

DRAWING AND DRAMATIZATION IN FORENSIC SETTINGS: EXTERNAL
AND INTERNAL PROMPTS IN CHILDREN'S AND ADULTS' EYEWITNESS
TESTIMONY

by

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Declaration

I 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 elsewhere.

First Middle Last name

Date

Abstract

This thesis explored the effects of drawing and dramatization as well as the intersection between temperament, symbolic skills, language ability, mood, and various interview methods (drawing, dramatization, verbal-only) in children's and adults' verbal recall of a salient event. Studies One and Two examined whether drawing and dramatization facilitate 3- to 6- year olds' verbal recall, after delays of one day, two weeks, and six months. Study Three looked the content of the drawings the children produced and how it changes over time. Study Four investigated whether drawings (own drawing or another's drawing) can act as memory aids for a video event after a two-week delay. Study Five explored the effects of drawing on adults' memory of a live event, after an immediate, a two-week, and a three-month delay. In all studies, measures of internal characteristics were taken, and their intersection with different interview methods was examined. The findings suggest that drawing while narrating enhances children's recall about objects within a two-week time frame. Drawing does not have an effect on adults' recall. Children consistently depict the more general features of an event, whereas information regarding 'the perpetrator' and 'victim' dissipates from drawings as time elapses. Drawings per se may not act as memory cues for a past event, as children may use them to identify the depicted features rather than link back to the event. Importantly, the intersection between different interview methods and children's and adults' individual differences may affect their reports. Temperamental traits, language skills, and symbolic ability interrelate with a verbal-only, a drawing, and a dramatization interview to either facilitate or compromise verbal reports. Given these findings, forensic officials are advised to take eyewitnesses' individual characteristics into account and try to adapt investigative interviews to their needs, to facilitate their eyewitness testimony.

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Dedication

To my parents, for everything.

To Katerina, for the dreams.

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Preface

My interest in children's ability to report forensic information through drawing and dramatization stems from my work as a practitioner child psychologist and drama therapist in Greece. In my private practice, I have seen a number of children who have experienced various types of abuse. Children rarely talk about these experiences. Rather, they re-enact them in different ways: through drawing, role-play, pretend play with toys, etc. Children may engage with the same (symbolic) activity repeatedly, in an attempt to make sense of their experience, work through it, and gain power and control over it.

One particular child I worked with, Agnes¹, in her effort to describe to her mother the experiences she had with her father, which formed a child sexual abuse case in court, took a piece of paper and a pencil and drew the sequence of events, in segments. Agnes was six at that time, but loves drawing, and had been taking drawing lessons since she was four, therefore she was a prolific drawer. Her mother took the drawing to the family's lawyer, a highly experienced legal professional in child sexual abuse cases in Greece. The lawyer suggested that the child be immediately referred to therapy, and that the psychologist responsible should write a report regarding the content of the drawing and the child's accompanying verbal account.

Agnes and I had previously worked together, therefore rapport had been established: she was happy to come to my practice weekly and 'play' with me and my toys. During the sessions, Agnes wanted to re-enact (role-play) various scenes, which I believe were related to the segments in her drawings. It was evident to me that she was trying to understand her experience and express it in a way that was safe for her.

¹ The name has been changed to maintain confidentiality.

In the months that followed, Agnes was interviewed by numerous legal officials (police officers, child psychiatrists, her lawyer, and the judge). I was informed by the family's lawyer that her drawing, along with my written report of it and the child's statement, were accepted as evidence in court. According to the lawyer, the drawing played an important role in convincing the judge that communication between Agnes and her father should cease, which pleased Agnes, as she was afraid to meet her father.

Agnes was very tired of the numerous interrogations, and on many occasions felt that the investigators doubted her testimony. Yet, she told me that she was motivated to talk to all these individuals because she wished to protect other children from having similar experiences.

This project is extremely dear to me. It is my way of 'helping' Agnes achieve her goal. If anything comes out of this thesis which could help police and forensic officials facilitate children's eyewitness testimony, I will consider this project a success.

Chapter One: **General Introduction**

Children's ability to act as reliable eyewitnesses has long been a matter of scientific debate (Bull, 2001; Goodman & Reed, 1986). It is important to investigate this area in preschool children and highlight ways to facilitate accurate reports, given the inclusion of such young witnesses in trials (Bull, 2001). The fact that many criminal cases involve only young witnesses has led to extensive research on children's ability to remember and report events (Pipe, Lamb, Orbach, & Esplin, 2004). Findings from such work suggest that even children as young as three years can provide accurate and coherent accounts of past witnessed or experienced events, however, their free recall narratives are typically scant (Butler, Gross, & Hayne, 1995; Nelson & Gruendel, 1981; Pipe et al., 2004; Saywitz, 1988), in part because their memory skills are still developing. Researchers have thus tried to find ways to assist young children's verbal recall. For this purpose, different types of interview methods and questions have been adopted. However, internal factors may also play a role, such as children's individual differences which can affect their reports as well as their willingness to talk to unfamiliar adults (Pipe et al., 2004). The main aim of this thesis is to investigate the effects of two nonverbal interview methods, drawing and dramatization, as well as the intersection between a host of internal and external supports in children's eyewitness testimony, in order to help enhance 3- to 6- year old children's verbal accounts.

To further explore the various mechanisms which may aid children's eyewitness recall, it is first imperative to have a general understanding of how memory works. The next section begins by discussing a general model of the various systems of memory (Schacter & Tulving, 1994; Tulving, 2002) and how they relate to forensic interviewing.

1.1 Memory

According to Norman (1970), there are as many as 25 different categorizations of memory (Tulving, 1972). The purpose of such distinctions is to help us understand better the various systems and processes of memory (Van Dyke, 2012). One approach is that memory involves multiple systems which are distinct in their structure and function and differ in the way they acquire, represent, and express a person's knowledge (Tulving, 1985; Van Dyke, 2012). One such distinction involves *short-term* and *long-term memory* (Shiffrin & Atkinson, 1969). Short-term memory is a temporary store for information which may then proceed to be kept in long-term memory. Long-term memory stores information which is never lost. Nonetheless, as we shall see later on, retrieval from long-term memory may be adversely affected by delay effects and interfering information.

Another important distinction between different memory systems is *non-declarative (implicit) memory* and *declarative (explicit) memory* (see Hintzman, 1990; Schacter, 1987; Shimamura, 1989; Squire, 1987, 2004; Tulving, 1985) (see Figure 1). Non-declarative memory involves procedural memory, which is responsible for storing implicit knowledge such as perceptual representations and memories about actions, habits, and physical abilities. It does not require conscious awareness of remembering past events, and involves our ability to unconsciously perform previously acquired sensorimotor behaviours such as walking, swimming, driving, and zipping one's coat when cold (N. J. Cohen & Squire, 1980; Goodman & Melinder, 2007). Thus, knowledge stored in non-declarative memory is mostly expressed by actions rather than consciously recalling an experience (Squire, 2004). Declarative memory involves consciously recalling explicit information about previous facts and events and is what we usually mean when we use the term *memory*

in everyday language. It is sub-divided into semantic and episodic memory, which will be discussed later in this chapter, and it is typically tested with recall, recognition, and cued tasks. Both non-declarative and declarative memory can be related to the same memory systems but can also be different (Schacter & Tulving, 1994). As an example, strong experimental evidence with amnesic patients have shown that a person with amnesia could memorize a mirror drawing task (non-declarative memory) but could not recall having practised the task (declarative memory) (Milner, 1962). Further research has shown higher scores in learning various skills, without however consciously recalling that the learning occurred (Squire, 1992). Such evidence suggests that declarative memory may be a separate memory system (Van Dyke, 2012).

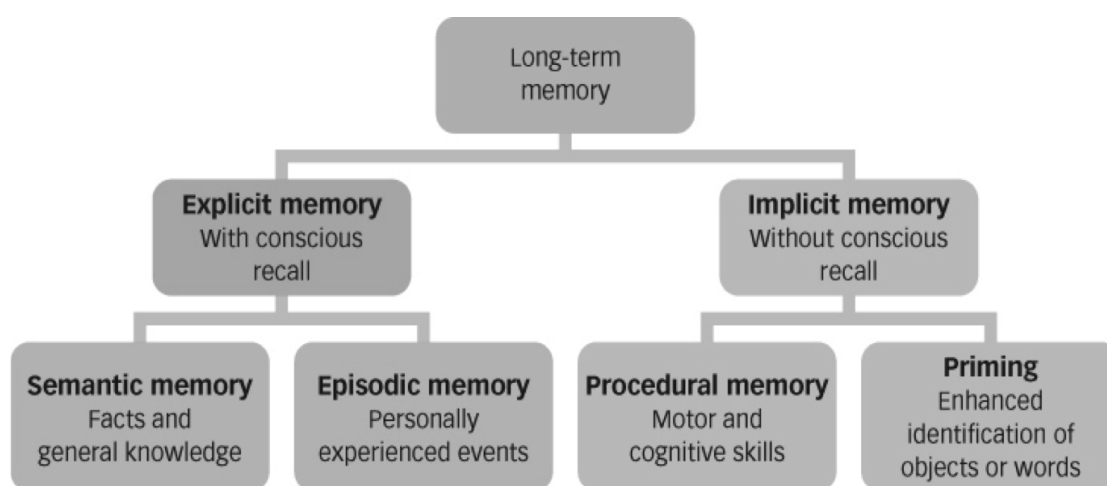


Figure 1. Different types of long-term memory. Adapted from Psychlopedia, retrieved from <https://psychlopedia.wikispaces.com/Declarative+Memory> Copyright 2018 by Tangient LLC.

The aforementioned data suggest that memory comprises a set of systems which involve processes that are independent, yet interact with one another (Schacter & Tulving, 1994). These processes involve mnemonic actions which enable memory

performance. The ability to remember past events includes three mnemonic processes: *encoding* of information (learning information by linking it to previously acquired knowledge), *storage* (maintaining this information over time) and *retrieval* of information (accessing this information when required) (Cordon, Pipe, Sayfan, Melinder, & Goodman, 2004; Tulving, 2002). Both declarative and non-declarative memory begin with encoding. For the information which is consciously recalled (declarative memory), encoding begins in episodic memory (E. E. Smith & Kosslyn, 2006). The most important task of encoding is putting the various parts of a fact or an event together to create a unified memory representation (Tulving, 1983). Retrieving this information from episodic memory may affect the content of this information. This is because when trying to retrieve a past event, transformation or loss of the stored information may occur (Tulving 1972). If the available retrieval cues are effective enough, they will increase the strength of the trace in memory and therefore lead to better recall of the target event (Tulving, 2002). After an original event is encoded, re-experiencing a similar event may lead to recoding the event, and therefore may bring about changes to the original encoded information (Tulving, 1984).

Even young children can already encode and store a great amount of details, however, their difficulty lies in retrieving this information (Butler, Gross, & Hayne, 1995; Jolley, 2010; Wesson & Salmon, 2001). Specifically, when children are asked to recall details about a past event, their reports are usually very brief, and they need further support to recall more details. This has been supported by research utilising repeated interviews. When children are interviewed repeatedly about the event, they may provide more, new details about the target incident. For instance, Fivush and Hammond (1990) found that 4- year old children who were interviewed on repeated occasions about an event they had experienced when they were 2.5- years old,

reported more information at this age than when they were two. Seventy-four percent of the information they reported at four years was new. Similar findings were obtained by Hudson (1990), who found that 2- to 3- year old children could recall memories which were first experienced when they were as young as 21 months. These findings suggest that children indeed store information in memory from an early age, however they have difficulty retrieving it, and multiple interviews can provide a context which can facilitate retrieval. In addition, various methods and techniques such as different questions and contextual cues (e.g. real items from an event) have been used by previous researchers to facilitate retrieval in young children and to further ascertain that the retrieved information is as accurate and complete as possible (e.g. Pipe et al., 2004; Pipe & Salmon, 2008).

1.1.1 Episodic and semantic memory. Another important taxonomy of memory systems which is often cited in the literature is the distinction between the two aforementioned sub-categories of declarative memory: *episodic* and *semantic memory* (Schacter & Tulving, 1994; Tulving, 1972, 1983). These systems are different from one another in various respects: (a) the nature of stored information, (b) reference to autobiographical versus cognitive information, (c) differences in the conditions and consequences of the retrieval stage, (d) susceptibility to transformation or loss of information, and (e) their dependence on one another.

Episodic memory is the most developed and advanced system in the brain, and allows one to encode, store, and retrieve information about past events (Ghetti & Bunge, 2012; Schacter, 1996). More specifically, it receives and stores information about the temporal aspects of situations and events as well as the temporal-spatial relationships of events that occurred in one's life (e.g. I went to Paris for my

honeymoon two years ago) (Tulving, 1984). It is a combination of the ‘who’, ‘what’, ‘where’, and ‘when’ of a specific event (Clayton & Dickinson, 1998; Nyberg et al., 1996). It further allows one to mentally travel back in time and mentally re-live past experiences (Nadel, 1994; Schacter, 1996; Schacter & Tulving, 1994; Tulving, 2002). Generally speaking, it is a person’s storehouse of personally experienced events, which always occur in relation to other events. Although it can operate independently from semantic memory, there may be occasions when the information stored in episodic memory is influenced by knowledge stored in semantic memory (Tulving, 1972), as I will discuss later on in this section.

Since witnesses are expected to recall specific details about a past event (the what, when, where, and who), they need to be able to access their episodic memory. One way to achieve this is to try to recall the context in which a particular memory was originally encoded. This is highlighted in the *encoding specificity principle* (Thomson & Tulving, 1970; Tulving, 1983; Tulving & Thomson, 1973), which posits that the greater the similarity between the certain features of an event at the time of encoding and the prompts available at the retrieval stage, the more efficient recall will be (Gentle, Powel, & Sharman, 2014). This is because the various contextual components of an event can act as successful memory cues which help one remember aspects of the event (Krafka & Penrod, 1985). In the above example, looking at photographs of one’s honeymoon in Paris two years after the event may trigger memories and specific details about it, which otherwise might have been forgotten. The photographs may serve as successful cues which allow to mentally travel back in that time of one’s life and retrieve memories.

Semantic memory is imperative for the use of language and refers to one’s general knowledge about facts (e.g. the capital of France is Paris; after spring comes

summer) (Tulving, 1972). It is a person's general knowledge about words, symbols, their meaning, their associations, as well as rules and principles on how to handle these words, symbols, and their associations. Semantic memory is less affected by loss or transformation of information than episodic memory. In receiving and storing information, this system mainly operates independently from episodic memory (Tulving, 1972, 2002).

Although episodic and semantic memory are different, they are interconnected and can operate simultaneously. This is because various mnemonic tasks involve information which is related to both systems (Tulving, 1972). Assigning a task to one of these systems is highly dependent on the type of question asked, the type of information to be recalled, or the aspect of a mnemonic claim made by the person who is recalling. As an example, a claim related to episodic memory may be 'Two hours ago I saw a man wearing a black coat stealing a lady's purse outside my house'. This piece of information involves an autobiographical experience which is recalled in relation to specific temporal and spatial details. A claim deriving from semantic memory may involve more general information (e.g. 'I know that the year following 2018 is 2019'). Such a statement involves a person's knowledge rather than remembering of an event and engages language to express a general concept. However, it can be regarded as memory, as this piece of information was entered in the person's semantic memory at some point in the past (Tulving, 1972).

From a forensic point of view, information deriving from semantic memory may involve some forensically related content but does not offer adequate evidence to support an investigation (Goodman & Melinder, 2007). For example, a child's statement such as 'Uncle John's pee pee can stand up' (Goodman & Melinder, 2007, p. 6) has forensic implications, in that the child offers information which may be

purely semantic, but may also involve the child's personal experience. The legal system requires that a child gives specific temporal and spatial information about a past experience, such as the time and the place an event took place as well as the people involved. As a result, interviewers are expected to help young eyewitnesses retrieve information from episodic memory (Goodman & Melinder, 2007). An important issue here is the developmental differences seen in children's ability to access their episodic memory. Some previous research has found that children can start accessing their episodic memory at three years (Bauer, 2007; Nelson & Fivush, 2004), with other work showing that they can recall specific novel events for a long time, from as early as 20 months (Fivush, Gray, & Fromhoff, 1987; Hudson, 1990; Nelson, 1988), supporting existing literature about children's ability to encode and store information from a very early age. These developmental differences may be affected by the characteristics of the to-be-remembered event, particularly whether an event is salient or is repeated in a child's life.

1.1.2 Repeated events. Children's memories of an event may be influenced by its frequency. An event is something that happens in a specific place and time (Tulving, 1984). An event that takes place as part of a series of continuing events becomes an episode. If children experience similar events repeatedly (e.g. going to school every day), they start forming general representations of these incidents, which are called scripts (Farrar & Goodman, 1992; Pipe, Thierry & Lamb, 2007). Scripts are related to schemas, which are cognitive structures that explain how old and new knowledge interrelate together in memory (Brewer & Nakamura, 1984). A script or event schema refers to a temporally and spatially organized sequence which includes how an event unfolds, the actions and people involved, and props used during an

event (Nelson & Gruendel, 1981; Schank & Abelson, 1977). A typical example is the restaurant script; when one goes to the restaurant he/she is expected to be seated, given a menu, order their meal and drink, eat, pay, and leave (Hudson, Fivush, & Kuebli, 1992). Scripts are flexible and dynamic, in that they give one the opportunity to predict and expect similar events to occur. For example, if one goes to the restaurant and he/she is told to order at the bar, then the person will not persist in the above stated scenario; rather, he/she will go to the bar, order their food and drink, and pay before they sit down at a table (Hudson et al., 1992). This suggests that previously acquired knowledge allows one to assimilate new knowledge in memory regarding a novel situation.

Most theories about schemas derive from Bartlett's schema theory (1932). Bartlett proposed that schemas are unconscious mental structures which are organized into general cognitive representations of past experiences. All new incoming information in memory interacts with pre-existing schemas, and any errors in recall are due to an individual's attempt to explain new data based on existing schemas. In many of his experiments about the effects of schemas on memory, Bartlett found that specific episodic information was recalled. This has been verified by various studies which found that information which is schema-related is better retrieved from memory than information that is unrelated to a schema (see Brewer & Nakamura, 1984). Pre-existing schemas facilitate retrieval by locating episodic details about an event (Brewer & Nakamura, 1984). These findings suggest that schemas play an active role in memory; individuals may need to access schematic information to retrieve more episodic details.

Even very young children tend to have well-organized representations of familiar and recurring events (e.g. what happens when one wakes up in the morning or goes to the supermarket) (Nelson, 1993). However, they may also have episodic

memories of salient events which occur on a single occasion (Hudson et al., 1992). This suggests that individuals can have both an (episodic) representation of a novel event, and also anticipate that this event may take place again in the future and will be similar to its first occurrence (scripted representation). The initial experience allows children to have an understanding of the event and to use this knowledge to predict similar future events (Hudson et al., 1992). Such prior knowledge may enhance the processes of encoding, storage, and retrieval with the passage of time (Ornstein, Shapiro, Clubb, Follmer, & Baker-Ward, 1997). Nonetheless, it can also lead to inaccurate reports after long delays (Myles-Worsley, Cromer, & Dodd, 1986; Ornstein et al., 1998), as children may rely on their scripted knowledge of similar events instead of remembering specific details about aspects of the (repeated) event (Roberts & Blades, 2000). Although children's tendency to offer script-related information diminishes with development (Poole & Lindsay, 2002; Thierry, Lamb, & Orbach, 2003), this schematic knowledge can confuse young children and hinder them from offering any information when asked about a previous event (Larsson & Lamb, 2009). This makes it imperative to find ways to assist children in recalling specific details about experienced events. As stated previously, children's difficulty to recall past information lies in the retrieval stage. Previous work has shown that slight adjustments to the interview process, such as utilizing different kinds of questions, can help children retrieve information from memory (Butler et al., 1995). This is because the way questions are phrased can activate different processes in memory, namely recall or recognition memory.

1.1.3 Recall and recognition memory. Recall and recognition memory are processes which enable the retrieval of information from declarative memory (Haist,

Shimamura, & Squire, 1992). *Recall* refers to searching one's memory in order to retrieve information, whereas *recognition* refers to making judgments about whether a person, an object, or a situation is familiar (Haist et al., 1992).

Information retrieved from recall memory is generally more accurate than that elicited from recognition memory, and therefore is of most importance in forensic contexts as it can support children's reports (Larsson & Lamb, 2009). However, previous work has shown that when children are asked questions which activate their recall memory, their responses are usually scant (Butler et al., 1995; Pipe et al., 2004). Such questions involve free recall, open-ended prompts such as 'tell me what you remember about the time when...' (Larsson & Lamb, 2009; Pipe et al., 2004). More details may be elicited by asking further open-ended free recall questions (e.g. 'tell me more about..' or 'and then what happened?') or more focused recall questions ('Who said that', 'when did you see him/her?'). Such more focused prompts usually involve wh- questions (e.g. 'where did the man put the sticker?'), however they also typically elicit brief responses from younger children (Lamb, Orbach, Warren, Esplin, & Hershkowitz, 2006; Larsson & Lamb, 2009).

Recognition memory, on the other hand, involves asking specific direct questions, which expect the respondent to concentrate on aspects of an event the interviewer deems important, such as 'Did this happen yesterday at school?' (Larsson & Lamb, 2009). Using direct questions about specific aspects of a past event has been found to facilitate younger children's recall to a greater extent than free recall questions only (Poole & Lamb, 1998). This may be because children as young as three years may not be linguistically advanced to express themselves when asked an open-ended question and need more direct prompts to aid their memory (Schneider & Bjorklund, 1998). Nonetheless, since answers to these questions are dependent on

recognition rather than recall processes, there is an increased probability of errors occurring (Melnik, Crossman, & Scullin, 2006). Direct prompts may lead to inaccurate responses, because children may respond without being certain about their answers (Larsson & Lamb, 2009). Such questions may also put pressure on the child to agree with the interviewers, thus increasing the likelihood of errors or suggestibility (see Pipe et al., 2004). These findings suggest that a combination of both open-ended and more closed-ended questions is more appropriate in forensic interviews with children, as this may allow them to access both recall and recognition memory.

Recall memory can also access stored temporal and spatial details which are crucial in legal investigations because they provide evidence regarding the target event. Recalling such details (e.g. when and where an incident took place) may involve accessing specific episodes that occurred in one's life (Tulving, 1992, 2002). As a result, one needs to reflectively structure their verbal reports to describe these events (Pipe et al., 2004). Orbach et al. (2004) found that almost three-quarters of such information (i.e. temporal) reported by 4- to 8- year old children were accessed through recall rather than recognition memory, and it was consequently more accurate. Although accounts that derive from recall memory are generally more reliable (Pipe et al., 2004), there may be instances when recall memory is inaccurate. This is particularly evident in cases when children are pressured to report details they are not certain about, when suggestibility has taken place before or after the event, and when there is a long interval between the event and the child's interview (Leichtman & Ceci, 1995; Poole & Lindsay, 1995; Poole & White, 1993). This last factor, delays between an event and a child's interview, is addressed in the next section.

1.2 Time of interview

Previous empirical work showed that interviews which take place immediately after an event can elicit more information than those which take place after long intervals (Lamb & Thierry, 2005; Pipe et al., 2004) because children (and adults) tend to forget as time passes (Baker-Ward, Gordon, Ornstein, Larus, & Clubb, 1993; Lamb, Sternberg, & Esplin, 2000; Steward, 1993). Forgetting usually involves making errors of omission (omitting aspects of an event) that errors of commission (reporting inaccurate information), in both children and adults (Larsson & Pipe, 2009). For instance, Lamb et al. (2000) found that after delays of more than one month children reported fewer new details about alleged abuse than children who were interviewed closer in time to the event. This indicates that long delays may have an adverse effect of on the quantity of children's reports.

The inability to recall long-held information from episodic memory is related to failure in accessing that memory (Tulving & Pearlstone, 1966), suggesting that the information has been encoded and stored but cannot be retrieved (Tulving, 1979). This may happen because the retrieval cues are insufficient to help identify the information needed (Van Dyke, 2012). When the various details stored in memory are similar, they can lead to cue-overload. Cue-overload happens when the retrieval cues are associated with various stored items, which makes it difficult to distinguish between the stored information (Nairne, 2002; Van Dyke, 2012). This leads to *interference*, which involves retrieving unwanted details from memory instead of the intended one. Interference can be proactive, which involves similar items preceding the target event, and retroactive, which refers to similar items following the target. This suggests that similar stored details may render retrieval susceptible to inaccuracies. Another explanation of forgetting is *decay*, the process of memory deteriorating over time (e.g. Anderson & Labiere; 1998; Lewandowsky, Duncan, &

Brown, 2004; Nairne, 2002; Page & Norris, 1998). Decay may occur because the stored information is not reactivated by some type of mnemonic mechanism, such as rehearsal, which involves storing items in short-term memory through repetition and transferring these items in long-term memory (Atkinson & Shiffrin, 1968; Van Dyke, 2012). In light of these theoretical perspectives, it is expected that both decay and interference will have an adverse effect on children's recall after delays, particularly if the retrieval cues are not robust enough. This further emphasizes the need to explore different interview techniques which could potentially enable retrieval after long intervals.

Nevertheless, as young children's difficulty lies in the retrieval stage, an immediate interview may not be enough to enable an exhaustive search of memory (Jolley, 2010). Multiple interviews may be needed to enable children to mentally reinstate the event. Repeated interviewing has been shown to have a positive effect on young children's recall, due in part to the fact that it provides additional opportunities for retrieval, which help children organize and access more information (e.g. Katz & Hershkowitz, 2010; La Rooy, Katz, Malloy, & Lamb, 2010; La Rooy, Lamb, & Pipe, 2009). Particularly, an interview shortly after an event may facilitate memory for various aspects of it, and may help organize and structure the details in a child's memory (see Salmon & Pipe, 2000). Following interviews may allow children to disclose more accurate information about the event. For repeated interviews to be effective, it has been proposed that the first interview should take place shortly after an alleged event, and subsequent interviews should occur close to one another (La Rooy & Lamb, 2008). However, repeated interviews are only beneficial when they are not contaminated by false information (Cassel & Bjorklund, 1995; Fivush & Hammond, 1990), as errors in the initial interview may be repeated in subsequent ones

(Salmon & Pipe, 2000). These findings highlight interviewers' responsibility to be cautious not to suggest and/or probe any type of misinformation.

In addition to the time the interview takes place, memories of past events may also be affected by developmental differences between children. This topic will be outlined in the next section.

1.3 Age-related differences in retrieval of information

Children five years and older tend to report more information about past experiences than 3- to 4- year olds, particularly in free recall interviews rather than when direct questions are asked (Butler et al., 1995). Some researchers have suggested that young children's poorer memory performance may be partly due to deficits in their abilities to encode and store information (see Howe & O'Sullivan, 1997).

However, as it has already been discussed, experimental work has generally shown that it is the retrieval stage that children have the most difficulty with (e.g. Butler et al., 1995; Fivush & Hammond, 1990) and therefore need external support to access information in their memory.

Young children's limited communication skills may also play a role in their inability to disclose detailed information (Butler et al., 1995; Gross & Hayne, 1998, 1999a; Macleod, Gross, & Hayne, 2013). This inability may be partly related to immaturity in expressive language (Schneider & Bjorklund, 1998). In an attempt to address these difficulties, several studies demonstrated that asking very young children direct rather than free recall questions allows them to report more episodic information (e.g. Butler et al., 1995; Hammond & Fivush, 1991; Poole & Lamb, 1998). However, as it has already been discussed in section 1.1.3, direct questions have been linked to higher levels of inaccurate details, particularly when the questions

require a yes/no answer (e.g. Brady, Poole, Warren, & Jones, 1999; Peterson & Bell, 1996).

In addition, compared to older children and adults, younger children's memory of free recall narratives is more susceptible to decay after long delays (Baker-Ward et al., 1993; Steward et al., 1996) and suggestibility (Ceci & Bruck, 1995; Goodman & Schaaf, 1997; Salmon & Pipe, 2000). As an example, Ornstein, Gordon, and Larus (1992) found that when young children were asked open-ended questions about a medical examination, the 6-year old participants remembered significantly more information than the 3-year olds. After a delay of three weeks, memory performance dropped for the younger children, whereas it remained intact for the older ones. These findings indicate that developmental differences between younger and older children may have an effect on their recall, with younger children being more vulnerable to inaccurate reports. Adjusting the interview to the needs of each child may minimize such age-related differences in memory performance. One way this can be achieved is through the use of several cues that facilitate retrieval.

1.4 Interview protocols

Previous research investigated extensively how to enable children to retrieve information from memory more efficiently, and found that this process is dependent on various external and internal cues. Various prompts from one's environment may be employed to activate memory for past events (E. E. Smith & Kosslyn, 2006), such as changes in interview procedures. Utilizing different types of questions (e.g. free recall and direct questions) and different kinds of nonverbal interview methods (e.g. drawing) may aid the retrieval stage (Butler et al., 1995).

Findings from relevant research have been taken into account with respect to what the best approach to interview children in the criminal justice system is. Currently, in England and Wales, all individuals under the age of 18 (as well as those with mental disorders, physical disability, and with significant impairments related to social functioning and intelligence, irrespective of age) are considered vulnerable witnesses and therefore must be interviewed in accordance with the Achieving Best Evidence (ABE) guidelines (Ministry of Justice, 2011). According to these guidelines, vulnerable witnesses should be interviewed in successive phases, starting with a free recall interview, followed by more direct, probed questions which are relevant to the information offered during free recall.

Research work conducted with young eyewitnesses and victims of crimes led to the development of specific interview procedures, whose main purpose is to conduct forensic interviews based on empirical findings (Saywitz, Lyon, & Goodman, 2017). An additional aim of such guidelines is to ascertain that interviewers ask the right type of questions and avoid statements that may lead to suggestibility and contaminate children's reports. These guidelines involve formal, scientifically sound interview protocols (see Pipe et al., 2004; Saywitz et al., 2017). One of the most widely used interview protocols with children is the NICHD Investigative protocol.

1.4.1 The NICHD Investigative protocol. The National Institute of Child Health and Human Development protocol (NICHD; Brown et al., 2013) follows a number of sequential phases. It starts with an introduction phase (Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007), followed by a rapport building stage, and a free recall phase which is accompanied by extra free recall and cued questions. Lastly, the interviewer may ask more direct, focused recall questions (Lamb et al., 2007). A

drawback of the NICHD protocol is that the accuracy and relevance of the information offered have not been extensively investigated, as researchers using it rarely know exactly what happened during a target event (Brown et al., 2013; Saywitz et al., 2017). Additionally, a recent meta-analysis did not support the benefits of the protocol in preschool children's performance (Benia, Hauck-Filho, Dillenburg, & Stein, 2015).

1.4.2 Narrative Elaboration Training. Another protocol used with children is the Narrative Elaboration Training (NET; Saywitz & Snyder, 1993, 1996). This protocol starts with a pre-interview session which allows children to practise (Brown et al., 2013). It entails specific open-ended and prompted questions, along with cue cards which aim to help them remember specific details, such as the location and the people involved in the target event (Pipe et al., 2004). The NET has been found to help children report a great amount of information without contaminating their accuracy (e.g. Camparo, Wagner, & Saywitz, 2001; Dorado & Saywitz, 2001; Saywitz & Snyder, 1996). However, it is time consuming, and time constraints do not facilitate its application (Pipe et al., 2004). In addition, it has not been tested after longer delays and with forensically relevant scenarios (Brown et al., 2013; Pipe et al., 2004).

1.4.3 The Cognitive Interview. One of the interview techniques that ABE proposes for use with vulnerable witnesses is the Cognitive Interview (CI; Fisher & Geiselman, 1992). The CI procedure is the most common, empirically-tested interview protocol used with eyewitnesses (Mattison, Dando, & Ormerod, 2016). It is used with adults, and it has also been used successfully with children (see La Rooy, Brown, & Lamb, 2013 for a review). The CI involves four basic instructions which are given to interviewees; (a) to report everything they recall, (b) to mentally reinstate

the context, (c) to recall the event in various different temporal sequences, (d) to change one's perspective and recall the event from another person's point of view (Milne & Bull, 1999, 2002).

Within the CI, participants are exposed to the Mental Reinstatement Context (MRC) procedure, which is premised on the encoding specificity principle and involves interviewees mentally reinstating the context a target event took place. Studies with children have produced positive effects of the MRC on recall (e.g. Dietze, Powell, & Thomson, 2010; Goodman & Melinder, 2007; Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz, 2002; Holliday, 2003). However, some studies have shown an increase in the amount of inaccurate details (see Köhnken, Milne, Memon, & Bull, 1999 for a meta-analysis). Further, empirical research has shown that the MRC is often not applied correctly by investigators, and sometimes it is not applied at all (Clifford & George, 1996; Dando, Wilcock, & Milne, 2009a; Dando, Wilcock, & Milne, 2009b). It is also time consuming, and makes it possible for interviewers to unintentionally provide participants with unsuitable retrieval cues and thus contaminate the accuracy of their reports (Dando et al., 2009b).

To address these issues, the Sketch Plan Mental Reinstatement of Context (Sketch MRC; Dando et al., 2009a, 2009b) was designed, which involves instructing interviewees to draw a sketch plan of the event they witnessed in as much detail as possible. The Sketch MRC has mainly been used in research with adults, and its use with young children has been empirically tested only on very few occasions. However, Gentle, Powell, and Sharman (2014) found a positive effect on children's recall, but only on their responses to suggestive questions and not on responses to free recall and open-ended questions.

Generally, the CI is very demanding for children, since even with neutral questions children may feel compelled to guess some of the answers (Milne & Bull, 2002). In addition, a recent meta-analytic review by Memon, Meissner, and Fraser (2010) found that the CI did not facilitate children's correct recall to the same extent as adults'.

1.4.4 Criticism of interview protocols. Collectively, interview protocols help ascertain that interviewers follow evidence-based practices (Saywitz et al., 2017). However, if the protocol follows a very strict format, it may hinder rapport between the interviewer and the child, or the interviewer may fail to notice various reactions of the child, which, if further explored, may elicit more information. The protocols follow specific phases, starting with an initial phase (e.g. introduction, rapport building, setting of rules, etc.), followed by a phase in which questions are asked, and concluding with a closure phase. So far, most research on the effectiveness of structured protocols has been conducted with respect to the second phase (types of questions asked), whereas the rapport building and closure phases have not been adequately studied (Saywitz, Larson, Hobbs, & Wells, 2015). Nonetheless, these phases, particularly rapport building, may be extremely important for the success of the interview. This is supported by experimental findings which showed that the characteristics of the interviewer (e.g. warmth, patience, humour) have a facilitative effect on the outcome of the interview, regardless of the method used (Lambert & Barley, 2001). Further, research has shown that children's individual differences (e.g. shyness) may often affect interviewers' use of questions (e.g. Gilstrap & Papierno, 2004). The phases-component of protocols disregards children's internal characteristics, including temperament and cognitive abilities (Saywitz et al., 2017).

The above findings suggest that utilizing only one way of interviewing children may not be enough; the personal characteristics of the child may be equally important for a successful interview.

In addition, a common limitation of verbal-only interviews, such as protocols, is that they rely heavily on open-ended questions, and as it has already been discussed, children do not report sufficient details in responses to such questions (Goodman & Melinder, 2006). As a result, other nonverbal interview prompts may be needed to mobilize children's memory, in relation to their internal characteristics. A variety of such nonverbal methods have been used in the literature and will be outlined in the sections that follow.

1.5 Nonverbal prompts in investigative interviews

Previous work investigated numerous interview methods to further supplement young children's recall. Such methods may help children's retrieval because they offer the opportunity to demonstrate through some kind of re-enactment what they remember, and hence minimize the strain put on verbal recall (Jolley, 2010). Incorporating them in eyewitness interviews may enhance young children's reports. Specifically, the prospect of taking into account the individual characteristics of each child, and then choosing an interview method (verbal or nonverbal) which can complement her/his abilities (e.g. an interview which allows a nonverbal child to point) may allow investigators to create the best conditions possible to enable young children's eyewitness testimony.

Nonverbal interview methods may facilitate children's recall and communication of information that might be missing from their statements because they act as retrieval aids, which help them remember and recount what they witnessed

or experienced (Pipe & Salmon, 2008). For example, props such as toys, dolls, body diagrams, and items from an actual event or crime offer children the opportunity to *show and tell* what happened at a specific event. This may assist them with disclosing information which would not be easy to convey in a verbal-only interview, and may help clarify what it is they are trying to report. This is particularly evident in sexual abuse cases. Gordon and colleagues argued that very young children do not possess the vocabulary needed to describe or encode sexual experiences in a clear-cut manner (Gordon, Schroeder, & Abrams, 1990). Given that such experiences are rarely discussed with adults, children's ability to express and report them verbally is substantially limited (B. S. Smith, Ratner, & Hobart, 1987). Thus, offering children the opportunity to demonstrate what happened at a specific situation by means of pointing, showing, or re-enacting may help substitute for any existing limitations in their narrative abilities and may lead to richer and clearer accounts than a verbal-only interview (Pipe & Salmon, 2008).

Further, nonverbal prompts may facilitate children's memories by acting as retrieval cues which help recall and recount more forensically related information (Pipe & Salmon, 2008). Such methods involve revisiting the scene of the crime mentally or physically (context reinternment), and/or viewing real items from the actual event (Stewart et al., 1996). They also help extend children's memories which leads to more detailed reports (Pipe, Salmon, & Priestley, 2002; Salmon 2001). Given such findings, Bull (1995) prompted investigative interviewers to promote further research and develop scientific recommendations regarding the use of nonverbal prompts in interviews with children.

However, not all nonverbal interview methods act as effective memory aids. To be effective, nonverbal prompts must under no circumstances contaminate the

accuracy and quality of children's reports (Pipe et al., 2004). Moreover, in line with the encoding specificity principle, the items presented to children need to match aspects of the encoded event (Ackerman, 1985; Tulving & Thomson, 1973). Items from an actual event are expected to help children remember and report information to a greater extent than unrelated props and toys (Pipe & Salmon, 2008). As per verbal-only interviews, the facilitative effect of nonverbal methods depends on the context they are presented and used. The following sections will present an overview of these methods, the context within which they are used, and evidence regarding their efficacy.

1.5.1 Anatomically detailed dolls and toys. Dolls help children show rather than talk, and communicate information about touch as well as body parts or bodily functions (Pipe & Salmon, 2008), which is difficult to elicit verbally. Nonetheless, the use of dolls and toys has been criticized (Pipe & Salmon, 2008). Previous work showed that dolls and props were not associated with a facilitative effect on recall (Salmon, 2001), did not enhance the accuracy of children's reports (DeLoache, Anderson, & Smith, 1995; Goodman & Aman, 1990; Gordon et al, 1993), and were suggestive (Ceci & Bruck, 1993). In fact, dolls were found to contaminate young children's accuracy as well as increase errors compared to other interview conditions and to free recall questions (DeLoache et al., 1995; Goodman, Quas, Batterman-Faunce, Riddlesberger, & Kuhn, 1997; Salmon, 2001). This suggests that the use of dolls and toys may compromise young children's eyewitness accounts.

For dolls to have a facilitative effect in forensic interviews, it is required that children understand that the prop is a representation of themselves, other people, or other items. However, children younger than three years may have not developed full

symbolic understanding and therefore not recognize that a doll can act both as an object and a symbol of something else (DeLoache & Burns, 1993). As a result, toys and props which are more generic in nature and are not directly linked to the to-be-remembered event may contaminate children's reports with inaccurate information, as children may try to engage in play instead of using them as recall aids (Gross & Hayne, 1999a; Priestley & Pipe, 1997; Salmon, 2001; Saywitz, Goodman, Nicholas, & Moan, 1991).

In line with the encoding specificity principle (Tulving & Thomson, 1973), for toys to be effective retrieval cues they need to be linked to an encoded piece of information, and should also be characteristic of the target event (Pipe & Salmon, 2008). Findings from empirical work with toys, which resemble items of the event in question, and scale models, which are identical replicas of such items, show that children report a greater amount of accurate details compared to verbal-only interviews (Priestley & Pipe, 1997; Salmon & Pipe, 1997). Yet, providing children with objects from the event may not always be feasible, and in some cases re-exposing the child to aspects of the event may be traumatic (e.g. in sexual abuse cases) (Pipe & Salmon, 2008), which suggests that their potential use may hinder children's reports.

However, from an applied perspective, there may be instances in which children are expected to disclose information about some kind of touch, and prompts which help them communicate such sensitive information may be needed. Given the problematic use of dolls, body diagrams, which can extract details about alleged touch without being confused for a toy, have been implemented.

1.5.2 Body diagrams. Body diagrams, also called human figure diagrams or drawings, are two-dimensional depictions of the human body and are mostly used in

research relating to body touch (Pipe & Salmon, 2008). They can potentially allow children to disclose information about body parts they have been touched on, or to clarify what they mean when they disclose information about various body parts. They are also used to communicate information in a nonverbal manner when children do not possess the vocabulary or cognitive abilities needed to verbally express their experiences (Brown, Pipe, Lewis, Lamb, & Orbach, 2007). In this sense, they allow children to communicate information through showing rather than telling.

