific information than typically developing children, 95% CI [2.942, 4.562]. No significant effects of group were found for the amount of incorrect or confabulated action information produced, both Fs < 3.175, both ps > .078. Also, no significant effects of condition were found for the amount of correct, incorrect or confabulated action items recalled during the questioning phase, all Fs < 3.012, all ps > .055. Further, no significant group X condition interactions were revealed, all Fs < 2.239, all ps > .113.

Table 50. *Means and standard deviations for correct, incorrect and confabulated action information recalled during questioning as a function of group and condition*.

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	3.37	2.37	.53	.82	.83	1.44
MRC (total)	3.10	3.37	.60	.81	1.93	2.02
Control (total)	2.63	2.83	1.17	1.64	1.77	2.89
ASD (total)	2.24	2.25	.53	1.04	1.24	2.39
Sketch	2.53	1.81	.33	.62	.33	.62
MRC	2.27	2.87	.53	.92	1.27	1.49
Control	1.93	2.05	.73	1.44	2.13	3.68
TD (total)	3.82	3.21	1.00	1.28	1.78	2.04
Sketch	4.20	2.62	.73	.96	1.33	1.84
MRC	3.93	3.71	.67	.72	2.60	2.29
Control	3.33	3.37	1.60	1.77	1.40	1.84

A significant main effect of retrieval condition emerged for the percentage accuracy of action information recalled (see figure 67), F (2, 83) = 6.697, p = .002, η^2 = .095. Regardless of group, children in the Sketch-RC condition, *M* = 68.56, *SD* = 35.22, 95% CI [56.113, 82.069] were significantly more accurate when recalling action specific information than children in both the MRC, *M* = 46.46, *SD* = 37.85, 95% CI [32.446, 58.442], p = .037, and Control conditions, *M* = 35.91, *SD* =36.14, 95% CI [23.425, 49.378], p = .002. No significant difference in action information accuracy was found between children in the MRC and Control conditions, p = .992. Further, no significant effect of group was found for the percentage accuracy of action information recalled during the questioning phase of interviews, F = .000, p = .986, nor did a significant group X retrieval condition emerge, F = 1.187, p = .310.

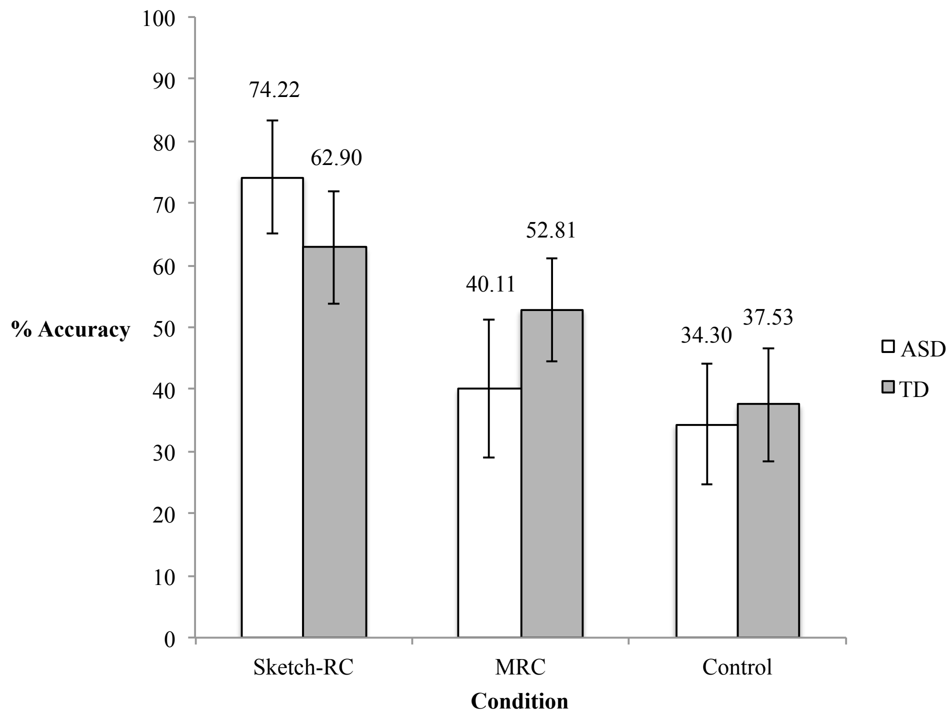

Figure 67. Percentage accuracy of action information recalled during questioning as a function of group and retrieval condition.

