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Individual Differences in the Effect of Drawing on Children’s Memory

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Abstract

For more than a century, drawing has enjoyed a prominent position in clinical interviews with children. In surveys conducted in the United States, for example, drawing consistently ranks as one of the top 10 instruments used by clinicians who work with children. Despite its popularity, many of the claims made about the use of drawing during clinical interviews have never been empirically assessed. The purpose of the present thesis was to examine the effects of two drawing techniques commonly used to elicit complete and accurate accounts of children's past experiences.

Prior research has shown that when children are interviewed about their past experiences, those given the opportunity to draw report more verbal information than children merely asked to tell. This finding has been obtained irrespective of the nature of the target event (e.g., educational, emotional, clinical), and over delays that range from 1 day to 1 year. Although the effect of drawing on the amount of information that children report has been replicated in a number of different laboratories, the mechanism responsible for this effect is not known. Furthermore, despite these group effects, some children clearly profit more from the opportunity to draw than others.

In a series of two experiments, I examined whether differences in the way that interviewers interacted with children during drawing interviews could provide an explanation for why drawing elicits more complete reports than telling alone. In addition, I examined whether differences in intelligence, memory, language development, drawing skill, theory of mind, temperament, and socioeconomic status could be used to explain
individual differences in children’s performance when they were given the opportunity to
draw during a memory interview.

Consistent with prior research, the results showed that drawing facilitated 5- to 6-
year-old children’s verbal reports of educational and emotional events without
compromising accuracy. Interestingly, examination of the interviewers’ behaviour
revealed that the drawing interview increased children’s verbal reports because it
encouraged interviewers to take more conversational turns. That is, interviewers asked
more questions and made more minimal responses when interviewing children who were
drawing and as a consequence, the children reported more information. With respect to
individual differences in children’s performance during drawing interviews, the results
showed that while drawing ameliorated the impact of having a poor memory on
children’s verbal reports, drawing was of little benefit to children who were highly
distractible.

In two additional experiments, I examined children’s ability to use human figure
drawings or body maps to indicate where they had been touched during the course of a
staged event. I also examined which child characteristics might be used to predict
individual differences in children’s ability to use the body maps effectively. Irrespective
of children’s socioeconomic background, the delay between the event and the interview,
and individual child characteristics, 80% of children made at least one false allegation of
touch when using the body maps. Moreover, approximately 10% of children erroneously
indicated that they had been touched on the genitals, and 25% of children erroneously
indicated that they had received a touch to the breast. On the basis of these data, I
conclude that children fail to understand the representational nature of body maps. Given this, use of body maps in clinical or legal contexts should be discouraged.

Taken together, these findings indicate that although children can remember considerable amounts of information about their experiences, the efficacy of drawing as a medium for eliciting this information varies depending on the way that drawing is employed. While drawing was highly effective when used as a medium for eliciting verbal information from children, providing children with a pre-drawn body map failed to facilitate children’s accounts of bodily touch. Overall, these data have important implications for how children are interviewed in clinical and legal settings.
Acknowledgements

Well, thanks to the help and support of numerous people, I am finally PhinisheD!

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Chapter 1

The Problem: Facilitating Complete and Accurate Accounts of Children’s Past Experiences

The number of substantiated cases of child maltreatment (neglect, sexual, physical, and emotional abuse) is high in many countries (International Child Abuse Network, 2003). In 2000, it was estimated that 12.2 American children per 1,000 were the victims of maltreatment (U.S. Department of Health and Human Services, 2002). Statistics from the United Kingdom estimate the incidence of child maltreatment to be 2.3 children per 1,000 (Department of Health, 2003). In New Zealand, the statistics are equally sobering. In 2002, an estimated 10 children per 1,000 were maltreated (G. Young, Manager, Ministerials Unit, Child, Youth, and Family Service, National Office, personal communication, 26 August, 2003). These statistics only reflect substantiated cases of child maltreatment. Child protection agencies receive many more notifications of suspected abuse that also require investigation.

When a child has sufficient language skills, investigations of maltreatment typically include an interview with the alleged victim (Reed, 1996). Obtaining complete and accurate verbal evidence from children is important because in cases of suspected maltreatment, especially sexual abuse, there is often a lack of physical evidence and no eyewitness to corroborate the child’s allegations. Hence, the information that the child is able to provide may be the cornerstone of any criminal proceeding (Bruck, Ceci,
Because the child's testimony may ultimately determine the guilt or innocence of an alleged perpetrator, it is crucial that the information that he or she provides is accurate. The ramifications of mistakes in cases of alleged maltreatment are far reaching. In cases where the accused is wrongfully acquitted, he or she is free to re-offend. In cases where the accused is wrongfully convicted, his or her liberty is jeopardized and a child may be deprived of a loving family member or caregiver (Reed, 1996).

In clinical settings, obtaining complete and accurate information from children is also extremely important. It is estimated that at least 1 in 10 American children have some form of mental health problem (e.g., depression or anxiety) that causes significant impairment in that child's school and social functioning (National Institute of Mental Health, 2002; U.S. Department of Health and Human Services, 1998). This figure is comparable to statistics from Great Britain which also indicate that 1 child in 10 suffers from a mental illness (United Kingdom Parliament, 2000). Although there are no New Zealand statistics relating to the frequency of mental illness in children, it is reasonable to assume that New Zealand children experience mental health problems with the same frequency as their American and British peers.