One of the great advantages of body diagrams is that, due to their two-dimensional nature, they cannot be misunderstood for play objects, and previous work has suggested that even 2-year old children can understand the representational nature of pictures (DeLoache, 2000, 2004; Preissler & Carey, 2004). However, research showed that the use of body diagrams comes with a number of limitations. First, in most studies, body diagrams are used to elicit new information about touch, and not to clarify already reported information (Pipe & Salmon, 2008). However, asking children about various types of touch in the first place may be problematic for a number of reasons; first, children rarely talk about touch, irrespective of whether body diagrams are included in interviews or not (Pipe & Salmon, 2008). Even when a child is asked directly about touch, errors of omission are rather common, which suggests that children may not report touch that occurred. Bruck (2008) observed that children in her research did not report touch that had happened, presumably because they had not encoded contact with an adult as touch. Consequently, asking about touch may not elicit the details interviewers are looking for (Pipe & Salmon, 2008). Children may exclusively communicate information about touch nonverbally (e.g. by showing), therefore follow-up open-ended questions are needed for further clarification of the actual touch (Pipe & Salmon, 2008). Nonetheless, as touch pertains sexual and

physical abuse cases, incorporating some kind of non-harmful touch in research may further our understanding relating to children's reports of it. It may be that asking children about touch through drawing or showing on their body allows them to disclose information about it, which can then be investigated further in the forensic interview. Accordingly, this thesis also explored children's memory for touch.

1.5.3 Context reinstatement. Reinstatement of the context in which an event took place is affected by the encoding specificity principle (Thomson & Tulving, 1970; Tulving & Thompson, 1973) and involves two forms: mental context reinstatement and physical context reinstatement. As it has already been discussed, mental context reinstatement involves mentally reconstructing the context of a past event, and it has mainly been investigated within the confines of the Cognitive Interview (Fisher & Geiselman, 1992; Memon & Bull, 1991). Physical context reinstatement refers to physically revisiting the setting the event happened (Pipe et al., 2004).

Many studies have confirmed that context reinstatement can have a positive effect on children's recall (e.g. Hershkowitz et al., 1998; Orbach et al., 2000; Pipe & Wilson, 1994; Priestley, Roberts, & Pipe, 1999). Some studies involved real items and props from the actual event, and concluded that more details are reported when these props are included in the interviews (e.g. Gee & Pipe, 1995; Salmon, Bidrose, & Pipe, 1995). However, as it has already been discussed, real props are also associated with a greater increase in errors (e.g. Stewart et al., 1996). In addition, revisiting the actual place an eyewitness event took place or using real props from the event may not be feasible due to the ethical issues surrounding the emotional safety of children (Pipe & Salmon, 2008).

From a practical point of view, the use of props, toys, and actual items from crimes may be problematic. This is because in various investigative cases, the interviewers have limited or no previous knowledge of the target event (Butler et al., 1995). Under such circumstances, one cannot know what kind of items need to be presented to children to facilitate their reports, and props that are not selected wisely have a greater risk of leading to more inaccurate reports (Jolley, 2010). As a result, an interview method that allows children to create their own retrieval cues would be more beneficial. One such method involves drawing.

1.6 Drawing

Previous research has supported the use of drawing as a facilitative memory aid because drawing allows children to generate their own retrieval cues and enables them to talk about their experiences, without any previous knowledge on the part of the interviewer (Butler et al., 1995). When children generate their own retrieval cues, the interviewer's interference is minimal, compared to an interviewer providing the child with retrieval cues (e.g. through specific questions). This helps minimize the risk of interviewers' suggestibility or errors occurring in the interview due to the use of other props (e.g. toys).

Drawing has been used extensively in clinical settings, mainly as a method to assess children's psychological well-being and functioning as well as to supplement children's ability to talk about past events (Gross & Hayne, 1998; Pipe & Salmon, 2008). According to Jolley (2010), when drawing is provided in investigative interviews, it is purely to amuse the child rather than as a method incorporated in the actual interview process. This could be because police officers are not trained to evaluate drawings, or feel that any interpretation is subjective and therefore not valid

enough. However, drawings are permanent records; they include what a child considers important about the subject she/he is asked to draw, and interviewers can go back to various items drawn and ask further details (Barlow, Jolley, & Hallam, 2011; Jolley, 2010). As such, drawings could be helpful in investigative interviews because of the verbal reports that accompany the drawing activity as well as the content of the drawings. The advantages of using drawing in interviews with children are multiple, as outlined below.

1.6.1 The benefits of drawing. Drawing facilitates children's recall for a number of reasons. First, drawing is a pleasant activity for most children which does not require any training and therefore allows them to provide a great amount of information in a quick and efficient manner (Butler et al., 1995; Jolley, 2010). Drawing extends the duration of the interview and keeps children focused on the task for longer, thus enabling memory search, retrieval, and report of more information (Barlow et al., 2011; Pipe & Salmon, 2008; Wesson & Salmon, 2001). It is also associated with a decreased risk of errors being introduced by interviewers, as they are not required to be familiar with the event in question (Brennan & Fisher, 1998; Butler et al., 1995). Drawing further helps children generate their own retrieval cues and organize their reports, in that, by drawing one aspect of an event after the other they also structure their narration (Butler et al., 1995; Freeman, 1980; Gross & Hayne, 1998; Gross, Hayne, & Drury, 2009). This leads to an improved and more thorough verbal interview. Moreover, the actual representations in children's drawings can probe children's memory search and hence verbal reports (Jolley, 2010). Particularly, as children make a drawing of a topic they like, they are likely to start talking about the most prominent and salient aspects of their drawing. As they draw, they may offer

information, and even go back to items already drawn and offer more details, or recall more features about aspects of the event. This process allows the investigator to ask further questions about aspects of the drawing, which can enhance retrieval of more details about the event (Jolley, 2010).

Besides this, drawing helps bypass developmental and conversational constraints which may hinder children from providing complete reports of past experiences (Butler et al., 1995). As an example, Butler and colleagues (1995) found that, in response to specific, direct questions (e.g. 'how did you get there?'), children in a drawing condition provided specific details about the event, which were not reported by children in a verbal-only condition, and which was exactly the kind of information instigators would hope to elicit in eyewitness testimony interviews (Jolley, 2010). Drawing also helps children focus on the information that is of interest to them and which they consider important, which may not be what adults regard as important (Nelson, 1990). As young children's memories of past events are incoherent, drawings can act as maps, which link together the various pieces of information in a more logical order (Jolley, 2010). These findings suggest that drawing can promote a more child-lead interview, which allows children to recall details of an event on their own, without any previous knowledge on the part of the interviewer.

The effectiveness of drawing in children's eyewitness testimony has also been linked to interviewers' supportive manner of questioning (Gross et al., 2009; Patterson & Hayne, 2011). When drawing is used, interviewers limit their participation to minimal responses, which are usually non-directive encouraging prompts used to maintain the flow of the interview (Gross et al., 2009; Patterson & Hayne, 2011; Salmon et al., 2003; Wesson & Salmon, 2001). As children concentrate on their

drawing, they feel less pressured by the presence of an unknown individual, and it is at this stage that they may start talking about what they remember (Butler et al., 1995; Jolley, 2010). This is crucial, especially when children are expected to disclose potentially embarrassing information. For shy and more reserved children particularly, drawing may be a more beneficial interview technique because by concentrating on their drawing they may feel more comfortable to talk about aspects of their experiences. These findings lend further support to drawing forming the basis of a more child-lead interview, which can promote more accurate reports.

Past research has on many occasions confirmed the benefits of drawing in children's memory performance through the use of several methodological approaches. A number of these are outlined in the following sections.

1.6.2 Drawing and different types of events. Drawing has been investigated in relation to various types of events. A number of them involve autobiographical emotional experiences (e.g. Gross & Hayne, 1998; Salmon et al., 2003; Wesson & Salmon, 2001). Such studies resemble numerous legal cases with young witnesses the most (Jolley, 2010). As an example, Gross and Hayne (1998) asked 3- to 4- and 5- to 6- year old children to draw while recounting or simply talk about a time they felt happy, sad, scared, and angry and then verified the accuracy of the children's reports with their parents. They found that children who drew while narrating reported twice as much information (particularly, objects and descriptions) compared to those who only talked about their experiences, with no decrease in accuracy. The key finding of their study however is that drawing had a significant effect on the reports of 3- to 4- year olds, as well as older children. This is imperative because 3- to 4- year old children have been found to have a greater need of external aids to successfully

recount past experiences (Wesson & Salmon, 2001) due to their less developed cognitive and language skills compared to older children.

Nonetheless, a general limitation in studies which investigate children's autobiographical memories is that there is great variability in the amount of information recalled, which cannot be controlled for, as experimenters have no previous knowledge of the events (Jolley, 2010). In addition, interviewers cannot be certain about the accuracy of children's accounts, as they rely on parents' knowledge of the described experiences. Parents may not be aware of some of the events children talk about, and their memories of their children's experiences may be adversely affected by delay (Jolley, 2010). For these reasons, rather than utilizing personal experiences, using a staged event which the interviewer is aware of may offer a better understanding of the effects of drawing on children's recall.

Several studies adopting staged events have also supported the beneficial effects of drawing, both with respect to the amount of information reported as well as the accuracy of these reports (Brennan & Fisher, 1998; Butler et al., 1995; Gross & Hayne, 1999a). Butler and colleagues (1995) found in two experiments that 5- to 6-year old children who drew reported twice as much information one day and one month after the event (i.e. a visit to a fire station) than the same age children who only talked about the visit. Drawing did not reduce the accuracy of children's reports. However, the positive effects of drawing were evident only in relation to direct questions, and drawing did not facilitate the reports of the younger age group (3-to 4-year olds). The authors contended that drawing might not have facilitated younger children's recall due to the poor representational quality of their drawings compared to their older counterparts. This suggests that the drawings themselves may be visual

cues that mobilize children's memories, with drawings of better representational quality acting as better reminders of the target event.

An imperative finding in Butler and colleagues' work (1995) is the positive effects on children's memories after one month. This suggests that drawing may help children recall and report more information after longer delays. To test this further, Gross and Hayne (1999a) conducted a similar study, in which 5- to 6- year old children visited a chocolate factory and were interviewed about it either one day or six months after, and again one year after the visit (both delay groups). Again, they found that the drawing group reported significantly more accurate details compared to the tell-only group in all three delays. This supports the facilitative effect of drawing even after one year of the event. Moreover, one year later, the children in the drawing condition recalled significantly more new details about the event than the children in the verbal condition. These findings suggest that drawing while narrating in the initial interviews may have helped children recode the event and hence retrieve more information at a later interview.

In another study comparing the effectiveness of drawing and a verbal-only interview as well as props from a health assessment procedure on 5-year old children's recall (Salmon & Pipe, 2000), drawing was less effective than the other two interview conditions. These disparate findings may be due in part to the fundamentally distinct methodologies used. Salmon and Pipe's event involved a routine health assessment which may be a common experience in a child's life, whereas Gross and Hayne used a novel, live salient event. These data imply that drawing may be a more robust retrieval cue for a distinct event than a routine event, which may cue the child's generic knowledge and further produce more inaccurate information (Salmon & Pipe, 2000).

The effects of drawing on children's memories have also been investigated with videoed events. Barlow et al. (2011) explored 5- to 6- year old children's verbal reports of a video about gravity. They found that children asked to make an interactive draw and tell report gave more information about item/objects. This finding confirms the findings of previous work about the facilitative effect of drawing in object recall (Gross & Hayne, 1998). Barlow and colleagues' finding is important in that the questions used in the interactive drawing method (i.e. specific wh- questions) are similar to the questions suggested by the ABE guidelines regarding interviewing young witnesses (Ministry of Justice, 2011). According to ABE, specific wh- questions (e.g. 'who', 'what', 'why?') may be needed in interviews with children, along with open-ended questions, to facilitate their reports. ABE guidelines allow interviewers to incorporate drawing in the interview process but do not offer any guidance on how this should be done, presumably due to lack of empirical findings in this area. The interactive draw-and-tell approach could potentially offer interviewers a framework on how to combine drawing and verbal prompts to facilitate children's' eyewitness interviews (Barlow et al., 2011). Nonetheless, the event used in this study was an educational video, and as such it may not approximate an eyewitness situation. Jack, Martyn, and Zajac, (2015) utilized a more forensically related short film in their research, and investigated the effects of drawing on children's, adolescents', and adults' verbal recall. The participants either drew a sketch plan of the crime scene they had seen in a video, looked at a provided sketch plan, looked at a photograph of the scene, or talked without any visual aid provided. Jack e al. (2015) found that all three nonverbal methods were equally efficient and allowed for an increased amount of total new information to be recalled compared to a verbal-only interview, across all three age groups. They further found that participants who were instructed to draw

offered more information, particularly about people and surroundings, than those in the other groups.

1.6.2.1 Criticism of studies with staged events and videos. The studies discussed in the previous section suggest that drawing can act as a retrieval cue for various types of events children have experienced, even after long delays. The most prominent criticism of studies employing staged events involves their use of artificial rather than real-life scenarios, which may lack ecological validity (Pipe & Salmon, 2008; Saywitz et al., 2017). However, such analogue studies allow researchers to have thorough knowledge of the event in question and thus explore and determine the effectiveness of nonverbal interviews on the accuracy of children's reports. Another criticism is that staged events can be quite long and rich in detail (e.g. Butler et al., 1995; Gross & Hayne, 1999a), and one cannot know what kind of information each child encodes and for how long, which suggests that there might be variability in their responses (Jolley, 2010).

Further, an issue with drawing staged events is that the drawings may relate to children's generic knowledge of a specific event. According to Davison & Thomas (2001), children's depictions tend to include schematic information, as children tend to draw more general details about a topic than more specific elements. Such general depictions may incorporate their general knowledge of an event (e.g. in the case of Butler et al. (1995), already acquired knowledge about how a fire station operates) or knowledge about the order an event is expected to unfold (scripts) (e.g. what fire fighters do when a fire has been started) (Jolley, 2010). Even though such details may reflect both children's pre-existing scripts and schemas about a situation and the event in question, they are typically counted as correct recall by interviewers. In eyewitness

cases, such generic knowledge needs to be separated from the information children offer about an actual event, particularly if such knowledge is unrelated to the target event (Jolley, 2010). However, children may need this generic knowledge to be able to encode further details about an incident. Schematic information may allow children to organize, understand, and retrieve information from memory (Brewer & Nakamura, 1984; Taylor & Crocker 1981). If there are gaps in their memory about an event they can access their scripts in order to fill those gaps. This suggests that, while information originating from scripts may entail errors, it can also facilitate retrieval (Greenberg, Westcott, & Bailey, 1998).

One way previous work tried to solve this methodological issue is by utilizing videos. Videos may offer interviewers the flexibility to manipulate events in such a way, that the presented material does not tap into children's existing generic knowledge (Jolley, 2010). As an example, Barlow and colleagues (2011) utilized a video depicting a series of comic events involving two individuals and a puppet cat attempting to persuade another puppet cat to jump from a window ledge. This unique event helped control for children's scripted knowledge, as children's general knowledge of such an event (involving toy cats having odd accidents) is expected to be limited and therefore cannot negatively affect their recall performance. Videos further help ascertain that all participants are presented with the same material and aid the process of scoring children's verbal reports, as accuracy can be double checked by re-watching the video (Barlow et al., 2011).

Nevertheless, the effects of videos on memory have also been criticized (Thierry & Spence, 2004) on the basis of theories of television learning. For example, 2- year old children have more difficulty learning from television rather than real-life events because the representations from television are not as robust as the

representations acquired from stimuli deriving from live events (Schmitt & Anderson, 2002). A possible explanation for this is that the representations of television images are two-dimensional, and therefore cues relating to perception of depth, such as texture and shadows, are distorted. Because of these distortions, children may be unable to process the information deriving from the screen, for example, the quantity of objects presented or their colour, making it more difficult for them to interpret the various actions and objects projected (Schmitt & Anderson, 2002; Thierry & Spence, 2004). Additionally, Troseth (2003) has shown that young children (around two years) cannot relate what is happening on television to their real-world referents, unless adults explicitly point out the correspondence. A plausible explanation for this is that, at such a young age, children cannot grasp that an item presented on screen is symbolic (e.g. a two-dimensional image of a toy presented on TV) and refers to a real item (e.g. the actual toy). These findings suggest that children may perform better at a memory task which involves a live event than the same event presented on a video (Troseth, 2003). With this argument in mind, investigating further a live and a video presentation of the same event may offer us a more profound insight on the effects of different mediums in children's recall.

1.6.3 Representational quality and the content of drawings. Previous research has also addressed whether the representational quality of children's drawings is related to the amount of information they recall. Representational drawing refers to depicting various lifelike topics, which then allow one to recognize their actual referent (Rose, Jolley, & Charman, 2012). Such drawings can be created either by direct observation of an actual item or scene, or through one's memory of such referents. Children's representational drawing follows a specific developmental

pattern (e.g. Golomb, 1992); during the preschool years children usually draw scribbles and abstract shapes. During the early school years, they begin to draw shapes which start to look like real-life objects, although their drawing ability keeps developing (Golomb, 1992). In this process, they start to draw more details and also keep improving in spatial alignment, proportion, depth, partial occlusion, and perspective (Jolley, 2010). These progressive changes are further affected by developmental changes in cognitive processes, such as motor and spatial understanding. Such processes are discussed in depth in the work of Luquet (2001) and Willats (2005), which is beyond the scope of this thesis. In short, both these theorists agree that children intend for their drawings to represent the world realistically, therefore they strive to make effective representations of real-life items and their spatial relationships.

Previous studies attempted to test whether children's representations are related to recall. One way this question was approached was by assessing the representational quality of children's drawings in relation to the amount of reported details (Butler et al., 1995; Gross & Hayne, 1998, 1999a). In related studies, representational quality was mainly determined by raters who were asked to assess whether the drawings were good or bad representations of real-world referents, as well as by more formal tools, such as the Golomb's Revised Compositional Scale (1987, 1992) and the Draw-A-Person task (DAP; Nagliery, 1988). Typically, a positive relationship was found between children's verbal recall and representational quality. Butler and colleagues (1995) justified this finding by arguing that, since children's ability to draw improves with time, the more concrete and recognizable aspects of an event which are depicted in the drawings may help retrieve more information about that event.

However, Jolley (2010) raises serious concerns about this interpretation; first, children's abilities to recall information and draw improves as they grow, and these studies did not take into account developmental differences in their analyses. In addition, other empirical work did not find a significant relation between verbal recall and representational quality (e.g. Wesson & Salmon, 2001). Children who are asked to draw a past event may draw at a lower representational level than one would anticipate from children of the same age group because they are required to draw, recall, and answer the interviewer's questions at the same time, and this is cognitively demanding (Jolley, 2010). These arguments suggest that representational quality, as it has so far been assessed, is not enough to provide us with information about children's recall.

It is possible, however, that the actual content of children's drawings (i.e. the representations themselves) may act as a retrieval cue, which can further probe their memories about previous events. Previous work has shown that children between 2- and 6- years can derive information from drawings, by recognizing one's own drawing from an array of drawings as well as by identifying the various items drawn in one's own drawing or other drawings (e.g. Adi-Japha, Levin, & Solomon, 1998; Bloom & Markson, 1998; Gross and Hayne, 1999b). It has further been found that when the depictions are not clear, children may try to understand the artist's intention to interpret drawings (Bloom & Markson, 1998; Preissler & Bloom, 2008). In support of this view, Armitage and Allen (2015) showed that when children and adults try to understand what is presented in a picture, they first attempt to link the representations to their real-world referents. If the representations are ambiguous, they rely on the artist's intention of what the picture represents to derive further information. These findings imply that the actual content of drawings, which so far has been overlooked

by researchers, might act as a memory cue, which enables children to derive detailed information about an event they witnessed.

Indeed, such work has been done (e.g. Gross & Hayne, 1999b) but entails a significant limitation; it mainly investigated children's ability to recognize and describe the content of drawings which were produced in an initial interview only, disregarding the effect of delay. In addition, it did not test whether the descriptions of the drawings supported children's recall of the events the drawings referred to. Drawings may include supportive evidence and reflect what children consider important about an incident (Jolley, 2010). Moreover, children may communicate forensically relevant information in their drawings (e.g. about the perpetrator), which can act as a retrieval cues to elicit further information from memory. As it has already been noted in section 1.2, time delays affect children's verbal recall negatively due to forgetting (Baker-Ward et al., 1993; Lamb et al., 2000; Steward, 1993). These delay effects may also be evident in the content of children's drawings. Particularly, aspects of an event depicted may remain stable over time and other aspects might disappear with the passing of time. Exploring this further by looking at the drawings children produce in consecutive interviews after an event, will tell us whether drawings can actually act as supplementary aids in children's eyewitness testimony.

1.7 Dramatization

As stated previously, nonverbal methods which provide the opportunity to 'show and tell' what happened at a specific situation have been found to supplement children's verbal reports, by helping them communicate information that is unclear or missing from their statements (Pipe & Salmon, 2008). This is supported by the fact that children tend to use accompanying nonverbal behaviour when talking about past

experiences (Stevanoni & Salmon, 2005). Particularly, children use gestures, mime, and bodily movements from a very early developmental stage to express emotions and other representational information, such as attributes of objects and actions (Kelly & Church, 1998; P. J. Miller & Sperry, 1988). Given that young children usually provide brief reports of past experiences (e.g. Hammond & Fivush, 1991), allowing them to demonstrate what happened may facilitate their limited narrative skills (Pipe & Salmon, 2008) and hence enhance their eyewitness accounts.

1.7.1 Research evidence about the use of dramatization in recall. Previous empirical work used the term re-enactment to describe the use of movements and spontaneous expression of emotions by means of gestures and mime (Liwag & Stein, 1995; Risemberg & Zimmerman, 1992). Initial research on re-enactment in relation to children's memories was produced by Risemberg and Zimmerman (1992). They found that children who re-enacted past experiences through body movements and facial expressions showed better recall than children who were asked to re-enact without a facial expression, or only talk. The authors concluded that the kinetic, cognitive, and affective nature of re-enactment facilitates retrieval, by organizing the various pieces of information relevant to a target event, thus allowing children to provide more detailed reports.

Liwag and Stein (1995) further investigated whether emotional reinstatement facilitated 2- to 6- year old children's verbal accounts of past emotional experiences, which were provided by their parents. They found that re-enactment helped children provide more detailed and structured reports, compared to the children in the other conditions. The striking finding in this study was that children were not only reinstating the emotion in question, but were physically *dramatizing* all the actions

that took place in the target event by doing ‘full-blown imitations’ (p. 26), despite the fact they had been instructed to only reinstate an emotion. Liwag and Stein argued that emotion reinstatement cannot take place without body movements and gestures, which are elements of re-enactment and dramatization. They concluded that re-enactment provides children with additional nonverbal cues which help organize their narration and thus facilitates verbal recall (Liwag & Stein, 1995). Although this work looked at re-enactment of past memories from various angles, it mainly involved children’s reinstatement of emotions about personal experiences, based on their parents’ elaborations, and not their own.

Wesson and Salmon (2001) took Liwag and Stein’s work a step further and asked 5- to 9- year old children to recollect a time when they felt happy, sad, or scared and to either tell, draw and tell, or re-enact and tell what happened. They found that the children who drew and re-enacted while talking provided twice as much information than the children in the tell-only condition. They also found that both drawing and re-enactment elicited similar types of information, specifically information about objects and descriptions, which was significantly more than the verbal interview provided. This finding implies that both these strategies may arise from a common mechanism, or mechanisms, which render them effective. Wesson and Salmon concluded that both drawing and re-enactment may serve as retrieval cues which activate children’s memory of emotionally meaningful autobiographical experiences. However, no check was made by the experimenters to verify if the information reported by the children was true or fabricated, an issue that raises concerns regarding children’s accuracy of reports.

Salmon and her colleagues (2003) investigated whether drawing and re-enactment of children’s emotional experiences (happiness and fear) enhanced their

verbal accounts, and verified their reports with their parents. Contrary to Wesson and Salmon (2001), they found that drawing elicited a greater amount of retrieval cues than re-enactment. They proposed that drawing is a sound interview strategy when asking children to talk about past experiences because it seems to produce more verbal information than re-enacting or simply talking about an event (Salmon et al., 2003). Nonetheless, as per the previous studies, concerns can be raised regarding the accuracy of children's reports. It may be that the guardians' memories of the children's experiences were affected by time delays, and there might have been cases in which the parents were not familiar with the reported events (Jolley, 2010).

The aforementioned studies investigated the effectiveness of re-enactment as a retrieval cue in children's memories of experiences that are emotionally meaningful to them. Previous work has shown that events which evoke strong emotions tend to persist longer in memory than more neutral events (Mickley Steinmetz, Schmidt, Zucker, & Kensinger, 2012). However, there may be instances in which children are required to offer testimony for events they witnessed which may not evoke particularly strong emotions. This issue was addressed by Stevanoni and Salmon (2005). In a more detailed study on re-enactment, they investigated the effects of different kinds of gestures (i.e. instructed gesture, spontaneous gesture, modeled gesture, and no gesture) on children's verbal recall of a staged event. They found that children in the gesture-instructed condition reported more than twice the amount of information than the children in a no-gesture condition, thereby producing richer and more thorough reports. They too support previous findings that gesturing while narrating may help children reinstate the experience in their memory, serving as a nonverbal cue which in turn activates other aspects of memory. There is also a possibility that the children who were instructed to gesture engaged more with the task

and therefore were motivated to report more information. Stevanoni and Salmon (2005) argued that re-enacting may be a useful tool in children's forensic interviews, however their event was not forensically related. In their study, each child became a pirate, made a map, found a key, and then located the hidden treasure.

To investigate the effectiveness of re-enactment in children's recall of an event they passively witnessed, this thesis adopted a more forensically relevant scenario. This will allow us to empirically test whether this method facilitates eyewitness accounts, and further investigate if children's individual differences in relation to bodily movements can enrich their reports. From an applied perspective, if re-enactment has a positive effect on children's recall it could potentially enhance legal officials' work with young eyewitnesses, as it does not require any props and is easy to use. Taking into account Liwag and Stein's observation (1995) that the children in their study dramatized whole scenes of the past events, the term 'dramatization' is considered more appropriate and will be used within this project to refer to re-enactment of events.

In summary, the nonverbal interview methods outlined in the previous sections have been used in an attempt to supplement children's verbal reports. Nevertheless, the substantial variability which has been observed within age groups in children's verbal reports suggests that children's individual differences may also play an intermediary role in their recall of events (Salmon et al., 2003) and hence deserve further empirical testing. Such internal factors will be explored in the following sections.

1.8 Individual differences

Each child is unique, in that she/he has different temperamental traits and cognitive abilities from other children. This is reinforced by research findings which show great variability in children's memory performance within and across studies (Quas, Qin, Schaaf, & Goodman, 1997). Investigating these is imperative because harnessing these differences may potentially help children report more information, whereas ignoring such traits may compromise their reports, adversely affecting their eyewitness testimony. This section will begin by discussing children's temperament and how it may relate to their recall.

1.8.1 Temperament. Temperament involves 'the characteristic phenomena of an individual's emotional nature, including his susceptibility to emotional stimulation, his customary strength and speed of response, the quality of his prevailing mood, and all the peculiarities of fluctuation and intensity of mood, these phenomena being regarded as dependent upon constitutional make-up and therefore largely hereditary in origin' (Allport, 1961, p. 34). A. H. Buss & Plomin (1984) endorsed this definition because it implies that one's temperament may be affected by both genetic factors as well as her/his emotional responses to the environment. They argue that temperament involves personality traits that develop early in infancy and can be biological. Within this thesis, this theoretical approach is adopted because it acknowledges the role both environmental and heritable factors play in shaping one's temperament across development. According to this approach, temperament in children is divided into four internal traits: sociability, shyness, emotionality, and activity (A. H. Buss & Plomin, 1984).

1.8.1.1 Sociability and shyness. Sociability refers to one's desire to be in the presence of others rather than alone, in various contexts, and in different kinds of relationships (A. H. Buss & Plomin, 1984). Shyness, on the other hand, refers to one's tendency to feel inhibited and uncomfortable in the presence of strangers and acquaintances. Such feelings cause further distress and prompt one to distance him/herself from a social situation. Traditionally, sociability and shyness were regarded as the same personality characteristic, with shyness meaning one has low sociability levels (A. H. Buss & Plomin, 1984). However, more recent work showed that being shy does not necessarily mean that one is unsociable (Tang, Santesso, Segalowitz, & Schmidt, 2016). Shyness and sociability are in fact separate traits, with shyness being more related to inhibition/withdrawal characteristics in social situations and sociability relating to approach-related tendencies, with the aim to be with other people in social situations (Asendorpf, 1990; Cheek & Buss, 1981). It has further been suggested that shyness is related to embarrassment, as being sensitive to other people's evaluation may evoke states of both shyness and embarrassment (Asendorpf, 1990). It can be inferred from these findings that shy children are expected to feel more overwhelmed by a novel social situation compared to sociable children, who are more open to social interactions. This may affect their ability to respond to questions or participate in an interview-like context.

1.8.1.2 Emotionality and activity. Emotionality refers to a child's tendency to become distressed easily and react to various stressful situations with emotional arousal (A. H. Buss & Plomin, 1984). Children high in emotionality are expected to be more fearful of novel or threatening situations. Activity involves the child's energetic behaviour and amount of movement and comprises tempo and vigour.

Children high in activity may exhibit more anger towards a threatening situation due to their direct and forceful response to it (A. H. Buss & Plomin, 1984).

While it was originally argued that activity may derive from positive emotionality (Rothbart & Bates, 2006), Zentner & Bates (2008) suggested that these two traits are separate, as movement and vigour can be present in the expression of positive as well as negative and neutral situations. In forensic research, activity is far less investigated than the other temperamental traits, with previous work mainly concentrating on its strong relationship with genetic influences (Schmitz, Saudino, Plomin, Fulker, & DeFries, 1996), externalising behaviour problems (Hagekull, 1994), and rejection by peers (Walker, Berthelsen, & Irving, 2001). In a longitudinal study conducted by D. Buss, Block, and Block (1980), activity in preschool children was related to lower levels of shyness and compliance and higher levels self-assertiveness, aggression, and competitive and manipulative behaviour. However, its direct association with memory performance has not been thoroughly addressed. It has been proposed in the literature (Ornstein et al., 1997; Shapiro, Blackford, & Chen, 2005) that temperamental traits such as emotionality and activity may deleteriously affect a child's attention towards an event, thus limiting her/his ability to encode and retrieve information about it. If investigators take such temperamental differences into account, they may be able to adjust the interview to the child's needs and hence aid their testimony.

1.8.1.3 Types of temperament and recall. The relationship between temperament and children's recall has been investigated mainly in studies that focus on children's reports of medical procedures, of which the details are known to the investigators (Salmon et al., 2003), and in relation to suggestive questioning and

children's responsiveness to false information (e.g. Brown & Pipe, 2003; Bruck, Ceci, & Melnyk, 1997; Chae & Ceci, 2005; Quas et al., 1997). Some of these studies found no association between aspects of temperament and children's recall (e.g. Imhoff & Baker-Ward, 1999). Other studies found moderate associations between aspects of temperament, such as the ease with which children adjust to or approach new social experiences, their emotionality, and their perseverance in various situations (Gordon et al., 1993; Salmon et al., 2003) and recall. Further, Shapiro et al. (2005) found a positive correlation between activity and shyness and children's suggestibility. Roebbers and Schneider (2001) found that shyer children offered fewer accurate responses to specific questions than children who were less shy. Such findings are not explained by deficiencies in children's memories, but rather by other factors, such as difficulty paying attention during encoding and retrieval (Shapiro et al., 2005) or feeling uneasy in the presence of a novel, unknown person.

Potential interactions between such internal factors and different interview methods may enhance our understanding of how to help children provide accurate and complete reports. As drawing allows children to concentrate on something else other than the interviewer, it may reduce a child's anxiety with respect to the interview (Butler et al., 1995; Jolley, 2010). Dramatization requires that a child is more (physically) expressive in the presence of an unknown person (Salmon et al., 2003). Thus, shyer children may not be able to benefit from an interview that requires them to 'show' as well as tell what they remember about a past event. More sociable children may be able to benefit from such a method, as they may feel less overwhelmed by the presence of an unknown individual. To test this, Salmon and colleagues (2003) investigated the association between aspects of temperament and different interview methods in children's recall of autobiographical events. They

found that for children who were asked to re-enact while narrating, the amount of information recalled was related to one aspect of temperament (effortful control). For children who drew or talked only, temperament played no significant role in verbal recollection. However, Salmon et al. looked at children's memories of personal events which evoked strong emotions. They speculated that temperament may be affected by changes in the type of event. This implies that if children are asked to recall an event they are passive viewers of and does not involve strong personal feelings, their temperamental traits may interact differently with the interview process to facilitate or compromise their reports.

In view of these findings, it is important to empirically investigate the interaction between children's temperamental traits and different nonverbal interview methods further (Pipe & Salmon, 2002; Wesson & Salmon, 2001). It may be that more sociable children benefit from both verbal and nonverbal interviews because of their ability to build rapport easily and be more open to experiencing novel situations. On the other hand, children who are shy may not be able to respond to a verbal interview because they may be fearful of a novel situation, more reserved, or need more time to build rapport with the interviewer compared to a more sociable child. Such children may benefit from a drawing interview which allows them to concentrate on the task rather than the investigator. If shy children do in fact benefit from a method which provides the basis for rapport building, then forensic interviewers can target this in real legal contexts. Such findings could potentially inform us about what type of interview method is appropriate for each child, based on his/her unique internal characteristics.

1.8.2 Language ability and symbolic play skills. Language and symbolic play ability may also interact with children's ability to report past events. This is because language and memory originate from a common cognitive and neural level, and language is closely related to symbolic ability (Gupta & MacWhinney, 1997; Lewis, Boucher, Lupton, & Watson, 2000; Van Dyke, 2012). McGuigan & Salmon (2004) found that the association between language ability (both expressive and receptive) and recall during the preschool years was stronger for younger than older children. Salmon and colleagues (2003) further showed that young children's expressive language ability was positively associated with verbal performance when describing an emotional event. They argued that better expressive language ability may also relate to better recall. Supporting this argument, Boland, Haden, and Ornstein (2003) found that preschool children with better language skills were able to form more detailed mental representations of a camping event and report more details about it on a later occasion than children with poorer language skills. These findings support a potential link between language ability and memory performance.

In addition, previous work found an association between language ability and symbolic play ability. Symbolic play is defined as the ability to substitute one object for another, give an imaginary attribute to something or someone, and make a reference to an absent object as if it were present (e.g. Baron-Cohen, 1987). Symbolic play skills are evidenced in children's pretend play. Pretend play is a creative process which involves, among others, a child's ability to interact with various actions and items symbolically, engage in role play and improvisation, and recall a past memory which involves various emotions (Bergen, 2002; Russ & Wallace, 2013). A number of theorists have argued that language and certain types of pretend play are closely related because both these functions are dependent on one's ability to use symbols

(e.g. place a banana next to one's ear and pretend it is a phone) (e.g. Piaget, 1962; McCune, 1995). Lewis and colleagues (2000) found a significant correlation between symbolic skills and expressive and receptive language in 1- to 6- year old children and suggested that symbolic ability may act as a foundation for symbolic play and language development.

If symbolic ability is positively correlated with language ability, then we would expect that children with better symbolic skills will offer more detailed verbal reports than children with lower symbolic skills in an interview that involves drawing or dramatization due to the symbolism inherent in such media (Cox, 1992; Meltzoff, 1995). It may be that some children are more facilitated by such activities to talk about past events, by mainly using gestures and mime or depicting items in their drawings than only (verbally) recounting an event. This issue will be empirically tested in this thesis. If in fact children with better symbolic skills offer more information in drawing or a dramatization interview, judicial officials could use these media to enhance their eyewitness recall.

1.8.3 Mood. Children's mood during the interview is important as it may influence their ability to endure an interview. Previous research has mainly concentrated on investigating stressful events and their effects on memory (see Pipe et al., 2007) rather than children's mood during the interview and its relationship to recall. It has been found that remembering and reporting a traumatic event can lead to anxiety arousal (Brenner, 2000; Levine, Burgess, & Laney, 2008), which may be negatively associated with children's accuracy (see Rush et al., 2014).

One common psychological tool which has been used to evaluate anxiety in studies with children is face scales (e.g. Buchanan & Niven, 2002; Ortigosa Quiles et

al., 2013). Generally, such scales measure intensity and discomfort related to pain (e.g. the Facial Affective Scale [FAS]; McGrath et al., 1996). More recently they have been used to evaluate positive/negative affect (Affect; Nilsson, Kokinsky, Nilsson, Sidenvall, & Enskär, 2009) and emotional distress (Distress; Connelly & Neville, 2010) in young children. As a number of previous studies on children's eyewitness testimony have involved medical procedures and examinations (e.g. Ornstein, Baker-Ward, Gordon, & Merritt, 1999; Salmon & Pipe, 2000), the use of such a scale may offer a valid representation of children's affect (mood score) prior and after an interview. This is important, as, depending on their mood, children might offer more thorough or less detailed reports. Should mood play a role in the amount of recalled information, then it can be targeted by interviewers to ascertain more detailed and accurate eyewitness accounts. Accordingly, the relationship between mood and verbal performance will be tested in this thesis.

1.9 Theoretical framework of the thesis

Based on the evidence reviewed so far, it is clear that recalling a past event may be influenced by a variety of external and internal factors (see Figure 2). External factors may involve the type of the event, the time the interview takes place relative to that event (Howe, 1997; Salmon & Pipe, 1997, 2000), interviewers' questions (Ceci & Bruck, 1993; Haist et al., 1992; Poole & Lindsay, 1995), and the use of nonverbal interview methods, such as drawing and dramatization during the interview (Salmon, 2001). Internal factors include age differences, language and symbolic ability, emotional factors, and temperamental differences, which may affect children's willingness to talk in an interview and/or their desire to gain the investigators' approval (Pipe et al., 2004). Such factors may influence the level of

reporting. As an example, a child may have memory of a past event but refuse to recount the event due to shyness. Consequently, it is worthwhile to investigate how these internal and external supports interrelate and facilitate children's reports.

INTERNAL FACTORS

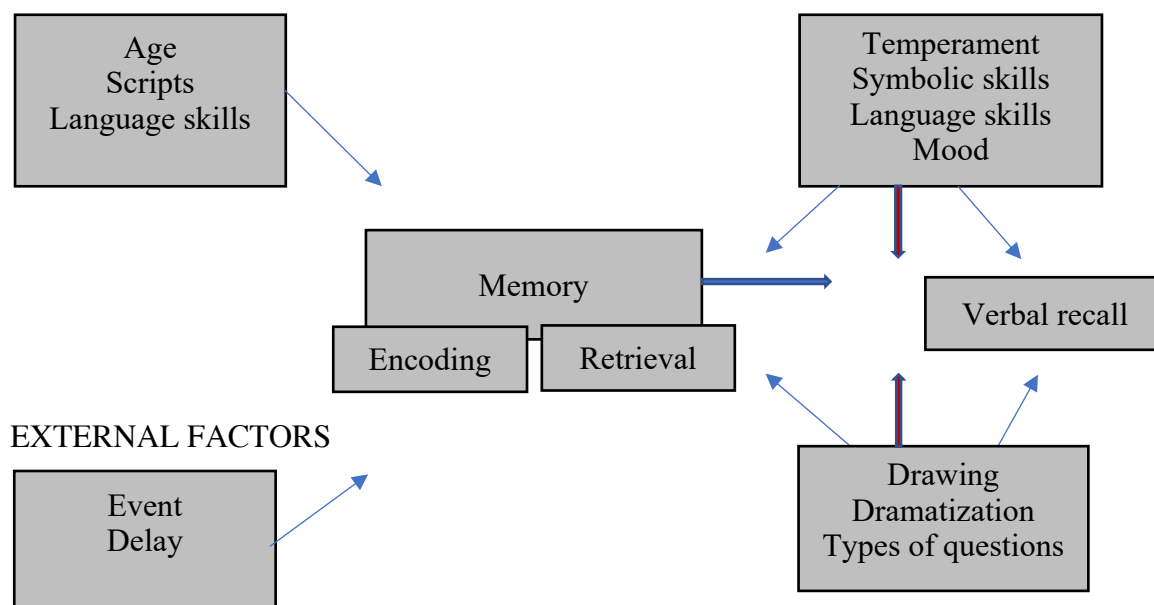


Figure 2. A schematic representation of the factors that may influence recall of a past event.

As previous work has repeatedly shown, preschool children may have difficulty retrieving information from memory and may require external scaffolding methods to facilitate this process (Butler et al., 1995; Jolley, 2010; Wesson & Salmon, 2001). In accordance with the theory of memory outlined by Tulving and colleagues (Nadel, 1994; Schacter, 1996; Schacter & Tulving, 1994; Tulving, 2002), drawing and dramatization may allow children to mentally travel back to the time they experienced a specific incident, mentally reinstate it, and recall details about it. In this sense, these two methods may act as cues which facilitate the retrieval stage. As can be seen in Figure 2, children's scripted knowledge may also affect recall (Bartlett, 1932; Nelson & Gruendel, 1981; Roberts & Blades, 2000; Schank & Abelson, 1977). In this thesis,

this issue is approached in a novel manner: the content of children's drawings, particularly the inclusion of salient (central) vs more script-related (peripheral) details, and how these change over three different time delays is explored. This will show us whether children communicate information in their drawings which has forensic value, thus rendering drawings supplementary aids in eyewitness testimony cases. It will also inform us about the effects of retention intervals in children's memories, which can range from months to years in legal contexts, and may also reinforce one's tendency to rely on scripts (Myles-Worsley et al., 1986; Slackman & Nelson, 1984). Further, when children are asked to draw and talk about an event, not only do they retrieve information from their memory, but they may also recode the event anew (Tulving, 1984). Exploring this will inform us whether drawings themselves act as memory cues for a past event, and also whether they facilitate the process of recoding the event.