Questioning Phase: Surrounding Information

A significant main effect of group emerged for the total amount of surrounding information recalled during the questioning phase of interviews (see figure 68), *F* (1, 83) = 10.620, *p* = .002, η^2 = .113. Posthoc analysis revealed that children with autism, *M* = 7.07, *SD* = 6.10, 95% CI [5.277, 9.175] recalled significantly less surrounding information than typically developing children, *M* = 11.91, *SD* = 7.14, 95% CI [9.803, 13.701]. No significant effect of condition was revealed, *F* = .423, *p* = .656, nor was a significant group X retrieval condition found, *F* = .040, *p* = .961.

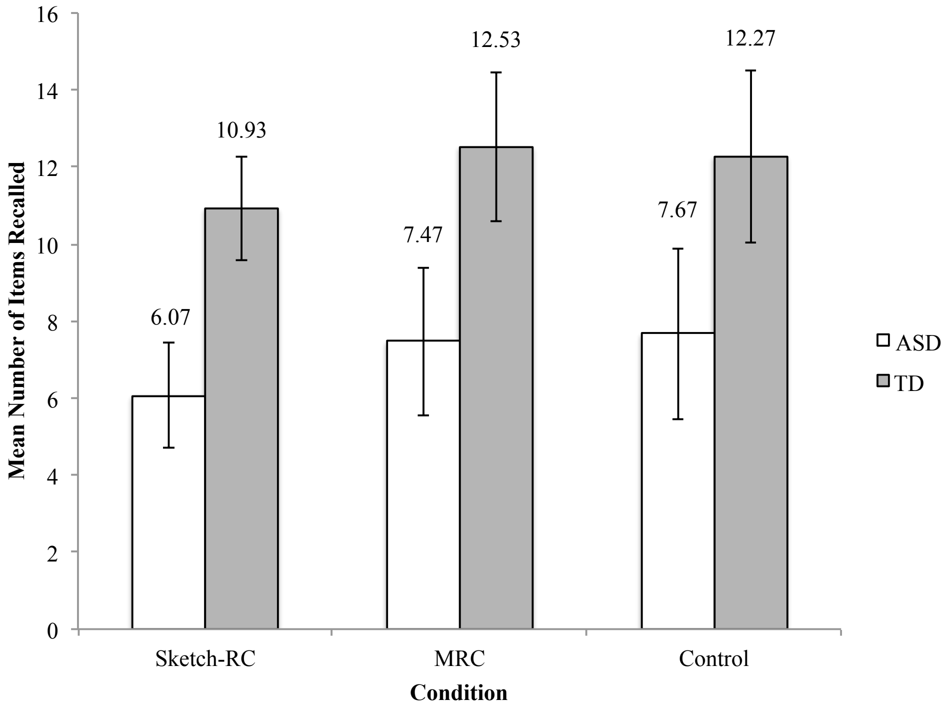

Figure 68. Total amount of surrounding information recalled during questioning as a function of group and retrieval condition.

Univariate analysis revealed a significant effect of group on the amount of correct surrounding information recalled, F (1, 83) = 19.878, $p < .000$, $\eta^2 = .193$ (see table 51 for means and standard deviations). Children with autism, 95% CI [3.199, 5.913], recalled significantly fewer correct items than typically developing children, 95% CI [7.510, 10.223]. No significant effect of group was found for the amount of incorrect or confabulated surrounding information reported, all Fs < 2.970, all ps > .099. With regards to condition, no significant effects were found for all surrounding information recalled, all Fs < 2.545, all ps > .085. Similarly, no significant group X condition interactions emerged, all Fs < 1.000, all ps > .372.