Historically, children's verbal reports of their mental health difficulties have been subjugated relative to the reports of their parents and caregivers. While parents and caregivers are able to provide a wealth of helpful information about children's difficulties, there is evidence to suggest that they evaluate and interpret events differently from children. As a result, parents and caregivers are unable to accurately report some aspects of the child's experience (see Levine, Stein, & Liwag, 1999; McCloskey,
Figuero, & Koss, 1995; Steward, O'Connor, Acredolo, & Steward, 1996a; Wachtel, Rodrigue, Geffken, Graham-Pole, & Turner, 1994). Because children may have information about their own experience that is not readily apparent to others, it is crucial to conduct a verbal interview with the child to ensure the accurate assessment and effective treatment of mental health problems (Wesson & Salmon, 2001).

In summary, in both clinical and legal settings, professionals are frequently required to interview children about past experiences. Ensuring the integrity of the information that these children provide is crucial. The capacity to obtain complete and accurate accounts from children, however, depends upon the professional’s ability to tailor his or her interview to the needs of the child. To achieve this, professionals must understand the development of children’s mnemonic competence and language skill. The following section will briefly outline the development of these capacities and the ongoing difficulties that children experience when asked to provide accounts of their prior experiences.

**Children's Verbal Accounts**

During the preschool years, most children undergo a period of rapid linguistic development. While children under the age of two rarely talk about past experiences, by 3 years of age, they are typically able to provide brief verbal accounts of prior events, particularly within the context of a family discussion (Hudson, 1990; Hudson & Nelson, 1986). The amount of information provided by preschoolers is extremely limited; a coherent narrative is typically only obtained through substantial parental scaffolding (see Reese, 2002 for a review). By the time children reach school at the age of 5 years, they are able to independently provide brief verbal reports of prior experiences (Butler, Gross,
& Hayne, 1995; Gross & Hayne, 1998). Although children of this age report only a small amount of information in response to general open-ended questions such as, “Tell me what happened,” their verbal reports can be bolstered through the use of direct questions such as, “Tell me where you went” (Bruck et al., 1998; Butler et al., 1995; Gross & Hayne, 1998; Salmon & Pipe, 1997).

The acquisition of language is clearly one rate limiting step in children’s ability to provide verbal accounts of their past experiences, but language acquisition alone is not sufficient to account for the paucity of young children’s narrative accounts. In fact, children’s ability to use language in the service of memory lags considerably behind their general linguistic skills (Simcock & Hayne, 2002). In addition to basic verbal skills, age-related changes in memory mechanisms influence children’s verbal accounts of past experiences.

Historically, it was assumed that infants and young children were unable to encode, store, and retrieve information from memory (e.g., James, 1890; Piaget, 1952). Over the last three decades, however, a plethora of research has firmly established that beginning with birth (and perhaps before) the human central nervous system is capable of learning and memory (DeCasper & Fifer, 1980; DeCasper & Spence, 1986). Despite these precocious abilities, there are also clear age-related changes in mnemonic skill that occur during infancy and childhood.

Empirical research has repeatedly shown that older children learn new information more rapidly than younger children (Barr & Hayne, 2000). In addition, older children retain more information in memory than young children. This is due, at least in part, to a developmental improvement in encoding. While young children use rudimentary
strategies to enhance encoding such as naming to-be-remembered items (Baker-Ward, Ornstein, & Holden, 1984), older children use more elaborate strategies such as grouping related items together (Perlmutter & Myers, 1979). Older children are also more proficient at searching their memories and generating cues to prompt recall (Ceci & Howe, 1978; Kobasigawa, 1974). Finally, older children retain information in memory over longer delays than do younger children (Burgwyn-Bailes, Baker-Ward, Gordon, & Ornstein, 2001; Flin, Boon, Knox, & Bull, 1992; Peterson, 2002).

Despite developmental advances in language skill and memory ability, children’s verbal reports of episodic memories remain sparse in detail, even into adolescence. For example, Sutherland and Hayne (2001) tested 5- to 6-year olds, 11- to 12-year-olds, and adults’ recall of a video that they had watched in the laboratory. As might be expected, the verbal reports of 5- to 6-year olds were particularly lean, but even the recall of 11- to 12-year-olds was sparse relative to that of adults.

Empirical evidence suggests that the paucity of children’s accounts is due, at least in part, to children failing to tell all that they know about an event. That is, they encode more information into memory than they articulate during verbal interviews. Simcock and Hayne (2002, 2003) tested 2- to 4-year-olds’ recall of a unique event via a verbal interview, a photo recognition task, and a re-enactment procedure. They found that the children’s memory performance varied across the different memory measures. Children reported less information during the verbal interview than during either the re-enactment or the photograph recognition phases of the study. These findings indicate that while the children encoded significant amounts of information about the event, they failed to report all that they knew during the verbal interview.
Studies in which children report different aspects of the same event to different people (Fivush, Haden, & Adam, 1995; Fivush & Hamond, 1990; Fivush & Shukat, 1995), or different aspects of the same event across time delays (Gross & Hayne, 1998; Steward et al., 1996a) provide further evidence that children rarely tell all that they know about an event. For example, MacDonald and Hayne (1996) conducted a study in which 3- to 4-year-old children were interviewed about a unique event after a 1-week delay. During the week prior to the interview, children’s parents recorded the content of any conversations that their child had about the event. While children reported similar amounts of highly accurate information to their parents and to the interviewers, there was very little overlap in the content of the children’s reports in these two contexts.