As shown on Figure 2, external factors are not the only ones which may have an effect on children's recall; different interview methods may interact with children's internal characteristics when they are asked to report what they remember about an incident. Children with better verbal skills may be able to offer more detailed reports in a verbal-only interview than children with lower verbal abilities. Children with better symbolic abilities may benefit more from drawing or the use of gestures and movements to recount a past event than children with less advanced symbolic skills. By contrast to more sociable children, children with a shy and more emotional temperament may find it difficult to talk to a novel interviewer, not because they do not recall details about a past event, but because they are timid of the novel situation they find themselves in. If children feel stressed and unhappy during the interview, they may not want to co-operate.

These data suggest that children's individual differences and cognitive abilities may interact with different interview methods and can affect their reports. Such internal characteristics may weight differently during an interview. As an example, a very sociable child may have limited verbal skills and therefore benefit more from a drawing interview than a verbal-only interview. A very shy child may have excellent verbal skills and still refuse to talk due to inhibition. Although this last issue is not tested directly within this thesis, it may be important to bear in mind in interviews with children. It suggests that investigators may be able to harness the available external supports and children's internal supports during interviews to facilitate children's recall. Investigating these combinations will allow us to adjust the interview process to the needs of each eyewitness and facilitate the retrieval stage.

The memory theories and models which have so far been outlined in this chapter pose a crucial limitation; they do not take into account the individual characteristics of each child, such as their temperamental traits and mood, when recalling a past event. Each child is different, and their ability to report events as well as tolerate the interview process may be affected by their individual differences, such as their personality. Accordingly, the aforementioned empirical research, which is premised upon these theories, and which focuses primarily on external factors, might be insufficient to explain a child's eyewitness testimony without considering internal factors. Therefore, the primary objective of this thesis is to explore the combination of external factors (i.e. a drawing and a dramatization interview) and internal factors (i.e. temperament, mood, language skills and symbolic play ability) in children's eyewitness recall.

1.10 Aims of the thesis

This project aims to investigate external prompts (drawing and dramatization) and internal characteristics (temperament, language ability, symbolic ability, and mood) and their intersection in verbal recall, in a series of five studies (Figure 3). Up to now, no study has looked at the combination of drawing, dramatization and temperament, language ability, symbolic ability, and mood simultaneously, in children's accounts of a staged event they are passive viewers of.

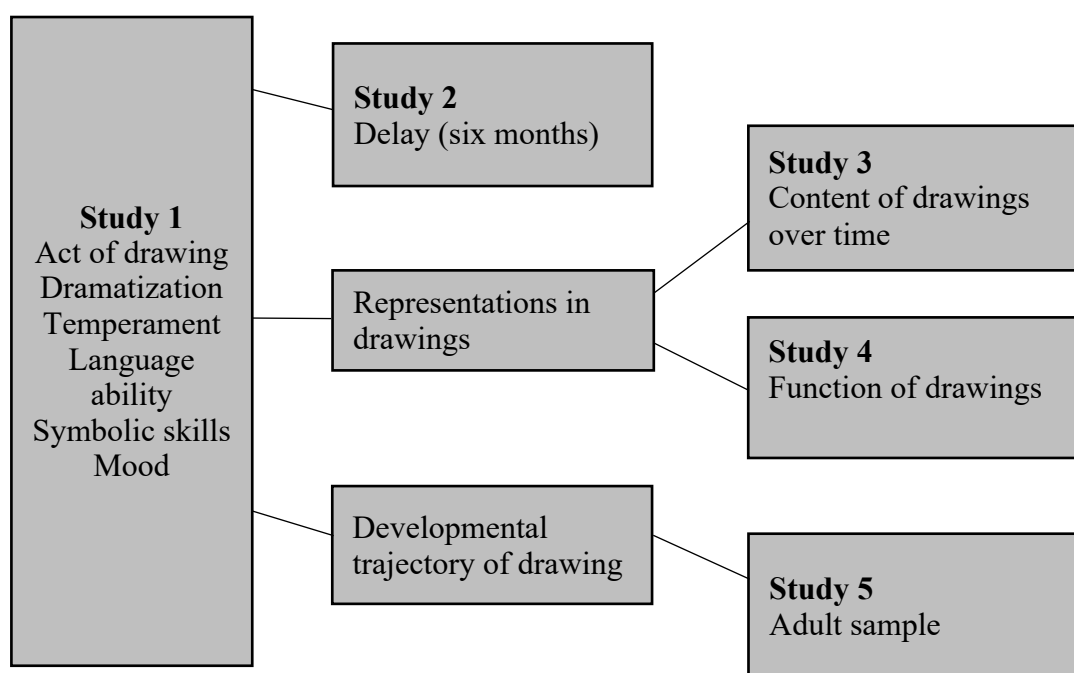


Figure 3. A schematic representation of the thesis.

Studies One and Two (Chapters Two and Three) will investigate whether drawing and dramatization can facilitate retrieval of information about a novel event, after details of one day, two weeks, and six months. They will further explore whether children's individual characteristics interact with these external prompts to facilitate recall. The combination of internal and external supports may lead to more detailed and accurate accounts. Study Three (Chapter Four) looks at the content of the

drawings produced in Studies One and Two and how it changes over a period of one day, two weeks, and six months, an issue that has been hitherto overlooked by previous studies. Children's ability to recall a past event by looking at the content of drawings, either their own or others', is also explored in Study Four (Chapter Five). This will help us have a better understanding of the function of drawings as memory cues of past events. Finally, to gain further knowledge on the developmental trajectory of drawing, the effects of different interview methods and their intersection with individual differences will be investigated in an adult sample. This is explored in Study Five (Chapter Six).

Within this project, in all studies involving children participants, *age* will be treated as a covariate. This will be done for several reasons. First, as it has already been shown throughout this chapter, age effects have been extensively and thoroughly investigated in previous work (e.g. Butler et al., 1995; Gross & Hayne, 1998), and further exploration of age will not offer anything new to the field. In addition, there were not enough participants in this study to form two comparable age groups (i.e. 3- to 4- year olds and 5- to 6- year olds). This may be due to the longitudinal nature of the study, which resulted in a substantial number of children not returning for a third interview, as well as the fact that interviews were video recorded, which prevented some parents from permitting their children to participate. Further, children's internal characteristics may play a mediating role in the substantial within age-related variability found in children's reports (Salmon et al., 2003). As a result, the effects of age on children's recall will not be discussed in depth.

The aims of this thesis are the following:

- First, to explore whether drawing and dramatization have an effect on children's verbal recall of a live staged event, after delays of one day, two weeks, and six months (Chapters Two and Three).
- To investigate whether there are relations between children's overall recall and their temperament, mood, language and symbolic skills under different interview conditions (Chapters Two and Three).
- To investigate how the content of children's drawings changes over delays of one day, two weeks, and six months (Chapter 4).
- The fourth aim is to explore if drawings act as retrieval cues for children, as suggested (Adi-Japha et al., 1998; Bloom & Markson, 1998; Gross & Hayne, 1999b). To do this, Study Four (Chapter Five) will explore whether different drawings (a child's own drawing vs another child's drawing) have an effect on memory of a video presentation of an altercation.
- Finally, to understand whether the mechanisms of drawing have a similar effect on adults and whether drawing interacts with adults' individual differences, Studies One and Two (Chapters Two and Three) will be replicated with an adult sample (Study Five, Chapter Six).

Chapter Two: **The role of individual differences, drawing, and dramatization for facilitating young children’s eyewitness testimony**

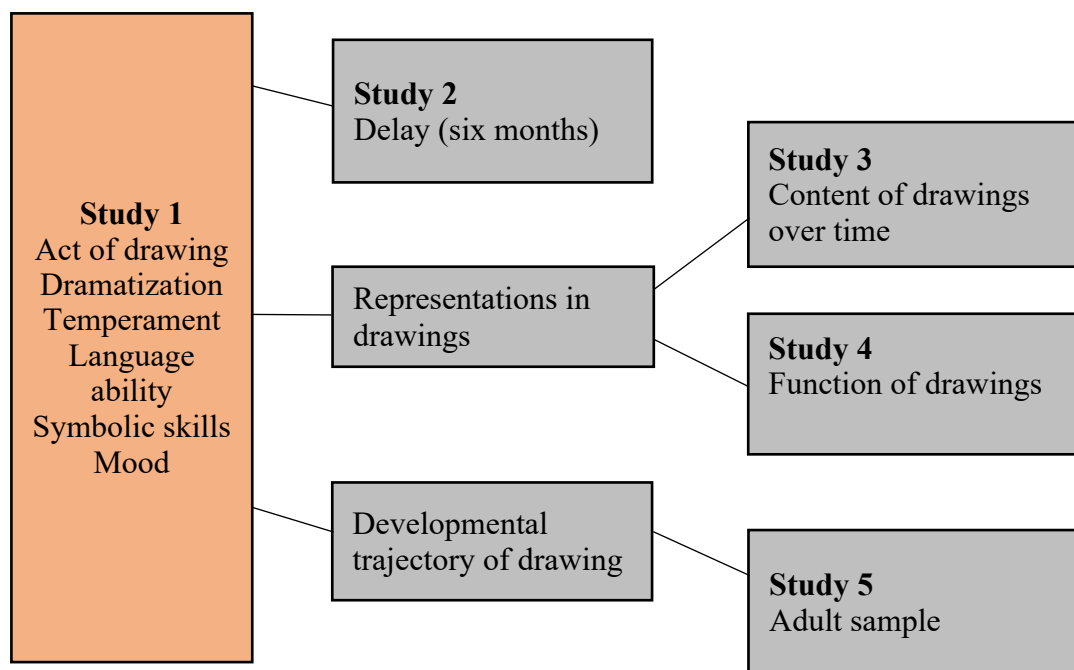


Figure 4. A schematic representation of Study One in relation to the overall thesis.

2.1 Study One

Nonverbal interview techniques, such as drawing and dramatization, have been shown to successfully facilitate children’s reporting of past events and emotional experiences (e.g. Butler et al., 1995; Gross & Hayne, 1998, 1999a; Katz & Hershkowitz, 2010; Lev-Wiesel & Liraz, 2007, Liwag & Stein, 1995; Macleod et al., 2013, 2016; Otgaar, van Ansen, Pauw, & Horselenberg, 2016; Risemberg & Zimmerman, 1992; Salmon, et al., 2003; Wesson & Salmon, 2001). Drawing allows children to generate their own retrieval cues (Gross & Hayne, 1998) and make them more concrete (Butler et al, 1995; Wesson & Salmon, 2001). Asking children to ‘show and tell’ what happened at a specific situation can supplement their verbal reports (Liwag & Stein, 1995) by helping them communicate information that is

unclear or missing from their statements (Pipe & Salmon, 2008). These prompts can provide supportive *external* scaffolding for recall processes.

It is possible that drawing and dramatization enhance children's verbal recall to varying degrees. Drawing may facilitate the reporting of objects and descriptive information because these items are easier to depict than attempting to depict actions (Wesson & Salmon, 2001). By contrast, dramatization may facilitate the reporting of actions and emotions because it allows children to move and gesture freely, and further demonstrate how they feel through facial expressions (Liwag & Stein, 1995; P. J. Miller & Sperry; 1988; Risenberg & Zimmerman, 1992; Wesson & Salmon, 2001).

A child's ability to report information is not entirely dependent on interview techniques. Individual differences such as personality and cognitive abilities may equally affect recall processes (Quas et al., 1997). One significant internal factor is a child's ability to tolerate the interview. Obtaining a gauge of mood, such as a crude happiness scale (Sun, Greenhoot, & Kelton, 2016) before and after an interview session, can inform how well children adjust to this process. Moreover, as interviews are inherently social situations in which children are required to interact with unfamiliar individuals (Chae & Ceci, 2005), personality traits such as shyness and sociability may affect a child's ability to cope in such contexts. For example, shy children have been shown to be less accurate than more sociable children when answering cued recall questions about a video or an event they saw (Chae & Ceci, 2005; Roebbers & Schneider, 2001) and when recalling text aloud (Schneider & Sodian, 1991). This reduced performance is likely due to inhibition associated with unfamiliar situations (Kagan, Reznick, & Snidman, 1987). However, Schneider and Sodian (1991) showed that if shy children were asked later in the session to recall a

new text, the shyness effect disappeared. This suggests that any reduced recall may dissipate after shy children become familiar with an interviewer.

Emotionality and activity may also relate to children's memory performance, however studies on their effects are scarce. Most studies on emotionality have yielded non-significant effects on children's verbal recall (e.g. Burgwyn-Bailes, Baker-Ward, Gordon, & Ornstein, 2001; Chae & Ceci, 2005; Geddie, Fradin, & Beer, 2000). In contrast, Gordon et al. (1993) found that 5-year old children's total correct recall was positively correlated with emotionality. Their findings are in conflict with Chae & Ceci's (2005) expectation that children high in emotionality will perform worse in an interview. Gordon et al. also found that 3-year old children who were high in emotionality used more nonverbal means such as gestures to express themselves than their non-emotional counterparts. This suggests that for young children who tend to express negative emotions more intently, recall may be facilitated by nonverbal communication.

These personality factors may interact with external supports. Compared to sociable children, for instance, shy children may be less able to benefit from the opportunity to use dramatization when verbally recalling an event due to less developed social skills: shy children may feel more unease acting out an event due to fearfulness of this novel social situation or embarrassment (A. H. Buss & Plomin, 1984; Colonna, Engelhard, & Bögels, 2010). For these children, drawing may facilitate recall to a better extent. Drawing helps reduce the anxiety associated with the interview and shifts the attention from the unfamiliar interviewer to the activity, allowing children to start recalling the target event (Butler et al., 1995; Jolley, 2010).

Cognitive functions such as language and symbolic skills may also affect children's ability to act as an eyewitness due to language and memory's shared

cognitive and neural foundations (Gupta & MacWhinney, 1997). Salmon et al. (2003) found a positive relation between expressive language and recall of autobiographical experiences in 5- to 7- year old children. Receptive language skills may also contribute to amount of information reported; children need to understand the instructions of the interviewer to successfully answer open-ended and particularly closed-ended questions, which are typically used with younger participants (Butler et al., 1995). Researchers have traditionally studied the impact of either cognitive abilities (e.g. Lewis et al., 2000), nonverbal techniques (e.g. Butler et al., 1995; Salmon, 2001), or personality (e.g. Roebbers & Schneider, 2001). However, individual differences may interact with external scaffolding techniques when children are asked to recount an event they have witnessed. Techniques which ask children to draw or dramatize while providing reports may be related to symbolic ability, given the links between symbolic skills and language (Lewis et al., 2000) and the symbolism inherent in drawing and re-enactment (Cox, 1992; Meltzoff, 1995). This suggests that cognitive abilities may interact with nonverbal techniques.

The nature of the event children are describing may also play a role in how they recall information about it. In many studies examining the effects of external prompts on children's reports, children are either asked to reflect upon different time points and salient events in their own lives (e.g. Gross & Hayne, 1998; Salmon et al., 2003; Wesson & Salmon, 2001) or are actively involved in the event. In such studies, children have engaged in events such as visits to a fire station (Butler et al., 1995a), chocolate factory (Gross & Hayne, 1999a), a magic show (Bruck, Melnyk, & Ceci, 2000), and a pirate show (La Rooy, Pipe, & Murray, 2005). Such studies offer fun, interactive experiences, which children are then asked to recount. Although such scenarios are valuable, they have been criticized for a lack of forensic relevance

(Macleod et al., 2013), and they may differ from eyewitness situations which are less positive in valence. Those events often have an interactive element which may not be present in eyewitness situations. In situations where participants are passive viewers of an event, memory may work differently. For example, Hope and colleagues (2016) showed that active adult witnesses of a stressful situation reported significantly less accurate information than non-active observers. For a less stressful scenario, in which children are bystanders to, memory may be more accurate.

This study considers the role of external prompts (drawing and dramatization) and internal characteristics, such as temperament, language ability, symbolic skills, and mood, on children's ability to report information following a simulated live eyewitness event. Drawing and dramatization are considered external cues in that children will be asked to utilise drawing materials or their own body as nonverbal aids to further facilitate recall, as opposed to merely narrate what they remember. A minor altercation between two friends regarding who will read a storybook to the children was staged; during this altercation, a salient object (stuffed monkey) was taken from one of the actors by the other. This kind of event provides a more ecologically valid way to measure memory for something a child may be asked to give testimony about, than a fun, educational interactive scenario (Butler et al., 1995; Gross & Hayne, 1998), as here children are passive viewers of a minor argument. The effects of three interview techniques were tested: verbal recall only, drawing, and dramatization. As young children show significant forgetting after longer delays (Baker-Ward et al., 1993; Lamb et al., 2000; Pipe et al., 2004), memory retention was investigated one day after the event and approximately two weeks later. The study also included a third delay, six months after the event. However, after six months a substantial number of the participants did not return for an interview, which may have adversely affected the

analyses of the study. As a result, the findings of the six-month delay will be presented separately in the following chapter (Chapter Three).

Following previous investigators (see Gilstrap & Papierno, 2004), open-ended and prompted, close-ended questions were utilized. Both types of questions were used because free recall directives can result in accurate, however brief reports, particularly in younger children (around three years) (e.g. Gross & Hayne, 1998; Salmon et al., 2003; Wesson & Salmon, 2001). Providing such young children with more direct questions may facilitate their reports (Butler et al., 1995; Hammond & Fivush, 1991).

Several hypotheses were made in this study. First, as drawing helps children make retrieval cues more concrete and represent objects more easily than actions (Wesson & Salmon, 2001), it is hypothesized that children who draw will report more information about objects (Gross & Hayne, 1998). Further, as dramatization involves gestures and mime, it may facilitate the reporting of actions (Wesson & Salmon, 2001). Third, children will report more information when interviewed one day after the event than two weeks after. Fourth, sociability is expected to be positively related to recall. Fifth, emotionality and shyness are predicted to be negatively related to a verbal-only interview, particularly during the first interview. Sixth, although no previous studies have investigated the link between activity and verbal recall, it is speculated that activity will be related to better recall, more so in the verbal and dramatization conditions than the drawing condition, which allows for less kinetic activity. Seventh, it is hypothesized that children with better symbolic skills will perform better in the drawing and dramatization conditions, as higher symbolic skills will help them engage in these tasks. Lastly, children with better language skills are expected to perform better in the verbal condition.

2.2 Method

Participants

Eighty-one children, aged 3-6 years ($M = 58.83$ months, $SD = 11.05$ months) were recruited from two private nursery schools and two public primary schools in Lancashire, UK. There were 38 girls ($M = 57.63$ months, $SD = 10.16$ months) and 43 boys ($M = 59.88$ months, $SD = 11.79$ months), who were predominantly Caucasian. All children were English speaking and attended English speaking nursery and primary schools. Participants were randomly assigned to one of three conditions: a Verbal condition (27), Drawing condition (28), or Dramatization (26) condition. Initially, 97 children were recruited. However, four children refused to participate, two were not English speaking, and the remaining 10 were not present on the day of the event. One child did not attend the second interview, and one child's parents did not fill out the EAS Survey for Children. Children received a colouring book and a packet of crayons as a thank you for their participation.

Materials

The Test of Pretend Play (ToPP; Lewis & Boucher, 1998). The ToPP assesses symbolic play abilities in children between 18 months and 6 years through elicited, instructed, and modeled play. It measures three different types of symbolic play: substituting one object for another (e.g. using a cloth for a blanket to put a doll to bed), attributing an imaginary property to an object (e.g. pretending the teddy bear feels poorly), and referring to an absent object as if it were present (e.g. pretending to lick an ice-cream cone).

The Preschool Language Scale (PLS-4; Zimmerman, Steiner, & Pond, 2002). The PLS-4 assesses receptive and expressive language ability from birth to 6

years 11 months, in areas such as attention, play, social communication, gesture, vocal development, vocabulary, concepts, phonological awareness, language structure, and integrative language abilities (Zimmerman et al., 2002). It consists of Auditory Comprehension (AC) and Expressive Communication (EC) subscales.

EAS Survey for Children: Parent Rating (A. H. Buss & Plumin, 1984).

The EAS Survey assesses the dimensions of Emotionality (proneness to distress), Activity (behavioral arousal), Sociability (preference to being in the company of others versus being alone), and Shyness (tendency to be timid and tense with strangers and acquaintances). The EAS Survey is a 20-item questionnaire through which parents rate their children's behaviour on a 5-point Likert scale ranging from 'not characteristic or typical of my child' to 'very characteristic or typical of my child'.

Mood scores. Children's mood scores prior and after each interview were assessed with a self-report scale comprising a row of five smiley faces which ranged from very unhappy to very happy. It was adopted from the Facial Image Scale (FIS), which measures anxiety in relation to dental procedures (Buchanan & Niven, 2002). Face scales have been used successfully in previous research to investigate children's anxiety levels (Buchanan & Niven, 2002). A different number of faces (varying from three to nine faces) with different elements of facial expression (forehead, eyebrows, eyelids, mouth, and tears) is presented to children (Salas, Gabaldón, Mayoral, & Amayra, 2002). Children attribute a numerical point to each face which represents an emotional state, and which is then calculated by the interviewer to give a score to the child's choice (Méndez, 1999).

In this study, each child was asked to point to the face they felt most likely at that moment. The scale was scored by giving a value of one to the most negative affect and five to the most positive affect. To investigate changes in mood across the

three conditions of the study, mean mood scores were calculated by subtracting scores after each interview from scores prior to each interview to provide a single difference score.

Props. A teddy bear (Teddy) (H=32cm, W=20cm), a monkey toy (Monkey) (H=33cm, W=26cm), and a children's picture book (Tsoroni-Georgiadi, 2014) were used as aids for the staged event which children witnessed. To make sure the children were not familiar with the content of the story, a Greek picture book which was translated in English by the experimenter was used. The book was age appropriate and of educational value; it is part of a series of picture books that aim to help children express their emotions.

Design

A 3 x 2 repeated measures design was used. Condition (Verbal, Drawing, and Dramatization) was the between-subjects factor and Delay (one day (first interview) vs two weeks (second interview)) acted as a within-subjects factor. The dependent variables were verbal performance in free recall and verbal performance in prompted recall. Pearson product-moment correlations and regression analyses were also performed on the total amount of information recalled.

Procedure

Initial testing. Prior to the study, participant information sheets, consent forms, and a copy of the EAS Survey were distributed to parents by teachers at the participating schools. Initially, all children whose parents had granted permission met with the experimenter to establish rapport. At this stage, each child's symbolic play and language skills were assessed through the ToPP and the PLS-4. Each child was

tested individually in a quiet room in their school, first with the ToPP followed by the PLS-4, in two sessions. All children were tested on these scales prior to their participation in the staged event, apart from one who was tested after.

Staged event. A novel, salient event involving an altercation was devised to simulate an eyewitness situation, and it took place in the children's classrooms. It lasted approximately 7-10 minutes and the children witnessed it simultaneously, in groups. Specifically, the event was presented six times in total across the four participating schools, in groups of eight, 11, 27, and 16 children. The number of participants in each group was determined based on each school's availability and needs regarding accommodating the event in their premises. It involved a book reading interaction between two actors. Actor 1 (male) entered the children's classroom, introduced himself, and explained that he had come to read a story about a brave little elephant. He then introduced to the children his two friends, Teddy and Monkey, who would also listen to the story. Two respective stuffed animals were placed in clear view equidistant from the actor (Figure 5). Before he began to read the book, he told them that his friend (Actor 2, female) was supposed to read the story with him, but as she was late, he would start without her. After he read a few pages, Actor 2 stormed in the room and reprimanded Actor 1 for starting the story without her. She said angrily: *'John, you started the story without me? Why did you do that? You were supposed to wait for me! I wanted to read the story! Oh, I'm leaving!'*. When she reached the door, she turned back, grabbed the monkey toy, said to Actor 1 angrily *'And, I'm taking Monkey with me!'*, and stormed out of the classroom. Actor 1 reassured the children that Actor 2 and Monkey were fine and were probably waiting for him in the schoolyard, and then finished reading the storybook. Actor 1 then told the children that he had a special sticker for each one of them, which only goes on the

left hand, and asked them to put out their hands to place it on there. If any child refused to allow the actor to place the sticker, they were allowed to put it on their own hand (see Appendix A for the script of the event, p. 206).



Figure 5. Image from a recording of the event.

Memory interviews. Children were interviewed individually by the experimenter: (a) one day after the event (first interview, $M = 1.09$, $SD = .84$) and (b) two weeks after the event (second interview, $M = 14.12$, $SD = .60$)². All interviews took place in a quiet room in the children's schools and were video recorded. First, children were shown a mood scale comprising smiley faces ranging from very unhappy to very happy and were asked to indicate how they felt at that particular

² Six children were interviewed a few hours after the event. Four children missed the initial interviews and were interviewed later: two, four, five, and six days after the event. One child was interviewed for the second time 19 days after the event due to absence. To investigate potential differences, the analyses were run twice: once with all participants included and once without the children who were tested two days and more after the event ('off-schedule participants'). As there were only two cases of minor differences in the results, the data from the full sample and the two instances of different results are reported.

moment. They were given the following instruction: *'I want you to look at these smiley faces. This one is very unhappy, this is unhappy, this is neither happy nor sad, this is happy, and this is very happy! How do you feel right now? Show me'*. The same procedure was repeated after the interview was over.

All children were randomly assigned to one of three conditions: Verbal, Drawing, or Dramatization. Each condition comprised a free recall and a prompted recall phase.

Verbal condition. The interview started with the free recall phase in which the children were asked to provide a narrative account of what happened in the event they witnessed. In line with previous research (Butler et al., 1995; Gross et al., 2009), the experimenter started the interview with the following statement: *'I heard that yesterday/a while ago, something really special happened here in the nursery/school and you were given a sticker like this one* (each child was shown a sticker like the one they had been given). *I wasn't here. Can you tell me all about what happened? Tell me anything you can remember about when you got the sticker'*. When it was obvious that each child had recounted all the information he or she remembered, the prompted recall phase followed, which comprised four recall prompts (a) *'tell me who was there'*; (b) *'tell me what the story was about'*; (c) *'tell me if there were any cuddly toys'*; (d) *'tell me where the man put your sticker'*. All children were asked to answer these questions even if they had already provided the relevant information during the free recall phase of the interview (Gross & Hayne, 1999a).

Drawing condition. Here, participants were provided with a sheet of paper, 10 colouring pencils, a pencil, and a rubber and were asked to draw what they saw while narrating. The free recall phase was the same as per the verbal condition, with the experimenter asking the following question: *'Can you draw and tell me all about what*

happened? Draw me anything you can remember about the time when you got the sticker'. Although previous research found that children of this age usually narrate while they draw (e.g. Butler et al., 1995; Gross & Hayne 1998, 1999a), I found that most of the time children did not narrate while drawing. If a child did not spontaneously narrate while drawing, he/she was asked to do so through prompts such as '*Please draw and tell me*', '*What are you drawing now?*' and '*What is that (you are drawing)?*'. In the prompted recall phase the experimenter asked the same four questions as per the verbal condition, but this time each child was asked to 'draw and tell' their answers.

Dramatization condition. In this condition, participants were asked to show and narrate what they witnessed through gestures and mime. The directions given were the same as per the verbal condition. More specifically, in free recall the experimenter said: '*Can you show and tell me all about what happened? Show me anything you can remember about the time when you got the sticker*'. Children were further asked to show and tell what happened '*by using your hands and your legs like this (experimenter moves hands and legs)*'. To make sure they understood the task, the experimenter used the following everyday example; '*For example, when I wake up in the morning I open my eyes (experimenter opens eyes, stretches and yawns), I wash my face (experimenter pretends to wash her face), I brush my teeth (experimenter pretends to brush her teeth), I eat my breakfast (experimenter pretends to eat breakfast from a bowl), I drink my milk (experimenter pretends to drink milk), and then I go to school (experimenter pretends to walk)*'. The prompted recall phase followed with the experimenter asking the same four questions as per the verbal condition, but this time each child was asked to 'show and tell' their answers. If a child did not spontaneously

‘show’ while narrating, he/she was asked to do so through prompts such as ‘*Please show and tell me*’.

During each interview, the experimenter only responded enough to maintain the conversation. Non-directive prompts were used to maintain the conversational flow such as ‘*uh huh*’, ‘*and then what*’, ‘*tell me more*’, ‘*show me*’, ‘*you are doing great*’, ‘*is there anything else you can remember/draw/show me about the time when you got the sticker?*’, and repetitions of a portion of the child’s words. When each child had stated they could not remember anything else, prompted recall followed.

Coding

Interviews of all conditions were video and audio recorded and were transcribed verbatim. Children’s scores in free and prompted recall were determined by the accuracy of their verbal reports, based on the coding schemes used in previous research (e.g. Butler et al., 1995; Gross & Hayne, 1998; Salmon et al., 2003; Wesson & Salmon, 2001). Free recall responses included all details provided as an answer to the initial open-ended question. Prompted recall responses involved all responses given for every prompted question and any other piece of information that was offered spontaneously at this stage of the interview. The amount of accurate information elicited was coded into one of seven content categories: people, actions, objects, descriptions, places, time, and affective information. The total number of items relating to each content category for free and prompted recall was calculated, and each child received a score for each category. Children were only given credit the first time they reported a piece of information. People referred to any people present in the event other than the child him/herself and the main characters of the book (e.g. *the lady* took the monkey, *the elephant* was lost). Actions involved activities that took

place during the event and in the storybook (e.g. he *read* a story). Objects included items that were present in the event and the storybook (e.g. the cuddly *toy*). Places and time included information referring to places and time in the storybook and the event (e.g. he sat *on* a chair, the elephant found his mum *again*). Affective information referred to any information offered regarding the child's evaluation of the event, the emotions expressed during the event by the actors, and the emotions experienced by the characters of the book (e.g. the lady was *angry*, the elephant was *scared*). Descriptions involved elaborations of all the categories (e.g. *two* toys, a *black* shirt). Only information relating to the child's description of the staged event and the storybook was coded. Any information that was offered which was not true (e.g. the book was about *Gruffalo*) was coded as *error*.

The experimenter coded 100% of the transcripts and a second coder independently coded 25% of the narratives. First, inter-observer reliability was calculated by using Cohen's kappa. However, as the kappa statistic is only reliable for a small number of categories (Viera & Garrett, 2005), and here we coded for total numbers of items (e.g. total number of objects in free recall and in prompted recall), inter-observer reliability was recalculated using Pearson product-moment correlations, and Cohen's kappa was dropped. Correlations on total items of each content category yielded a correlation coefficient of $r(15) = .99, p < .001$ for the first interview and $r(22) = .99, p < .001$ for the second interview. Two further Pearson product-moment correlation on the amount of errors produced by the participants in both phases of each interview yielded an inter-observer reliability coefficient of $r(15) = .93, p < .001$ for the first interview and $r(22) = .99, p < .001$ for the second interview. The experimenter's scores were used for analysis.

2.3 Results

In order to show that children in each condition were matched on background characteristics preliminary one-way Analyses of Variance (ANOVAs) were performed which revealed no significant differences across conditions (all F s < 2.24, all p s > .05) in symbolic play (ToPP), PLS auditory comprehension, PLS expressive communication, EAS emotionality, EAS activity, and EAS shyness. There was however a significant difference in EAS sociability ($F(2, 77) = 3.39, p = .039, \eta^2_p = .08$), therefore it was included in further analyses as a covariate.

Interviewer's non-directive prompts

First, to ascertain that recall in each condition was not affected by the interviewer's utterances, the amount of non-directive prompts offered by the experimenter was considered. The mean rate of prompts per minute for each interview was calculated, and a one-way ANCOVA with condition as a between-subjects factor and age and sociability as covariates was performed, which revealed no significant main effects (all F s < 3.91, all p s > .05). A similar analysis for the second interview found a significant main effect of age, $F(1, 74) = 16.10, p < .001, \eta^2_p = .18$ and condition, $F(2, 74) = 5.39, p = .007, \eta^2_p = .13$. Further post hoc tests revealed a similar pattern to that found by Wesson and Salmon (2001). The mean rate of prompts per minute given in the Drawing condition ($M = 7.98, SD = 3.22$) was significantly *lower* than the Dramatization condition ($M = 11.42, SD = 4.51, p = .005$) but not the Verbal condition ($M = 10.35, SD = 4.56, p = .099$).

Interview duration

Next, to investigate whether children who drew and dramatized spent more time in the interview (in minutes) relative to those in the verbal-only interview, analyses were run on the duration of each interview. A one-way ANCOVA with condition (Verbal, Drawing, Dramatization) as the between-subject factor was initially performed for the first interview. Age and sociability were entered as covariates. There was a significant main effect of condition on interview duration, $F(2, 75) = 27.79, p < .001, \eta^2_p = .43$. A post hoc Bonferroni test revealed that the Drawing interview ($M = 5.78, SD = 3.11$) was significantly longer than the Verbal interview ($M = 1.73, SD = .97, p < .001$) and the Dramatization interview ($M = 2.36, SD = .77, p < .001$). Age, $F(1, 75) = .02, p = .879, \eta^2_p = .00$ and sociability, $F(1, 75) = 3.62, p = .061, \eta^2_p = .05$ did not have an effect. A similar analysis on the duration of the second interview found a significant main effect of condition, $F(2, 74) = 25.71, p < .001, \eta^2_p = .41$. A post hoc Bonferroni test showed that two weeks after the event the Drawing interview ($M = 5.01, SD = 3.23$) was significantly longer than the Verbal interview ($M = 1.39, SD = .60, p < .001$) and the Dramatization interview ($M = 1.79, SD = .42, p < .001$). Age, $F(1, 74) = 3.54, p = .064, \eta^2_p = .05$ and sociability, $F(1, 74) = 3.57, p = .063, \eta^2_p = .05$ did not have an effect on the duration of the interview.

Type of correct information in the first and the second interview

Free recall. In line with Wesson and Salmon (2001) and Salmon et al. (2003), each of the seven content categories in free recall were separately analysed. Separate 3(condition: Verbal, Drawing, Dramatization) x 2(delay: first interview vs. second interview) repeated measures ANCOVAs were performed with condition as a

between-subjects factor and delay as a within-subjects factor. Age and sociability were entered as covariates.

Main effects of condition. A significant main effect of condition was found for ‘objects’, $F(2, 74) = 4.64, p = .013, \eta^2_p = .11$. A post hoc Bonferroni test showed that children in the Drawing condition reported significantly more objects than children in the Verbal condition ($p = .013$) (Table 1).

Main effects of delay. A significant main effect of delay was found for ‘descriptions’³ only (Table 2). A post hoc Bonferroni tests revealed no significant differences ($p = .567$).

Main effects of the covariates age and sociability. A significant main effect of age was found for ‘actions’, $F(1, 74) = 4.50, p = .037, \eta^2_p = .06$, ‘objects’, $F(1, 74) = 9.24, p = .003, \eta^2_p = .11$, and ‘places’, $F(1, 74) = 7.48, p = .008, \eta^2_p = .09$. There was no other main effect of age on the remaining categories (all $F_s < 3.72$, all $p_s > .05$). Further, a significant main effect of sociability was found for ‘people’, $F(1, 74) = 7.31, p = .008, \eta^2_p = .09$, ‘actions’, $F(1, 74) = 6.55, p = .013, \eta^2_p = .08$, and ‘objects’, $F(1, 74) = 6.23, p = .015, \eta^2_p = .08$. Sociability did not have an effect on the remaining categories (all $F_s < 3.91$, all $p_s > .05$).

³ When the off-schedule participants were excluded from the repeated measures ANCOVA, delay had an effect on ‘places’, $F(1, 69) = 4.75, p = .033, \eta^2_p = .06$. However, post hoc Bonferroni tests revealed no significant differences ($p = .178$).

Table 1

Means (Standard Deviations), F-Values, p-Values, and Effect Sizes Across Conditions for the Seven Content Categories in Free Recall of the First and the Second Interview

	<u>Verbal</u>	<u>Drawing</u>	<u>Dramatization</u>			
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>F(2, 74)</i>	<i>p</i>	η^2_p
People				.24	.790	.01
1st interview	1.30 (1.20)	1.72 (1.70)	1.52 (1.42)			
2nd interview	1.52 (1.72)	1.20 (1.50)	1.52 (1.72)			
Actions				.59	.556	.02
1st interview	2.52 (3.48)	3.08 (3.63)	3.37 (3.50)			
2nd interview	2.00 (2.76)	1.48 (2.18)	2.07 (2.37)			
Objects				4.64	.013	.11
1st interview	1.33 (1.14)	3.08 (2.94)	2.37 (1.92)			
2nd interview	1.26 (1.40)	2.88 (3.06)	1.44 (1.50)			
Descriptions				1.20	.307	.03
1st interview	.63 (1.08)	1.52 (2.22)	1.48 (1.78)			
2nd interview	.93 (1.44)	1.28 (2.03)	1.04 (1.51)			
Places				1.26	.289	.03
1st interview	.56 (.93)	1.28 (1.88)	.89 (1.34)			
2nd interview	.48 (1.09)	.96 (1.46)	.74 (1.09)			
Time				1.01	.368	.03
1st interview	1.00 (2.53)	.92 (1.73)	1.33 (1.86)			
2nd interview	.48 (1.01)	.36 (.70)	.74 (1.53)			
Affect. Inf.				1.49	.233	.04
1st interview	.11 (.32)	.32 (.56)	.07 (.27)			

2nd interview .00 (.00) .12 (.33) .07 (.27)

Note. Affect. Inf. = Affective information.

Table 2

Means (Standard Deviations), F-Values, p-Values, and Effect Sizes of Delay (First Interview and Second Interview) for the Seven Content Categories in Free Recall

	<u>First interview</u>	<u>Second interview</u>	<i>F</i> (1,74)	<i>p</i>	η^2_p
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			
People	1.51 (1.44)	1.42 (1.64)	3.78	.056	.05
Actions	2.99 (3.51)	1.86 (2.44)	.45	.503	.01
Objects	2.24 (2.20)	1.83 (2.19)	3.04	.085	.04
Descriptions	1.20 (1.77)	1.08 (1.65)	4.12	.046	.05
Places	.90 (1.44)	.72 (1.22)	3.07	.084	.04
Time	1.09 (2.06)	.53 (1.14)	.00	.988	.00
Affect. Inf.	.16 (.41)	.06 (.24)	.00	.968	.00

Note. Affect. Inf. = Affective information.

Interactions between age and delay, delay and sociability, and delay and condition. There were further significant interactions between delay and age for ‘people’, $F(1, 74) = 4.35, p = .040, \eta^2_p = .06$, ‘actions’, $F(1, 74) = 4.48, p = .038, \eta^2_p = .06$, and ‘places’, $F(1, 74) = 4.53, p = .037, \eta^2_p = .06$. A post hoc Bonferroni test showed there was a significant difference between delays for actions ($p = .001$). Children reported significantly more actions in the first interview ($M = 2.98, SD =$

⁴ When the off-schedule participants were excluded from the repeated measures ANCOVA, the interaction between age and delay for ‘people’ was not significant, $F(1, 69) = 3.77, p = .056, \eta^2_p = .05$.

3.51) than the second interview ($M = 1.86, SD = 2.44$). Further post hoc Bonferroni tests showed that there were no significant differences between delays for objects ($p = .115$) and places ($p = .261$). There were no further significant interactions (all $F_s < 3.04$, all $p_s > .05$).

Prompted recall. Further separate 3(condition: Verbal, Drawing, Dramatization) x 2(delay: first interview vs. second interview) repeated measures ANCOVAs were performed for each of the seven content categories in prompted recall with condition as a between-subjects factor and delay as a within-subjects factor. Age and sociability were entered as covariates.

Main effects of condition and delay. Condition and delay did not have an effect on any of the content categories (all $F_s < 2.70$, all $p_s > .05$).

Main effects of the covariates age and sociability. There was a significant main effect of age for ‘objects’, $F(1, 74) = 4.87, p = .030, \eta^2_p = .06$, and ‘descriptions’, $F(1, 74) = 6.41, p = .013, \eta^2_p = .08$. There were no other main effects of age on the remaining categories (all $F_s < 3.13$, all $p_s > .05$). There was also a significant main effect of sociability for ‘places’, $F(1, 74) = 4.86, p = .031, \eta^2_p = .06$. Sociability did not have a significant effect on any of the remaining categories (all $F_s < 2.63$, all $p_s > .05$).

Interactions between age and delay, delay and sociability, and delay and condition. There were no significant interactions between the variables (all $F_s < 2.14$, all $p_s > .05$).