Table 51. *Means and standard deviations for correct, incorrect and confabulated surrounding information recalled during questioning as a function of group and condition.*

	Information Recalled					
	Correct		Incorrect		Confabulations	
Condition/Group	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sketch (total)	7.20	5.38	.83	1.15	.47	.90
MRC (total)	6.93	5.25	1.83	2.31	1.57	2.01
Control (total)	6.00	5.66	1.80	2.87	2.50	5.59
ASD (total)	4.38	3.94	1.09	1.51	1.82	4.64
Sketch	5.00	4.00	.73	1.03	.33	.62
MRC	5.00	4.99	1.53	1.96	1.60	1.40
Control	3.13	2.36	1.00	1.36	3.53	7.73
TD (total)	9.04	5.67	1.89	2.77	1.20	1.88
Sketch	9.40	5.79	.93	1.28	.60	1.12
MRC	8.87	4.91	2.13	2.64	1.53	2.53
Control	8.87	6.57	2.60	3.72	1.47	1.69

A significant main effect of group was found for the percentage accuracy of surrounding information (see figure 69), F (1, 83) = 4.346, p = .040, η^2 = .050. Post hoc analysis revealed that children with autism, M = 61.61, SD = 34.51, 95% CI [53.881, 70.736] were significantly less accurate when recalling surrounding specific information than their typically developed peers, M = 75.53, SD = 23.18, 95% CI [66.400, 83.256]. No significant effect of condition was revealed for the accuracy of surrounding information, F = 2.394, p = .098, nor was a significant group X retrieval condition found, F = .431, p = .651.

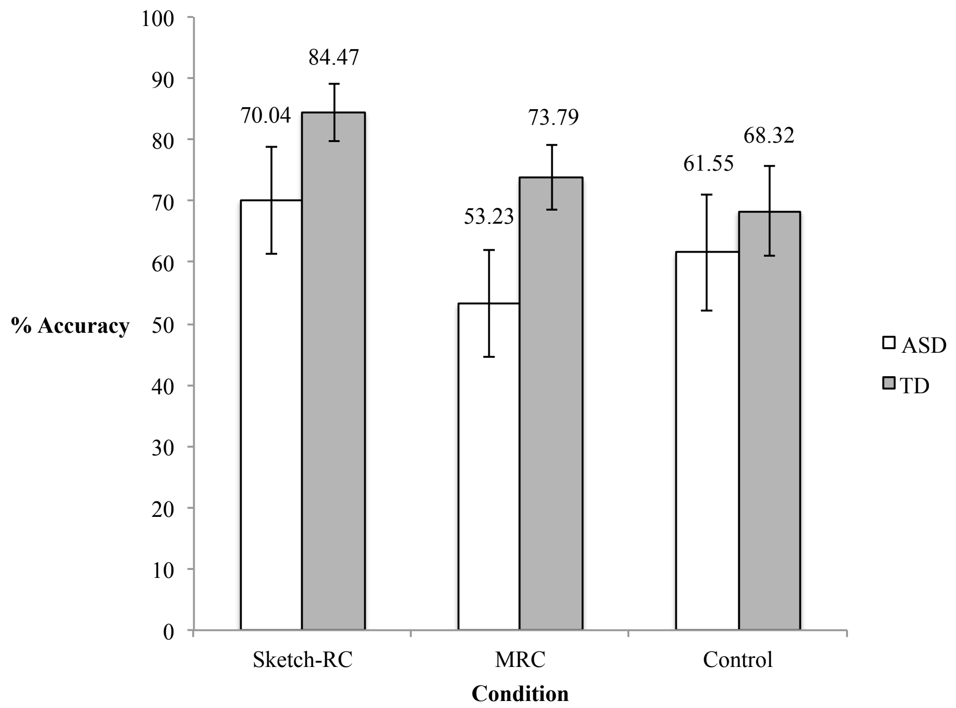

Figure 69. Percentage accuracy of surrounding information recalled during questioning as a function of group and retrieval condition.