In addition to the difficulties associated with obtaining complete accounts from children, obtaining accurate accounts can also be difficult. While there is consensus that children can provide accurate accounts of their past experiences, there is also a large body of literature demonstrating that inappropriate interviewing practices may lead to inaccuracies in children’s reports (Bruck, Ceci, & Hembrooke, 2002; Goodman & Aman, 1990; Lamb, 1994; Poole & Lamb, 1998; Poole & Lindsay, 1995). For example, empirical research has shown that the number of errors children make in their verbal reports is increased by exposure to misleading information (Sutherland & Hayne, 2001), to leading questions such as, “Where did John touch you?” (Goodman & Schaaf, 1997; Reed, 1996), and to complex, age-inappropriate language (Carter, Bottoms, & Levine, 1996) or language with an accusatory context (e.g., “That bad man;” Leichtman & Ceci, 1995). In addition, because children are sensitive to the social demands inherent in the interview context, they are likely to acquiesce to misleading information supplied by the
interviewer (Poole & Lindsay, 1995; Reed, 1996), especially if the child perceives the interviewer to be an authority figure (Bruck et al., 1998; Tobey & Goodman, 1992).

In conclusion, in the last two decades, both the number of reported cases of child maltreatment and public awareness of children’s mental health problems has increased. As a result, professionals are frequently presented with the difficult task of eliciting information from children. While children often possess the basic language and memory skills necessary to recount their past experiences, they rarely tell everything that they know and inappropriate interview practices can easily undermine the integrity of their verbal accounts. Hence, recent research has focused on developing interview techniques that assist children to provide complete accounts of their past experiences without compromising their accuracy. Interview techniques that have been developed to facilitate complete and accurate accounts by children are discussed in Chapter 2.
Chapter 2

Interview Techniques

During the 1980's, there was a dramatic increase in the number of reported cases of child sexual abuse. In response to this trend, researchers began to systemically investigate the association between various interview techniques and the quantity and the quality of the information provided by children (Poole & Lamb, 1998). Although the primary impetus for this research was to identify techniques for eliciting complete and accurate testimony from the child witness, the findings also have implications for how children are interviewed in clinical settings. In Chapter 2, several prominent verbal interview protocols and a number of ancillary aids that professionals use to augment verbal interviews with children are reviewed.

Verbal Interviews

The principle assessment tool of both clinical and legal professionals is the verbal interview. As a result, a large number of researchers have investigated how the standard verbal interview commonly used with adults should be conducted when trying to elicit complete and accurate verbal accounts from children (e.g., Geiselman & Padilla, 1988; Hayes & Delamothe, 1997; Orbach, Hershkowitz, Lamb, Sternberg, Esplin, & Horowitz, 2000a; Saywitz & Snyder, 1996; Saywitz, Snyder, & Lamphear, 1996; Sternberg, Lamb, Orbach, Esplin, & Mitchell, 2001b).
There is now substantial consensus in both the academic and professional communities regarding how to conduct the best possible verbal interviews with children (Orbach et al., 2000a; Sternberg, Lamb, Davies, & Westcott, 2001a). For example, building rapport with the child prior to commencing the interview is vitally important (Sternberg et al., 2001b). In addition, many experts recommend encouraging the child to report everything that he or she remembers about an event (including minor details: Geiselman & Padilla, 1988). Experts also recognise that it is important to explain to the child that it is acceptable to ask questions, to say “I don’t know,” and to correct the interviewer if he or she makes an error (Orbach et al., 2000a; Poole & Lamb, 1998). Many professionals also suggest asking the child about benign past events prior to discussing the target event, to familiarise the child with the interview process (e.g., Orbach et al., 2000a; Saywitz & Snyder, 1996).

In addition to consensus regarding the structure of the introductory phases of the interview, there is also general agreement regarding the best way to conduct the substantive phase of the interview. Empirical studies have consistently shown that children make more errors in response to specific (e.g., “What colour was the car?”) and closed (e.g., yes-no and option posing) questions than in response to open-ended questions (e.g., “Tell me everything that you can remember:” Dent, 1991; Dent & Stephenson, 1979; Hershkowitz, Lamb, Sternberg, & Esplin, 1997; Lamb & Fauchier, 2001; Peterson & Bell, 1996). Hence, to protect the integrity of the child’s verbal account, it is recommended that interviews begin with open-ended questions, followed by a series of increasingly more specific (but not leading) questions when the child is unable to supply any additional free narrative information. Experts also recommend that closed
questions be asked infrequently and only in the latter stages of the interview (Lamb, Orbach, Sternberg, Esplin, & Hershkowitz, 2002; Poole & Lamb, 1998; Sattler, 1992).

In the last decade, a number of clinical and legal professional groups have published books and guidelines that encourage use of the interview practices outlined above (e.g., American Academy of Child and Adolescent Psychiatry, 1997; American Professional Society on the Abuse of Children, 1990; Carr, 1999; Memorandum of Good Practice, 1992; Sattler, 1992; U.S. Department of Justice, 1996). Unfortunately, a number of studies have shown that, despite awareness of these guidelines, professionals continue to use inappropriate interview procedures (Cederborg, Orbach, Sternberg, & Lamb, 2000; Lamb, Sternberg, & Esplin, 2000; Orbach et al., 2000a; Sternberg et al., 2001a; Walker & Hunt, 1998; Warren, Woodall, Hunt, & Perry, 1996). For example, Sternberg et al. (2001a) evaluated the investigative interview practices of English and Welsh professionals trained to interview children according to the standards of the Memorandum of Good Practice (MOGP: 1992). Despite the clarity of the MOGP guidelines, nearly 40% of questions asked by interviewers were either multiple-choice or suggestive. That is, interviewers continued to frame questions in a manner that potentially undermined the integrity of the children’s verbal accounts.