Accuracy scores and analyses for errors

Children's accuracy scores and amount of errors made in each phase of the two interviews were also examined. Children's accuracy levels in free and prompted recall in the first and the second interview combined were very high (percent correct free recall scores: $M = 97.12$, $SD = 7.97$, percent correct prompted recall scores: $M = 86.07$, $SD = 15.97$). Further, two 3(condition: Verbal, Drawing, Dramatization) x 2(delay: first interview vs. second interview) repeated measures ANCOVAs with age and sociability entered as covariates investigated differences in 'errors' made by the children in free and prompted recall and produced no significant main effects or interactions (all $F_s < 2.21$, all $p_s > .05$).

Mood scores

The mean mood score prior and after the first interview was, $M = 4.14$ (out of 5.00 which denotes a happier state), $SD = .35$. The mean mood score prior and after the second interview was, $M = 4.11$ (out of 5.00), $SD = .12$.

Relations between internal factors and children's overall recall

I further investigated whether children's temperament, symbolic and language abilities, and mood change were associated with performance in free and prompted recall. As I was interested in the children's overall performance in each condition, I ran analyses split by condition and combined free and prompted recall.

First interview. First, the relation between cognitive and temperament factors and overall performance was investigated, using partial correlation analyses and controlling for Age. In the Verbal condition, the total amount of information reported (free and prompted recall combined) was negatively correlated with Emotionality and

Shyness and positively correlated with Auditory Comprehension and Expressive Communication. In the Drawing condition, the total amount of information reported was positively correlated with Sociability. In the Dramatization condition, the total amount of information was positively correlated with Symbolic Ability (ToPP total score), Auditory Comprehension, and Expressive Communication (see Table 3).

Table 3

Correlations Between Temperament, Symbolic and Language Ability, Mood Change, and Children's Overall Verbal Recall in Each Condition of the First Interview

Recall	Emo	Act	Soc	Shy	ToPP	AC	EC	Mood
Verbal	-.51**	.38	.34	-.44*	.28	.46*	.62***	-.33
Drawing	.21	.12	.42*	-.34	.36	.31	.22	.32
Drama	.02	-.32	.02	-.33	.54**	.47*	.48*	.16

Note. *** $p \leq .001$, ** $p < .01$, * $p < .05$ (2-tailed). Drama = Dramatization. Emo = Emotionality; Act = EAS Activity; Soc = EAS Sociability; Shy = EAS Shyness; ToPP = Symbolic Ability; AC = PLS Auditory Comprehension; EC = PLS Expressive Communication; Mood = Mood Change. For the Control condition, $N = 27$. For the Drawing condition, $N = 25$. For the Dramatization condition, $N = 27$.

Further regression analyses split by condition investigated whether any of the overall variables predicted children's verbal reports. Only the variables that came out significant in the correlations were entered into the analyses. Multiple regressions were run on the total amount of information reported in the first interview with Age, Symbolic Ability, Expressive and Receptive Language, Sociability, Shyness, and Emotionality entered simultaneously as predictor variables. In the Verbal condition ($R^2 = .59, p = .009$) and the Drawing condition ($R^2 = .42, p = .135$), none of the predictor variables accounted for a significant portion of the variance (all $ps > .05$). In the Dramatization condition ($R^2 = .62, p = .005$), Shyness ($\beta = -.40, t = -2.34, p$

= .030) accounted for a significant portion of the variance, suggesting that shy children offer less information.

Second interview. The same correlation analyses as per the first interview were performed for the second interview (see Table 4). In the Verbal condition, the total amount of information reported was positively correlated with Activity, Sociability, and Expressive Communication. The total amount of information was also positively correlated with Sociability in the Drawing condition and with Symbolic Ability in the Dramatization condition.

Table 4

Correlations Between Temperament, Symbolic and Language Ability, Mood Change, and Children's Overall Verbal Recall in Each Condition of the Second Interview

Recall	Emo	Act	Soc	Shy	ToPP	AC	EC	Mood
Verbal	-.22	.58**	.39*	-.25	.23	.12	.40*	-.07
Drawing	-.08	.34	.42*	-.29	.36	.12	.20	.27
Drama	.12	-.16	.20	-.35	.53**	.19	.24	-.10

Note. *** $p \leq .001$, ** $p < .01$, * $p < .05$ (2-tailed). Drama = Dramatization. Emo = Emotionality; Act = EAS Activity; Soc = EAS Sociability; Shy = EAS Shyness; ToPP = Symbolic Ability; AC = PLS Auditory Comprehension; EC = PLS Expressive Communication; Mood = Mood Change. For the Control condition, $N = 27$. For the Drawing condition, $N = 25$. For the Dramatization condition, $N = 27$.

Further multiple regressions split by condition were performed on total details reported in the second interview, with Age, Symbolic Ability, Expressive Language, Sociability, and Activity entered simultaneously as predictor variables. The variables that did not come out significant in the correlations were not entered into the analysis. In the Verbal condition ($R^2 = .51, p = .007$), only Activity ($\beta = .43, t = 2.10, p = .048$) explained a significant portion of the variance, suggesting that activity can predict children's overall recall after a delay of two weeks. In the Drawing condition (R^2

= .56, $p = .005$), Sociability marginally accounted for a significant portion of the variance ($\beta = .37, t = 2.19, p = .041$), suggesting that sociability may predict overall recall. In the Dramatization condition ($R^2 = .51, p = .007$), Symbolic Ability explained a significant portion of the variance ($\beta = .54, t = 2.58, p = .017$), suggesting that symbolic ability can predict overall recall two weeks after the event.

2.4 Discussion

This study used a novel staged event to investigate young children's eyewitness testimony under different nonverbal interview techniques, and further examined how temperament, symbolic ability, language skills, and mood facilitate their verbal reports. Confirming the first hypothesis, it was found that children who drew reported significantly more objects than children who simply narrated what happened. The second hypothesis, that dramatization would facilitate the reporting of actions, was not confirmed. The third hypothesis, that children would report more information when interviewed one day after the event than two weeks after, was confirmed only for actions. In line with the fourth hypothesis, sociability correlated positively with recall in the Drawing condition in the first interview and with recall in the Verbal and Drawing conditions in the second interview. The fifth hypothesis, that emotionality and shyness would correlate negatively with recall in the Verbal condition, and that this effect would diminish after two weeks, was also confirmed. In addition, shyness predicted negatively recall in the Dramatization condition in the first interview. Supporting in part the sixth hypothesis, activity correlated with and predicted recall in the Verbal condition in the second interview. Confirming the seventh hypothesis, symbolic ability positively correlated with recall in the Dramatization condition in both interviews and predicted recall in the same condition

in the second interview. Lastly, the hypothesis that language skills would correlate with recall in the Verbal condition was also confirmed. Language ability was also associated with recall in the Dramatization condition. These findings will be discussed in turn.

Drawing may have facilitated the reporting of objects for a variety of reasons. Drawing allows children to generate their own retrieval cues (Gross & Hayne, 1998) and make them more concrete (Butler et al, 1995; Wesson & Salmon, 2001). Specifically, as children draw an element of the event, they may remember and report more aspects of it. One reason this may occur is that drawing provides another avenue to mentally ‘reinstatate’ the context of the witnessed event (see Milne & Bull, 2002). By drawing one aspect after another, children may talk about the content of their drawings and therefore mentally re-experience the event (Barlow et al., 2011). This process may cue them to recall more details relevant to the event, or even go back to drawn items and disclose additional details about it (Barlow et al., 2011; Schacter & Tulving, 1994; Tulving, 2002). The longer duration of the drawing interviews relative to the other conditions may also have affected memory recall by allowing children more time to search their memory and provide a structure for their reports (Butler et al., 1995; Pipe et al., 2002; Salmon, 2001). In fact, creating a drawing requires that children organize and plan their drawings (see Freeman, 1980). As their verbal reports of past events may be fragmented, planning their drawing may allow them to structure their narration in a logical sequence (Jolley, 2010) and thus scaffold their memory search.

Children may benefit from drawing for object recall in particular, simply because drawing objects is easier than drawing actions; indeed, objects are one of the first types of representational drawings children create (Eng, 1999; Golomb, 1974). It

is also possible that the aspects of planning during drawing production favour object representations. When executing a drawing, one needs to be specific about the size and spatial relationships of the elements being drawn (Golomb & Farmer, 1983), which may focus children upon concrete elements such as objects in order to provide initial structure to the scene. It would be useful in future work to note whether children draw objects first and graphically structure the remainder of the event around them.

Congruent with Wesson and Salmon's findings (2001), dramatization did not facilitate children's recall in this study. First, dramatization may have not facilitated children's reports due to children's inability to engage fully with the task. Although the experimenter physically demonstrated (with gestures and mime) what each child was expected to do, on some occasions the children only narrated without any accompanying movements. This frequently urged the experimenter to prompt the children to 'show' during the task, and this is evident in the second interview in which the interviewer used significantly more non-directive prompts than in the drawing condition. Wesson and Salmon found that drawing and re-enactment were equally effective methods for eliciting more descriptions. Two methodological differences may explain these disparate findings. Children in Wesson and Salmon's study were asked to make a corresponding facial expression of the emotion they had felt at the time the experience took place, and found that re-enactment facilitated verbal recall. This parallels the methods of Liwag and Stein (1995), who also found an advantage when children 'emotionally reinstated' personal past experiences. In this study, the children passively watched an interaction between two other people, which may have not been encoded as efficiently as a self-performed task (Engelkamp & Zimmer, 1997; Hornstein & Mulligan, 2001). Thus, the findings of this study may differ from prior

work because here the children did not re-experience the event emotionally, and this study involved an observed rather than a personal event.

The analyses also showed that children freely reported significantly more action when they were interviewed one day after the event than two weeks after. This effect of delay in verbal performance interacted with age. This finding is consistent with previous research (Lamb & Thierry, 2005; Pipe et al., 2004). The real-world implication is that interviews which take place immediately after a target event are more valuable than those which take place after longer intervals, as memory decay can occur between the event and the interview (Baker-Ward et al., 1993; Lamb et al., 2000). This is especially important given that there are usually delays between the occurrence of an event and the child's questioning (Brown, Lewis, & Lamb, 2015).

Further, no significant differences were found in accuracy between age, sociability, delay, and among conditions in the number of *errors* reported in any of the interviews. Accuracy was very high across the board, and children did not confabulate. This confirms that nonverbal methods such as drawing and dramatization may facilitate aspects of eyewitness testimony without compromising the accuracy of reports.

With regard to individual differences, sociability was positively correlated with overall recall in the Drawing condition of both interviews. The regression analysis further showed that sociability marginally predicted overall recall in the Drawing condition two weeks after the event. It is possible that more sociable children remember more information, but more likely that they are simply more willing to talk about events with an adult or are less fazed by the demands of an interview situation than a less sociable child. This may also explain the finding that more sociable children reported more information in the Verbal condition two weeks after the event.

Moreover, it is possible that the enjoyable activity of drawing allowed them to build rapport with the experimenter more easily (Jolley, 2010) and then offer more information when asked prompted questions. Given that rapport building can enhance children's performance (Hershkowitz, Lamb, Orbach, Katz, & Horowitz, 2012), and children perform better with adults they feel comfortable with (Lamb & Brown, 2006), investigative officials are encouraged to establish rapport with children before commencing forensic, clinical, or research interviews (Rotenberg et al., 2003). Social support and rapport building methods have been shown to facilitate detailed reports by shy and timid children (Johnson, McWilliams, Goodman, Shelley, & Piper, 2016).

This is further supported by the finding that, one day after the event, shyer children reported fewer details in the Verbal condition. Shyness also negatively predicted overall verbal performance in the Dramatization condition one day after the event. Shyer children may have been unwilling to verbally recount the event and dramatize due to inhibition regarding the unknown interviewer and embarrassment to physically re-enact features of the event in front of her (Colonnesi et al., 2010). As predicted, the shyness effect diminished after two weeks.

Similar results were obtained regarding emotionality. Contrary to previous work (Burgwyn-Bailes et al., 2001; Chae & Ceci, 2005; Geddie et al., 2000; Gordon et al., 1993), it was found that children with higher scores in emotionality reported fewer details in the Verbal condition in the first interview. It may be that the children's unfamiliarity with the interview condition rendered them less willing to recount the event due to fearfulness (A. H. Buss & Plomin, 1984). Gordon et al. (1993) also found that 3-year old children with higher emotionality scores offered more nonverbal elaborations by means of gestures. However, this finding needs to be viewed with caution, as, in their study, emotionality was predictive of nonverbal

behaviour only in conjunction with approach-withdrawal, which refers to a child's ability to approach new situations easily or more cautiously (Sullivan, 2011). Further, as expected, emotionality did not correlate with recall in the Verbal condition after two weeks. This finding suggests that emotionally intense children may report fewer details in a purely verbal interview compared to a nonverbal one (e.g. drawing) immediately after an event, possibly due to reluctance over the novel social circumstances they find themselves in.

Interestingly, two weeks after the event, children with higher activity scores reported more information in the Verbal condition, and activity predicted overall recall. This finding contradicts previous speculations that active children may not be able to encode an event sufficiently due to inability to focus their attention on it (Ornstein et al., 1997; Shapiro et al., 2005). It supports previous empirical evidence which suggests that there is an interaction between action and linguistic processing, and that language requires bodily actions (McNeil, 1992; Willems & Hagoort, 2007). It may be that active children utilize more movements when they talk, which further prompts them to offer more information about the topic they are discussing. Additionally, this finding may reflect activity's relation to lower levels of shyness and higher levels of self-assertiveness (D. Buss et al., 1980). The children who were more active may have been more willing to talk about the event in the second interview. So far, no previous work has examined the relationship between activity and verbal recall under different interview methods, hence additional research is needed to clarify potential links.

Symbolic ability correlated highly with children's overall recall in the Dramatization condition one day and two weeks after the event and also predicted a significant portion of the variance two weeks after. This may in part be related to the

particular assessment tool used. Success on the ToPP (Lewis & Boucher, 1998) requires children to think flexibly and refer to absent objects (e.g. pretending to hold and absent object), which are also required when recounting and dramatizing a past event.

In addition, when children were interviewed one day after the event, both receptive and expressive language ability correlated with overall recall in the Verbal and Dramatization conditions. After two weeks, expressive communication was related to overall verbal performance in the Verbal condition. These findings indicate that children with greater language skills were better at expressing themselves verbally, may have had a stronger memory for events, or that language is related to overall cognitive ability (see Marchman & Fernald, 2008), which may have mediated performance on the task. Moreover, the use of gestures in the Dramatization condition may have played a role in children's verbal performance. Gestures are strongly related to language development (Iverson & Goldin-Medow, 2005), and previous work has shown that when children are instructed to gesture, they recall more details about an event they have participated in (Stevanoni & Salmon, 2005).

In this study, there were no significant correlations between mood change and recall. This may be because there was not enough variation in children's mood to detect change. As shown in the Results section, on the whole, children seemed to be happy to participate throughout the interviews.

This study has several limitations. The event involved a child-friendly argument between two friends over who would read a storybook to the children. Ideally, a real forensic event would provide an ecologically valid scenario. However, for ethical reasons it was not possible to stage a truly traumatic event for young children. In actual forensic situations, the interview is conducted in an unfamiliar

setting, thus the findings may not be representative of real-life situations as children were tested in school. In addition, all interviews were conducted by the same interviewer who is an experienced child psychotherapist to ascertain that children would feel more comfortable with a familiar person. This may not always be the case in forensic interviews, which may be conducted by police officers with less experience and confidence interviewing children.

Nonetheless, this study adds to an increasing amount of research regarding young children's eyewitness testimony and the nonverbal cues that enhance their reports. Subsequent studies could investigate whether drawing and dramatization affect recall of an eyewitness event after longer delays, as children are often asked to provide testimony over much longer time periods (Brown et al., 2015). Future research should also try to tease apart precisely what aspects of drawing help children report more information. Given that many professionals avoid interviewing young children about forensically related cases even when they are sole witnesses, and abuse is suspected (Hershkowitz et al., 2012), it is imperative to uncover external supports and intrinsic factors that may enhance young children's eyewitness testimony.

Overall, this study has important implications for legal professionals who interview young eyewitnesses. It shows that drawing while narrating has a positive effect on children's reporting of objects. Additionally, different temperamental traits as well as intrinsic factors such as language and symbolic skills may affect recall under different interview conditions. More specifically, more sociable children may recall more information in a drawing and a verbal interview. Emotionality may inhibit recall in a verbal-only interview and shyness may have a negative effect in a verbal-only and a dramatization interview. By contrast, activity may enhance verbal recall. Moreover, children with better symbolic and language skills may perform better in a

dramatization and a verbal-only interview respectively. These findings highlight the need to identify the temperament of children and their cognitive skills prior to eyewitness situations, as they impact their performance and the way they respond to interview techniques.

Chapter Three: **The role of different interview methods and individual differences in children's eyewitness testimony after a six-month delay**

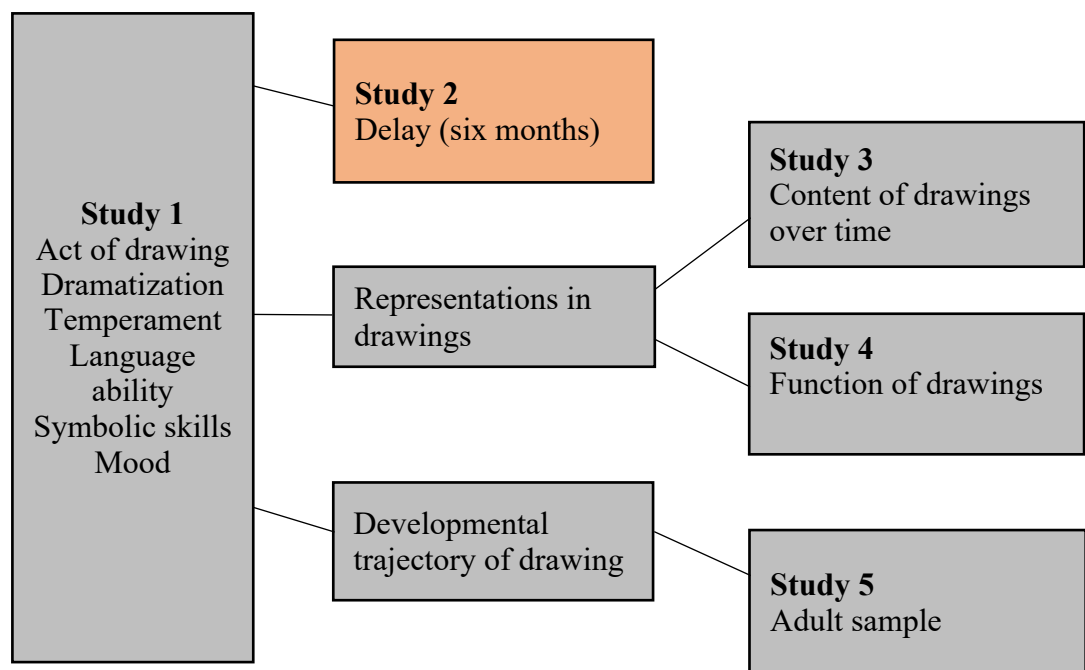


Figure 6. A schematic representation of Study Two in relation to the overall thesis.

3.1 Study Two

This chapter presents the findings of the statistical analyses which include the data from the first interview and the second interview (Study 1), as well as the third interview, six months after the event. The results with this added delay are outlined in a separate chapter because approximately 18.5% of the children did not return for a third interview, and this would have affected the power of the statistical analyses. In spite of this, it is imperative to investigate children's recall after longer delays, as in reality, interviews with children may take place several months after an alleged event (Flin, 1995; Goodman et al., 1992; Lash, 1995). In countries such as the United Kingdom, the USA, and New Zealand, delays between an alleged event and a child's questioning may take up to two years (Brown et al., 2015; Hanna, Davies, Henderson,

Crothers, & Rotherham, 2010; Plotnikoff & Woolfson, 1995; Quas & Sumaroka, 2011).

Previous work found that young children can recall past events very accurately, even after many months or years (e.g. Fivush & Hammond, 1990; Fivush & Shukat, 1995; Salmon & Pipe, 1997). Nonetheless, there is a decrease in their accuracy levels over time, particularly in their free recall responses (Gee & Pipe, 1995; Hammond & Fivush, 1991; Ornstein et al., 1992; Pipe & Wilson, 1994; Poole & White, 1993). Contrary to these findings, Gross and Hayne (1999a) found that 5- to 6- year old children in a drawing interview recalled significantly more correct information about a visit to a chocolate factory one day, six months, and one year after the event than children in a verbal-only interview, with no negative effects on accuracy. However, younger children (3-year olds) have been found to commit more errors after a delay of one year than older children (5-year olds), (Salmon & Pipe, 1997). The effects of a dramatization condition on children's recall of a witnessed event after a long delay have not been studied.

With these findings in mind, I set out to investigate the effects of external and internal prompts on children's verbal recall of a staged event after a delay of six months. The hypotheses are the same as in Study One (Chapter Two). In summary, first, it is hypothesized that children who draw will report more information about objects (Gross & Hayne 1998; Wesson & Salmon, 2001). Second, children who dramatize will report more information about actions. Third, delay is expected to negatively affect children's recall. It is further predicted that sociability will relate with recall. The fifth hypothesis is that activity will be positively associated with recall in the verbal and dramatization conditions. Sixth, it is anticipated that children with better symbolic skills will perform better in the drawing and dramatization

conditions due to the symbolic nature of these activities. Finally, language is expected to correlate with recall in the verbal condition.

3.2 Method

The methodology used in this study is exactly the same as per Study One (Chapter 2).

Participants

The children in this study are the same as in Study One. Out of the 81 children who participated in the first interview, 66 returned for a third interview ($M = 60.29$ months, $SD = 11.66$ months) six months after the event. There were 29 girls ($M = 59.51$ months, $SD = 10.87$ months) and 37 boys ($M = 60.89$ months, $SD = 12.36$ months).

Materials

All the materials used were the same as per Study One (Chapter Two).

Design

The analyses conducted in this study involve the two interviews of Study One as well as the interview that took place six months after the event. Accordingly, a 3 x 3 repeated measures design was used. Condition (Verbal, Drawing, and Dramatization) was the between-subjects factor and Delay (one day (first interview) vs two weeks (second interview) vs six months (third interview)) acted as a within-subjects factor. Age was entered as a covariate. The dependent variables were verbal

performance in free recall and verbal performance in prompted recall. Partial correlations and regression analyses split by condition were further performed.

Procedure

The procedure was identical to Study One (Chapters Two).

Memory interviews. The interviews were exactly the same as per Study One and took place six months after the event (third interview)⁵.

Coding

The coding procedures are the same as in Study One (Chapter Two). Inter-observer reliability was recalculated using Pearson product-moment correlations. The analysis on the total items reported in free and prompted recall combined yielded a correlation coefficient of $r(14) = .99, p < .001$. A second Pearson product-moment correlation on the amount of errors reported in free and prompted recall combined yielded an inter-observer reliability coefficient of $r(15) = .94, p < .001$. The experimenter's scores were used for analysis.

3.3 Results

To check whether children in each condition were matched on background characteristics, preliminary one-way Analyses of Variance (ANOVAs) were

⁵ Out of the 66 children who participated in this study, six were interviewed a few hours after the event. Three children missed the initial interviews and were interviewed later: two, four, and five days after the event. One child was interviewed for the second time 19 days after the event due to absence. To investigate potential differences, the analyses were run twice: once with all participants included and once without the children who were tested two days and more after the event ('off-schedule participants'). As there were only two differences in the results, the data from the full sample and the two instances of different results are reported.

performed which revealed no significant differences across conditions (all $F_s < 1.67$, all $p_s > .05$) in symbolic play (ToPP), PLS auditory comprehension, PLS expressive communication, EAS emotionality, EAS activity, and EAS shyness. However, there was a significant difference in EAS sociability ($F(2, 63) = 4.05, p = .022, \eta^2_p = .11$), thus sociability was included in further analyses as a covariate.

Interviewer's non-directive prompts

First, the amount of non-directive prompts offered by the experimenter was investigated to determine whether recall in each condition was affected by her utterances. A one-way ANCOVA on the mean rate of prompts per minute for each condition of the third interview was performed. Age and sociability were entered as covariates. The analysis revealed a significant main effect of age, $F(1, 61) = 9.58, p = .003, \eta^2_p = .14$ and condition, $F(2, 61) = 3.54, p = .035, \eta^2_p = .10$. The mean rate of prompts per minute in the Drawing condition ($M = 6.48, SD = 3.21$) was significantly lower compared to the Verbal condition ($M = 9.33, SD = 3.39, p = .030$) but not for the Dramatization condition ($M = 7.98, SD = 3.31, p = .480$).

Interview duration

To investigate whether children who drew and dramatized spent more time in the interview (in minutes) relative to those in the verbal-only interview, a one-way ANCOVA with condition (Verbal, Drawing, Dramatization) as the between-subject factor was performed. Age and sociability were entered as covariates. The dependent variable was interview duration. There was a significant main effect of condition, $F(2, 61) = 20.81, p = .013, \eta^2_p = .41$. A post hoc Bonferroni test revealed that the Drawing interview ($M = 3.91, SD = 2.43$) was significantly longer than the Verbal interview (M

= 1.06, $SD = .30$, $p < .001$) and the Dramatization interview ($M = 1.55$, $SD = .53$, $p < .001$). Age, $F(1, 61) = 3.97$, $p = .051$, $\eta_p^2 = .06$ had a marginally significant main effect, and sociability, $F(1, 61) = .82$, $p = .369$, $\eta_p^2 = .01$ did not have an effect.

Type of correct information after one day, two weeks, and six months

Free recall. As per Study One, each of the seven content categories in free recall was analysed. Separate 3(condition: Verbal, Drawing, Dramatization) x 3(delay: first interview vs. second interview vs. third interview) repeated measures ANCOVAs were performed with condition as a between-subjects factor and delay as a within-subjects factor. Age and sociability were entered as covariates.

Main effects of delay and condition. There was no significant main effect of delay or condition on any of the categories (all $F_s < 2.83$, all $p_s > .05$). The effects of condition are presented on Table 5 to allow for a comparison with those in the first and the second interview (see Table 1, Chapter Two, p. 75). The highest observed power for condition was .54 (for ‘objects’) and for delay, it was .43 (for ‘objects’).

Main effects of the covariates age and sociability. A significant main effect of age was found for ‘people’, $F(1, 60) = 7.82$, $p = .007$, $\eta_p^2 = .11$, ‘actions’, $F(1, 60) = 5.52$, $p = .022$, $\eta_p^2 = .08$, ‘objects’, $F(1, 60) = 9.44$, $p = .003$, $\eta_p^2 = .14$, ‘descriptions’, $F(1, 60) = 4.55$, $p = .037$, $\eta_p^2 = .07$, and ‘places’, $F(1, 60) = 7.47$, $p = .008$, $\eta_p^2 = .11$. There was no other significant main effect of age for ‘time’, $F(1, 60) = .72$, $p = .399$, $\eta_p^2 = .01$, and ‘affective information’, $F(1, 60) = .39$, $p = .532$, $\eta_p^2 = .01$. Further, a significant main effect of sociability was found for ‘people’, $F(1, 60) = 7.02$, $p = .010$, $\eta_p^2 = .10$, ‘actions’, $F(1, 60) = 8.00$, $p = .006$, $\eta_p^2 = .12$, ‘objects’, $F(1, 60) = 6.51$, $p = .013$, $\eta_p^2 = .10$, ‘places’, $F(1, 60) = 5.39$, $p = .024$, $\eta_p^2 = .08$, and ‘time’, $F(1, 60) = 4.89$, $p = .031$, $\eta_p^2 = .07$. There were no other main effects of sociability (all $F_s < 3.14$,

all $ps > .05$). The highest observed power for age was .86 (for ‘objects’) and for sociability, it was .79 (for ‘actions’).

Table 5

Means (Standard Deviations), F-Values, p-Values, and Effect Sizes Across Conditions for the Seven Content Categories in Free Recall of the Third interview

	<u>Verbal</u>	<u>Drawing</u>	<u>Dramatization</u>			
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>F(2, 60)</i>	<i>p</i>	η^2_p
People	.83 (1.15)	.77 (1.19)	.85 (1.35)	.18	.838	.01
Action	1.39 (1.72)	.59 (1.18)	.90 (1.41)	.81	.449	.03
Objects	.91 (1.16)	.73 (1.12)	.85 (1.39)	2.83	.067	.09
Descriptions	.56 (.84)	.41 (.80)	.55 (1.15)	.81	.450	.03
Places	.39 (.66)	.23 (.43)	.40 (.68)	.47	.626	.01
Time	.17 (.39)	.14 (.35)	.25 (.79)	1.16	.321	.04
Affect. Inf.	.00 (.00)	.04 (.21)	.01 (.12)	1.82	.170	.06

Note. Affect. Inf. = Affective information.

Interactions between age and delay, delay and sociability, and delay and

condition. There was a significant interaction between delay and sociability for ‘people’, $F(1, 120) = 3.19, p = .045, \eta^2_p = .05$, and ‘actions’, $F(17.55, 102.37) = 3.27, p = .049, \eta^2_p = .05$ (Greenhouse-Geisser correction applied). A post hoc Bonferroni test on delay showed that in the third interview ($M = .81, SD = 1.21$) children reported significantly fewer people than the first interview ($M = 1.54, SD = 1.50, p = .002$) and

⁶ When the off-schedule participants were excluded from the repeated measures ANCOVA, the interaction between delay and sociability for ‘people’ in free recall was not significant. $F(1, 114) = 2.91, p = .058, \eta^2_p = .05$.

the second interview ($M = 1.44, SD = 1.64, p = .003$). Further post hoc Bonferroni analyses showed that in the third interview children ($M = .97, SD = 1.48$) reported significantly fewer actions than the first interview ($M = 3.12, SD = 3.69, p < .001$), and the second interview ($M = 1.97, SD = 2.59, p = .004$). In the second interview children reported significantly fewer actions than the first interview ($p = .010$). There were no further significant interactions (all $F_s < 2.77$, all $p_s > .005$). The highest observed power in all interactions was .68.

Prompted recall. Further separate 3(condition: Verbal, Drawing, Dramatization) x 3(delay: 1-day vs. 2-week vs. 6 months) repeated measures ANCOVAs were performed for each of the seven content categories in prompted recall, with condition as a between-subjects factor and delay as a within-subjects factor. Age and sociability were entered as covariates.

Main effects of delay and condition. There was a significant main effect of condition on 'time', $F(2, 60) = 3.89, p = .026, \eta^2_p = .11$. A post hoc Bonferroni test showed that children in the drawing condition reported significantly fewer details about time (first interview: $M = .45, SD = .21$, second interview: $M = .04, SD = .21$, third interview: $M = .00, SD = .00$) than children in the Dramatization condition (first interview: $M = .85, SD = 1.46$, second interview: $M = .30, SD = 1.13$, third interview: $M = .55, SD = 1.15, p = .031$), but not compared to children in the Verbal condition (first interview: $M = .22, SD = .60$, second interview: $M = .04, SD = .21$, third interview: $M = .13, SD = .62, p = 1.00$). All other effects of condition on recall were not significant (all $F_s < 2.66$, all $p_s > .05$). Further, there was no significant main effect of delay on any of the content categories (all $F_s < 1.95$, all $p_s > .05$). The

highest observed power for condition was .68 (for ‘time’) and for delay, it was .40 (for ‘actions’).

Main effects of the covariates age and sociability. A significant main effect of the covariate age was found for ‘people’, $F(1, 60) = 6.22, p = .015, \eta^2_p = .09$, ‘objects’, $F(1, 60) = 4.59, p = .036, \eta^2_p = .07$, and ‘descriptions’, $F(1, 60) = 7.87, p = .007, \eta^2_p = .12$. Age did not have a significant effect on any of the remaining categories (all $F_s < 3.56$, all $p_s > .05$). A significant main effect of the covariate sociability was found for ‘descriptions’, $F(1, 60) = 4.28, p = .043, \eta^2_p = .07$, and ‘places’, $F(1, 60) = 4.19, p = .045, \eta^2_p = .06$. Sociability did not have a significant effect on any of the remaining categories (all $F_s < 1.88$, all $p_s > .05$). The highest observed power for age was .79 (for ‘descriptions’) and for sociability, it was .53 (for ‘descriptions’).

Interactions between age and delay, delay and sociability, and delay and condition. There were no significant interactions between delay and age, delay and sociability, and delay and condition (all $F_s < 2.32$, all $p_s > .005$). The highest observed power in all interactions was .53.

Accuracy scores and analyses for errors

Children’s accuracy scores in free and prompted recall in the the third interview were calculated (percent correct free recall score: $M = 84.12, SD = 34.46$, percent correct prompted recall score: $M = 60.79, SD = 35.81$). To investigate differences in accuracy across the three interviews for free and prompted recall, two 3(condition: Verbal, Drawing, Dramatization) x 3(delay: first interview vs. second

⁷ When the off-schedule participants were excluded from the repeated measures ANCOVA, the effect of sociability on ‘places’ in prompted recall was not significant. $F(1, 57) = 3.77, p = .057, \eta^2_p = .06$.

interview vs. third interview) repeated measures ANCOVAs with age and sociability entered as covariates were conducted and found no significant main effects or interactions (all $F_s < 3.36$, all $p_s > .05$). The highest observed power for all effects and interactions for percent correct scores was .46. Further, two 3(condition: Verbal, Drawing, Dramatization) x 3(delay: first interview vs. second interview vs. third interview) repeated measures ANCOVAs with age and sociability entered as covariates investigated differences in ‘errors’ made in free and prompted recall. The analyses produced no significant main effects or interactions (all $F_s < 1.42$, all $p_s > .05$). The highest observed power for all effects and interactions for ‘errors’ was .30 in free recall and .39 in prompted recall.

Mood scores

The mean mood score prior and after the third interview was, $M = 4.44$ (out of 5.00 which denotes a happier state), $SD = .09$.

Relations between internal factors and children’s overall recall

Further analyses were run to examine whether temperament, symbolic skills, language abilities, and mood change were related to overall recall (free and prompted combined) six months after the event. Partial correlation analyses controlling for Age and split by condition were run. The total amount of information reported did not correlate with any of the cognitive and temperament variables in the Verbal condition. Total verbal recall was positively correlated with Symbolic Ability in the Drawing condition. It was further negatively correlated with Activity and positively correlated with Symbolic Ability in the Dramatization condition (see Table 6).

Table 6

Correlations Between Temperament, Symbolic and Language Ability, Mood Change, and Children's Overall Verbal Recall in Each Condition of the Third Interview

Recall	Emo	Act	Soc	Shy	ToPP	AC	EC	Mood
Verbal	-.33	.05	.20	-.13	.39	.26	.30	-.00
Drawing	.08	-.02	.18	-.35	.48*	.29	.07	.28
Drama	-.02	-.64**	-.10	-.09	.46*	.29	.34	.09

Note. *** $p \leq .001$, ** $p < .01$, * $p < .05$ (2-tailed). Drama = Dramatization. Emo = Emotionality; Act = EAS Activity; Soc = EAS Sociability; Shy = EAS Shyness; ToPP = Symbolic Ability; AC = PLS Auditory Comprehension; EC = PLS Expressive Communication; Mood = Mood Change. For the Control condition, $N = 22$. For the Drawing condition, $N = 21$. For the Dramatization condition, $N = 20$.

Multiple regressions split by condition were also performed. Only the variables that came out significant in the correlations were entered simultaneously into the analysis as predictor variables (Age, Symbolic Ability, and Activity). In the Verbal condition ($R^2 = .24, p = .147$), none of the predictor variables accounted for a significant portion of the variance (all $ps > .05$). In the Drawing condition ($R^2 = .29, p = .086$), the model was also not significant. In the Dramatization condition ($R^2 = .62, p = .001$), Activity accounted for a significant portion of the variance ($\beta = -.46, t = -2.74, p = .015$), suggesting that after a six-month delay, activity can compromise overall recall.

3.4 Discussion

In this chapter, the findings of the children who participated in all three delays are reported. The first hypothesis, that children who drew would report more information about objects, was not confirmed. The second hypothesis, that dramatization would aid the reporting of actions, was also not supported. Nonetheless,

dramatization facilitated children's recall of details regarding time in prompted recall to a better extent than drawing. The third hypothesis was confirmed for only two categories: children reported fewer people and actions in the third interview than the previous two. The fourth hypothesis, that sociability would correlate with recall irrespective of conditions was not supported. Surprisingly, and contrary to the fifth hypothesis, activity was negatively associated with recall in the dramatization condition. Confirming the sixth hypothesis, verbal performance in the drawing and dramatization conditions was correlated with symbolic ability. The final hypothesis, that language ability would correlate with verbal recall was not confirmed.

First, the power in the study was relatively low: the observed power in the analyses was below .80, which does not imply adequate power (J. Cohen, 1988), suggesting that the decreased number of children who returned for an interview after six months (18.5% of the children did not return) may have adversely affected the findings. Thus, the results should be viewed with caution: the null effects found may be due to low power, and the significant effects found may not be reliable.

With respect to the non-significant effects, insufficient power may explain why, contrary to previous work (Gross & Hayne, 1998; Wesson & Salmon, 2001), children who drew did not report more objects than children in the verbal condition after six months. Methodological differences between this and previous studies may also account for this finding. In Gross and Hayne (1998) and Wesson and Salmon's (2001) work, children's memory for autobiographical experiences was investigated. Objects in their work involved items about personally meaningful events. The children may have talked about these events with others prior to the interviews, or they may have been reminded of them on several occasions by family members or

friends, photographs, or videos (e.g. a birthday party), and this may have enhanced their recall of these items (Pipe et al., 2004; Pipe et al., 2007).

In line with the findings of Study One (Chapter Two), the second hypothesis, that dramatization would facilitate the reporting of actions, was also not confirmed. As per Study One, the nature of the event could potentially have played a role here. Previous work which found positive effects of dramatization on recall (e.g. Liwag & Stein, 1995) involved autobiographical incidents that evoked strong emotional experiences, and which were accompanied by relevant facial expressions. Liwag and Stein (1995) found that children did not only talk about emotions which were associated with their facial expressions, but also dramatized the related incidents and thus offered more detailed accounts of those events. This implies that dramatization may act as a better retrieval cue for events that may be stronger in valence and for which the children are active participants and not passive viewers of (Engelkamp & Zimmer, 1997; Hornstein & Mulligan, 2001), as was the case in this study.

Interestingly, children in the dramatization condition reported significantly more details about time in prompted recall than children in the drawing condition. As already discussed, this finding may be spurious due to inadequate power. A further explanation is that, drawing allows for the spatial relationships of various items to be depicted (Golomb & Farmer, 1983), but this is not so for the temporal elements. Consequently, information about time (e.g. ‘And he readed us a story ... and *then* in the middle of the story...there was a girl who said this and took one teddy away’) may not be easy to depict in drawings. By contrast, previous work has shown a strong link between recalling details about time and actions/gestures (Jamalian & Tversky, 2012; Tversky, 2011). This implies that utilizing gestures when talking about temporal aspects of an event may facilitate later retrieval.

Diminished power may also relate to the null delay effects after six months. A comparison between the mean scores of each free recall category in Study One (Table 1, p. 75) and in this study (Table 5, p. 95) shows that there is a meaningful trend for most of the categories to drop after six months. This suggests that children may have recalled fewer details in general (including objects) due to memory decay (Lewandowsky et al., 2004; Nairne, 2002). In the time interval between the second and the third interview, the event may have not been reinforced in the children's memories through some kind of repetition. Irrespective of condition or recall category, lack of rehearsal may have rendered children unable to access relevant information from their episodic memory (Atkinson & Shiffrin, 1968; Tulving, 1979).

Further, interactions between delay and sociability in free recall were found. Analyses of the delay effects relating to these interactions showed that children reported significantly fewer people and actions in the third interview than the first and the second interview, and significantly fewer actions in the second interview than the first interview. In prompted recall, delay did not have an effect and there were no interaction effects either. We could speculate that after six months children may have difficulty recounting aspects of a past event when open-ended questions are posed and require more specific, prompted cues to search their memories for specific details (Butler et al., 1995; Hammond & Fivush, 1991; Hudson & Fivush, 1987). More participants are needed to investigate this issue further.

There were no more differences in accuracy between age, condition, sociability, and delay, and among conditions in the number of errors reported six months after the event. However, the accuracy rate in prompted recall dropped substantially after six months (to approximately 60%). This drop, in relation to the non-significant effects in accuracy scores and errors, supports that limited power may

have adversely affected the results: in this case, not picked up existing significant differences in accuracy levels. The drop in prompted recall is also in line with previous work regarding the adverse effects of more focused questions on the accuracy of children's reports (Larsson & Lamb, 2009; Melnyk et al., 2006). Another possible explanation of these effects is interference (e.g. Keppel, 1968; Watkins & Watkins, 1975). After six months, children may have confused aspects of the event with similar experiences that had occurred in their lives (e.g. storybook reading in their classroom by their teachers), leading them to retrieve wrong information in their attempt to respond to the prompted questions. This highlights that delay between a target event and a forensic interview may affect children's accuracy levels negatively (e.g. Baker-Ward et al., 1993; Cassel & Bjorklund, 1995), an issue which should be taken into account by interviewers to safeguard children's testimonies from inaccuracies.

A further finding was that, even though sociability was positively related to verbal performance in the drawing condition of the first and the second interview and with performance in the verbal condition of the second interview, it did not correlate with verbal performance in any of the conditions of the third interview. It may be that after six months, the less sociable children felt more comfortable with the interview due to familiarity with the interviewer and the process, and therefore were more willing to talk about the event, thus minimizing the impact of sociability.

Interestingly, and contrary to the fifth hypothesis, six months after the event activity correlated and predicted performance in the dramatization condition in a negative manner. Children who are active and more energetic in nature may typically experience more events in their lives than non-active children. As a result, this event may not have been salient for active children because they might not have experienced

it as something out of the ordinary. Additionally, interference effects (Van Dyke, 2012) may have taken place; aspects of the event may have been forgotten due to confusion with other similar events.

Although in Study One symbolic skills correlate with verbal performance only in the dramatization condition, here symbolic skills correlated with recall in both drawing condition and dramatization condition, supporting the sixth hypothesis. Symbolic skills may allow children to use drawing and dramatization more because of the symbolism which is inherent in these media (Cox, 1992; Meltzoff, 1995). This implies that children with higher symbolic skills may be able to report more details about an event through these methods. In the same respect, for children with lower symbolic skills drawing and dramatization may not facilitate their reports.

Language ability did not have an effect on verbal recall. This finding may be due to the fact that, overall, children reported fewer details after six months. As a result, there might have not been enough variability in children's responses to allow for any effects to emerge across conditions. Additionally, mood change did not correlate with recall. As per Chapter Two, children may have been quite happy to participate in the third interview.

This study has several limitations which have already been outlined in Chapter Two. These include the nature of the event, which for ethical reasons could not represent a real forensic scenario, and the fact that the interviews were conducted by a single interviewer, which may not be characteristic of real-life forensic cases. The major limitation involves the insufficient power of the analyses due to the smaller sample size compared to Chapter Two. Nonetheless, this study shows some meaningful trends with respect to the effects of long delays on children's recall of an event. Children may report fewer details compared to an interview closer to the event,

and their accuracy level may drop when more focused questions are asked. These trends could be explored in future work with a larger sample size. This study also supports that the combination between different interview methods and children's temperamental traits and cognitive skills may impact on their recall after long delays. Specifically, asking more active children to 'show and tell' what they remember about a past event may compromise their reports. Moreover, children with better symbolic skills may offer more detailed reports if they are given the opportunity to draw and dramatize during an interview. Thus, forensic interviewers are advised to adjust the interview process to the child's individual characteristics in order to enhance their eyewitness testimony.

Chapter 4: **An investigation of the content of children's drawings in eyewitness interviews over different time delays**

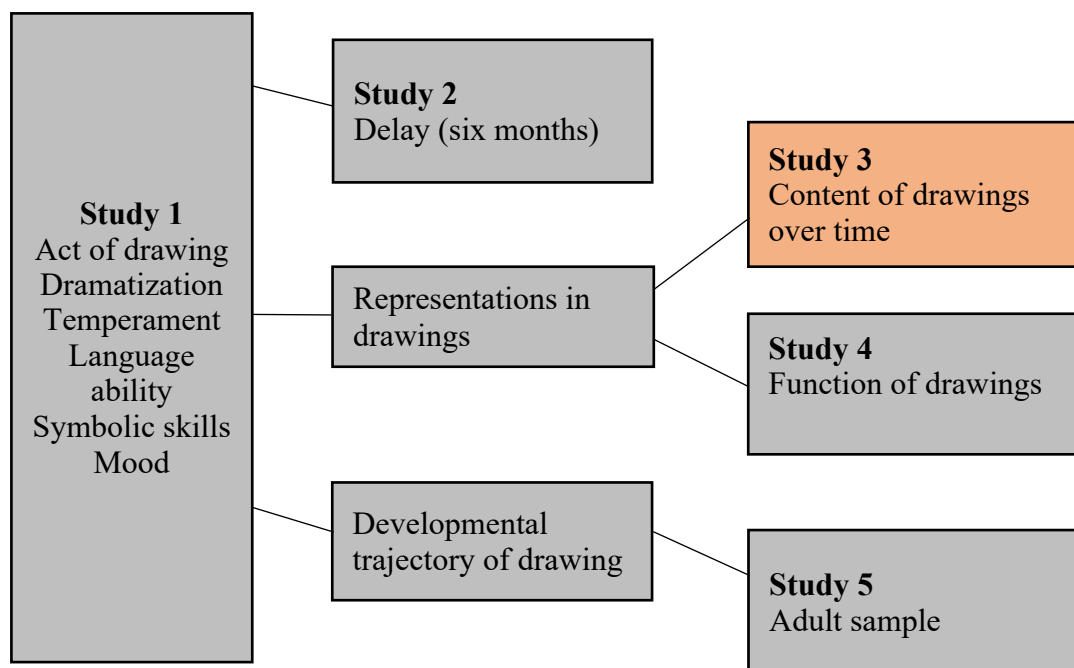


Figure 7. A schematic representation of Study Three in relation to the overall thesis.

4.1 Study 3

Although the process of drawing has been shown to facilitate memory retrieval (Gross & Hayne, 1998, 1999a; Macleod et al., 2013, 2014; Otgaar et al., 2016; Woolford, Patterson, Macleod, Hobbs, & Hayne, 2015), so far no work has investigated the actual content of drawings children produce in successive eyewitness interviews, beyond rating its quality.

There are several possible reasons for the effectiveness of drawing as a retrieval technique. For instance, as children draw and describe their depiction, they may remember information about related details and aspects of an event or return to features already depicted and offer more information about them (Barlow et al., 2011).

Drawing may help children remember particular types of information, which may otherwise be overlooked or be too exhaustive to report in an everyday conversation. For example, in Butler et al. (1995), children who drew provided very detailed information about the bus that took them to the fire station (e.g. colour, size, location of people, the location the driver placed his jacket), while the tell-only group merely reported they arrived by bus. Such details would be unnecessary in ordinary conversations but may be highly important in eyewitness testimony cases (Jolley, 2010).

Previous work on children's and adults' eyewitness testimony has made a distinction between the central features of an event (i.e. description of the main characteristics of an event) and the peripheral, yet forensically relevant features (e.g. supplementary details which describe the context of the event) (Roebbers & Schneider, 2000; Shapiro et al., 2005). However, the distinction between central and peripheral information is not consistently defined. For example, Shapiro et al. regard information about the suspect's clothing as central, whereas Roebbers & Schneider regard it as peripheral.

It is important to carefully define central or peripheral aspects of an event, and for studies investigating drawing, this definition should consider features children are able to readily depict. Between 2- and 4- years, children go through a pre-schematic phase in their drawings, during which they draw people in a simple manner and with very few features, and tend to use their favourite colours instead of realistic colours of an item (Steele, 1998). Children's drawings may often be schematic and thus depict the general features which are common in a topic, and not specific information about the topic (Davison & Thomas, 2001).

In line with this, children may be influenced by their own general knowledge or schemas (Bartlett, 1932; Hudson & Nelson, 1983), which can be irrelevant for forensic situations (see Jolley, 2010). Much of young children's knowledge is structured as schemata for familiar information about events, people, places, and objects (Mandler, 1979), and this may influence what they depict when recalling an event. For an event that occurs in their classroom, for instance, children may focus on depicting their classmates or teacher in a drawing, as opposed to new and unfamiliar people involved in the salient action. The 'generic' knowledge can be considered peripheral, as it is less directly relevant and does not provide information that would be essential in an eyewitness situation. It is possible that this generic knowledge replaces central knowledge of the event as time passes, as children may use their scripts to help them retrieve information (Jolley, 2010; Ornstein et al., 1998).

According to schema theory (Bartlett, 1932; Brewer & Nakamura, 1984), children will first access their pre-existing schemas in their attempt to recall specific episodic details about an event. Such schematic knowledge may minimize their ability to recall details of salient events (Nelson & Gruendel, 1981; Roberts & Blades, 2000; Schank & Abelson, 1977) because the typical features are easier to remember than the atypical ones (Ornstein et al., 1998). Time delays between an event and memory retrieval may also strengthen children's tendency to rely on scripts rather than episodic knowledge (Myles-Worsley et al., 1986; Slackman & Nelson, 1984). As a result, children may report the more general aspects of an incident rather than specific details (Pipe et al., 2004). Additionally, relying on one's schematic memory to recall a past event is related to an increase in inaccuracies and errors (Greenberg et al., 1998; Kleider, Pezdek, Goldinger, & Kirk, 2008; Neuschatz, Lampinen, Preston, Hawikins, & Toglia, 2002). Given such findings, an interesting question is whether children's

drawings regarding an event they saw include salient or more script-related details, and whether time delays adversely affect the content of drawings. Empirically exploring this question is important because drawings can be permanent (Barlow et al., 2011; Jolley, 2010), and therefore can be used as supplementary aids in children's eyewitness testimony.

Previous work appraising the drawings used to facilitate verbal reports has been strictly limited to analysis of representational quality: whether the drawings were 'good' depictions of the target events, and whether this correlated with the amount of information reported verbally (Barlow et al, 2011; Butler et al., 1995; Gross & Hayne, 1998, 1999a). But analysis of representational quality has two limitations: it does not tell us what items children draw relevant to these events, and children tend to draw at a lower representational level in studies than would be expected from children of the same age group. This is mainly because, at the same time, they have to verbally respond to the interviewer, which interferes with the drawing activity (Jolley, 2010). This suggests that children may not efficiently coordinate verbal responses and motor planning during interview situations, and that drawings need to be verbally interpreted as children are producing them. This way of contemplating drawings suggests that they only serve as memory aids.

However, drawing can act as a communication tool as well as a memory cue for children (Driessnack, 2005), allowing them to communicate visually as well as verbally (Naumburg, 1966; Rollins, 2005). This may be particularly important for younger children whose cognitive skills are not developed enough to allow full verbal self-expression (Malchiodi, 1999). Drawing is considered a pathway to children's inner experiences and has been used extensively in research and clinical settings to facilitate communication of thoughts and emotions (Driessnack, 2005; Rollins, 2005).

If this theory is true, *what* children depict may be as important as the drawing process itself.

The primary aim of this study was to explore whether schema theory can be applied to children's drawings (Bartlett, 1932; Brewer & Nakamura, 1984). As young children's drawings are generally more schematic (Davison & Thomas, 2001), we would expect that children will draw the more general features of an event. This study assessed the inclusion of central, peripheral, and inaccurate information in the drawings that children created in the previous two studies (Chapters Two and Three) and it further looked at whether these features remain stable or change over different time delays. The event took place in children's schools and involved a quarrel between two adults over who would read a storybook to the children. The majority of studies on drawing and children's verbal recall concern children of five years and older (e.g. Barlow et al., 2011; Salmon et al., 2003), yet children as young as three years may benefit from external aids to recount past experiences (Pipe et al., 2004). This study investigated whether drawing can benefit the memories of children ranging from three to six years. In addition, as in real life situations there are usually delays between an eyewitness event and children's questioning (Brown et al., 2015), it explored young children's recall after delays of one day, two weeks, and six months.

As the information which is related to a schema is more easily recalled than information that is unrelated to a schema (Brewer & Nakamura, 1984), two things were hypothesized. One: recall for the central features in children's drawings would decline over time and two: the presence of peripheral features would remain stable. This is because the central features of the study were novel to the children and unlikely to reside in an existing schema. The peripheral features (e.g. people not central to the primary event, such as a teacher) involved aspects of the event which

were related to the environment it took place, and which the children were familiar with and were thus more likely to have a schema about (Ornstein et al., 1998). Given that relying on one's schematic knowledge to recall more details about an event may lead to an increase in inaccuracies (Greenberg et al., 1998; Neuschatz et al., 2002; Kleider et al., 2008), it was further hypothesized that the proportion of inaccurate features in the drawings would increase significantly over time.

4.2 Method

Participants

This study is part of Studies One and Two (Chapters Two and Three) comparing verbal recall in baseline, Drawing, and Dramatization conditions, and involved the children who participated in the Drawing condition of these studies. Twenty-seven 3- to 6- year old children ($M = 58.48$ months, $SD = 9.77$ months) participated. Of these children, one missed the second interview two weeks after the event and four did not return for a third interview six months later. Participants were predominantly Caucasian.

Materials

All the materials used were the same as per Study One (Chapter Two).

Design

This study used a repeated measures design with Delay (one day (first interview) vs two weeks (second interview) vs six months (third interview)) as a within-subjects factor. Age was entered as a covariate. The dependent variables were central, peripheral, and inaccurate features.

Procedure

The procedure was the same as in Chapters Two and Three. In summary, children witnessed a 10-minute salient event in their schools which involved a minor altercation between two actors over who would read a storybook to the children, leading Actor 2 to take Actor 1's Monkey and leave the classroom. Then, Actor 1 finished reading a storybook. Before leaving, he requested that all children put out their left hands so that he could place a sticker on them. This was done to probe memory for touch (Pezdek & Roe, 1997). If any of the children did not want Actor 1 to put the sticker on their hand, they were allowed to do so themselves.

Memory interviews. The interviews were those in the Drawing condition of Studies One and Two (Chapters Two and Three), and took place in the children's schools⁸.

Coding and scoring

Representational quality. To make comparisons with previous literature (e.g. Butler et al., 1995) and to provide a crude measure of children's drawing ability, two adult blind raters were given a description of the event and were asked to rank the representational quality of the drawings from 1 (worst; not recognizable of objects and people) to 7 (best; objects and people very

⁸ Some children were unavailable on the scheduled testing days ('off-schedule participants') and were tested on different occasions; for the first interview, one child was interviewed a few hours after the event and another two were interviewed two and six days after the event respectively. For the second interview, one child was interviewed 19 days after the event. To examine if there were any differences in the results, analyses were run once with all participants included and once without the children who were tested two or more days after the event. As there were two differences in the results, the data from the full sample and the instances of different results are reported.

recognizable). The level of agreement between the two raters was determined using intraclass correlations (ICC). The single measure ICC was .94, $p < .001$, indicating an excellent level of agreement. The first coder's scores were used for analysis. Representational quality was not used in any further analyses.

Content of drawings. To explore the content of drawings, the experimenter made notes of the items drawn in free and prompted recall (e.g. *FR* (free recall) *mummy elephant* and *PR* (prompted recall) *little elephant*) on each child's drawing. Notes had to be taken because 65% of the drawings had low representational quality (scores of 1 and 2 on the 7-point Likert scale), consistent with prior reports (Jolley, 2010). All items depicted in children's drawings (e.g. monkey, teddy, teacher, chair, friend, sticker, etc.) were noted. An issue with exploring the content of drawings in this manner is that children tend to depict items they also recall verbally. If they recall more details, they may include more items, which suggests that the content of drawings and children's verbal recall may be confounded. Accordingly, looking at the content of drawings based on children's attributes of the depicted features may simply provide a different avenue of measuring of recall. Nonetheless, Gross and Hayne (1999a) argued that it may be difficult to interpret drawings without children's accompanying verbal reports, as observers may not be able to decipher what each item represents. This difficulty becomes more prominent if children draw scribbles or non-representational items (Gross & Hayne, 1999a). As a result, exploring drawings by measuring each depicted item seemed the most appropriate way to appraise their content.

As children assign meaning to their drawings (Bloom, 2004), scribbles and non-representational items which were described by the children as representing an item (e.g. a circle representing 'the little elephant') were noted as being that item.

During the coding process, the experimenter saw her notes on the drawings. All items were then grouped in four categories:

Central features. This category included seven items which were deemed important for a forensic scenario: ‘perpetrator’ (Actor 2), ‘victim’ (Actor 1), ‘taken monkey’, ‘teddy bear’, ‘book’, ‘sticker’, and ‘hand’. The sticker and the hand were considered central features because they involved touch by a novel person.

Peripheral features. All remaining accurate items drawn (e.g. classmate, table, chairs) were considered peripheral. All instances of people other than the victim and the perpetrator were collapsed into a ‘teacher’ and a ‘child’ category. Some children included themselves in their drawings, and these items were collapsed in a ‘themselves’ category. In principle, the number of peripheral features included could be infinite. In total, 28 different peripheral features were counted.

Inaccurate features. These include *errors* (features that are there but are incorrectly labelled by the child; e.g. a leopard from the story labelled tiger), *confabulated people* (representations of people that were not present; e.g. a witch), and *confabulated objects* (representations of objects not present; e.g. a potato).

Uncodable features. Unspecified information referring to ‘a cuddly toy’ (some children drew a cuddly toy, without giving any further information whether it signified ‘Monkey’ or ‘Teddy’) and the presence of letters in the drawings were not analysed.

Each item was counted and collapsed across free and prompted recall. If the same item was drawn multiple times, it was only credited once.

Reliability. A second coder assessed 100% of the drawings, which included the experimenter’s notes. This way she could identify all low representational features. The mean ICC score was calculated for all central features, separately for

each interview (first interview, second interview, and third interview). The mean single measure ICC score for all interviews combined was $M = .93$, $SD = .07$ (minimum ICC = $.75$ $p = .001$, maximum ICC = 1.00 $p < .001$, range = $.25$), indicating an excellent level of agreement. The mean ICC score was calculated for each inaccurate feature (errors, confabulated people, confabulated objects) in each time delay. The mean single measures ICC score for the features was $M = .77$, $SD = .21$ (minimum ICC = $.29$ $p = .080$, maximum ICC = $.96$ $p < .001$, range = $.67$), indicating a good level of agreement. This mean score ($.77$) was likely because it was difficult for the second coder to determine whether an inaccurate feature was an error or a confabulation (e.g. the coder could not know whether a drawn 'sister' was a classmate present in the event or a confabulation (i.e. a child falsely reporting that his/her sister was present in the event, when in fact she was not). Further intra-class correlation analyses with all inaccurate features collapsed into one category showed a mean single measures ICC score of $M = .91$, $SD = .11$ (minimum ICC = $.78$ $p = .001$, maximum ICC = $.99$ $p < .001$, range = $.21$), indicating an excellent level of agreement. By process of elimination, all other accurate features were considered peripheral and therefore no ICC score was calculated.

4.3 Results

Content of Drawings

Descriptive information. The mean number of central, peripheral, and inaccurate features (errors, confabulated people, confabulated objects combined) included in the drawings are presented in Figure 8.

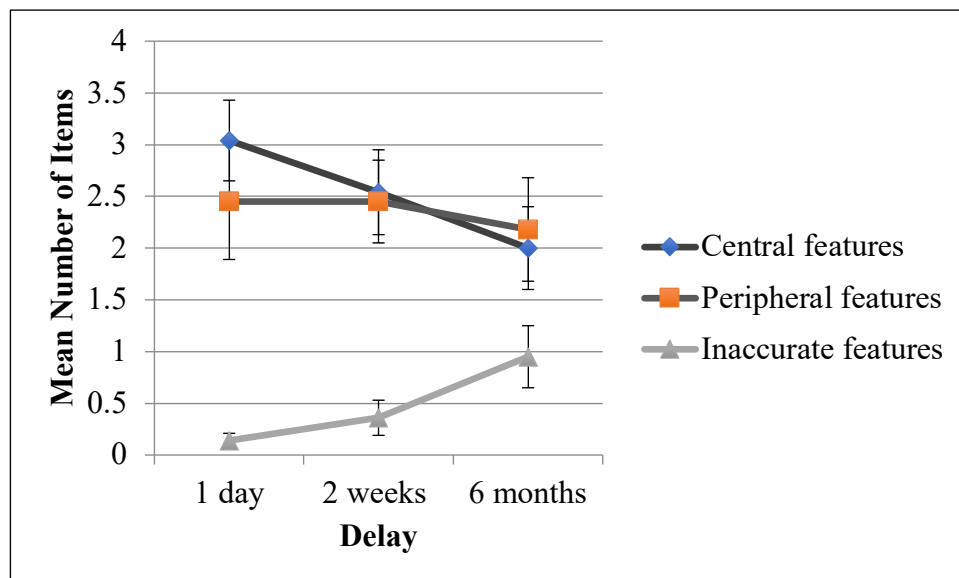


Figure 8. Number of central, peripheral, and inaccurate features in children's drawings over time.

To explore if there were significant differences over time (first interview vs second interview vs third interview) in the number of different features depicted in the drawings, three separate repeated measures ANCOVAs were performed with delay (first interview vs second interview vs third interview) as a within-subjects factor. Age was entered as a covariate. A significant main effect of age was found for the central features $F(1, 20) = 20.40, p < .001, \eta^2_p = .50$, and for the peripheral features, $F(1, 20) = 12.21, p = .002, \eta^2_p = .38$, but not for the inaccurate features, $F(1, 20) = 2.03, p = .169, \eta^2_p = .09$. Further, there were no significant effects of delay or significant interactions between age and delay for any of the categories (all F s < 2.57 , all p s $> .05$)

Percentage of features depicted over time. To determine how these features associated with the total number of depicted items across each category, the percentage of each feature was calculated, and three separate repeated measures

ANCOVAs were performed with delay (first interview vs second interview vs third interview) as a within-subjects factor. Age was entered as a covariate. A significant main effect of age was found for the inaccurate features $F(1, 15) = 12.56, p = .003, \eta^2_p = .46$. There were no further significant main effects of age (central features: $F(1, 15) = 2.12, p = .166, \eta^2 = .12$, peripheral features: $F(1, 15) = 3.00, p = .104, \eta^2_p = .17$). There were no significant effects of delay^a or significant interactions between age and delay for any of the categories (all $F_s < 2.07$, all $p_s > .05$) (Table 7).

Table 7

Mean (Standard Deviations) Percentages of Central, Peripheral, and Inaccurate Features Depicted in Children's Drawings Over Different Time Delays

	<u>First interview</u>	<u>Second interview</u>	<u>Third interview</u>
	<i>M (SD) %</i>	<i>M (SD) %</i>	<i>M (SD) %</i>
Central features	59.28 (24.65)	42.50 (21.28)	35.28 (25.04)
Peripheral features	35.86 (25.55)	47.37 (21.10)	44.72 (28.82)
Inaccurate features	4.85 (12.88)	10.14 (25.33)	20.00 (22.47)

Further analyses were run on the different subcategories of central and inaccurate features. No further analyses were run on the peripheral features as they were not divided in any subcategories.

^a When the off-schedule participants were excluded from the repeated measures ANOVAs there was a significant main effect of delay, $F(1.43, 20.01) = 5.64, p = .018, \eta^2 = .29$, and a significant interaction between age and delay $F(1.43, 20.01) = 3.90, p = .049, \eta^2_p = .22$ for the inaccurate features (Greinhouse-Geisser correction applied in both effects). Post hoc tests with Bonferroni corrections showed that children drew a significantly higher percentage of inaccurate features in the third interview ($M = 19.17, SD = 22.94$) than the first ($M = 2.03, SD = 5.72, p = .008$), but not the second interview ($M = 4.52, SD = 10.61, p = 1.00$).

Central features

The seven central features children drew, and how they changed over time (first interview vs second interview vs third interview) were further investigated (see Table 8). Friedman analyses revealed that there was a statistically significant difference in inclusion of the ‘victim’, $\chi^2(2) = 6.50, p = .039$, and the ‘perpetrator’, $\chi^2(2) = 8.40, p = .015$, which both decreased over time (Figure 9). Post hoc analyses with Wilcoxon signed-rank tests and a Bonferroni correction for three comparisons ($p = .017$) were conducted for each feature. None of the comparisons were significant (all $ps > .017$). There were no further significant differences in children’s drawings for the remaining central features (all $ps > .05$).

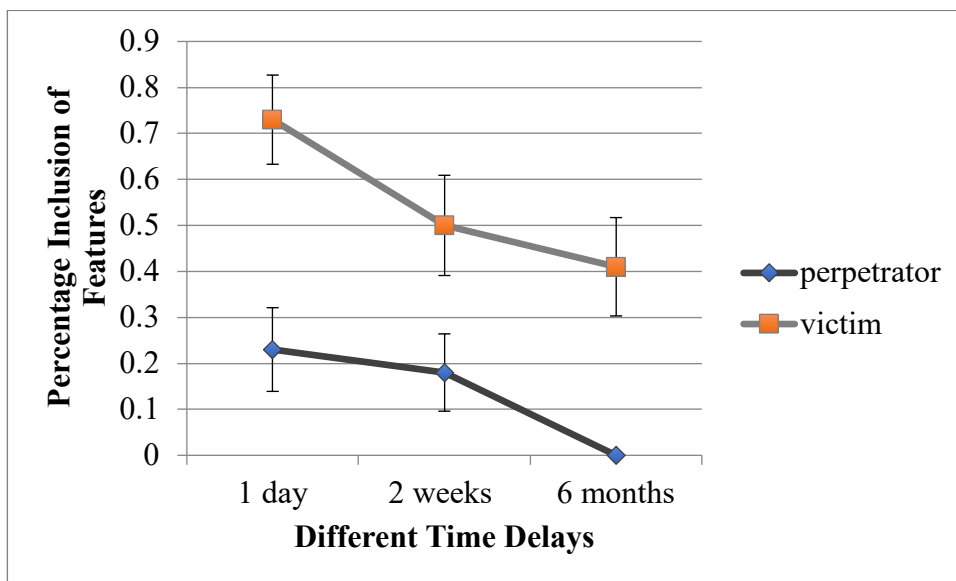


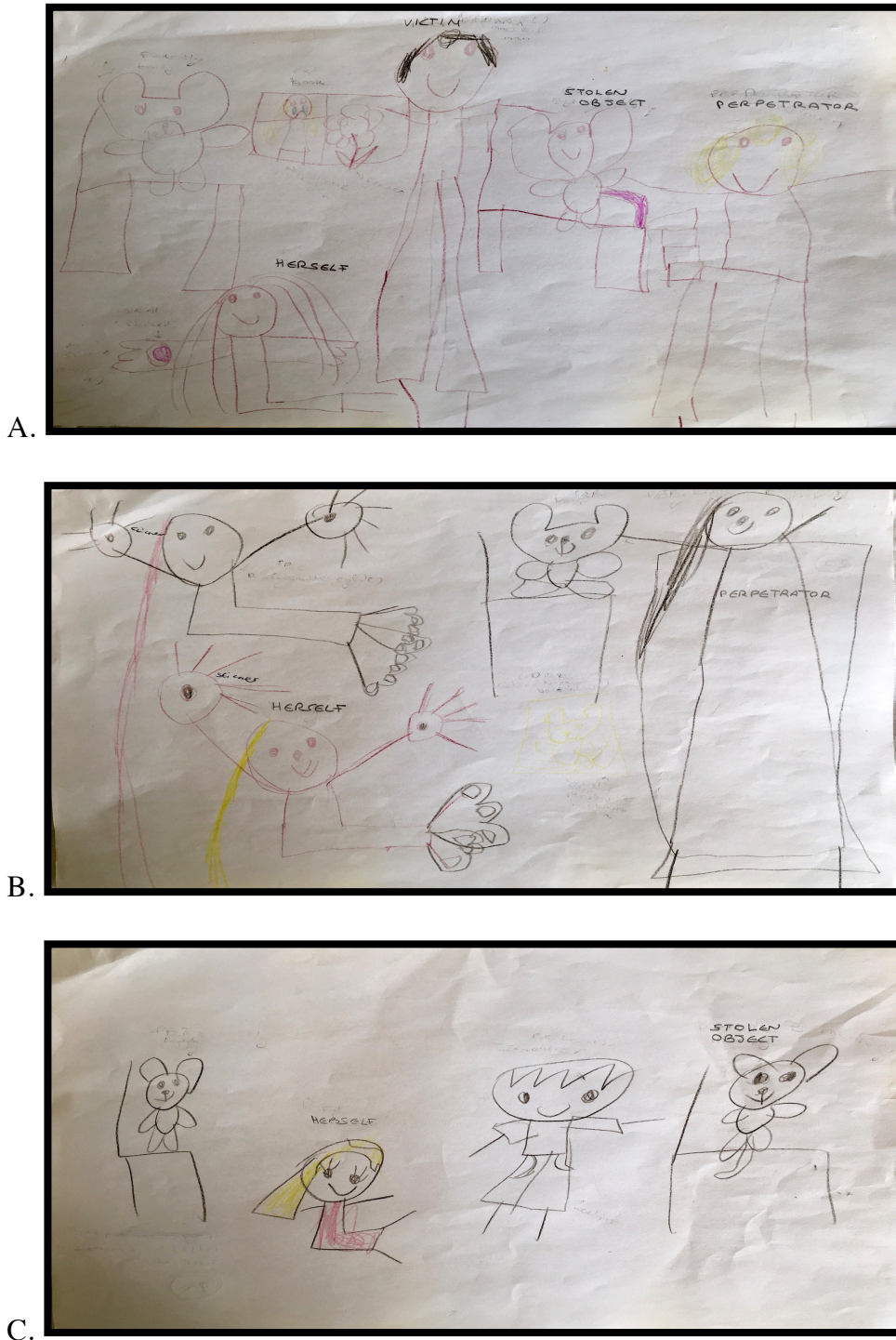
Figure 9. Percentage inclusion of the ‘victim’ and the ‘perpetrator’ in children’s drawings declined over time.

Table 8

Percent of Children who included the Seven Central Features in Their Drawings One Day, Two Weeks, and Six Months After the Event

	<u>First interview</u>	<u>Second interview</u>	<u>Third interview</u>
Central features	(N = 27)	(N = 26)	(N = 23)
Victim	77.8%	48.1%	37.0%
Perpetrator	22.2%	14.8%	0.0%
Taken monkey	29.6%	22.2%	22.2%
Teddy bear	37.0%	33.3%	29.6%
Book	48.1%	40.7%	25.9%
Sticker	51.9%	40.7%	37.0%
Hand	29.6%	40.7%	18.5%

For an example of a child's drawing in each interview of the study, see Figure 10.



One day after the event the perpetrator, the victim, and the stolen object were included (A). Two weeks after, the perpetrator and the stolen object were included (B). Six months after, the stolen object was included (C).

Figure 10. The drawings of a 54-month-old child one day, two weeks, and six months after the event.

Inaccurate features

The different types of inaccurate features (errors, confabulated people, confabulated objects) over time were also explored. First, the percentage of each content category out of the total number of inaccurate features was calculated (see Table 7 for descriptive statistics). Three separate repeated measures ANCOVAs were conducted, with delay as a within-subjects factor. Age was entered as a covariate. A significant main effect of age was found for confabulated people¹⁰, $F(1, 20) = 4.88$, $p = .039$, $\eta^2_p = .20$. There were no further significant main effects of age or delay or significant interactions between age and delay (all F s < 1.41 , all p s $> .05$) (Table 9).

Table 9

Mean (Standard Deviations) Percentages of Errors, Confabulated People, and Confabulated Objects Out of Total Errors Depicted in Children's Drawings Over Different Time Delays

	<u>First interview</u>	<u>Second Interview</u>	<u>Third interview</u>
	<i>M (SD) %</i>	<i>M (SD) %</i>	<i>M (SD) %</i>
Errors	28.57 (48.79)	14.58 (35.00)	75.00 (43.30)
Confabulated people	14.29 (37.80)	25.00 (46.29)	3.64 (12.06)
Confabulated objects	57.14 (53.45)	60.42 (50.35)	21.36 (37.69)

¹⁰ When the off-schedule participants were excluded from the repeated measures ANOVAs age did not have an effect on confabulated people, $F(1, 19) = 1.14$, $p = .298$, $\eta^2_p = .06$.

4.4 Discussion

The content of the drawings that children produced in Studies One and Two, and how central, peripheral, and inaccurate features change from one day, two weeks, and six months after witnessing a novel event were investigated. The first hypothesis that inclusion of the central features would decline over time was not confirmed. Further analyses on the central features category showed that inclusion of the ‘perpetrator’ and the ‘victim’ did decline over time. The prediction that inclusion of the peripheral features would remain stable with the passage of time was confirmed. The third hypothesis, that inclusion of inaccurate features would increase significantly with the passage of time was not confirmed. Lastly, there were no differences in the types of inaccurate information depicted over time.

The results of the study showed that both central and peripheral features remained stable over time. Despite these non-significant results, Figure 8 (p. 116) shows a meaningful drop in the number of central features depicted over time. This finding could suggest that the longer the interval between an incident and the interview the more episodic information might be lost from children’s drawings, although not to a significant level.

Some previous work on children’s and adults’ eyewitness recall showed an advantage of central compared to peripheral information (Cassel & Bjorklund, 1995; Shapiro et al., 2005). However, that work involved children’s verbal reports which are fundamentally different than drawings, for a number of reasons. First, young children’s drawings may be schematic and may include more general themes rather than specific details about an event (Davison & Thomas, 2001). Further, drawing enables children to depict spatial elements such as objects (Golomb & Farmer, 1983),

but this is not so for temporal elements, such as time, which are easier to talk about than draw. In this study, the category of central features was purposely restricted to *people* and *objects* (e.g. perpetrator, victim, storybook, etc.), which were more likely to be visually represented rather than actions or time (e.g. ‘She *took* Monkey and *then* left’). The central features were also new and unknown to the children, whereas the peripheral category included aspects of the event which involved features of the school life the children were exposed to frequently and therefore could have formed scripts about (Farrar & Goodman, 1992; Pipe et al., 2007). Children could have been reinforced to depict items from a pre-existing schema because such information is easier to recall than information which is not related to a schema (Brewer & Nakamura, 1984; Nelson & Gruendel, 1981; Roberts & Blades, 2000; Schank & Abelson, 1977). Drawing has been criticized for facilitating the reporting of information which may be the result of pre-schematic knowledge and not drawing itself (Jolley, 2010). Nonetheless, children may require this schematic knowledge to further facilitate their episodic memory (Bartlett, 1932; Brewer & Nakamura, 1984). The children in this study may have drawn the more general aspects of the event, not necessarily only because these features were easier to retrieve from memory (due to repeated exposure to some of them); children may have been utilizing their existing knowledge to scaffold their memory about the more specific details of the event. This suggests that what they depict in their drawings may be meaningful to them and may help them structure their recall.

Of all seven central features, the only ones that declined to a significant amount were ‘the perpetrator’ and ‘the victim’. This could be explained by the fact that the remaining central features, which stayed consistent over time, involved objects (teddy bear, monkey toy, storybook, sticker, hand). This finding supports

existing drawing literature on children's verbal recall, which showed that drawing enhances memory for objects compared to other recall categories, such as people (e.g. Gross & Hayne, 1998; Wesson & Salmon, 2001). Additionally, some of these objects (e.g. the stuffed animals and the sticker the children received after their participation) may have been more interesting to them than the two unfamiliar individuals. As such, they were easier to retrieve from their memory than the two adults.

Contrary to the third hypothesis, the proportion of inaccurate information included in the drawings did not change significantly over time, and there were no further significant differences among delays in the three categories of inaccuracies (errors, confabulated people, confabulated objects). This result is consistent with Hayne and colleagues' work (Butler et al., 1995; Gross & Hayne, 1999a), who showed that drawing does not have a negative effect on children's accuracy level over time. Despite this non-significant result, there was a meaningful trend in the inaccurate features category to increase. As shown on Table 7 (p. 118), the percentage of inaccurate features remained very low in the first two interviews (less than 5% in the first interview and approximately 10% in the second interview), suggesting that children's drawings provide veridical accounts of a witnessed event when they are interviewed within a short delay (up to two weeks) of the incident. After six months however, children's inaccuracy rate reached approximately 20%. This finding suggests that a long delay between an event and the interview may lead to a rise in inaccuracies in children's drawings. As per the central features, this finding could be explained by memory decay (Lewandowsky et al., 2004; Nairne, 2002; Van Dyke, 2012). Stored information about the event may have been less accessible for retrieval after six months, leading children to forget various features of it. As a result, when they were asked to draw what they remembered, children may have relied on their

schematic knowledge and tried to substitute the missing data from their scripts (Brewer & Nakamura, 1984). This may have led to inaccurate guesses (Greenberg, Westcott, & Bailey, 1998; Kleider et al., 2008; Neuschatz et al., 2002) and thus, depictions of inaccurate details. Consequently, this study highlights the need to question young eyewitnesses as soon as possible after an incident, within a two-week timeframe, which could prevent delay-related errors from occurring (Greenberg et al., 1998; Lamb, et al., 2000).

This study has several limitations. First, the interviews with the children took place in their schools, despite actual forensic interviews taking place in unfamiliar settings. The analysis also contains limitations: the second coder was given copies of the children's drawings with the notes made by the experimenter included. This was done because a child's own interpretation is necessary for understanding it (Gross & Hayne, 1998). In addition, as stated in the Methods section of this chapter (p. 114), 65% of the drawings were non-representational, which is consistent with previous reports on the quality of children's drawings while recalling an event (see Jolley, 2010). Thus, it was deemed best for the second coder to view the drawings with the notes included, particularly in cases where unidentifiable or non-representational items and scribbles were involved.

Overall, this study shows some support that the content of children's drawings may match schema theory (Bartlett, 1932; Brewer & Nakamura, 1984), in that children tend to depict the more general topics of an event over time, and the more central features, such as the perpetrator and the victim, fade as time passes. It may be possible that children are using these more general themes to guide their memories to more episodic details. Consequently, it is fruitful to analyse the content of children's drawings during interview situations. Drawings may offer insight into how children

mentally represent the event and may provide a second mode of communication beyond verbal description. The study also showed that after six months, inclusion of inaccurate information in drawings may increase. These findings suggest that, if drawings are utilized, immediate interviews may allow children to depict more specific (episodic) details and prevent from inaccuracies, and thus safeguard the quality of their eyewitness reports.

Chapter Five: **Own-drawing vs other-drawing: The function of drawings in children's recall of an eyewitness event**

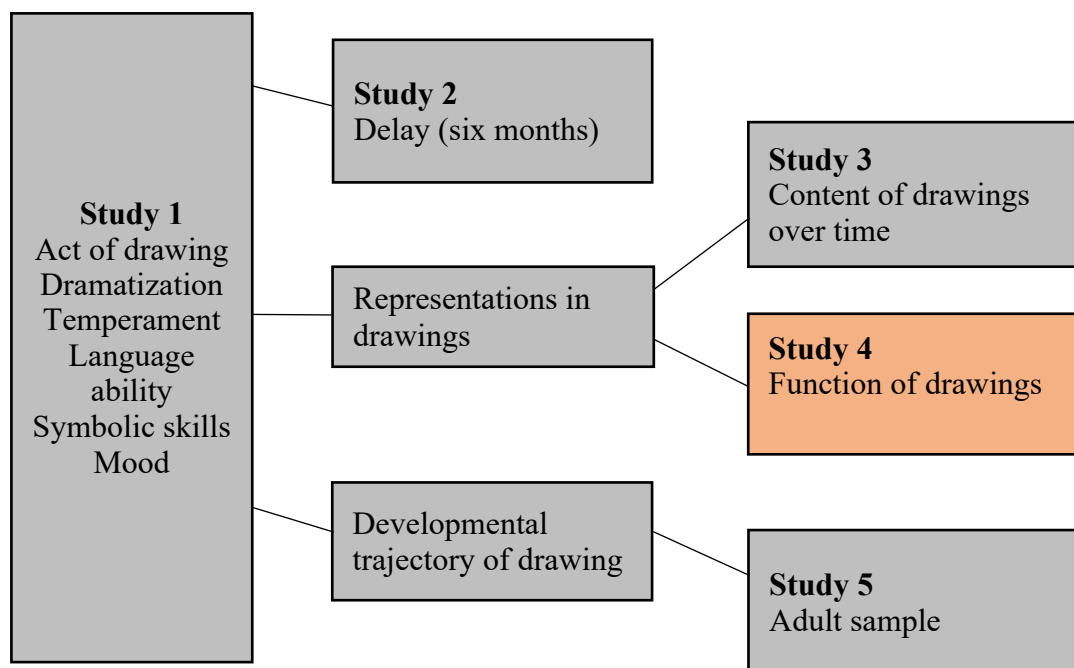


Figure 11. A schematic representation of Study Four in relation to the overall thesis.

5.1 Study Four

Chapter Two showed that drawing has a positive effect on children's recall of objects, supporting previous studies (Butler et al., 1995; Gross & Hayne, 1999a). However, this does not tell us what the function of drawings is. The representations in children's drawings may also act as cues, which further assist memory search and verbal reports (Jolley, 2010). The current study examined how children use drawings of an event to recall information about that event.

According to the generation effect theory (e.g. Bertsch, Pesta, Wiscott, & McDaniel, 2007; Mulligan & Peterson, 2008; Rosner, Elman, & Shimamura, 2013), the material produced by the same person during encoding (e.g. a picture of a dog) will be better remembered on a later stage, than merely seeing a stimulus produced by

another (Jack et al., 2015). This is because generating one's own stimuli is more cognitively demanding and involves more effortful processing than solely looking at or reading other-generated stimuli (e.g. Bertsch et al., 2007; Mulligan & Peterson, 2008; Rosner et al., 2013). This is consistent with the process of creating a drawing, which requires that children mobilize various cognitive abilities, such as motor control, planning, memory, and concentration (Jolley, 2010). Only viewing a drawing is not as demanding; here, a child needs to only look at the depicted items and try to describe them, by recognizing their resemblance to their real referents. Additionally, when children are asked to draw and recall what happened in an event, they mentally reinstate the event (Jack et al., 2015). According to the encoding specificity principle (Thomson & Tulving, 1970; Tulving, 1983; Tulving & Thomson, 1973), the greater the similarity between the cues presented at the time of encoding and those presented at retrieval, the more information will be recalled (Gentle et al., 2014). With these theories in mind, we would expect that when a child creates a drawing immediately after seeing an incident, it may reinforce encoding, and therefore looking at her/his drawing at a later stage may facilitate retrieval (Krafka & Penrod, 1985).