Due to the difficulties that interviewers in legal settings have in translating and applying general questioning guidelines to their professional practice, a number of structured interview protocols have been developed. These protocols incorporate many

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1 As mentioned in Chapter 1, traditionally, professionals in clinical settings have relied heavily on parents, teachers, and direct behavioural observation to obtain information about children’s mental health difficulties. Recent research indicating that children are privy to information about their experiences that is not readily apparent to others has highlighted the importance of conducting a thorough verbal interview with the child. To date, however, few studies have investigated whether clinicians strictly apply best practice guidelines when trying to elicit complete and accurate information from children.
of the interview strategies recommended in professional guidelines, but they translate the guidelines into a series of semi-structured, yet flexible scripts that can be readily applied by interviewers in the field (Orbach et al., 2000a). The following section briefly outlines four of the most commonly used structured interview protocols: the Step-Wise Interview, the National Institute of Child Health and Human Development (NICHD) Interview, the Cognitive Interview (CI), and the Narrative Elaboration Technique (NET).

**Step-Wise Interview**

The Step-Wise Interview, developed by Yuille and colleagues, proceeds in a series of discrete stages that adhere to recommendations made in best practice guidelines (Marxsen, Yuille, & Nisbet, 1995; Yuille, Hunter, Joffe, & Zaparniuk, 1993). Initially, rapport is established with the child. The child is then encouraged to tell the truth and is asked to describe two prior experiences unrelated to the target event. This phase of the interview familiarises the child with the interview process and allows the professional to assess the child’s verbal skill. The substantive phase of the interview then progresses in a step-wise fashion, beginning with open-ended questions to prompt free recall of the event, followed by more specific questions and the use of ancillary aids, such as anatomically detailed dolls (AD dolls), if the interviewer requires additional information.

Because the Step-Wise Interview closely adheres to best practise guidelines, few researchers have sought to empirically re-establish the efficacy of this protocol. Yuille, Marxsen, and Menard (1993; described in Marxsen et al., 1995) conducted one field study and found that police and child protection workers who used the Step-Wise Interview protocol made fewer statements that potentially contaminated the child’s verbal report than did professionals who did not use the protocol. Although this study provides
preliminary evidence for the ecological validity of the Step-Wise Interview, because the exact nature of the children's experiences was unknown, the authors were unable to determine the accuracy of the children's reports. Laboratory studies in which there is a record of the child's experiences are necessary to ascertain the effect of the Step-Wise Interview on accuracy. The lack of empirical research replicating the findings of Yuille et al. (1993; described in Marxsen et al., 1995), coupled with the absence of laboratory analogue studies, makes it difficult to draw definitive conclusions about the efficacy of the Step-Wise Interview.

**National Institute of Child Health and Human Development (NICHD) Interview**

Researchers at the National Institute of Child Health and Human Development developed the NICHD Interview in response to empirical studies which indicated that training interviewers and children to pose and respond to open-ended questions, respectively, facilitated children's verbal reports (Orbach & Lamb, 2000; Sternberg et al., 2001b). In the NICHD Interview, rapport is first established with the child. The child is then instructed about the importance of telling the truth, correcting the interviewer if he or she makes a mistake, and admitting when he or she does not understand a question. The interviewer then elicits verbal accounts of neutral events that the child has experienced to familiarise the child with the interview process. The substantive phase of the interview adopts the recommended hierarchical approach to interviewing the child, beginning with open-ended questions, followed by focused questions, if necessary, to obtain forensically relevant information. Unlike the Step-Wise Interview, the NICHD Interview uses the child's responses to direct the course of the interview. Hence, the
NICHD Interview is child-directed rather than interviewer-directed (Lamb et al., 2002; Orbach et al., 2000a).

A number of field studies have been conducted to investigate the efficacy of the NICHD protocol for interviewing child witnesses (Orbach et al., 2000a; Sternberg et al., 2001b). The results of these studies have consistently demonstrated that, although NICHD Interviews do not elicit more information from alleged victims than standard interview practices, the interviews are of higher quality. For example, Orbach et al. (2000a) compared the interview practices of six Israeli professionals prior to, and following, training with the NICHD Interview protocol. Orbach et al. (2000a) found that children (4- to 13-year-olds) reported the same amount of substantive information irrespective of the interview technique used. When interviewers used the NICHD protocol, however, the quality of their interviews improved relative to when they used the standard verbal interview. When using the NICHD protocol, the interviewers asked twice as many open-ended questions and half as many option-posing questions relative to when they used the standard interview. As a result, children interviewed with the NICHD protocol provided significantly more information in response to open-ended questions.

Because responses to open-ended questions are typically more accurate than responses to option-posing questions, Orbach et al. (2000a) concluded that use of the NICHD protocol was likely to improve the accuracy of information provided by children. The authors acknowledged, however, that they were unable to empirically assess the accuracy of the children's accounts because there was no corroborative information available. Laboratory analogue studies, using contrived events, are necessary to
empirically assess the accuracy of children’s verbal accounts. The absence of such studies currently precludes drawing definitive conclusions about the efficacy of the NICHD Interview protocol.

In sum, although both the Step-Wise and the NICHD protocols improve the quality of interviews conducted by professionals, they largely fail to elicit additional information from children. While improving the quality of interviews is important, it is equally important that interview protocols facilitate children’s accounts of past experiences. When children do not disclose information, it is difficult to evaluate the likelihood of abuse, to determine the guilt or innocence of the accused, and to plan treatment for victims (Saywitz et al., 1996). Empirical studies show that verbal interviews often do not facilitate recall of past events because they fail to compensate for developmental limitations in children’s ability to generate their own retrieval strategies (Ceci & Howe, 1978; Kobasigawa, 1974). The Cognitive Interview (CI) and the Narrative Elaboration Technique (NET) overcome this limitation by providing interviewees with ancillary aids designed to improve memory retrieval.

Cognitive Interview (CI)

Geiselman and his colleagues developed (Geiselman et al., 1984), and later refined (Fisher, Geiselman, Raymond, Jurkevich, & Warhaftig, 1987), the CI for use with adult eyewitnesses. The CI begins with rapport building, followed by open-ended questions about the target event. When the witness is unable to provide any additional free-narrative information, the interviewer asks a series of open-ended questions in conjunction with a number of tasks designed to enhance memory retrieval. The memory retrieval tasks involve asking participants to mentally reinstate the context of the event, to
report everything that they can recall (including minor details), to recount the event from
different perspectives (e.g., from the perspective of another person present during the
event), and to recount the event in a variety of temporal orders (e.g., both forward and
backward: Geiselman & Padilla, 1988). The content of the interviewee’s verbal report is
then reviewed prior to closing the interview (Poole & Lamb, 1998).

The CI has been shown to facilitate reports by adults in both laboratory and field
settings (e.g., Chapman & Perry, 1995; Fisher et al., 1987; Fisher, Geiselman, & Amador,
1989; Geiselman, Fisher, MacKinnon, & Holland, 1985). Studies examining the efficacy
of the CI with children have, however, produced more equivocal results. For example,
Geiselman and Padilla (1988) interviewed 7- to 12-year-old children about a simulated
liquor store hold-up witnessed three days earlier. Half of the children were interviewed
with the CI and half were interviewed with a standard verbal interview. Children
interviewed with the CI reported 21% more information than those interviewed with the
standard interview. This increase in recall did not occur at the expense of accuracy, but
Geiselman and Padilla (1988) did note that asking children to recount the event from
different perspectives resulted in children making a disproportionate number of errors.

In a second study, Geiselman, Saywitz, and Bornstein (1990; cited in McCauley &
Fisher, 1996) asked 7- to 11-year-old children to play games with an experimenter. Two
days later, the children were interviewed about the event with either the CI or a standard
verbal interview. The authors found that while the CI improved children’s recall by 26%
with no associated decrease in accuracy relative to those interviewed with the standard
interview, some children had difficulty reporting the event in different temporal orders.

\(^2\) The term *error* refers to the absolute number of incorrect responses made, while *accuracy* is the
proportion of correct facts reported.
As a result, Geiselman and his colleagues concluded that the changing perspectives and the changing temporal orders components of the CI might be too demanding for young children.

Geiselman, Saywitz, and Bornstein (1993) hypothesised that providing the opportunity to practice using the CI may help children overcome the difficulties associated with its use. Children between 8 and 12 years of age participated in two staged events (viewing a slide show and talking to a “surfer dude”). The children were randomly assigned to one of three interview conditions: CI with practice, CI without practice, or a standard verbal interview. After completing the staged events, children assigned to the CI without practice and the standard verbal interview conditions took part in a rapport building exercise, while children assigned to the CI with practice condition used the CI to discuss their interaction with the “surfer dude.” Two days later, children were interviewed about the slide-show event using either the CI (i.e., children in the CI with/without practice conditions) or a standard verbal interview.

Consistent with previous research, children interviewed with the CI without training reported 24% more correct information than did children in the standard verbal interview condition. Training with the CI further bolstered children’s performance. Children trained to use the CI reported 48% more information than did children interviewed with the standard verbal interview. Importantly, use of the CI with practice was not associated with an increase in errors.

Although these results appear encouraging, studies examining the efficacy of the CI with children have traditionally been laboratory studies involving events that the experimenters knew occurred. In applied settings, however, children who have allegedly
been abused, but in fact have not been, are also interviewed about their experiences. The impact of using CI techniques (e.g., having the child repeatedly describe an event) on the validity of these children’s reports remains unknown (Poole & Lamb, 1998).

**Narrative Elaboration Technique (NET)**

In 1993, Saywitz and her colleagues developed the NET to help children verbally recount past experiences, while minimising the need for specific questions that could potentially undermine the accuracy of children’s accounts (Saywitz & Snyder, 1993, 1996; Saywitz et al., 1996). Initially during NET training, each child is provided with a rationale for using memory strategies and is instructed to tell everything that he or she can recall. The interviewer then explains that organising the event into categories (e.g., participants, setting, actions, and conversation/affective) can facilitate recall. Next, the child is shown a series of cue cards that can be used to remind him or her to report information about each category. The child then practices using the NET (free recall, followed by use of the cue cards) to recount a benign event. At this time, the interviewer provides the child with feedback about his or her performance and offers suggestions regarding how his or her recall could be further enhanced. Immediately prior to discussing the target event, children are given a booster session on how to use the cue cards effectively. The technique is then implemented during the substantive phase of the interview (Saywitz & Snyder, 1996; Saywitz et al., 1996).