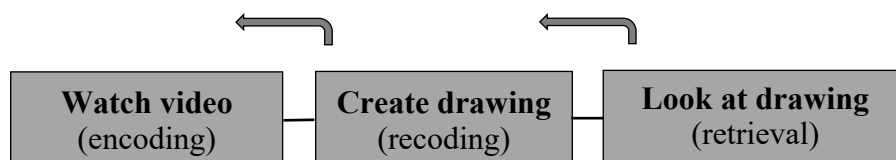
This is further supported by empirical work on the strategies children use to interpret drawings. It has been suggested that children can understand the symbolic content of a drawing, even if the representational quality of it is not realistic (Golomb, 1992; Matthews, 1984). If pictures are clear representation of real-world referents, then children will rely on the resemblance between the drawn features and their referents to interpret the content (Armitage & Allen, 2015). If, however pictures are ambiguous, children may rely on the intentionality of the artist to understand their content (Armitage & Allen, 2015; Bloom & Markson, 1998; Preissler & Bloom, 2008). Previous research showed that 3- to 4- year olds understand that a drawing can

have a different meaning depending on the creator's intention (e.g. Bloom & Markson, 1998). This suggests that a drawing created by the same child at the time of encoding will act as a better memory cue, because that child will be able to understand what the drawn features are intended to represent (e.g. a stick figure representing a specific person).

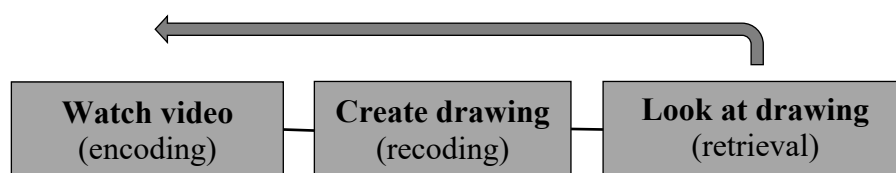
So far, relevant research has explored children's ability to describe the content of drawings after delays (i.e. describe what they see in the drawings) (e.g. Bloom & Markson, 1998; Gross & Hayne, 1999b) but not whether drawings can act as visual cues for the event they refer to. Investigating this question will further our understanding of the function of drawings in legal settings. Is one's own drawing a stronger memory cue for a past event, or can any drawing relevant to the incident act as a memory cue for that incident?

According to the generation effect (e.g. Bertsch et al., 2007; Mulligan & Peterson, 2008; Rosner et al., 2013), looking at one's own drawing should act as a better retrieval cue for a past event, because one's own picture should bring to mind creating the drawing and the intentionality behind the drawing. This is further supplemented by research highlighting the critical role of intention in pictorial understanding (Bloom & Markson, 1998; Preissler & Bloom, 2008); one's own drawing is expected to act as a better retrieval cue for a past event than any other drawing, because it will be easier for the creator to recognize the drawn items and hence link them to the event. Further, in accordance with the encoding specificity theory (Thomson & Tulving, 1970; Tulving, 1983; Tulving & Thomson, 1973), drawing one's own picture immediately after an event and looking at it after a retention interval should act as a better memory cue than any drawing, because of the similarity of the stimuli at encoding and retrieval. It can be inferred from these theories that looking at one's own drawing will act as a memory cue for the time the

drawing was created, which will further activate memory for the event the drawing refers to (see A, Figure 12). If this is true, then one's own generated cues (own drawing) will facilitate recall to a better extent than any visual cue (other drawing). This has important implications for forensic investigators, as it proposes that children can use their own drawings as visual aids of witnessed events.



- A. One's own drawing of an event (right box) may trigger memory for the time the child created the drawing (middle box), which may further link back to the event (left box) and facilitate recall.



- B. Any drawing relevant to the event (right box) may facilitate a child's recall of that event (left box), thus bypassing the recoding stage (middle box).

Figure 12. The function of drawings in recalling a past event.

Previous research showed that by preschool years children can understand that pictures are both symbols, and the depicted items can also relate to real-world referents (Ganea, Allen, Butler, Carey, & DeLoache, 2009). It has further been found that even young children can recognise the content of another child's drawing (e.g. Bloom & Markson, 1998; Gross & Hayne, 1999b). These findings suggest that any prompt (e.g. a drawing) which is related to a past event may act as a cue to that event (Salmon & Irvine 2002), because it may reactivate the stored memory trace of the

event (Chalfonte & Johnson, 1996; Howe, Courage, & Bryant-Brown, 1993) and thus facilitate retrieval. If this is true, then any drawing regarding the event should trigger memory for that event, by bypassing the process of creating one's drawing (recoding phase) (see B, Figure 12).

The aim of this study was to explore the function of drawings at a later recall. Three- to- 6- year old children watched a video of the event which was utilized in Studies One and Two (Chapters Two and Three). The video was used for practical reasons, mainly because the actors were no longer available to present a live event to children, and I wanted to keep the event consistent with studies One, Two, and Three. Additionally, recalling information from a video of an incident which did not take place in the children's schools may minimize the effects of more scripted knowledge interfering with their recall (Barlow et al., 2011; Jolley, 2010). Consequently, the use of these two media of the same incident will allow to compare if a live event is easier to recall than a video presentation. To effectively control for encoding, all children were given the same experience in the first interview: immediately after watching the video, they were all asked to draw and freely narrate what they saw. After two weeks, children were presented with either their drawing or another child's drawing and were asked to recall what they saw in the video, and to further identify the items in the drawings.

As per Studies One and Two (Chapters Two and Three), children's temperament and mood scores in relation to their verbal recall were also explored. Previous work has not investigated the association between temperament and mood and recall in an own-drawing versus another-drawing condition. Nonetheless, with previous studies in mind, it is predicted that sociable children will perform equally well in both conditions, because of their ability to adjust well to novel situations (A.

H. Buss & Plomin, 1987). In past work, shy children were less accurate than more sociable children in their answers to cued recall questions about a video event and when asked to verbally recall text (Chae & Ceci, 2005; Roebbers & Schneider, 2001; Schneider & Sodian, 1991). Their poorer performance may have been related to inhibition and reluctance towards novel situations (Kagan et al., 1987). In light of these findings, it is speculated that shyer children may perform worse in a condition in which they are expected to recall information about a novel drawing.

Several hypotheses were made in this study. First, in line with the generation effect, intentionality theory, and the encoding specificity principle (e.g. Bertsch et al., 2007; Bloom & Markson, 1998; Preissler & Bloom, 2008; Rosner et al., 2013; Tulving, 1983; Tulving & Thomson, 1973), it is hypothesized that children in the own-drawing condition will recall more information about the event than children in the other-drawing condition. Given that previous work found that drawing facilitates memory for objects (e.g. Gross & Hayne, 1998), it is further anticipated that more information about objects will be reported in the own-drawing condition. Secondly, it is predicted that children will report more information about the event immediately than two weeks after. Although the two interviews are methodologically different (the first interview involves children drawing and talking simultaneously), this speculation was made on the premise that an immediate interview will facilitate recall to a better extent than an interview after a two-week delay. Thirdly, it is hypothesized that sociability will be positively related to recall. Fourth, shyness will correlate negatively with recall in the other-drawing condition. Fifth, with respect to the content of drawings, it is hypothesized that children will identify more items correctly in their own drawing than in another child's drawing, because creating their own drawing will facilitate their memory to a better extent at the retrieval stage (e.g. Bertsch et al.,

2007; Bloom & Markson, 1998; Preissler & Bloom, 2008; Rosner et al., 2013; Tulving, 1983). Lastly, as children's ability to correctly identify the content of other children's drawings drops after a long delay (Gross & Hayne, 1999b), it is anticipated that children in the other-drawing condition will make more inaccurate identifications compared to those in the own-drawing condition.

5.2 Method

Participants

Forty 3- to 6- year old children ($M = 59.77$ months, $SD = 14.78$ months) participated in the study. They were recruited from three public primary schools in Lancashire, UK. There were 19 females ($M = 63.16$, $SD = 13.40$) and 21 males ($M = 56.71$, $SD = 15.24$). The children were predominantly Caucasian. Twenty children were assigned to the Own-drawing condition and twenty children were assigned to the Other-drawing condition. Originally, 45 children were recruited. However, two children refused to draw, one child refused to talk, and two children had previously witnessed the event, when it had taken place in their school as part of Studies One and Two, therefore they were excluded from the research. All children received a colouring book and a packet of crayons as a thank you for their participation.

Materials

EAS Survey for Children: Parent Rating (A. H. Buss & Plumin, 1984).

The EAS Survey measures four distinct temperament dimensions; Emotionality (tendency to be distressed), Activity (behavioral arousal), Sociability (inclination to be with others versus to being alone), and Shyness (tendency to be fearful and anxious in the presence of strangers and acquaintances). The Parent Rating version of the EAS

Survey is a 20-item questionnaire in which parents rate their children's behaviour on a 5-point Likert scale, ranging from 'not characteristic or typical of my child' to 'very characteristic or typical of my child'.

Mood scores. Children's mood scores were assessed prior and after each interview. This was done with a self-report scale comprising a row of five smiley faces, which ranged from very unhappy to very happy (adapted from the Facial Image Scale, Buchanan & Niven, 2002). The procedure was exactly the same as in Studies One and Two (Chapters Two and Three). For the analyses of the study, mean mood scores were calculated by subtracting scores before and after each interview to provide a single difference score.

Props. A Mac OS X Yosemite computer on which the video event was presented was used. The video involved the same teddy bear, stuffed monkey toy, and children's picture book (Tsoroni-Georgiadi, 2014), which were used in Studies One, Two, and Three.

Design

The first independent factor was Delay: one day (first interview) vs two weeks (second interview). This was a within-subjects factor. During the second delay (second interview) there were two conditions: Own-drawing and Other-drawing. This was a between-subjects factor. The dependent variables were verbal performance in the first interview and verbal performance in free recall of the second interview. Pearson product-moment correlations and regression analyses were also performed on the total amount of information recalled in free recall of the second interview. With respect to the content of drawings, two further Multifactorial Analyses of Variance with condition (Own-drawing vs Other-drawing) as a between-subjects factor were

performed. The dependent variables were the percent identified features in the drawings during free recall and after a drawing identification question was asked.

Procedure

Testing. Prior to the study, participant information sheets, consent forms, and a copy of the EAS Survey were placed in sealed envelopes and were given to the parents by the children's teachers at the participating schools. After permission was granted, each child was tested individually in a quiet room in their school. First, the teacher introduced each child to the experimenter. The experimenter introduced herself, and asked each child if they wanted to watch a video she had in her computer. After each child had agreed, the experimenter started the video.

Video event. A video of a novel, salient event, which was devised to simulate an eyewitness situation and used in a Studies One and Two (Chapters Two and Three) was shown to the children (see Appendix B for the script of the event, p. 208). The event was filmed in a teaching room in Lancaster University, and the actors were the same as per the live event. The primary actor reading the storybook was facing the camera so that the viewers had the sense that he was addressing them directly. The video lasted approximately six minutes and it was an exact replication of the event that took place in the children's schools. In the video, however, the event ends after Actor 1 finishes reading the story and informs the children that he intends to look for Actor 2 and Monkey, and that he is certain that they will make up and be friends again. Then he waves goodbye.

Memory interviews. Children were interviewed individually by the experimenter on two occasions; right after they watched the video (first interview) and two weeks after the event (second interview)¹¹.

First interview. All interviews were video recorded and took place in the same room where children viewed the video. Prior to and after watching the video, each child was shown a mood scale comprising five smiley faces, ranging from very unhappy to very happy, and were asked to point to the face which indicated how they felt at that moment. The instructions given were exactly the same as per Studies One and Two (Chapters Two and Three).

After the video was over, each child was presented with a sheet of paper, colouring pencils, a standard black pencil, and a rubber and was asked to freely narrate and make a drawing of what he/she had seen. Specifically, the experimenter gave the following instructions: *'Now, can you draw and tell me all about what happened in the video? Draw me anything you can remember about what you saw. You can use any colouring pencils you want'*. If children did not spontaneously describe while drawing the experimenter encouraged them to do so with prompts such as: *'Please draw and tell me what happened'*. To make sure that the children offered all the information they recalled, when a child indicated he/she had finished, the experimenter asked: *'Can you draw and tell me anything else?'*. In line with previous studies (e.g. Butler et al, 1995; Salmon et al., 2003; Wesson & Salmon, 2001), she maintained the flow with prompts such as *'uh huh'*, *'really'*, *'you're doing really well'*, or by repeating a portion of a child's previous utterance.

¹¹ Due to school holidays, two children were re-interviewed 11 days after watching the video ('off-schedule participants'). To investigate potential differences, the analyses were run twice: once with all participants included and once without these two children. There were only two cases of minor differences in the results, therefore the data from the full sample and the two instances of different results are reported.

Second interview. Approximately two weeks later ($M = 13.85$ days, $SD = .66$), all children were re-interviewed about the video they had seen. They were randomly assigned to one of two conditions: Own-drawing and Other-drawing. Each condition comprised a free recall phase. The participants in the *Own-drawing* condition were first shown the drawing they had created two weeks before and were asked to freely narrate what they remembered about the video they had seen, based on their drawing. The following instructions were given: *'This is a drawing you made two weeks ago, after watching a video. The drawing might help you remember what you saw. Can you look at it and then tell me everything you remember about what happened in the video?'* As an additional memory prompt, when a child indicated that they had finished their narration, the experimenter said: *'Is there anything else you remember?'*

The children in the *Other-drawing* condition were shown another child's drawing. This was selected on the basis of its similarity to the other child's drawing, and included roughly the same number and shapes of items as the other child's drawing (Gross & Hayne, 1999b). The children were given similar instructions as the children in the *Own-drawing* condition: *'This is a drawing another child made two weeks ago, after watching a video. The drawing might help you remember what you saw. Can you look at it and then tell me everything you remember about what happened in the video?'* As an additional memory prompt, when a child indicated that they had finished their narration they experimenter said: *'Is there anything else you remember?'*

In both conditions, if children did not spontaneously describe the items depicted in the drawings, they were asked an extra identification question such as *'What do you see in this drawing?'* or *'What else do you see in the drawing?'* or *'How about here?'* . Out of the 40 children, 32 were asked this *drawing identification*

question (DIQ). Out of these 32, 12 were in the Own-drawing (60% of the children) condition and 20 were in the Other-drawing condition (100% of the children). Further, out of these 32 children, five did not answer the question or answered 'I don't know'. A Pearson's chi-square test was calculated comparing the frequency of the DIQ asked in children in the Own-drawing and Other-drawing condition. The chi-square test with Fisher's exact test correction applied revealed significant association ($p = .003$). This indicates that children were less likely to provide a spontaneous description when drawings were created by another child. As a result, the second interview was divided in a free recall phase (as per the drawing interview) and a further Drawing identification question phase (DIQ). Prior and after each interview, the children were assessed on their mood scores, as per the drawing interview.

To provide a rough measure of children's drawing ability, after the second interview was over, each child was given another A4 piece of paper and a black pencil and was asked to draw a house, as per Clark's Drawing Ability Test (CDAT; Clark, 1989).

Coding and scoring

Verbal interviews. Interviews of all conditions were video and audio recorded and were transcribed verbatim. The coding procedure was exactly the same as per studies One and Two (Chapters Two and Three).

The experimenter coded 100% of the transcripts and a second coder independently coded 100% of the narratives. Inter-observer reliability was calculated using Pearson product-moment correlations. Correlations on the total items of each content category produced a correlation coefficient of $r(38) = .99, p < .001$ for the first interview, $r(38) = .99, p < .001$ for the free recall phase of the

second interview, and $r(30) = .99, p < .001$ for the total number of items reported in the DIQ. Further Pearson product-moment correlation on the amount of errors made by the participants produced an inter-observer reliability coefficient of $r(38) = .96, p < .001$ for the first interview, $r(38) = .97, p < .001$ for the free recall phase of the second interview, and $r(30) = .98, p < .001$ for the errors reported in the DIQ. The experimenter's scores were used for analysis.

House drawings. The experimenter and a blind coder ranked the representational quality of the house drawings from 1 (worst; not recognizable of objects and people) to 7 (best; objects and people very recognizable). The second coder was first given a description of the content of the video. She was then presented with three drawings with a score of 1, 4, and 7 respectively, and was asked to code the remaining drawings. The level of agreement between the two coders was determined using intraclass correlations (ICC). A high degree of reliability was found. The single measure ICC was $.96, p < .000$, indicating an excellent level of agreement. In order to investigate if there was a significant difference in children's representational quality between conditions (Own-drawing, Other-drawing), an independent samples t-tests was performed on the experimenter's rankings of the house drawings. The test revealed no significant difference ($p > .05$).

Content of children's drawings. During the interviews, the experimenter made notes of what the children drew. This was done because, in many cases, drawings are not easy to interpret without the aid of children's verbal reports (Gross & Hayne, 1998), and correctly or incorrectly identified items were also coded. In line with Study Three (Chapter Four), the experimenter made notes of all depicted items (e.g. leopard, elephant, strange looking animal). In addition, the experimenter made notes of all the items in the drawings that were identified when the Drawing

identification question (DIQ) was asked as well as during free recall (FR). If an item was mentioned by the child in both phases (e.g. FR baby elephant and DIQ baby elephant) it was counted in both phases separately. Children tend to assign meaning to their own drawings even if they are not iconic (Bloom, 2004). Therefore, items which were non-representational as well as scribbles which the children drew as representing an item (e.g. a line representing 'a snake') were noted as being that item.

In line with Study Three (Chapter Four) all items drawn and identified were grouped in one of three categories:

Central features. This category included five items that were considered important for a forensic event: the 'perpetrator' (Actor 2), the 'victim' (Actor 1), the 'taken monkey', the 'teddy bear', and the 'book'.

Peripheral features. All other accurate items drawn (e.g. elephant, leopard, whiteboard). Overall, there were 18 peripheral features.

Inaccurate features. These were items incorrectly drawn or identified and involved three categories; *errors* (items that were incorrectly labelled by the child; e.g. a 'strange looking animal' incorrectly labelled as a 'human'), *confabulated people* (depictions of characters who were not part of the storybook; e.g. 'a snake'), and *confabulated objects* (depictions of items or places not present or non-existent; e.g. 'a nopper', 'wind', 'storm', 'sun').

Correctly identified inaccurate features. These were *errors*, *confabulated people*, and *confabulated objects* which were correctly identified as such when children were shown the drawings two weeks after the event. This category was added in this study because here (by contrast to Study Three) children were shown their previous drawings and were asked to identify the depicted items.

Reliability. A second coder coded 100% of the drawings. The drawings included the notes made by the experimenter for all items drawn and identified during free recall and the DIQ. This was done so that the coder could identify all drawn items, which were not easy to interpret due to low representational quality, as well as all the identified items. The level of agreement between the two coders was determined using intraclass correlations (ICC). Any disagreements between the coders were settled through discussion. Some categories only included one or two occurrences, therefore were combined in larger categories. Accordingly, *correctly identified errors*, *people*, and *objects* were combined in a *correctly identified inaccurate features* category in both free recall and the DIQ. The level of agreement between the two raters was excellent, with the strongest single measure ICCs being 1.00, $p < .000$ and the lowest being .86, $p < .000$.

5.3 Results

In order to show that children in each condition (Own-drawing, Other-drawing) were matched on background characteristics, preliminary independent samples t-tests were performed, which found no significant differences between conditions in EAS emotionality, EAS activity, EAS sociability, and EAS shyness (all $ps > .05$). As already stated in the Methods section (p. 138), a Pearson's chi-square test comparing the frequency of the DIQ asked in the Own-drawing and the Other-drawing condition showed a significant association ($p = .003$). Children in the other-drawing condition were less likely to describe drawings that were created by other children, presumably because they were having difficulty deciphering the features presented in the drawings.

Interviewer's non-directive prompts

To determine whether recall in each condition was influenced by the interviewer's utterances, the amount of non-directive prompts used was investigated. The mean rate of prompts per minute was calculated, and a one-way ANCOVA with condition as a between-subjects factor and age as covariate was performed. The analysis did not produce any significant main effects of condition or age (all $F_s < 3.18$, all $p_s > .05$).

Verbal interviews

First, analyses were run on the information children verbally recalled during the first and the second interview.

Type of accurate information. To investigate any differences in the type of verbal information reported, separate 2(condition: Own-drawing, Other-drawing) x 2(delay: first interview vs. second interview) repeated measures ANCOVAs were performed on each of the seven content categories of the first interview and the free recall phase of the second interview. Condition was the between-subjects factor and delay was a within-subjects factor. Age was entered as a covariate. No main effects of condition were expected in the first interview, as children were divided in the own-drawing and other-drawing conditions only in the second interview.

Main effects of condition. Condition did not have an effect on any of the content categories (all $F_s < 2.86$, all $p_s > .05$).

Main effects of interview. There was a significant main effect of delay on 'actions', 'time', and 'affective information' (see Table 10). Further post hoc Bonferroni tests showed that children reported significantly more details about actions

($p = .011$) in the second interview than the first interview, however, there were no significant differences for time ($p = .057$) or affective information ($p = .626$).

Table 10

Means (Standard Deviations), F-Values, p-Values, and Effect Sizes of Delay (First Interview vs Second Interview) for the Seven Content Categories

	<u>First interview</u>	<u>Second interview</u>	$F(1,37)$	p	η^2_p
	$M (SD)$	$M (SD)$			
People	1.50 (1.58)	1.47 (1.65)	.39	.535	.01
Actions	.40 (.93)	1.22 (2.20)	8.54	.006	.19
Objects	1.85 (2.59)	.77 (1.12)	.03	.854	.00
Descriptions	.52 (1.24)	.67 (1.12)	2.17	.149	.05
Places	.12 (.33)	.25 (.49)	3.82	.058	.09
Time	.10 (.30)	.60 (1.79)	9.02	.005	.20
Affect. Inf.	.05 (.22)	.07 (.27)	4.21	.047	.10

Note. Affect. Inf. = Affective information.

Main effects of the covariate age. There was a significant main effect of age for ‘people’, $F(1, 37) = 18.39, p < .001, \eta^2_p = .33$, ‘actions’ $F(1, 37) = 40.11, p < .001, \eta^2_p = .52$, ‘descriptions’ $F(1, 37) = 19.38, p < .001, \eta^2_p = .34$, ‘places’, $F(1, 37) = 13.66, p = .001, \eta^2_p = .27$, and ‘time’, $F(1, 37) = 19.78, p < .001, \eta^2_p = .35$. There were no other significant main effects of age on the remaining categories (all $F_s < 3.19$, all $p_s > .05$).

Interactions between age and delay and delay and condition. There were further significant interactions between delay and age for ‘actions’, $F(1, 37) = 13.14, p = .001, \eta^2_p = .26$, ‘places’, $F(1, 37) = 5.73, p = .022, \eta^2_p = .13$, ‘time’, $F(1, 37) =$

12.57, $p = .001$, $\eta^2_p = .25$, and ‘affective information’¹², $F(1, 37) = 4.93$, $p = .033$, $\eta^2_p = .12$. A further post hoc test on places (post hoc findings for all other variables were discussed in the *Main effects of interview* section) found no significant main effects of delay ($p = .106$). There were no further significant interactions between delay and age (all $F_s < 2.91$, all $p_s > .05$) and delay and condition for any of the remaining categories (all $F_s < 3.48$, all $p_s > .05$).

Accuracy scores and analyses for errors. The percentage of correctly recalled information was further calculated in the first and the second interview. As shown in Table 11, accuracy scores in free recall were higher in both interviews compared to the children who were asked the DIQ, whose accuracy scores were lower.

Table 11

Mean (Standard Deviations) Percentage of Accurate Information Recalled in the First and the Second Interview

	<i>N</i>	<i>M (SD) %</i>
First interview (free recall only)	36	80.35 (34.35)
Second interview (free recall)	28	84.66 (23.97)
Second interview (DIQ)	26	69.32 (44.19)

Note. DIQ = Drawing Identification question.

¹² When the off-schedule participants were excluded from the repeated measures ANCOVA, there was no significant main effect of delay on affective information, $F(1, 35) = 3.50$, $p = .070$, $\eta^2_p = .09$. The interaction between delay and age for affective information was also not significant, $F(1, 35) = 3.80$, $p = .059$, $\eta^2_p = .10$.

A further 2(condition: Own-drawing, Other-drawing) x 2(delay: first interview vs. second interview) repeated measures ANCOVA with age entered as a covariate was run to investigate differences in ‘errors’ made by the children during free recall. No significant effects or interactions were found (all $F_s < 3.22$, all $p_s > .05$).

Mood scores. The mean mood score prior and after the first interview was, $M = 4.42$ (out of 5.00 which denotes a happier state), $SD = .11$. The mean mood score prior and after the second interview was, $M = 4.31$ (out of 5.00), $SD = .01$.

Relations between internal factors and children’s overall recall. Next, associations between children’s temperament, mood change, and verbal performance in the free recall phase of the second interview were investigated. A partial correlation analysis was performed, controlling for Age and split by condition. In the Own-drawing condition, there was a positive correlation between verbal recall and Emotionality. In the Other-drawing condition, there was a negative correlation between Shyness and verbal recall (see Table 12). There were no further significant correlations among recall and the remaining variables (all $p_s > .05$).

Table 12

Correlations Between Temperament and Mood Change, and Children’s Verbal Recall in Each Condition of the Free Recall Phase of the Second Interview

Verbal recall	Emotionality	Activity	Sociability	Shyness	Mood change
Own-drawing	.52*	-.13	-.20	-.03	-.02
Other-drawing	-.06	.45	.27	-.53*	.09

Note. * $p < .05$ (2-tailed).

A multiple regression split by condition was further performed, with only the variables that came out significant in the correlations entered into the analysis. Age, Emotionality, and Shyness were entered simultaneously as predictor variables. In the Own-drawing condition ($R^2 = .60, p = .005$), Emotionality was significant ($\beta = .41, t = 2.27, p = .038$), suggesting that emotionality can facilitate recall when children are shown their own drawing. Age was also significant ($\beta = .81, t = 4.10, p = .001$). In the Other-drawing condition ($R^2 = .83, p < .001$), Shyness ($\beta = -.33, t = -3.02, p = .009$) predicted verbal recall. This finding suggests that when children are shown another child's drawing, shyness can inhibit verbal recall of a video event. Age was also significant ($\beta = .96, t = 8.01, p < .001$).

Content of drawings

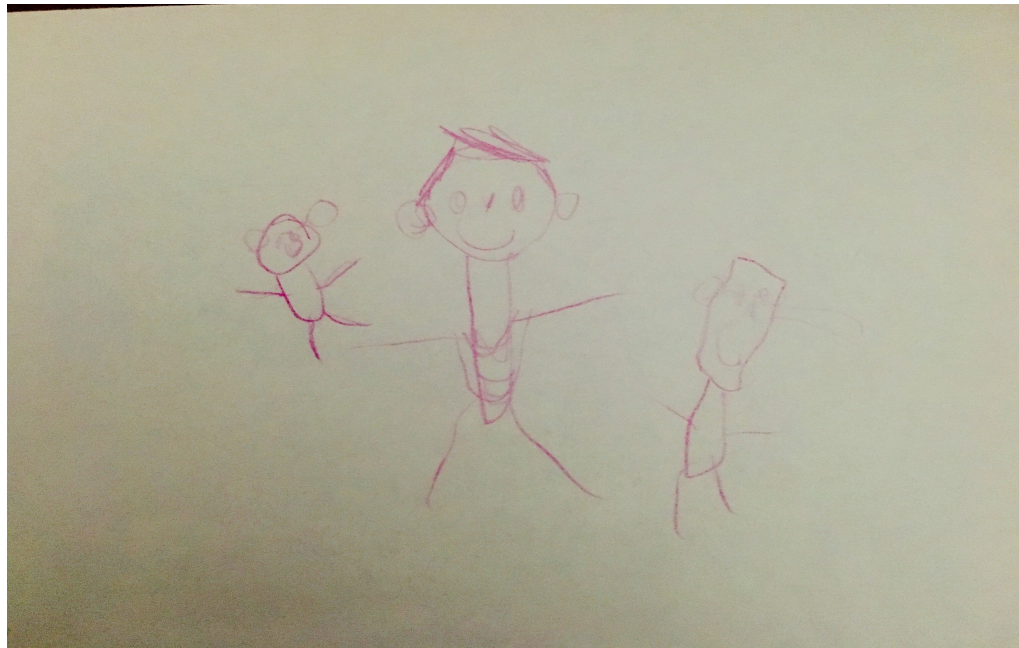
Further, the content of children's drawings was examined. Analyses were run to investigate the number, percentage, and type of features (e.g. central, peripheral, errors, confabulations) children depicted and identified in the drawings they saw.

Descriptive information for the first interview. The mean number of features *depicted* in the children's drawings was $M = 3.17, SD = 2.69$. These features included central and peripheral information, errors, confabulated people, and confabulated objects (see Figure 13 for an example of a drawing). The percentages of each depicted feature category are presented in Table 13.

Table 13

Mean (Standard Deviations) Percentage of Features Depicted by the Children in the First Interview

	<i>M (SD) %</i>
Central features	24.49 (39.43)
Peripheral features	45.43 (44.63)
Errors	2.26 (9.42)
Confabulated people	14.37 (33.40)
Confabulated objects	13.45 (30.81)



From left to right, this child drew four central features: the 'taken monkey', 'the victim' (in the middle), the 'book' (the lines at the bottom of the victim's body), and the 'teddy bear'.

Figure 13. A drawing of a 56-month-old child.

Descriptive information for the second interview. The mean number of features the children *identified* in the drawings was also calculated separately for free recall and the DIQ. These features included central and peripheral details, errors and confabulated objects (inaccurate identifications), and correctly identified inaccurate features combined in one category (correctly identified inaccuracies: errors, confabulated people, and confabulated objects). In free recall, the mean number of features identified in the Own-drawing condition was $M = 2.85$, $SD = 2.66$, and in the Other-drawing condition it was $M = .75$, $SD = 1.07$. An independent samples t-test on all accurate details identified (central, peripheral, and correctly identified inaccuracies) showed that children in the Own-drawing condition ($M = 2.75$, $SD = 2.61$) made significantly more accurate identifications than children in the Other-drawing condition ($M = .60$, $SD = 1.05$), $t = 3.42(24.94)$, $p = .002$ (equal variances not assumed). The mean number of features identified in the DIQ in the Own-drawing condition was $M = 3.17$, $SD = 2.92$, and in the Other-drawing condition, it was $M = 2.05$, $SD = 1.99$. An independent samples t-test on all accurate details identified in the DIQ (central, peripheral, and correctly identified inaccuracies) revealed that children in the Own-drawing condition made significantly more accurate identifications ($M = 2.91$, $SD = 2.74$) than children in the Other-drawing condition ($M = .70$, $SD = 1.42$), $t = 2.58(14.57)$, $p = .021$ (equal variances not assumed). No confabulations were made in the DIQ. Percentages of all identified categories were also calculated and are presented in Table 14.

Table 14

Mean (Standard Deviations) Percentage of Features Identified in the Own-drawing Condition and the Other-drawing Condition in Free Recall and the Drawing Identification Question of the Second Interview

	<u>Free Recall</u>		<u>DIQ</u>	
	<u>Own-drawing</u>	<u>Other-drawing</u>	<u>Own-drawing</u>	<u>Other-drawing</u>
	<i>M (SD) %</i>	<i>M (SD) %</i>	<i>M (SD) %</i>	<i>M (SD) %</i>
Central features	21.25 (34.76)	16.67 (35.35)	10.18 (29.00)	.00 (.00)
Periph. features	73.44 (35.34)	61.11 (48.59)	66.74 (42.10)	27.00 (43.17)
Errors	.00 (.00)	.00 (.00)	5.49 (10.90)	66.33 (46.31)
Confab. objects	2.81 (7.74)	22.22 (44.10)	-	-
Correct. ident.				
inaccur. features	2.50 (6.83)	.00 (.00)	17.59 (38.62)	6.67 (25.82)

Note. Periph. features = Peripheral features; Confab. objects = Confabulated objects; Correct. ident. inaccur. features = Correctly identified inaccurate features.

Different features identified in the drawings in the second interview. To further examine whether there were significant differences in the percentage of different features identified in the drawings during free recall and the DIQ, two Multifactorial Analyses of Variance with condition (Own drawing vs Other drawing) as a between-subjects factor were performed. Age was entered as a covariate.

Free recall. There was a significant main effect of age on the percentage of peripheral features identified, $F(1, 37) = 14.69, p < .001, \eta^2_p = .28$. There was no other significant main effect of age or condition on the remaining categories (all F s < 2.73 , all p s $> .05$).

Drawing identification question (DIQ). There was a significant main effect of condition on the percentage of peripheral features identified, $F(1, 29) = 9.87, p = .004, \eta^2_p = .25$, and the percentage of errors identified, $F(1, 29) = 7.86, p = .009, \eta^2_p = .21$. As seen on Table 15, children in the Own-drawing condition identified a higher percentage of peripheral features ($p = .004$) than children in the Other-drawing condition. Children in the Other-drawing condition had a higher percentage of errors in the drawings (i.e. labelled a drawn item inaccurately) than children in the Own-drawing condition ($p = .009$).

Table 15

Mean (Standard Deviations) Percentage of Peripheral and Correctly Identified Inaccurate Features in the Drawing Identification Question

	<u>Own-drawing</u>	<u>Other-drawing</u>
	<i>M (SD) %</i>	<i>M (SD) %</i>
Peripheral features	66.74 (42.10)	20.25 (38.95)
Errors	5.47 (10.90)	49.75 (49.48)

There was also a significant main effect of age on the percentage of identified peripheral features, $F(1, 29) = 24.36, p < .001, \eta^2_p = .46$, and the percentage of correctly identified inaccurate information, $F(1, 29) = 4.35, p < .046, \eta^2_p = .13$. There were no further significant main effects of condition or age on the remaining categories (all $F_s < 2.92$, all $p_s > .05$).

5.4 Discussion

This study investigated whether one's own drawing relevant to an event can act as a better retrieval cue for that event than a drawing created by another child. It further explored whether temperament and mood are related to children's recall under different interview conditions, and whether children can derive more meaning from their own rather than other children's drawings. The first hypothesis, that children in the own-drawing condition would report more information about the event than children in the other-drawing condition was not confirmed. The second hypothesis that children would recall more information immediately than two weeks after the video presentation was also not confirmed. Sociability did not correlate with recall in any of the conditions. However, shyness was negatively related with performance in the other-drawing condition and emotionality was positively related to verbal performance in the own-drawing condition. In line with the final two hypotheses, children in the own-drawing condition identified more peripheral features and made fewer inaccurate identifications. All these findings will be discussed in turn.

First, children in the other-drawing condition were less likely to provide a spontaneous description of the drawings when these were created by another child. Some children did not respond to the interviewer's directive (i.e. 'Please look at the drawing and tell me what you remember about the video you saw') or gave skeletal accounts, which urged the experimenter to further prompt a substantial number of children to describe the content of the drawings. All children in the other-drawing condition were asked this question (DIQ) compared to slightly above half the children in the own-drawing condition. This may relate to the representational quality of the drawings. The children in the own-drawing condition knew what their own drawings were meant to depict and used their intentionality to describe them (Bloom &

Markson, 1998; Preissler & Bloom, 2008). Children in the other-drawing condition did not have access to the intentions of the artist, which may have made it more difficult to decipher the drawn features.

The prediction that one's own drawing would act as a better retrieval cue than any drawing for the event was not confirmed; there were no differences between children in the own-drawing and the other-drawing condition in the amount of information reported. This finding suggests that my original speculations about the functions of drawings in children's recall were incomplete. In summary, I speculated that, in line with the encoding specificity principle and the generation effect (Bertsch et al., 2007; Mulligan & Peterson, 2008; Rosner et al., 2013; Thomson & Tulving, 1970; Tulving, 1983; Tulving & Thomson, 1973), one's own drawing should act as a better memory cue for the video than another child's drawing. If this did not happen, I considered any drawing created by another child to act as a reminder which could cue memory for the event (Chalfonte & Johnson, 1996; Howe et al., 1993) (see Figure 12, p. 130). Given the null findings and the finding that children in the other-drawing condition all had to be asked to identify items in the drawing, another interpretation is that looking at a drawing may not link back to the original event but to the drawing itself (Figure 14). Children may use drawings to talk about what they are seeing rather than the event the drawings are related to. Future researchers could take this finding into consideration and redesign this study so that we understand better the function of drawings in children's recall.

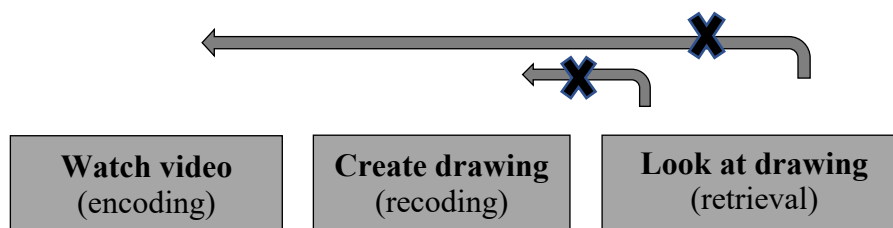


Figure 14. Looking at a drawing of an event may not facilitate recall of the event or of the first recall but rather prompt children to describe the content of drawings.

Regardless of condition, compared to a live event, the video presentation may not have allowed children to encode information sufficiently. Videos involve two-dimensional images which may present distorted visual cues (Schmitt & Anderson, 2002; Thierry & Spence, 2004), thus affecting children's performance (see Chapter One, pp. 34-36 for a criticism of videos). Consequently, children may have performed better in Study One (Chapter Two) in which the task involved a live event (Troseth, 2003). A quick comparison between the mean number of recalled items in Chapter Two (Table 2, p. 76) and this study (Table 10, p. 143) shows that children here reported fewer details. Understandably, a direct comparison cannot be made due to the different nature of events; for example, the live event involved features (e.g. classmates, teachers, schoolroom) which the children were familiar with and therefore could have pre-existing schemas about. Although the event presented in this study was the same, some of these details were missing from the video. As it has already been supported in Chapter Four, live events may trigger children's schematic knowledge, which suggests that the positive effects of drawing on recall may be partly due to children's scripts (Barlow et al., 2011; Jolley, 2010). Nonetheless, the diminished verbal performance here (compared to Chapter Two) could imply that children need this more generic knowledge to search their memory for more episodic details

(Brewer & Nakamura, 1984). In the lack of schematic details relating to a video presentation, children's amount of verbal reports may dissipate.

Furthermore, children reported significantly more information about actions after two weeks than immediately after the video presentation, a counterintuitive finding. This result could be for a number of reasons. Firstly, since the experimenter was present during the video presentation (which differed from the live event in Chapters Two and Three), children may have assumed that she was aware of the content of the video and therefore disclosed fewer details immediately after the video. These details were mainly related to the content of their drawings (Adi-Japha et al., 1998), which suggests that children may primarily talk about the depicted items when shown drawings. In the second interview, in which children did not have to draw, they might have offered more spontaneous details about actions (e.g. 'the elephant *found* his mummy'), which are easier to talk about than draw (Eng, 1999; Golomb, 1974).

In terms of accuracy, in the first interview and the free recall phase of the second interview, children's scores exceeded 80%, suggesting that, on the whole, looking at drawings of an event does not have an adverse effect on children's accuracy levels. When the DIQ was asked, the accuracy rate dropped a little below 70%. The DIQ involved children (all of the children in the other-drawing condition and slightly more than half the children in the own-drawing condition) identifying the features in the drawings. As already discussed, difficulty recognizing the content of drawings due to inability to link the drawn items with the intention of the artist (Bloom & Markson, 2008; Preissler & Bloom, 2008) may have lead children to inaccurate guesses. Perhaps a more recognizable reminder of the event (e.g. photographs) will act as a better memory cue because the more realistic elements may allow children to identify its content (Armitage & Allen, 2015).

Further analyses were run to investigate associations between children's verbal performance in different interview conditions and their mood scores and temperament. Mood did not have an effect on recall. The mood scores reported in the Results section suggest that children may have been willing to participate throughout, thus there was not enough variability in their responses to bring about any differences in mood. In contrast to the third hypothesis, sociability did not correlate with recall in any of the conditions. This does not mean that sociable children do not perform well verbally. Rather, compared to Chapter Two, children reported fewer details in general, and this may have not permitted any sociability effects to emerge.

In line with the fourth hypothesis, shyness was negatively correlated and predicted recall in the other-drawing condition. It is plausible that inability to understand the content of the drawings in the other-drawing condition rendered shyer children more self-conscious with respect to their performance on the task (R. S. Miller, 1995). Their concern that they would not succeed and may be negatively evaluated by the interviewer (Asendorpf, 1990) may have rendered them unable or unwilling to offer more detailed accounts. This suggests that shyer children may require more reassurance from the investigator with respect to how well they are doing in the interview than less shy children.