Initial studies investigating the efficacy of the NET produced encouraging results. Saywitz and her colleagues consistently found that using the NET facilitated children’s verbal recall of an event without reducing accuracy (Saywitz & Snyder, 1996; Saywitz et al., 1996). For example, Saywitz and Snyder (1996) tested the efficacy of the NET with
7- to 11-year-old children. Children took part in a staged event involving a student teacher being accused of taking another teacher's craft materials without asking. Each child was randomly assigned to one of three experimental conditions: NET, instruction-based control, or control. Children in the NET condition received the complete NET training protocol prior to being asked about the staged event. Children in the instruction-based group were told that there are better and worse ways of remembering events, and were encouraged to be complete and accurate. Children in the control group were not given any specific training or instructions regarding how best to complete the verbal interview. Each child was interviewed approximately two weeks after the event. Initially, he or she was asked to provide a free narrative account of the event. When the child was unable to report any additional free narrative information, he or she was presented with the cue cards (e.g., participants, setting, actions, and conversation/affective) and asked if they reminded him or her to tell anything else.

Children interviewed with the NET provided significantly more correct information during free recall than did children in either the instruction-based or the control conditions. In addition, provision of visual cues facilitated the verbal reports of children in the NET condition relative to those children in the instruction-based and the control conditions. The increase in information reported was not associated with an increase in errors.

Despite the promise of these early findings, Brown and Pipe (2003a: Experiment 2) found that after a 9-month delay, 6- to 8-year-old children interviewed with the NET did not provide more information (free and cued recall combined) than did children in a control condition. Furthermore, although the NET was not associated with a decrease in
accuracy, children interviewed with the NET made 7 times more errors when responding to the 'participants' cue card and 4 times more errors when responding to the 'conversation/affect' cue card than children in the control condition. Because children are often not interviewed about their experiences until months, or even years after alleged abuse occurred, the NET should be used with caution in applied settings.

There are a number of other caveats for the use of the NET in applied settings. First, given the limited time that professionals have to spend with their clients, the 30 minutes required to train children to use the NET is an obstacle to the utility of the procedure in the field (but see Brown & Pipe, 2003b). Second, to date, all research investigating the efficacy of the NET has been conducted with contrived events. As a result, the efficacy of the NET in applied clinical and legal settings is yet to be established (Orbach et al., 2000a; Orbach & Lamb, 2000).

In summary, academics and professionals who work with children have developed a number of best practice guidelines and structured interview protocols (i.e., the Step-Wise Interview and the NICHD Interview) that, when implemented correctly, improve the quality of verbal interviews. Because children often fail to generate their own retrieval cues, however, the provision of ancillary techniques is often necessary to increase the quantity of information reported by children. For example, the use of mnemonic strategies in the CI, and the use of cue cards in the NET, both facilitated children's recall of their past experiences. Caution is required when using the CI and the NET in the field, however, because both techniques can introduce errors into children's accounts and there is currently no research examining their efficacy in applied settings.
Ancillary Techniques

The memory retrieval strategies employed in the CI and the NET are examples from a myriad of ancillary techniques that are used in conjunction with verbal interviews to augment children’s accounts of past experiences. Although there are numerous other techniques currently in use, the following section reviews only those that have been studied empirically: anatomically detailed dolls (AD dolls), anatomically detailed drawings (AD drawings), other prop items (e.g., toys), context reinstatement, and drawing.

Props

The theoretical rationale for using props such as real, model, and toy items, AD dolls, and AD drawings for facilitating children’s accounts of their past experiences is twofold. First, according to Tulving’s theory of encoding specificity, the likelihood of retrieving information from memory increases if the context at the time of retrieval is similar to the context present at original encoding (Tulving, 1983). Props may, therefore, facilitate retrieval of information because they partially reinstate the context present at encoding. Second, re-enactment with props may provide children with a non-verbal medium to convey information that they are unwilling or unable to recount verbally (Goodman & Aman, 1990; Price & Goodman, 1990).

Alternatively, props may be deleterious to the accuracy of children’s accounts. For props to function as retrieval cues and as tools for re-enactment, children must understand the correspondence between the prop item and the real item it represents. That is, they must understand that props have a dual representation (DeLoache, 1991). DeLoache and her colleagues have consistently shown that children find it difficult to understand dual

The contrasting theoretical perspectives regarding the utility of props encouraged researchers to examine the conditions under which props enhance, or conversely, spoil children’s accounts of their past experiences. Research exploring the efficacy of AD dolls, AD drawings, and scale model/real items for facilitating recall will each be discussed in turn.