It was further found that emotionality was positively correlated and predicted verbal performance in the own-drawing condition. An interpretation of this result is that emotional children's ability to recognize their drawings helped them feel more confident to talk about what they remembered, thus preventing any strong (negative) emotions from emerging and compromising their reports.

Next, the content of children's drawings was investigated. Looking at the descriptive information in Table 13 (p. 147), it is evident that, collectively, children

depicted a higher percentage of peripheral features followed by central ones. Overall, the study involved only five central features and a total of 18 peripheral, hence there were more peripheral features to depict. The remaining 30% of the depicted features involved inaccurate details (errors and confabulations). This inaccuracy rate may be associated with the video presentation. As it has already been discussed, the two-dimensional aspect of the video may have not allowed children to encode all details sufficiently. As a result, children may have been uncertain about some of the images (e.g. the type of stuffed animals involved) (Schmitt & Anderson, 2002; Thierry & Spence, 2004), and therefore made errors in their depictions. It is also plausible that these inaccuracies were related to children's pre-existing schematic knowledge (Brewer & Nakamura, 1984). Specifically, in their attempt to recall the event, children may have used their pre-existing knowledge to interpret the images in the video, which lead to inaccurate judgments (e.g. confusing the 'bat' and the 'leopard' in the storybook with a 'butterfly' and a 'tiger' respectively).

Supporting the final hypotheses, when children were asked to identify the content of their own drawing they recognized more peripheral features and labelled more drawn features accurately than children in the other-drawing condition. Again, these findings are in line with my previous assumptions with respect to children's intentionality when they draw (Bloom & Markson, 1998; Preissler & Bloom, 2008). Children who were shown their own drawing may have been more able to decipher the content, presumably because they understood what the depicted item represented. Children in the other-drawing condition may have had more difficulty on the task due to the fact that they could not know the artist's intentions. In an attempt to accurately identify the depicted features, they may have made inaccurate assumptions about what

was drawn. These findings suggest that a drawing created by the same child will act as a more accurate memory cue than a drawing with ambiguous content.

This study has a number of limitations, particularly with respect to the methodological steps followed. As children were not responding to the interviewer's directive to look at the drawing and describe the event it referred to, she urged a number of them to describe the content of the drawings instead. In light of this issue, it may be more appropriate for future work to have a verbal free recall phase first, without drawing, then show children their/others' drawings and ask them to re-describe the event, and then include a final free recall phase without drawings, to ascertain that children have reported all the information they recall. Further, future work could compare the effects of a child's own drawing to a photograph of an event. Since photographs involve more realistic representations, it is plausible that they will make it easier for children to understand their content and further recall details about the event, as their appearance is expected to dominate over intentionality. Finally, future research could use a live event and then ask children to draw what they remember, as the three-dimensional format may have a more positive effect on their memory than a video presentation. Additionally, a live event may provide a more ecologically valid path to explore the function of drawings in children's recall.

In summary, the findings of the study suggest that when drawings are presented to children as reminders of past events, they probe them to talk about the depicted images rather than the incidents they refer to. Moreover, if the images are unclear, children are inclined to make more errors in their attempt to understand the representations. These findings suggest that, compared to drawing while narrating a past event, the representations in children's drawings alone may not be enough to facilitate retrieval of a witnessed event.

Chapter Six: **The influence of drawing and individual differences in adults'**

eyewitness testimony

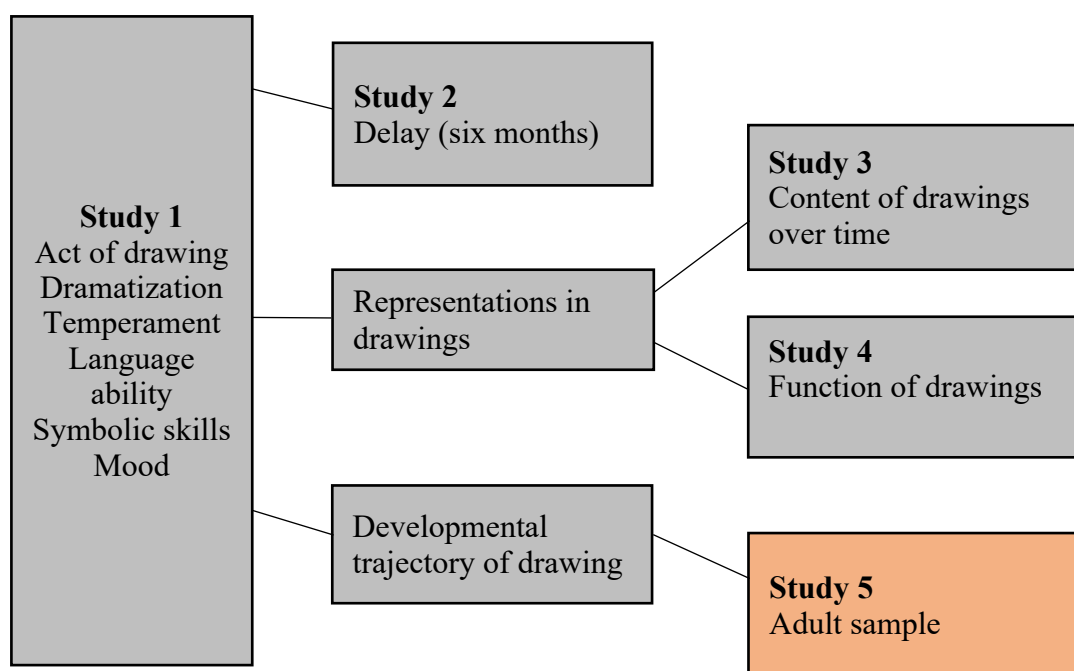


Figure 15. A schematic representation of Study Five in relation to the overall thesis.

6.1 Study Five

This chapter aims to replicate the studies in Chapters Two and Three with an adult sample in order to examine the developmental trajectory of drawing. This will tell us whether drawing affects adults' recall to the same extent as children's. Initially, a Dramatization condition was also considered. However, as during initial testing some of the participants were not engaging with the dramatization task (they were narrating without showing), and since there were no significant effects of dramatization in children's recall, dramatization was dropped from the study.

Many of the parameters that influence children's eyewitness testimony are similar to those of adults. For example, the quantity and accuracy of total recall may decrease after delays, and the provision of different cues, such as different types of

questions or nonverbal prompts, may facilitate memory in both children and adults (e.g. Cassel & Bjorklund, 1995; Fivush, Hudson, & Nelson, 1984; Ornstein et al., 1992). It is thus reasonable to speculate that drawing may be as successful a retrieval cue for adults as it has been found to be for children (e.g. Butler et al., 1995; Gross & Hayne, 1998, 1999a; MacLeod et al., 2013) and therefore enhance their eyewitness reports.

Currently, in the UK and Wales, investigations with adult eyewitnesses involve following a specific protocol (Dando, Wilcock, Milne, & Henry, 2009). The current UK Home Office interview framework is called PEACE, which refers to the distinct stages of an interview (i.e. Planning and preparation, Engage and explain, Account, Closure, and Evaluation). Within this framework, police officers are advised to utilize the Cognitive Interview (CI) (Fisher & Geiselman, 1992). The CI is a formal, empirically-tested interview procedure comprising different techniques which aim to obtain episodic information about an alleged event. One of the core techniques of the CI is the Mental Reinstatement of Context (MRC), which asks witnesses to mentally reinstate the physical and psychological context in which an event took place (Dando et al., 2009b). Nonetheless, research has shown that the MRC technique is not used properly or adequately by investigative interviewers (e.g. Clarke & Milne, 2001; Dando, Wilcock, & Milne, 2008; Dando, Wilcock, Milne, & Henry, 2009). One of the reasons for this is that the CI is time consuming, and the time constraints associated with police officers' work do not allow for its application (e.g. Clarke & Milne, 2001; Dando et al., 2008, 2009a). In addition, the MRC relies on police officers to provide retrieval cues for witnesses, which may lead to suggestibility and further contaminate witnesses' reports (Dando et al., 2009b).

To deal with these practical difficulties, a Sketch Plan Mental Reinstatement

of Context technique was proposed (Sketch MRC, Dando et al., 2009a, 2009b), which relies on drawing. The rationale for incorporating drawing in forensic interviews is that many police officers (44%) utilize sketch plans without being instructed to do so, suggesting that they acknowledge the value of drawing (Dando et al., 2009a, 2009b). This technique involves eyewitnesses drawing a sketch plan of an event while narrating what they saw, and it allows them to generate their own retrieval cues, which also makes the interview process less cognitively demanding for the interviewer. It is further less time demanding than the MRC and reduces the probability of suggestibility. Research with the Sketch MRC found that it is equally or more effective than a MRC interview in the amount of correct information it elicits and more effective than a no MRC interview (Dando et al., 2009a, 2009b; Dando, Wilcock, Milne, & Henry, 2009). Additionally, it does not compromise the accuracy of reports (Dando, 2013). This suggests that drawing may enhance the retrieval of episodic information in adults.

Nonetheless, the Sketch MRC (Dando et al., 2009b; Dando, Wilcock, Milne, & Henry, 2009) has been designed as a replacement/modification of the MRC within the confines of the CI (Dando, 2013) and is restricted to drawing sketch plans. On the other hand, a growing body of research with children has utilized free drawing (not specifically a sketch plan), independently of an interview protocol, and has shown that it facilitates recall even after delays of one year, with children reporting even twice as much the amount of information compared to those who are asked to simply narrate past events (e.g. Barlow et al., 2011; Butler et al., 1995; Gross & Hayne, 1998, 1999a; Patterson & Hayne, 2011; Salmon et al., 2003; Wesson & Salmon, 2001). Although the findings in Chapter Three suggest a much smaller and limited effect, it is still interesting to investigate this in an adult sample. It may be that drawing acts as a

stronger retrieval cue for adults, allowing them to report more information after a long delay than a verbal-only interview. Further, freely drawing and talking about past events elicits a greater amount of details about descriptive information (i.e. objects and descriptions) in children than a verbal-only interview (e.g. Gross & Hayne, 1998; Wesson & Salmon, 2001). Research with the Sketch MRC has not investigated this area, as it is mainly concerned with correct vs incorrect and confabulated information (e.g. Dando et al., 2009a; Dando, Wilcock, Milne, & Henry, 2009). Nonetheless, details such as the different types of information eyewitnesses offer (e.g. people, objects, places) may be important in forensic investigations, as they convey specific elements about various aspects of an event.

Jack and colleagues (2015) took these issues into consideration and investigated the effects of drawing in adults as well as children and adolescents' free recall of a video of a theft, although they did not utilize a free drawing scenario. They found that participants across all age groups who were provided with a visual aid (i.e. drew their own sketch plan, or viewed a provided sketch plan or a photograph) offered more new details than participants in the verbal condition. Their accuracy level was also very high. Furthermore, drawing facilitated recall of accurate details about people and surroundings to a greater extent than a provided sketch plan or a photograph. These findings suggest that drawing can act as retrieval cue for specific types of information. An essential limitation in this work however, as well as Dando and colleagues' work (Dando et al., 2009a, 2009b; Dando, Wilcock, Milne, & Henry, 2009), is that they utilized video events. In fact, Jack et al. argued that their findings might have been different had their participants been involved in a live event and were familiar of its location. As eyewitnesses are usually expected to recall information about live events, and compared to such events videos lack ecological validity

(Dando, Wilcock, Milne, & Henry, 2009), utilizing drawing as an interview method for a live scenario will inform us about its effectiveness as a retrieval cue in adults' recall.

Individual differences may also play a role in adults' eyewitness testimony. For example, participants' moods during the interview may have an effect on encoding and retrieval (Forgas, Laham, & Vargas, 2005). Moreover, temperament is related to adults' encoding and retrieval of information, can affect the accuracy and amount of recalled details, and has been found to facilitate responses to open-ended prompts (Shapiro, 2006). Certain temperamental traits, such as activity and emotionality, may impact on witnesses' understanding of an event as well as their attention levels during the event, whereas other traits, such as approach/withdrawal, can affect their adaptability to the interview process and the quality of their reports (Ornstein et al., 1997). As with children, previous research studies have mainly concentrated on the relationship between temperament and suggestibility and have produced inconsistent findings, with some work linking some temperamental traits (e.g. shyness, activity, emotionality) to suggestibility and other work associating aspects of it (e.g. shyness and emotionality) to higher accuracy levels (Shapiro, 2006; Shapiro et al., 2005).

The combination of temperamental traits and different interview methods has not been investigated with adult participants. An exploration of this combination will inform us about which interview methods are more effective retrieval cues, based on the individual characteristics of each eyewitness. For instance, Study One (Chapter Two) found that shyness and emotionality were negatively related with children's performance in a verbal interview immediately after an event, and these effects diminished after two weeks. Moreover, sociability positively correlated with overall

performance in a drawing and a verbal interview one day after the event and also predicted recall in a drawing interview two weeks later. These findings suggest that individual differences may interact with different interview methods and may affect recall. In adults however, these intersections may be different than children's. With adults, performance in a drawing interview may be impaired by embarrassment, as adults may be more self-conscious about the artistic outcome of their drawing. Previous work showed that embarrassment is closely related to fear of negative evaluation by others (Leary & Meadows, 1991; R. S. Miller, 1995), and more self-conscious people may experience more embarrassment and shyness compared to less self-conscious individuals (Asendorpf, 1990). The adult version of the EAS Temperament Scale (A. H. Buss & Plumin, 1984) measures fearfulness with respect to fear of social situations. In view of these findings, it is anticipated that adults may be intimidated by an interview which requires them to expose their drawing skills to the interviewer, from fear that these skills will be evaluated.

Generally, drawing in the form of sketch plans is a well-known mnemonic, and is recommended in police officers' training manuals as an effective prompt which can facilitate eyewitnesses' reports (MPS Directorate of Training and Development, 2002; NSLEC, 2004). Nevertheless, drawing has mainly been confounded within the CI in previous empirical work, and it is still an open question whether it can facilitate recall independently. From a theoretical standpoint, investigating drawing independently of an interview protocol will allow us to make comparisons with children and study more closely this developmental trajectory. It will further inform us whether drawing is an effective retrieval cue for objects for adults, as it is for children (e.g. Butler et al., 1995; Wesson & Salmon, 2001). As more often than not investigative interviews take place after delays of a few hours to months later (Wells,

1993), this study will also test whether drawing can act as an effective retrieval cue for an event after an immediate, a two-week, and a three-month delay. This issue was not considered in previous work, in which participants were interviewed shortly after they watched the videos (e.g. Dando et al., 2009a, 2009b; Dando, Wilcock, Milne, & Henry, 2009; Jack et al., 2015).

Taking all these findings into account, this study aimed to parallel Studies One and Two (Chapters Two and Three). It empirically evaluated the effects of drawing on adults' recall of an event, and whether these effects were similar to those in children. For the purpose of the study, a live staged event was designed to parallel the event in Study One, but with modifications to make it more appropriate for an adult audience. It involved a minor argument between two academic members of staff, during which one of them took the other's laser pointer and left the lecture hall. This event offers an ecologically valid way to measure recall of a situation which has been witnessed but not directly experienced. Participants were interviewed in either a verbal-only or a drawing condition, after delays of a few hours/one day, two weeks, and three months. Each condition comprised a free recall and a prompted recall phase. As per Study One, the relationship between participants' recall, temperamental traits, and mood scores was further examined.

The hypotheses of this study parallel Studies One and Two. It is first speculated that, similarly to children, drawing will allow adults to mentally reinstate the context of the event (Milne & Bull, 2002; Schacter & Tulving, 1994; Tulving, 2002) and therefore retrieve more episodic information from memory, particularly about objects (Gross & Hayne, 1998; Wesson & Salmon, 2001). If this speculation is confirmed, it will suggest that drawing may facilitate verbal recall irrespective of one's developmental stage, and could potentially be incorporated in forensic

interviews with both children and adults. Secondly, it is anticipated that delay will have a negative effect on verbal performance. Given that adults may be more self-conscious than children about their drawing skills, it is further hypothesized that fearfulness will be negatively related to drawing, particularly during the initial interview. This effect may dissipate in the following interviews due to familiarity with the interview process. The fourth hypothesis is that more sociable individuals will report more information.

6.2 Method

Participants

Forty-three English speaking students from Lancaster University participated in the study. They were aged between 18 and 46 years ($M_{age} = 23.58$, $SD = 7.05$ months). There were 36 female students ($M_{age} = 23.31$, $SD = 6.98$ months) and seven male students ($M_{age} = 25.00$, $SD = 7.85$ months). For 28 participants, English was their first language. For all others, their first language included Swedish, Norwegian, Hungarian, Polish, Russian, Romanian, Greek, German, Italian, Chinese-Mandarin, and Cantonese. To ascertain that there were no differences in the verbal performance between native and non-native speakers, statistical analyses were run which revealed no significant differences (see Results section). All participants were randomly assigned to one of two conditions. Twenty-one were assigned to the Verbal condition and 22 were assigned to the Drawing condition. Out of the 43 participants who were initially recruited, 40 returned for a third interview three months after the event.

Materials

The EAS Temperament Survey for Adults (A. H. Buss & Plomin, 1984).

The EAS Survey for adults is a self-report 20-item scale which assesses adult temperament on the dimensions of Emotionality, Activity, and Sociability.

Emotionality is further divided into three subscales; Distress, Fearfulness, and Anger.

According to A. H. Buss and Plomin (1984), distress is more closely related to emotionality, and fear and anger are different from distress. Each dimension of the scale consists of four items. In each question, participants rate their behaviour on a 5-point Likert scale ranging from 1 (not characteristic or typical of myself) to 5 (very typical of myself). The test-retest reliabilities of the five subscales range from .75 to .85.

Mood scores. Participants were asked to rate their mood on 7-point self-report Likert scales (Forgas et al., 2005). Participants' mood scores were measured prior to and after each interview by means of two questions: '*On a scale from one to seven how stressed do you feel right now?*' and '*On a scale from one to seven how happy do you feel right now?*'. The scales were scored by assigning a value of one to the most negative affect (i.e. very stressed, very unhappy) and seven to the most positive one (i.e. very relaxed, very happy). To further investigate changes in mood across the two conditions, participants' mean mood scores were calculated, by subtracting scores before and after each interview. This provided a single difference score.

Props. A desk-top computer, a white board where a PowerPoint presentation was shown, and a black laser pointer were used during the staged event of the study.

Design

A 2 x 3 repeated measures design was used. Condition (Verbal and Drawing) was the between-subjects factor and Delay (same day/one day (first interview) vs two weeks (second interview) vs three months (third interview)) was the within-subjects factor. The dependent variables were verbal performance in free recall and verbal performance in prompted recall. Further Pearson product-moment correlations and regressions split by condition were performed.

Procedure

The study took place on two occasions and involved four sessions (the staged event and three consecutive interviews). Participants were first informed that they would participate in a brief lecture about language which would be offered by a Psychology PhD student, and they would then be interviewed about it. Prior to the commencement of the lecture (staged event), all participants were handed participant information sheets and consent forms by a volunteer research assistant, so that the experimenter at this point would be unknown. After they had completed and returned them, the staged event took place.

Staged event. A novel, salient event was devised to simulate an altercation between two adults. It took place in a lecture theatre in Lancaster University. It lasted approximately 8-10 minutes and was witnessed by the participants simultaneously. Initially, Actor 1 (male) went into the lecture theatre, placed his laser pointer on the lectern, and asked all students to complete the information sheets and consent forms while he was trying to set up the PowerPoint presentation and fix the microphone. At this point, another actor stormed in the room (female), grabbed Actor 1's laser pointer from the desk, said '*Sorry James, I need this! Thanks*', and headed for the door. A

minor altercation followed, in which Actor 1 asked Actor 2 to give him back the laser pointer, which he needed for his presentation (see Appendix C, p. 210). Actor 2 contended that her lecture was more important than his presentation, therefore she would take it. After Actor 2 took the laser pointer and left the lecture theatre abruptly, Actor 1 looked very surprised and informed the students that he would proceed with the presentation and point with his hands when needed. When the talk was over, Actor 1 informed the students that the first part of the study was finished.

Memory interviews. The participants were interviewed individually by the experimenter in a quiet room in Lancaster University, on three occasions: (a) on the same day/one day after the event (first interview, $M = .37$ days, $SD = .49$), (b) two weeks after (second interview, $M = 14.28$ days, $SD = .45$), and three months after the event (third interview). The reasons the third interview took place after three months, and not after six months like in Chapter Three, was that a six-month delay coincided with the students' summer holiday, which rendered potential interviews impossible. All interviews were video recorded and transcribed verbatim. In the first interview, the participants were initially informed that the study was not really about language but memory. They were then handed the EAS Temperament Survey to complete. Prior and after each interview, they were asked to rate how stressed and how happy they felt on a scale from one to seven. During the first interview, they were also asked to report which their first language was. At the end of the third interview, participants were thoroughly debriefed. All participants were randomly assigned to one of two conditions: Verbal and Drawing.

Verbal condition. In line with previous research (Butler et al., 1995; Gross et al., 2009), the interview started with the free recall phase, in which participants were asked to describe what happened in the event they witnessed. The experimenter

started the interview with the following statement: *'I want you to tell me everything you remember about James' teaching session today/ yesterday/ two weeks ago/ three months ago, even if you think it's not important. Tell me anything you can remember in as much detail as possible'*. When participants had completed the first part of the interview, they were asked two follow up prompted questions: (a) *'Did something out of the ordinary happen?'* and (b) *'Did James speak to anyone else besides the students?'*. All participants were asked to answer these questions even if they had already provided the relevant information during free recall (Gross & Hayne, 1999a).

Drawing condition. In this condition, participants were provided with a sheet of paper, colouring pencils, a regular pencil, and a rubber. They were then asked to narrate what they remembered about the event while drawing about it. The interview started with the free recall phase, which was the same as per the verbal condition. The experimenter gave the following directions: *'Here are some drawing papers, a pencil, and colouring pencils and a rubber. I want you to make a drawing of what you remember about James' teaching session today/ yesterday/ two weeks ago/ three months ago. I would also like you to describe to me each item you are drawing as you draw it, even if you think it's not important. Don't worry about your drawing ability; it doesn't matter at all. Just draw and tell me anything you can remember in as much detail as possible'*. After the free recall phase was over, and it was obvious that the participants had offered all the information they remembered, the prompted recall phase followed. The questions asked at this stage were exactly the same as per the verbal condition, with the exception that participants were asked to 'draw and tell'.

During each interview, the experimenter only responded enough to maintain the flow of the conversation. This was achieved by using non-directive prompts, such

as ‘*uh huh*’, ‘*OK*’, ‘*yes*’, ‘*is there anything else you remember?*’ as well as repetitions of a portion of participants’ narratives.

Coding

All interviews were video and audio recorded and were transcribed verbatim. Based on the coding schemes of previous work (e.g. Butler et al., 1995; Gross & Hayne, 1998; Salmon et al., 2003), participants’ scores in both phases of each interview (free and prompted recall) were determined by the accuracy of their verbal reports. Free recall information involved participants’ responses to the initial open-ended question asked in the beginning of the interview. Prompted recall information involved participants’ responses to the two specific questions asked after the free recall phase was over. All the accurate details offered were coded into one of seven content categories: people, actions, objects, descriptions, places, time, and affective information. As the PowerPoint presentation was on the arbitrariness of language, and some of the information offered was quite abstract, some of the categories involved items which were either real/physical (e.g. ‘She took the *laser pointer*’) or abstract concepts (e.g. ‘The presentation was about *words*’). The total number of items offered in each content category in free and prompted recall was calculated, and each participant received a score for each category. Credit was given for an item only the first time it was offered. People involved any people present in the event, other than the participant him/herself, as well as people mentioned in the PowerPoint presentation (e.g. a *lady* took the laser pointer, a *guy* with a mustache). Actions involved actual or abstract actions that happened during the event or were mentioned in the PowerPoint presentation (e.g. She *took* the laser pointer, words *form* images). Objects referred to actual items or abstract concepts that were present in the event and

the PowerPoint presentation (e.g. the *laser pointer*, he introduced Finnish *words*). Descriptions were elaborations of all the categories (e.g. *sharp* shape, *large* thing). Places and time involved real information or abstract concepts referring to places and time in the staged event and the PowerPoint presentation (e.g. *in the beginning* of the lecture, he talked about objects which they showed to babies *in* studies). Affective information involved any details offered about the emotions expressed during the event by the actors or the participants (e.g. the person was *annoyed*, he didn't seem particularly *happy*). All inaccurate information was coded into an 'error' category (e.g. inaccurate names of the actors or inaccurate information regarding Actor 1's presentation). Information which was not related to the staged event and the PowerPoint presentation was not coded.

The experimenter coded 100% of the transcripts. A second coder independently coded 25% of the transcripts, which were randomly chosen. In line with previous work (Dando et al., 2009a; Dando, Wilcock, Milne, & Henry, 2009), inter-observer reliability was calculated using Pearson product-moment correlations. Correlations on the total number of items in all categories for free and prompted recall combined yielded a correlation coefficient of $r(9) = .97, p < .001$ for the first interview, $r(9) = .98, p < .001$ for the second interview, and $r(9) = .98, p < .001$ for the third interview. Similar analyses on the total amount of errors reported in both phases of the interviews yielded an inter-observer reliability coefficient of $r(9) = .97, p < .001$ for the first interview and $r(9) = 1.00, p < .001$ for the second and third interview respectively. All correlations revealed an excellent level of agreement between the two raters. The experimenter's scores were used for analysis.

6.3 Results

First, to determine whether there were differences in verbal performance between native and non-native speakers, independent samples t-tests were performed on the amount of total details reported in each interview. The analyses showed that there were no significant differences in the verbal reports of native and non-native speakers (all $ps > .05$). Further, preliminary independent samples t-tests were performed to ascertain that participants in each condition were matched on background characteristics, which revealed no significant differences between conditions in EAS sociability, EAS activity, and EAS fearfulness, EAS distress, and EAS anger (all $ps > .05$).

Interviewer's non-directive prompts

To determine whether participants' recall in each condition was affected by the interviewer's utterances, the amount of non-directive prompts used was investigated. First, the mean rate of the interviewers' prompts per minute in each interview was calculated. Three independent samples t-tests with Condition as an independent variable were conducted. There were no significant differences between conditions (all $ps > .05$).

Interview duration

To investigate differences between conditions in the duration of each interview (in minutes), independent samples t-tests were run, with condition as the independent variable. As with Studies One and Two, in all interviews the drawing condition was significantly longer than the verbal condition (equal variances not assumed for the second and the third interview) (see Table 16).

Table 16

Significant Differences in Interview Duration Between the Drawing and the Verbal Condition

	<u>Verbal</u>	<u>Drawing</u>		
	<i>M (SD)</i>	<i>M (SD)</i>	<i>t(df)</i>	<i>p</i>
First interview	2.22 (.87)	3.90 (.98)	-5.93(41)	<.001
Second interview	1.71 (.55)	2.81 (.88)	-4.91(35.33)	<.001
Third interview	1.39 (.52)	2.26 (.89)	-3.76(33.06)	.001

Differences in the type and amount of information.

Free recall. In line with Wesson and Salmon (2001) and Salmon et al. (2003), each of the seven content categories was analysed in free recall. Separate 2(condition: Verbal, Drawing) x 3(delay: first interview vs. second interview vs third interview) repeated measures ANOVAs were performed with condition as a between-subjects factor and delay as a within-subjects factor.

Main effects of condition. Condition did not have an effect on any of the content categories (all $F_s < 1.87$, all $p_s > .05$).

Main effects of delay. There was a significant main effect of delay for 'people', 'actions', 'objects', 'descriptions', and 'time' (see Table 17). Post hoc Bonferroni tests showed that participants recalled significantly more objects, descriptions, and time related details in the first and the second interviews than the third interview (Greenhouse-Geisser correction applied). They also reported significantly more details about people and actions in the first than the third interview.

Table 17

Means (Standard Deviations), F-Values, p-Values, and Effect Sizes for Delay in All Free Recall Content Categories

	<u>1st interview</u>	<u>2nd interview</u>	<u>3rd interview</u>			
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>F</i>	<i>p</i>	η^2_p
People	3.20 (2.22)	3.00 (2.20)	2.57 (1.93)	4.47	.015	.10
Actions	9.87 (7.06)	9.42 (6.42)	7.95 (6.01)	4.02	.021	.10
Objects	13.10 (7.18)	12.70 (6.35)	10.65 (5.47)	5.44	.010	.12
Description	15.55 (11.36)	13.72 (9.63)	10.42 (7.37)	11.35	.000	.23
Places	4.57 (5.76)	4.70 (4.26)	4.20 (4.34)	.38	.683	.01
Time	4.05 (4.27)	3.17 (3.14)	2.35 (3.04)	7.72	.002	.17
Affective	.05 (.22)	.07 (.35)	.10 (.50)	.53	.493	.01
Errors	.27 (.51)	.22 (.42)	.25 (.49)	.19	.796	.00

Note. For 'people', 'actions', and 'places', $F(2,76)$. For 'objects', $F(1.66,63.12)$. For 'descriptions', $F(1.73,65.62)$. For 'time', $F(1.56,59.33)$. For 'affective information', $F(1.14,43.24)$. For 'errors', $F(1.70,64.64)$.

Interactions between delay and condition. There were no significant interactions between delay and condition for any of the seven content categories (all $F_s < 3.01$, all $p_s > .05$).

Prompted recall. Further 2(condition: Verbal, Drawing) x 3(delay: first interview vs. second interview vs third interview) repeated measures ANOVAs were performed with condition as a between-subjects factor and delay as a within-subjects factor.

Main effects of condition. Condition did not have an effect on any of the categories (all $F_s < 2.62$, all $p_s > .05$).

Main effects of delay. A significant main effect of delay was found for ‘people’, ‘actions’, ‘objects’, ‘descriptions’, ‘places’, and ‘time’ (Greenhouse-Geisser correction applied to all variables, apart from ‘objects’) (see Table 18).

Table 18

Means (Standard Deviations), F-Values, p-Values, and Effect Sizes for Delay in All Prompted Recall Content Categories

	<u>1st interview</u>	<u>2nd interview</u>	<u>3rd interview</u>			
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>F</i>	<i>p</i>	η^2
People	.95 (1.08)	.60 (.81)	.52 (1.01)	4.16	.034	.10
Actions	2.80 (3.08)	1.40 (1.82)	.55 (1.15)	15.08	.000	.28
Objects	1.47 (1.48)	.75 (1.13)	.35 (.86)	13.15	.000	.26
Description	2.10 (2.49)	1.07 (1.18)	.62 (.77)	9.92	.001	.21
Places	1.12 (1.42)	.55 (.93)	.25 (.59)	10.34	.000	.21
Time	.97 (1.42)	.60 (.87)	.25 (.54)	7.48	.004	.16
Affective	.10 (.38)	.00 (.00)	.00 (.00)	2.62	.079	.06
Errors	.17 (.45)	.10 (.30)	.20 (.52)	.85	.432	.02

Note. For ‘objects’, ‘affective information’, and ‘errors’, $F(2,76)$. For ‘people’, $F(1.39,52.91)$. For ‘actions’, $F(1.29,49.10)$. For ‘descriptions’, $F(1.48,56.17)$. For ‘places’, $F(1.59,60.37)$. For ‘time’, $F(1.45,55.03)$.

A post hoc Bonferroni test showed that participants reported significantly more actions, objects, descriptions, and places in the first interview than the second and the third interview and more actions in the second interview than the third interview. Further, participants reported significantly more details about time in the first and the second interview than the third interview. A further post hoc Bonferroni

test revealed no significant differences between the interviews for people (all $ps > .05$).

Interactions between delay and condition. There were no significant interactions between delay and condition for any of the content categories (all $F_s < 2.62$, all $ps > .05$).

Accuracy scores

Participants' percent accuracy scores were measured separately for each phase of the three interviews. Their accuracy levels in free and prompted recall in all interviews were very high (see Table 19).

Table 19

Mean (Standard Deviations) Percentage of Correctly Recalled Information in Each Interview for Free and Prompted Recall

	<u>Free recall</u>	<u>Prompted recall</u>
	<i>M (SD) %</i>	<i>M (SD) %</i>
First interview	99.47 (1.00)	85.99 (34.52)
Second interview	98.96 (2.71)	91.12 (27.96)
Third interview	98.90 (2.66)	81.87 (38.90)

Two further 2(condition: Verbal and Drawing) x 3(delay: first interview vs. second interview vs. third interview) repeated measures ANOVAs investigated differences in 'errors' in free and prompted recall and produced no significant effects or interactions (all $F_s < .99$, all $ps > .05$) (for the mean number of 'errors' in each phase see Table 17 and Table 18 in this section).

Mood scores

The mean stress scores prior and after each interview were: first interview: $M = 4.88$ (out of 7.00 which denotes a more relaxed state), $SD = .23$, second interview: $M = 4.72$, $SD = .30$, third interview: $M = 4.88$, $SD = .19$. The mean happiness scores prior and after each interview were: first interview: $M = 4.99$ (out of 7.00 which denotes a happier state), $SD = .28$, second interview: $M = 4.94$, $SD = .01$, third interview: $M = 5.17$, $SD = .18$.

Relations between internal factors and participants' overall recall

Further analyses were run to investigate whether participants' temperament and mood change related with their verbal recall. As I was interested in participants' overall performance in each condition, I ran analyses split by condition and combined free and prompted recall.

First interview. First, the relation between temperament, mood change, and performance was investigated using Pearson product correlation analyses. In the Drawing condition, Fearfulness correlated negatively with total correct information ($r(20) = -.43$, $p = .046$). All other correlations were not significant (all $ps > .05$). In the Verbal condition, the total amount of correct information did not correlate with any of the variables (all $ps > .05$).

Further regression analyses split by condition were performed to investigate whether any of the variables predicted participants' recall. Only the variable that came out significant in the correlations was included. A simple regression was run on the total amount of correct information reported in free and prompted recall combined, with Fearfulness entered as a predictor variable. In the Drawing condition ($R^2 = .18$, $p = .046$), Fearfulness accounted for a significant portion of the variance ($\beta = -.43$, $t = -$

2.12, $p = .046$), indicating that fearfulness may inhibit the overall amount of correct details reported during an initial drawing interview.

Second interview and third interview. No other significant correlations emerged among temperament and mood change and total verbal recall in the Verbal and Drawing conditions in the second and the third interview (all $ps > .05$). As a result, no further regressions were performed.

6.4 Discussion

This study aimed to parallel the studies in Chapters Two and Three using an adult sample, in order to gain an understanding of the developmental time course of drawing as an interview method in verbal recall. It further explored the intersection between temperament, mood, and interview methods, and their effects on recall. The first hypothesis, that participants in the drawing condition would report more information about objects than those in the verbal-only condition, was not confirmed. As expected, delay had an effect on free and prompted recall. Confirming the third hypothesis, fearfulness negatively correlated and predicted recall in the drawing condition, only in the first interview. Sociability did not correlate with recall in any of the conditions. These findings will be explored in turn.

First, as per the Studies One and Two (Chapters Two and Three), the results showed that the interviewer's non-directive prompts did not differ significantly in any of the conditions for either of the three interviews, indicating that the participants' performance was not affected by her utterances. In additions, adults' accuracy scores were very high across the board, suggesting that they did not confabulate.

Contrary to previous findings in research with children (Gross & Hayne, 1998; Wesson & Salmon, 2001), drawing did not elicit a greater amount of information

about objects in adults. One reason for this may be developmental differences in memory performance. Although direct comparisons cannot be made between children and adults because they participated in different studies, just a look at the type of information reported by children (Tables 2, p. 76 and Table 5, p. 95) and adults (Table 17, p. 174) in free recall shows that, in general, children scored much lower in all categories compared to adults. Children's poorer verbal performance does not necessarily denote developmental differences at encoding between adults and themselves (Ofen et al., 2007). Rather, adults may be better able to retrieve more information from episodic memory due to maturation in the functions and structure of the brain (Ofen, Chai, Schuil, Whitfield-Gabrieli, & Gabrieli, 2012). This suggests that adults may not require scaffolding to the same extent as children. As a result, drawing might have not benefited their recall.

It was further found that participants freely reported significantly more details about objects, descriptions, and time in the first and the second interview than the third interview, and significantly more people and actions in the first interview than the third interview. During prompted recall, participants recalled significantly more objects, actions, and descriptions in the first than the second and the third interview and more actions in the second than the third interview. They further reported significantly more details about time in the first and the second interview than the third one. A plausible explanation of these delay effects involves memory decay or interference (Howe & Knott, 2015; Oberauer & Lewandowsky, 2008). First, participants may have forgotten specific details as time elapsed due to inability to mentally rehearse aspects of the event (Page & Norris, 1998). Additionally, with the passage of time they may have been unable to access specific details in episodic memory due to other similar memories interfering (e.g. weekly lectures or student

presentations in the same lecture hall that the event took place). This suggests that aspects of the event may have been confused with similar experiences and therefore participants could not retrieve them in later interviews. Since there are usually delays between an eyewitness event and an interview, which may be caused by various factors such as inability to identify or contact witnesses (Tuckey & Brewer, 2003), these findings suggest that immediate interviews may produce more detailed accounts.

As anticipated, fearfulness correlated negatively with and predicted the total amount of accurate information recalled in the drawing condition, only in the first interview. One reason for this could be adult participants' feelings about drawing. Contrary to children, for whom drawing is an amusing activity which renders the interview less socially demanding (Butler et al., 1995; Gross & Hayne, 1998; Jolley, 2010), drawing may bring about feelings of self-consciousness in adults. Adults may be worried that their drawing ability will be negatively evaluated (A. H. Buss & Plomin, 1984; Leary & Meadows, 1991; R. S. Miller, 1995). With respect to this study, prior to the commencement of every interview, all participants in the drawing condition were reassured that the quality of their drawing was of no significance. Nonetheless, during the first interviews, a great number of the participants still complained that they did not know how to draw. This may be because they considered the interviewer unreliable; in the beginning of the first interview, the interviewer revealed that the study was not about language, as the students had been originally informed, but about memory. She then reassured them that their drawing abilities would not be evaluated, which the participants could have considered a lie. As a result, adults may have been more preoccupied with the quality of their drawings than reporting all the information they remembered about the event.

Fearfulness did not correlate with recall in the second and the third interview. This may be for two reasons. First, familiarity with the interviewer and the interview process in subsequent interviews may have minimized any self-consciousness effects. It may be, however, that adults were equally able to retrieve information from their memory about the event irrespective of condition, thus minimizing any temperamental effects.

Further, contrary to children, for whom sociability correlated with performance in the verbal and drawing conditions of Study One (Chapter Two), sociability did not correlate with recall in any of the conditions for the adults. This does not essentially mean that sociability does not have an effect on adults' recall. Instead, less sociable adults may react differently in social situations than children. In this study, the participants were university students. As part of their studies, they are assessed on their oral presentation skills on a regular basis. In order to advance academically, they are required to complete such tasks successfully and therefore learn to tolerate them. Further, adults may be required to endure several other social situations they may consider undesirable (e.g. public speaking, job interviews, professional group meetings) and therefore have learnt to adjust to such contexts. Under such circumstances, any sociability effect on recall may disappear.

Finally, mood did not have an effect on verbal recall. As with the children in all previous studies, the mood scores reported in the Results section indicate that adults were fairly happy to participate in the study, as this was not a taxing experience. Thus, there may have not been enough variability in the data to allow for any mood effects to emerge. Additionally, the mood scales used may not have been sensitive enough to detect any effects of mood on recall.

This study has several limitations. First, due to the different staged events used here and in Study One (Chapter Two), direct comparisons between children and adults could not be made. In addition, all interviews were conducted by the same interviewer, which may not happen in a real forensic incident. As per Study One, the event involved a mild altercation between two members of staff. A more forensically related scenario would ensure more ecological validity. Lastly, participants were university students only, although an actual eyewitness incident may involve individuals from diverse educational and socio-economic backgrounds. Future research could compare children and adults directly, so that more straightforward assumptions with respect to the developmental trajectory of drawing can be drawn. Further, future work could also investigate the effects of dramatization in adult participants' memory of an eyewitness event, as gestures and spontaneous movements may facilitate their recall.

In summary, this study did not support the finding of Study One that drawing may facilitate recall for objects, suggesting that adults may not be in need of drawing to scaffold their memories of a past event to the same extent as young children. Nonetheless, adults' verbal performance may decrease with the passage of time. This indicates that forensic interviews which take place immediately after an incident may allow adults to retrieve more information from their memory. Lastly, this study showed that fear that one's abilities may be negatively evaluated may adversely affect total recall in a drawing interview. This finding draws attention to the fact that the level of information reported during an interview is not solely dependent on interviewees' memory. Their temperamental traits may also play a role. Consequently, police officials are advised to consider the individual characteristics of each eyewitness during investigative interviews.