Anatomically Detailed Dolls. Professionals in clinical and legal settings began to use AD dolls (dolls with genitalia) during assessments of alleged childhood sexual abuse in the 1970’s (Koocher, Goodman, White, Friedrich, Sivan, & Reynolds, 1995). Since this time, AD dolls have been used with children to initiate conversations about sexuality, to determine labels for body parts, to assess knowledge of bodily functions and sex, to facilitate verbal and non-verbal accounts of abuse, and to screen for and diagnose abuse (Everson & Boat, 1994, 2002). Because AD dolls were used for such a variety of purposes, by the 1990’s, their use was widespread (Kendall-Tackett & Watson, 1992). For example, Conte, Sorenson, Fogarty, and Rosa (1991) found that 92% of child protection workers surveyed used AD dolls in their practice.

Despite the diverse array of uses for AD dolls, they are most frequently employed to facilitate verbal and non-verbal accounts of children’s past experiences (Everson & Boat, 1994). Studies examining the efficacy of using AD dolls for this purpose began to emerge in the late 1980’s. For example, Leventhal, Hamilton, Rekedal, Tebano-Micci,
and Eyster (1989) reviewed the hospital records of 60 alleged victims of child sexual abuse. Following a verbal interview, each child had been asked to use an AD doll to demonstrate what happened during the alleged incident. The authors found that while only 13% of children were able to provide a detailed description of their experiences without AD dolls, 48% were able to provide a detailed description when they were interviewed with AD dolls.

On the basis of this finding, Leventhal et al. (1989) concluded that more information could be obtained from children by interviewing them with AD dolls. Unfortunately, however, Leventhal et al.’s (1989) conclusion was premature. Because children in the study were always questioned with AD dolls after taking part in a verbal interview, it is possible that more information would have been elicited without AD dolls if the interviewer had simply persevered with the verbal interview (DeLoache & Marzolf, 1995). In addition, because the study was conducted in the field, no information was available regarding the exact nature of the children’s experiences. It was, therefore, impossible to determine the accuracy of the children’s accounts. Indeed, some of the children who provided detailed descriptions of abuse may not have been abused.

To overcome the limitations associated with Leventhal et al.’s (1989) study, a number of controlled laboratory experiments have been conducted to examine the efficacy of using AD dolls to facilitate children’s reports. For example, Goodman and Aman (1990) asked 3- to 5-year old children to take part in an individual play session with a male confederate. Following a 1-week delay, the children were interviewed about their experience in one of four conditions: re-enactment with AD dolls and toy props, re-enactment with non-AD dolls and toy props, AD dolls and toy props as visual cues (but
not available for re-enactment), or a control condition (verbal recall with no visual cues).
Irrespective of interview condition, each child was asked to provide a free narrative account of the event. Children in the re-enactment conditions were encouraged to use the AD dolls and props to show and tell what happened.

Goodman and Aman (1990) found that children in the three prop conditions did not report any more information (either verbal or non-verbal), or make any more errors, than did children in the control condition (also see Lamb, Hershkowitz, Sternberg, Boat, & Everson, 1996). The authors speculated that children, especially 3-year-olds, were unable to use the prop items (including dolls) to demonstrate what happened during the event because they did not recognise the correspondence between the prop items and the real items they represented (i.e., children failed to understand props’ dual representation).

DeLoache and Marzolf (1995) conducted a study that examined Goodman and Aman’s (1990) supposition. Children aged between 2.5 and 4 years took part in an individual play session with a male confederate. The play session included a Simon S Hawks game involving the confederate and the child touching each other on the hand and on the foot, and a sticker game in which the confederate placed four stickers on the child in innocuous places. Immediately following the interaction, children were asked to place stickers on an AD doll in the same places as the stickers were placed on them (the stickers were still on the child). Next, children were asked to use an AD doll to show where the confederate had touched them during the Simon Says game.

The authors found that children, especially 2.5- to 3-year-olds, had considerable difficulty completing both the sticker task and the Simon Says task. In fact, children were often unable to demonstrate on the AD doll what they had already verbally reported.
to the interviewer. DeLoache and Marzolf (1995) concluded that, as Goodman and Aman (1990) suspected, AD dolls were ineffective as demonstration aids because children failed to understand the relation between AD dolls and themselves.

Because DeLoache and her colleagues had consistently found developmental improvements in children's ability to appreciate and exploit representational materials (e.g., photographs, models), Gordon, Ornstein, Nida, Follmer, Crenshaw, and Albert (1993) conducted a study with 3- to 5-year-old children to ascertain whether older children would benefit from the provision of AD dolls. In the Gordon et al. (1993) study, children were interviewed about a routine physical examination. Three weeks after the examination occurred, children were assigned to one of three interview conditions: a verbal condition, a role play condition in which children pretended that the AD doll was a child they were showing what to expect during a medical examination, or a representation condition in which children used AD dolls as a representation of themselves to show what happened during the medical examination. Irrespective of condition, each interview began with open-ended questions, followed by increasingly more specific questions until the child had discussed each of the health checks that occurred during the medical examination. Finally, the child was asked a series of misleading questions about events that were not included in his or her examination.

Gordon et al. (1993) found that providing 3-year-old children with AD dolls (irrespective of the protocol used) failed to facilitate reporting of the medical examination. In contrast, the reporting of 5-year-old children was enhanced when they used AD dolls as a representation of themselves. Moreover, irrespective of the protocol used, there was no decrease in accuracy associated with the use of AD dolls. The authors
concluded that by the age of 5, children possess the representational skill necessary to use AD dolls as a demonstration aid.