Chapter 7: **General Discussion**

This thesis examined the effects of two nonverbal interview methods, drawing and dramatization, as well as individual differences (temperament, language ability, symbolic skills, and mood) on children's verbal eyewitness recall. It further explored the effects of drawing as well as temperament and mood on adults' recall. Throughout, emphasis was placed on empirically testing the effects of different interview methods on recall and, importantly, the intersection between the aforementioned external and internal supports in order to elucidate how they interact to either facilitate or compromise eyewitness accounts. The various memory models which were discussed throughout the thesis (e.g. Bartlett, 1932; Brewer & Nakamura, 1984; Schacter, 1996; Schacter & Tulving, 1994; Thomson & Tulving, 1970; Tulving, 2002) do not take into account the individual characteristics of the child. Nonetheless, failure to report information does not necessarily imply memory deficits. A child may have encoded a great amount of information but not report it for reasons such as limited verbal skills, shyness during the interview, fear of the interviewer, etc. Accordingly, the main aim of this thesis was to inform empirical research which is premised upon various memory theories and models with respect to how the individual characteristics of each eyewitness affect their testimony. From an applied perspective, the goal of this project is to inform police and judicial officials about how to facilitate young children's eyewitness testimony.

Chapter Two examined whether drawing and dramatization can enhance children's retrieval of information regarding a salient staged event after delays of one day and two weeks and whether temperament, mood, and language and symbolic skills interact with these prompts to facilitate their reports. Building on this study, Chapter Three investigated the effects of these internal and external supports on

children's recall after an additional delay of six months. Chapter Four concentrated exclusively on the content of the drawings the children in the two aforementioned studies produced. It examined whether the content of drawings can act as a communication tool in children's eyewitness testimony, as well as how these drawings change over time. Chapter Five focused on the function of drawings as memory aids; it explored whether looking at the drawings created by the same or another child immediately after a video of an event can act as a retrieval cue of that event after a two-week delay. Lastly, Chapter Six replicated the studies of Chapters Two and Three with an adult sample. It explored the developmental trajectory of drawing as a retrieval cue, as well as the relationship between drawing and adults' temperament and mood, after an immediate, a two-week, and a three-month delay.

Collectively, the findings of the studies validate existing literature regarding drawing acting as a retrieval cue of a past event. Drawing while narrating may help children scaffold memory and retrieve information, particularly about objects, within a two-week time frame. Nonetheless, a six-month delay may have adverse effects on children's recall. When children draw and narrate, their drawings may follow the same pattern as that outlined by schema theory: children tend to draw more general features about an event, possibly in their attempt to search their memories for more episodic information. Showing children drawings of an event may not act as a memory cue, as children have difficulty linking the depicted features to the event they refer to and rather try to understand the content of the drawings. Further, drawing while narrating does not facilitate adults' recall of an event. The original contribution of this thesis to hitherto empirical work is that it highlights that memory for a witnessed event can be influenced by the combination between different interview methods and the witness's internal characteristics (see Figure 16). Temperament,

language ability, and symbolic skills interact with drawing, dramatization, and a verbal-only interview to either enhance or compromise children's verbal reports. The practical implications of these findings are that taking into account the individual characteristics of each child and applying appropriate interview methods based on these characteristics, may help children tolerate the interview process and potentially enhance their eyewitness testimony. Throughout this chapter, the findings of each study will be discussed in relation to the memory models and theories introduced in the Introduction chapter (Chapter One) and to their potential application in legal contexts.

INTERNAL FACTORS

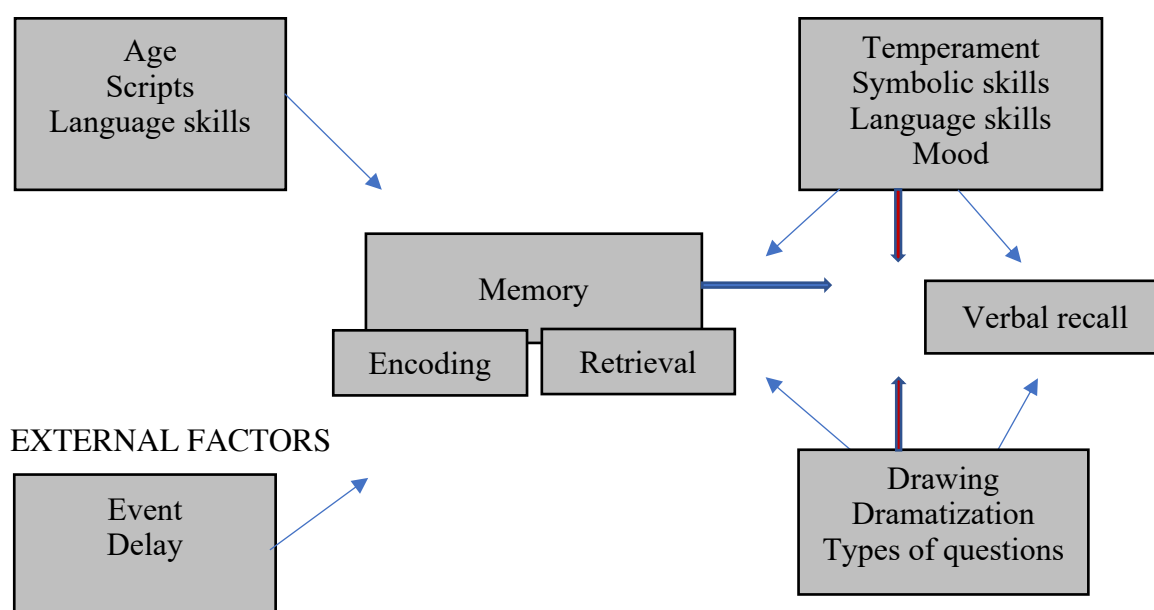


Figure 16. A schematic representation of the factors that may influence recall of a past event.

7.1 Drawing, dramatization, and individual differences in young children's and adults' verbal recall

Chapter Two (pp. 58-89) examined the role nonverbal interview methods and internal prompts play in 3- to 6- year old children's verbal recall within a two-week

time frame. The finding that children in the drawing condition reported significantly more information about objects than children in the verbal condition provides empirical evidence for the facilitative effect of drawing as a retrieval cue in this age group (Butler et al., 1995; Gross & Hayne, 1999a; Macleod et al., 2013, 2016; Otgaar, et al., 2016; Salmon et al., 2003; Woolford et al., 2015). One explanation for this finding is that drawing allowed children to spend more time on the task than a verbal-only and a dramatization interview. By engaging with the activity longer, the children had more time to search their memory for specific details. The positive effect of drawing only held in relation to free recall questions. An interpretation of this outcome involves the nature of these questions and how they tapped on children's episodic memory (Haist et al., 1992). More specifically, asking children more general questions (e.g. 'can you draw and tell me all about what happened about the time you got the sticker?') may have prompted them to think of specific details about the temporal and spatial aspects of the event (Tulving, 1992, 2002). How does drawing relate to this process? It is plausible that depicting one aspect of the event after another helped children to mentally experience the event anew (Nadel, 1994; Schacter, 1996; Schacter & Tulving, 1994; Tulving, 2002), and hence reflectively structure their verbal reports and describe what they remembered in a coherent sequence (Pipe et al., 2004). As an example, one child drew *the chairs* Actor 1 used to place his *two teddies*. The child said, while drawing, that he was drawing the second chair, because that is where one of the teddies was sitting, and '*halfway through a lady came and took it*'. By first drawing the chairs, this child was able to recall that a lady came in, the time she came in relative to the event (*halfway through*), and that she took one of the teddies away with her. Together, these findings imply that drawing while narrating may provide temporal scaffolding for young children's memories and

extend memory search. More specifically, the opportunity to draw within a two-week period from the event may reinforce children's memories about items relating to the incident, which could potentially be used as evidence.

By contrast to previous work (Gross & Hayne, 1998, 1999a; Wesson & Salmon, 2001), Chapter Three (pp. 90-106) did not find that drawing can facilitate retrieval after six months. As already discussed in Chapter Three, this null effect should be viewed with caution due to the insufficient power of the analyses. One potential explanation for this finding is the staged event used. First, compared to staged events utilized in previous studies, which involved longer out-of-school activities, such as school visits to a chocolate factory and a fire station (e.g. Butler et al., 1995, Gross & Hayne, 1999a), the event here was short (approximately ten minutes). Naturally, those events were richer in detail than the one utilized here, and the children were exposed to an array of novel facts which they were then asked to recall. The event here took place in the children's schools. The null result with respect to drawing, along with the fact that there was a trend for memory performance to decline after six months, offers some support to memory theories regarding the adverse effects of delay on recall (e.g. Anderson & Labiere, 1998; Page & Norris, 1998). It is possible that after six months children had forgotten parts of the event (decay) or confused aspects of it with various school activities (interference). As the event took place in a familiar setting, children may have also recalled more generic (schematic) than specific details after six months. Nonetheless, investigating events that happen in a familiar environment is crucial, given the series of school shootings in the USA recently, to which a great number of children were eyewitnesses, as well as the fact that children may be witnesses of domestic abuse or bullying in school. Chapter Three highlights the negative effects of long retention intervals on the

memory for a salient event that children are (passive) onlookers to. For an event that takes place in a familiar setting, immediate interviews may be required with young eyewitnesses to strengthen the memory trace of the event and help them retrieve more details.

In contrast to Chapters Two and Three, drawing did not have a facilitative effect in adult participants' recall, as in children (Chapter Six, pp. 158-182). It is plausible that 3- to 6- year old children are in greater need of a nonverbal interview method to scaffold their memories than adults. The adults in this study particularly were university students and therefore relatively intelligent and highly educated. Adults' more fully developed brain activity and language facility may render them equally able to report all the information they store in memory in a verbal-only interview. This speculation is reinforced by the high accuracy rate in adults' recall across all time delays. One interesting question that follows from these results is at what age the drawing effect on children's recall dissipates. Empirically examining this issue will allow investigators to take into account developmental differences in memory performance and tailor forensic interviews to eyewitnesses' needs, based on their developmental stage.

Additionally, Chapter Six showed that delays between the event and the interview can have adverse effects on recall, with adults reporting fewer facts with the passage of time. As it has already been discussed, this finding may be due to decay or interference (Howe & Knott, 2015; Oberauer & Lewandowsky, 2008) and signifies the negative impact of retention intervals on eyewitnesses' memory. It again highlights the importance of immediate interviews with both age groups (young children and adults), which could presumably allow for more information to be retrieved from memory.

Going back to Chapters Two and Three, when children were asked to dramatize six months after the event, they reported more information about time than children who drew. This finding may be explained by the fact that spatial details are easier to depict than temporal, and children in the drawing condition may have mainly talked about the items they depicted. Dramatization did not have any other effect on children's verbal recall. However, that is not to say that we should disregard the use of dramatization as an interview method altogether. Building on the explanation offered for this finding in Chapters Two and Three, dramatization may have not facilitated further recall because at the encoding phase of the event children were passive viewers and not active participants. Previous work has on many occasions confirmed that when *actions* are involved during encoding, the memory for the target event is stronger later at retrieval than an incident which is only verbally encoded (e.g. R. L. Cohen, 1981; Saltz & Donnenwelth-Nolan, 1981). A plausible explanation for this is that the motoric element of gestures aids both encoding and retrieval (Cook, Yip, & Goldin-Meadow, 2010). This may explain why Wesson and Salmon (2001) found significant effects of re-enactment on children's recall. In their study, children discussed previous autobiographical experiences such as '*we swam*', '*we chased butterflies*', '*I ate a cake*'. Such experiences involve actions at encoding and are fundamentally different than the event used here. It is thus possible that the event in this study was not encoded efficiently in the first place, and hence it was more difficult to describe through dramatization during the interviews. This suggests that dramatization may act as a better retrieval cue for events in which children are active participants than for events they are bystanders to.

A notable finding of Chapters Two, Three, and Six involves the significant results regarding the intersection between individual characteristics and different

interview methods. First, it was found that temperament may affect recall. To measure temperament, the EAS Temperament Scale (A. H. Buss & Plomin, 1984) was used because it is a 20-item scale which is easy to complete (approximately five minutes). Given the tight schedules of police and other legal officials, a quick and easy to use assessment tool could inform them about children's and adults' temperamental characteristics in a short time. With respect to children, the findings in Chapters Two and Three show that more sociable children may benefit from both a verbal-only and a drawing interview, presumably due to their ability to adjust more easily to novel situations and people. Conversely, more emotional and shyer children may perform worse in a verbal-only interview the first time they are interviewed, possibly because the social demands of the interview evoke feelings of distress and inhibition. Additionally, shyer children may perform worse in a dramatization interview, presumably because they feel more self-conscious and embarrassed to use gestures and mime in front of an unfamiliar person. These findings are crucial, in that they highlight how children's temperament may adversely affect their accounts. For children who are more reserved or emotional in nature, not disclosing much information in the interview does not necessarily mean that they have forgotten aspects of the event. They may simply refuse to talk due to inhibition regarding the novel situation. Such children may need more time to get acquainted with interviewers, build rapport with them, and adjust to the demands of the interview. With these children in particular, drawing might help, not necessarily as an interview method but as a rapport building aid. So far, the various interview protocols which have been proposed for use in investigative interviews with children place a lot of emphasis on eliciting as much information as possible, without really considering the individual characteristics of each child (Saywitz et al., 2017). Starting the interview by offering children the opportunity to draw may help shyer and more emotional children

relax and feel less intimidated. Once rapport building with the interviewer has been established, they may be better able to respond to the interviewer's questions in the interview stage of the protocol. Together, these findings stipulate that children who are more reserved or distressed may need more time to bond with the interviewer than more sociable children, and may require social support to provide eyewitness testimony. Their individual needs may affect their reporting and therefore should be taken into account in legal contexts.

With respect to adults, the finding that fearfulness was negatively associated with recall in the drawing condition suggests that drawing may have different effects in this age group than in young children. For children, drawing may be a pleasurable activity which could help them relax, build rapport, and potentially reveal more details. Adults, on the other hand, may view a drawing interview as a social situation in which they may be evaluated, and their self-consciousness may adversely affect the level of their reports. From an applied point of view, these findings suggest that both children's and adults' eyewitness accounts are not entirely dependent on their memory but also their internal characteristics. More specifically, their temperament may affect their reports. With adult eyewitnesses particularly, if drawing is incorporated in the interview (e.g. as part of the CI interview process), it may be beneficial to be clear about its purpose in the interview process, as adults may need reassurance that their drawing ability will not be assessed.

Referring back to children, cognitive abilities may also interact with the level of recall. Chapters Two and Three showed that children with better verbal abilities offered more details in a verbal and a dramatization interview and children with better symbolic skills reported more information in a drawing and a dramatization interview. Collectively, these findings suggest that with children with better cognitive abilities,

interviewers may be more flexible with respect to the interview methods they utilize. Children's symbolic skills in particular, were related to their recall in a dramatization interview across all time delays. This suggests that symbolic ability may have a long-term positive effect on children's mnemonic performance. The practical ramification of this finding is that giving children the opportunity to cultivate their symbolic skills through activities such as drawing and role-play may enhance their recall, an issue which could potentially be explored further in future research.

Lastly, mood did not have an effect on children's or adults' recall. Possible explanations for this result have already been offered within this thesis, and mainly relate to the fact that children were familiar with the interviewer, were happy to participate in the interviews in the first place, and for ethical reasons all studies were not taxing or harmful in any way. Real-life forensic interviews however may be more stressful because they may involve unknown interviewers and incidents which are traumatic. Accordingly, the non-significant results should not discourage interviewers from taking mood and anxiety during the interview into account in both age groups.

Together, these findings suggest that drawing may be a more helpful interview method for young children than adults. They further support that both children's and adults' recall of a past event is not solely dependent on the interview method used. The ability to report events as well as tolerate the interview process may be affected by their personality traits, and for children, by their linguistic and symbolic skills. Taking these individual differences into consideration and 'designing' the best interview approach, by adjusting the interview to their needs, may help children and adults offer better testimonies.

7.2 The content of drawings and their function as memory aids in 3- to 6- year old children's verbal recall

A novel aspect of this project is that it looked at the content of children's drawings for forensically relevant information and how it changes over time. Exploring this question was deemed essential as children may include details in their drawings which can supplement their verbal reports. The data of the 27 3- to 6- year old participants in the drawing condition of Studies One and Two (Chapters Two and Three) were used. Chapter Four (pp. 107-126) provides some evidence that schema theory (Bartlett, 1932; Brewer & Nakamura, 1984) may be applied to children's drawings. Specifically, the findings of the study suggest that children tend to include peripheral information in their drawings consistently as time elapses, and information regarding the perpetrator and the victim may dissipate. The peripheral features in this study involved aspects of the event (e.g. school room, teachers, classmates present in the event) which were also part of children's school life. Children's memory of these features could be affected by their pre-existing schemas (see Brewer & Nakamura, 1984), however, that is not to say that this information is not relevant to eyewitness testimony cases. As an example, occasions of domestic abuse may involve children witnessing forensically relevant events at home. Children in this study may have drawn these peripheral features in an attempt to respond to the interviewers' question regarding what they remembered about the event. Referring back to the example in section 7.1, the child drew the school chairs the teddies sat on (two weeks after the event) and then said that one of the teddies was taken away by the lady. By drawing a more general, familiar feature (*school chairs*) he may have searched his memory for more specific details about the event (*the lady who took one of the teddies away*). Hence, the findings suggest that children may make use of their peripheral (scripted)

knowledge in order to search their memory for more central details, which may be more difficult to recall after a long delay.

The findings that inclusion of the perpetrator and the victim dropped over time (with children not including the ‘perpetrator’ at all in their drawings after six months) and inclusion of inaccuracies increased (i.e. one out of five inaccurate features after six months) support the deleterious effects of retention intervals on children’s memories. It is plausible that, as time elapsed, scripted details were stronger in memory than more specific details. In their attempt to recall more specific information, children may have made more inaccurate speculations. From an eyewitness testimony viewpoint, this finding is critical. It suggests that interviews which take place within a short delay (a two-week time frame) may allow children to include details in their drawings that are more central to a crime, and further protect from errors. Together, the findings of Chapter Four suggest that drawings used during eyewitness interviews can provide relevant content about an event, in that children may depict the more general aspects of an incident, in an attempt to retrieve more episodic details.

Chapter Five (pp. 127-157) explored the function of drawings, particularly whether an initial drawing created at encoding by the same or another child can act as a memory aid for a previously witnessed event. Contrary to my expectations, which were grounded on the generation effect (e.g. Bertsch et al., 2007; Rosner et al., 2013) and the encoding specificity principle (Thomson & Tulving, 1973; Tulving, 1983), when children saw the drawings they spontaneously tried to identify the depicted features instead of use them as cues for the event they referred to. This does not necessarily mean that the children did not encode the event. A plausible justification is that when children are presented with drawings of a previous event, they first attempt

to understand the content rather than tie back to the incident, and in this effort, they may use the intentionality of the artist to interpret the drawings (Bloom & Markson, 1998; Preissler & Bloom, 2008). A drawing created by the same child is easier to recognize than a drawing created by another, because the child is aware of her/his own intentions of each depicted item. Nevertheless, in legal contexts, children need to understand that the drawing refers to a specific previous incident and use it as a cue to search their memory for information regarding that incident. The results of this study do not entirely support children's ability to do this.

Additionally, there was a substantially high percentage (30%) of inaccurate features depicted in the drawings, and in general, the accuracy levels in this study were markedly lower than in Studies One and Two (Chapters Two and Three). This may relate to the video presentation. It may be that a video presentation is related to a weaker memory trace than a live event and hence to more inaccuracies (Thierry & Spence, 2004). In this study, the video lasted approximately six minutes. During that time, many children lost their concentration and looked elsewhere (e.g. outside the window), leading the interviewer to bring their focus back with prompts such as 'please look at the video'. Further, the different context between the video and the live presentation (a lecture room, in contrast to a live event in a familiar classroom) may have also played a role. The live event involved features of the children's school life which the children are familiar with and have (scripted) knowledge about. The lower accuracy levels here imply that children may actually need peripheral, schematic information to achieve retrieval. When this knowledge is lacking, their verbal recall may dissipate. Together, the findings in Chapter Five suggest that using the content of children's drawings as a retrieval cue of a previously witnessed event may be problematic. Children may not be able to mentally travel back to the event (Tulving,

1972) and link the drawings to that event. Further, the drawings may include inaccuracies, and if the images are ambiguous, the probability of inaccurate identifications increases.

Collectively, Chapters Four and Five suggest that the content of drawings, either as a communication tool or as a retrieval cue for past events, may reflect how 3- to 6- year old children structure their memory to recall information: in their effort to remember specific details, they may need to rely on schematic information. Confusion between schematic and episodic knowledge may lead to a decrease in their accuracy levels, which is reflected in their drawings. The findings of these studies are in agreement with Jolley's remark (2010) that the forensically related benefits of drawing may actually lie in the *act* of drawing, which promotes accurate verbal reports than in the representations themselves. Drawing and instantaneously narrating what happened in a live event helps keep children's focus on the different aspects of the incident (Barlow et al., 2011), and therefore it may be a more robust and sound interview method in children's eyewitness testimony.

7.3 The effects of age on children's recall

As it has already been outlined on several occasions within this thesis, young children's reports are usually brief, and this may be due to difficulty in retrieving information rather than inability to encode and store it (Butler et al., 1995; Fivush & Hammond, 1990; Howe & O'Sullivan, 1997). All studies of this project involving children showed age and age by delay effects on recall. These effects were not analysed and explored further, mainly because emphasis was placed on the individual characteristics of young children, which may account for the substantial within age variability found in their reports (Salmon et al., 2003). In addition, there were not

enough children to form two comparable age groups in the studies comprising this thesis. Nonetheless, the results support the idea that with development memory for witnessed events will be enhanced, for a number of reasons. First, younger children (e.g. 3- year olds) have more limited communication skills than older children, partly due to immaturity in expressive language (Butler et al., 1995; Gross & Hayne, 1998, 1999a; Macleod et al., 2013; Schneider & Bjorklund, 1998), which suggests that their reports may be briefer than older children's. Further, younger children may be more susceptible to forgetting after long delays than older ones (Baker-Ward et al., 1993; Steward et al., 1996), which indicates that their reports may be further contaminated by inaccuracies.

Given these findings in the literature, the age effects in this thesis may reflect younger children's (3- to 4- year olds) difficulties to recall past details than older children's (5- to 6 year olds). It is plausible that older children recalled more information, and that their memories of the event were more resistant to time delays than younger children's. Children's ability to tolerate the interview may also be related to age differences. Younger children (3- to 4- year olds) may have more difficulty adjusting to the interview process. They may be more intimidated by an unknown interviewer than an older child and may require more time to build rapport with them. Although previous work has studied different age groups substantially, future research could investigate developmental differences in relation to children's individual characteristics and different interview methods, and how these impact on their eyewitness accounts. This will allow legal official to also take into account children's age when considering what the best approach to interview them is.

7.4 Limitations

In its attempt to make a contribution to the existing literature on children's eyewitness testimony, this thesis has several limitations. First, the sample sizes in the studies were not ideal, however several aspects of the studies made it difficult to recruit more participants. First, in Study One (Chapter Two) the experimenter was informed by the teachers that many parents were reluctant to give permission for their children's participation because the interviews would be filmed. Further, as the events took place in groups of children, some children who were not in school on the day of the event were excluded from the study. Some children who witnessed the event were not available on the set interview dates and had to be interviewed on different occasions, which affected the analyses. Moreover, the number of children who returned for a third interview (Chapter Three) after six months was lower than in the first two interviews. Due to refusal of several other schools to participate, the sample was not enough to allow for further investigations between different age groups (i.e. 3- to 4- and 5- to 6- year olds). In addition, the study involved only 3- to 6- year old children, and no other age-related samples, such as school-aged children (e.g. 7- to 12- year olds), which would allow for direct comparison in recall between different developmental groups.

The live event used in Studies One - Three (Chapters Two - Four) involved a mild argument between two adults which took place in the children's schools. For ethical reasons a more forensically relevant event could not be used. The type of event and the setting it took place may minimize the ecological validity of the study, as real crimes involve more traumatic events which may occur in unfamiliar settings. Moreover, the actors had to go to various schools to present the event. Although they tried to keep it as consistent as possible (same clothes, using the same words,

movements, and tone of voice on every occasion, etc.), it may be that children in each school experienced the event differently. For example, although most of the 5-to 6-year olds witnessed the event sitting on chairs, in one preschool children were sitting on the floor. Actor 1 was also asked to sit on the floor in that school (although in the other schools he was provided with a chair). These differences may have affected the type of information children recalled. Further, the live event used in these studies was different than the event used in Study Five (Chapter Six), therefore direct comparison between children and adults could not be made.

Study Four (Chapter Five) did not include a rapport building phase. Rapport building is considered a prerequisite before interviewing young eyewitnesses (Lamb & Brown, 2006). Nonetheless, in this study, children's school schedule did not allow for the children to familiarize themselves with the interviewer prior to the interviews. Besides, in Study Four, by contrast to my expectations, the presentation of drawings resulted in children trying to identify the drawn features rather than recount the event. In consequence, some children (but not all) were asked a further direct question regarding the content of the drawings.

Lastly, the time demands of Study Five (Chapter Six), particularly the requirement for participants to be present for the event and the interviews on four occasions, did not make it possible to recruit more students. As a result, an inclusion of a Dramatization group, which could potentially further our understanding of the effects of gestures and mime on adults' recall was not feasible. As with Studies One and Two, in this study too the event was presented to different students on two occasions. Again, the actors tried to keep both events consistent, but the different events could have potentially affected the results.

7.5 Future directions

Building on one of the limitations of this thesis, one path future work could take with respect to Studies One and Two (Chapters Two and Three) is to recruit more participants and re-investigate the effects of internal and external prompts on children's memory longitudinally, after delays of several months and even years. The importance of the replication of these studies longitudinally lies in the fact that children involved in the criminal justice system may be interviewed several months after a forensic incident takes place (Flin, 1995; Goodman et al., 1992; Lash, 1995). Additionally, children may be interviewed on several occasions by a number of officials (e.g. social workers, psychiatrists, attorneys, police officers, etc.) (Block, Foster, Pierce, Berkoff, & Runyan, 2013) before a decision is made. A long-term investigation with more participants will offer a better insight into the effects of drawing, dramatization, and children's personality traits and cognitive abilities on their eyewitness accounts. For instance, it may be that repeated interviews with drawing facilitate memory to a better extent. As children draw and narrate they create mental representations of an event (Tulving, 1972), and this process may facilitate rehearsal and therefore strengthen children's memory of that event.

Another interesting question to explore is whether consecutive interviews with different interviewers have an effect on shyer and more emotional children's recall. It is reasonable to expect that children with these temperamental traits will have more difficulty adjusting to the interview process every time a new interviewer is involved, nonetheless, this is usually what happens in real forensic scenarios. In such cases, different interview methods may help children adjust to the demands of the interview. Drawing on this suggestion and linking back to section 7.2, the role of drawing in investigative interviews could also be explored as a rapport building aid rather than a

memory cue. Utilizing drawing during the rapport-building phase with children with a shy and more emotional disposition may help them relax and get acquainted with the interviewer. It may also create a more friendly environment which can lead to a smooth transition to the interview phase.

Additionally, future work could potentially utilize a developmentally relevant event which both children and adults could be exposed to. This could offer a better understanding of the effects of different external and internal prompts on developmentally different populations and allow for direct comparisons to be made. Such work could investigate the developmental trajectory of different interview methods throughout the life span, starting from children younger than 3- years and also including adolescents and older adults. First, future work could also include school-aged children, between 7- to 12-years. Previous work on the effects of drawing on recall has mainly concentrated on preschool children (Patterson & Hayne, 2011), as this age group requires more support during interviews compared to older children (Macleod et al, 2013). Some studies have included older children (e.g. 7- and 8- year olds), mainly in relation to autobiographical experiences but not staged events (e.g. Patterson & Hayne, 2011; Salmon et al., 2003; Wesson & Salmon, 2001). However, non-verbal interview methods may have a different effect on older children compared to younger ones. First, retrieval strategies continue to develop throughout the school years until late adolescence, which suggests that nonverbal interview methods such as drawing may facilitate school-aged children's recall to the same extent as younger ones' (Patterson & Hayne, 2011; Salmon, 2001). On the other hand, as school-aged children have better communication and verbal abilities than preschool children, they may be in less need of an external interview method to scaffold their memory. Older children may utilise other mnemonic strategies to recall past details, such as rehearsal

and organization, which younger children can utilise with adult support (see Hashimoto, 1999). Further, older children may be more self-conscious about their drawing abilities (Cox, 1992), which may have a negative impact on their performance in a drawing interview. For all these reasons, investigating the effects of nonverbal interview methods in older children (e.g. 7- 12- years) compared to younger ones (3- to 6- years), as well as adults and adolescents may offer insight into the distinctive strategies that facilitate different developmental groups' recall.

Adolescence is another developmental stage worth investigating. Adolescents make up one of the most common developmental groups to appear in legal settings as witnesses or victims (U.S. Bureau of Justice Statistics, 2007). Adolescence is characterised by rapid changes in cognitive abilities and social and emotional behaviour (Spear, 2000). Further, adolescents may exhibit high levels of social anxiety, which may render them susceptible to memory conformity, which involves combining beliefs from different sources and compromising one's own beliefs about an event (Wright, London, & Waechter, 2010). Such findings indicate that adolescents' testimony may be adversely affected by factors such as suggestibility and mood changes. Thus, it is imperative to ascertain their credibility as witnesses. Additionally, the number of adults over the age of 65 who appear in courts as victims or witnesses is also increasing substantially (Dando, 2013). The ability to retrieve episodic information decreases in older adults, with memory performance deteriorating, particularly in free recall and cued recall procedures (Craik & Jennings, 1992; Craik & McDowd, 1987). Despite these findings, research on how to facilitate adolescents' and older adults' recall in legal contexts is scarce (Dando, 2013; Wright et al., 2010). Investigating the effects of different internal and external prompts in

memory performance through development may provide us with new insight on the processes that facilitate these groups' eyewitness recall.

With respect to the representations in drawings, a comparison between the content of drawings produced by children and adults can inform us about the different ways these two age groups perceive an event and its various aspects. Two potential questions which could be empirically explored here involve whether drawings produced by adults are as schematic as children's, and whether the central features depicted by adults fade away with time, as it is the case for some central features in children's drawings. In addition, adults may include more accurate than inaccurate features in their drawings than children, which could potentially support the use of drawings as supplementary aids in subsequent forensic interviews with them. As an example, when adults are re-invited for an interview they could first be encouraged to offer a free recall account. Then, the interviewer could present them with their initial drawings, point to various accurate features which were not mentioned in this (particular) interview and ask interactive wh- questions (i.e. 'what is it?', 'what did it do?', 'what happened?', 'what was said?', Barlow et al., 2011) to further facilitate recall. This may help elicit more information about specific aspects of a crime and also verify previous reports.

Building on the preceding proposition, Study Four (Chapter Five) could be replicated with an adult sample, to clarify what the function of drawings is in this particular age group and to allow for comparisons to be made with children. On the basis of the generation effect and the encoding specificity principle (e.g. Bertsch et al., 2007; Rosner et al., 2013; Tulving, 1983), adults may be better able to use drawings as retrieval cues of a previously witnessed event than children. It is also plausible that

adults are able to use other participants' drawings as a memory cue, on the assumption that the content of these drawings are less ambiguous.

Future research could also investigate the effects of dramatization on recall of a staged event similar to those utilized by Gross and colleagues (Butler et al., 1995; Gross and Hayne, 1999a), in which children participated more actively than in this study. Dramatization may be a useful interview method in legal contexts because it does not require any props, only children using gestures and mime, and therefore merits further empirical testing. Given that using movements at encoding may facilitate later retrieval (R. L. Cohen, 1981; Cook et al., 2010; Saltz & Donnenwelth-Nolan, 1981), an event in which children are active participants may be more appropriate to inform us about the use of dramatization in eyewitness interviews. An event of this sort, which does not rely on the verification of children's reports by their parents (e.g. Salmon et al., 2003; Wesson & Salmon, 2001), can further ascertain the accuracy of children's accounts. Children's movements in relation to their reports could also be empirically explored. I observed in Studies One and Two (Chapters Two and Three) that many children would lift their hand up or point to their hand with the fingers of the other hand when they were asked to tell where they had been touched by Actor 1. This was done without offering any verbal response and irrespective of condition. Studying this research topic will show us whether children tend to 'show' rather than tell when they are required to disclose information relating to touch. In sum, investigating dramatization further could presumably allow investigators to add one more interview method to their 'tool kit', which they could potentially use in interviews with children with an active role in an incident and thus enhance their eyewitness accounts.

Lastly, future research should investigate the effects of drawing and dramatization, by following the format of formal investigative interview protocols, which are already used by police officers in interviews with child witnesses. As stated in Chapter One, the aim of this project was to inform police and judicial officials about how to facilitate young children's eyewitness testimony. Nonetheless, none of the studies in this thesis were conducted according to the guidelines for interviewing child eyewitnesses proposed by the Ministry of Justice (2011) or the NICHD interview protocol (Brown et al., 2013; Lamb et al., 2007). Both these interview techniques follow a specific sequence of interview phases (see Sections 1.4 and 1.4.1). In summary, they propose that the interview commences with an introduction and a rapport building phase, during which the interviewer sets the ground rules, clarifies what the child is expected to do, and asks questions about brief neutral topics, so that the child feels comfortable enough to proceed. A free recall interview phase follows, during which open-ended questions are asked regarding the target event/incident. A subsequent 'questioning' phase allows the interviewer to ask further open-ended and more focused and closed-ended questions, which help the child elaborate more on the information offered during free recall and give specific details, such as the time and place of the event. Finally, a closing phase follows during which the interviewer may summarize what the child reported and thanks the child for her/his participation.

The interviews utilised in the studies of this thesis are different than the aforementioned formal interviews. Although the free and prompted recall phases are somewhat in line with the formal guidelines, the introductory/rapport building phase and the closing phase did not take place. Future research could redesign the studies by following all the phases proposed by the ABE guidelines, and more specifically by including a formal rapport building and closing phase. In addition, more 'wh'

questions can be used (e.g. 'who', 'where', 'what', 'when') in prompted recall, in conjunction with drawing and dramatization, as such questions can further facilitate children's recall (Ministry of Justice, 2011). Moreover, future studies on the effect of drawing and dramatization may utilise the NICHD protocol, in line with Katz and Hershkowitz (2010). Particularly, children may be interviewed with the protocol first, and then a second interview may follow, during which children will be asked further free recall and prompted recall prompts while drawing or dramatizing the target event. Redesigning the studies of this thesis by following more formal interview guidelines will render them more applicable to forensic officials who interview young eyewitnesses.

7.6 Conclusions

Taken together, the findings of this thesis suggest that drawing while recounting a past event can facilitate the reporting of objects in 3- to- 6- year old children within a two-week time interval (Barlow et al., 2011; Gross & Hayne 1998; Wesson & Salmon, 2001). Drawing does not have the same facilitative effect in adults' recall, presumably because adults may be less dependent on an external memory aid to scaffold their memory than children. Moreover, children's and adults' recall of an incident may be adversely affected by long delays, suggesting that immediate interviews may protect the quality and quantity of their reports. The content of the drawings children produce during consecutive interviews may entail more general features and reflect their attempt to use their schematic knowledge to retrieve more specific details about an incident. Despite this, after longer delays, central information may dissipate from the drawings, and children may tend to draw more inaccurate features. Showing children the drawings they produced after

witnessing an event may not facilitate their memory, simply because children attempt to identify the representations instead of recalling the event. Collectively, these findings suggest that it is the process of drawing while narrating that may facilitate children's recall of a witnessed event and not necessarily the drawings themselves (Jolley, 2010). Importantly, this thesis showed that children's temperament, symbolic skills, and language ability may interact with drawing, dramatization, and a verbal-only interview. Considering the combination of these internal and external prompts during questioning may increase the possibility of eliciting forensically relevant information from young children. Judicial and police officials are advised to take these parameters into account, for the benefit of young eyewitnesses.

In sum, this thesis showed that when different external and internal supports are used as part of forensic interviews with young children, they can enrich the interview process. It further emphasises that each eyewitness is unique, and adjusting the interview process to their internal characteristics and abilities may help elicit better eyewitness testimonies.

APPENDIX A: SCRIPT OF STUDIES ONE, TWO, AND THREE

John: *'Hi everyone! My name is John, and I'm here today to read you story! Do you like stories because I do!! (with excitement) (waits for children to answer) The story I've got for you today is called a frightened little elephant. And, I've brought some friends along to read the story with me. I've got my friend Teddy (takes Teddy out of his bag pack). Say hello to Teddy! (John makes Teddy wave hello to the children) He's going to sit right here. And I've got my friend Monkey (takes Monkey out of his bag pack). Say hello to Monkey! (John makes Monkey wave hello to the children) And he is going to sit right here. The thing is though, my friend Claire is meant to be here. She is meant to read the story with me. But she isn't here! Oh well, she is late! (annoyed) She's always running late! (annoyed) Oh, well, we'll start the story anyway and she can join in later (happily)! So, the story is called a frightened little elephant...'*

John starts reading. After reading a few pages Claire storms in and talks to John in an angry manner:

Claire: *'John, you started the story without me?? Why did you do that?? You were supposed to wait for me! I wanted to read the story!! (angrily, but somewhat childishly-whining almost) Ohhhh, I'm leaving!!' (angry) (John's reaction here is sort of surprised/annoyed/resigned)*

Claire heads to the door. When she reaches the door she turns back, looks at John and says in an angry manner:

Claire: *'And I'm taking Monkey with me!!!'* Claire grabs Monkey, puts him under her arm and storms out (angrily).

John: *'That was Claire. She took Monkey! (surprised manner) She was very angry! I don't know what to do. Tell you what, should we continue with the story and then I will try to find her later? Ok, let's continue with the story!'*

John reads the story book. After he finishes reading, he says:

John: *'Did you enjoy the story? I enjoyed reading it to you. Now, who likes stickers?*

(with excitement) I have a special sticker for everyone's hand!! Everyone put out your left hands like this!' (with excitement, and demonstrates putting out hands)

John gives every child a sticker and then says:

John: *'That's the end now. I've got to go find Claire and Monkey. I'm not sure where they are but I'll make it up. We'll make up, we'll be friends again! I'm sure they are outside waiting for us! Bye everyone!'* (happily)

APPENDIX B: SCRIPT OF STUDY FOUR

John: *'Hi everyone! My name is John, and I'm here today to read you story! Do you like stories because I do!! (with excitement) (waits for children to answer) The story I've got for you today is called a frightened little elephant. And, I've brought some friends along to read the story with me. I've got my friend Teddy (takes Teddy out of his bag pack). Say hello to Teddy! (John makes Teddy wave hello to the children) He's going to sit right here. And I've got my friend Monkey (takes Monkey out of his bag pack). Say hello to Monkey! (John makes Monkey wave hello to the children) And he is going to sit right here. The thing is though, my friend Claire is meant to be here. She is meant to read the story with me. But she isn't here! Oh well, she is late! (annoyed) She's always running late! (annoyed) Oh, well, we'll start the story anyway and she can join in later (happily)! So, the story is called a frightened little elephant...'*

John starts reading. After reading a few pages Claire storms in and talks to John in an angry manner:

Claire: *'John, you started the story without me?? Why did you do that?? You were supposed to wait for me! I wanted to read the story!! (angrily, but somewhat childishly-whining almost) Ohhhh, I'm leaving!!' (angry) (John's reaction here is sort of surprised/annoyed/resigned)*

Claire heads to the door. When she reaches the door she turns back, looks at John and says in an angry manner:

Claire: *'And I'm taking Monkey with me!!!'* Claire grabs Monkey, puts him under her arm and storms out (angrily).

John: *'That was Claire. She took Monkey! (surprised manner) She was very angry! I don't know what to do. Tell you what, should we continue with the story and then I will try to find her later? Ok, let's continue with the story!'*

John reads the story book. After he finishes reading, he says:

John: *'Did you enjoy the story? I enjoyed reading it to you. That's the end now. I've got to go find Claire and Monkey. I'm not sure where they are but I'll make it up. We'll make up, we'll be friends again! I'm sure they are outside waiting for us! Bye everyone! (happily)*

APPENDIX C: SCRIPT OF STUDY FIVE

James: *'Hi everyone! Thanks for coming! I'm James, and today I will give you a brief presentation on the arbitrariness of language, and then you will be asked to answer some questions about my teaching in a second session, for which you have already signed up on SONA, either this afternoon or tomorrow. You need to attend this second session to receive your SONA credits. Please sign your consent forms for the study now, while I'm fixing the microphone before we begin.'*

Meanwhile, Lara storms in the room grabs the laser pointer from the desk and says:

Lara: *'I need this! Thanks James!'* (heads to the door)

James: *'Lara, I need the laser pointer for my presentation!'*

Lara: *'Sorry! You have a presentation! I have a lecture! It's more important!'* (heads to the door)

James: *'But Lara, I'm doing Christiana's study!'*

Lara: *'Sorry! I need it more than you do!'* (she heads out of the room)

James: *'I can't believe this! She's not usually like that! (surprised) I guess I'll have to do my presentation without the laser pointer!'*

James proceeds to give the students a five-minute talk. After he finishes, he says:

James: *'Well that's all from me! This completes the first part of Rate a Talk Study 1. As I said before, you need to come back for a second session this afternoon or tomorrow to receive your SONA credits, so you need to remember your timeslot. Thank you for coming!'*

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