Despite empirical evidence indicating that 5-year-old children can use AD dolls as demonstration aids, few studies have specifically examined whether children will use AD dolls to report genital touch (e.g., Bruck, Ceci, & Francoeur, 2000; Bruck, Ceci, Francoeur, & Renick, 1995b). Anatomically detailed dolls are often used during assessments of sexual abuse because they allow children to show rather than to tell what occurred. To assess the effect of AD dolls on children’s reports of genital touch, Saywitz, Goodman, Nicholas, and Moan (1991) interviewed 5- to 7-year-old girls, 1-week or 1-month after a medical examination. As part of the examination, half of the children received a genital check-up, and half received a scoliosis check-up. Following free recall, each child was provided with an AD doll and medical props to demonstrate what happened during the medical examination.

Children reported twice as much correct information (verbal and non-verbal combined) about the event when they were provided with AD dolls and props, irrespective of examination type (genital or scoliosis) and delay (1 week or 1 month). Unfortunately, however, children also made more errors when using AD dolls to show and tell about the medical examination (although overall accuracy remained “respectably high” [p. 685]). Importantly, provision of AD dolls failed to elicit reports of the genital examination. Most children who received a genital examination did not report it until the interviewer asked about it directly (also see Katz, Schonfeld, Carter, Leventhal, & Cicchetti, 1995).
Because children in the Saywitz et al. (1991) study were always interviewed with AD dolls after completing a verbal interview, the same amount of correct and incorrect information may have been elicited without AD dolls if the interviewer had simply persevered with the verbal interview. As a result, drawing conclusions regarding 5- to 7-year-olds (in)ability to use AD dolls to facilitate recall would be premature. Confounding the presentation of AD dolls with the verbal interview does not, however, detract from the finding that AD dolls failed to facilitate children's reports of genital touch. Saywitz et al. (1991) concluded that AD dolls failed to elicit reports of embarrassing events in older children because they were aware of social conventions surrounding nudity and genital touch and, as a result, were less inclined to report such experiences.

Taken together, studies examining the efficacy of AD dolls indicate that prior to age 5, children are unable to use AD dolls to provide complete and accurate accounts of their past experiences (Gordon et al., 1993). Unfortunately, by the time children can successfully understand and exploit the representational nature of AD dolls, socioemotional factors, such as embarrassment, begin to interfere with children's willingness to report aspects of their experience (e.g., genital touch: Saywitz et al., 1991). Given that one of the principle rationales for using AD dolls is that they facilitate reporting of embarrassing events, their utility in applied settings is severely undermined. The utility of AD dolls is further undermined by a lack of empirical studies examining the effect of child characteristics (e.g., race, socioeconomic status), doll characteristics (e.g., how closely the doll resembles the child), and different methods of presentation (e.g., clothed or unclothed) on children's ability to use AD dolls as retrieval cues and
demonstration aids (Aldridge, 1998; Boat & Everson, 1988, 1994; Koocher et al., 1995; Skinner & Berry, 1993; White & Stantilli, 1988).

Anatomically Detailed Drawings (AD Drawings). Anatomically detailed drawings (2-dimensional human figure drawings that include genitalia) are often considered to be a superior alternative to AD dolls. Like AD dolls, AD drawings are thought to facilitate reporting of abusive experiences because their anatomically correct nature cues retrieval of the to-be-remembered event. Moreover, they are thought to facilitate non-verbal reporting of events that children are unwilling or unable to disclose verbally (Groth, 1984). It has also been argued that, unlike AD dolls, most children understand the representational nature of drawings. A study by DeLoache (1991: Experiment 2) provides preliminary support for this hypothesis. She showed 2.5-year-old children the location of a hidden toy via a photograph, a line drawing, or a scale model. Children were then asked to find the toy in the full-sized room depicted in the pictures/model. While only 41% of children shown a scale model of the room successfully located the hidden toy, 84% of children supplied with a photograph or a line drawing of the room were successful. DeLoache (1991) concluded that children were more successful at locating the toy using pictures and photographs because these materials are not salient as real objects. Pictures and photographs minimise difficulties with dual representation, making their symbolic nature clear even to very young children.

In addition to minimising children's difficulties with dual representation, it has also been argued that drawings are less gender specific than dolls. While girls have substantially more experience with dolls than do boys, boys and girls have equivalent prior experience with drawings. As a result, male children may provide more complete
and accurate accounts of abusive events using AD drawings than AD dolls. In addition, AD drawings may enhance the accuracy of females' reports of genital touch. In a recent study by Bruck et al. (2000), only 44% of female children, as opposed to 61% of male children, accurately reported genital touch using AD dolls. Bruck et al. (2000) suggested that female children were more inaccurate than males when interviewed with AD dolls because the dolls were interesting to females and resulted in fantasy play. Therefore, because AD drawings are not conducive to fantasy play, the accuracy of females' accounts may improve. Furthermore, because children cannot engage in fantasy play with AD drawings, the opportunity for professionals to observe and misinterpret innocuous exploratory behaviour is eliminated (Lamb, 1994).

Due to their perceived advantages, AD drawings are being used with increasing frequency in clinical and legal settings (Kendall-Tackett, 1992). For example, Conte et al. (1991) found that 66% of child protection workers surveyed used AD drawings as part of their assessment process. Given the prevalence of their use, the lack of studies examining the efficacy of AD drawings for facilitating recall is alarming. In fact, only one study has systematically assessed the efficacy of AD drawings.

Steward et al. (1996b) interviewed 3- to 6-year-old children about a medical examination on three occasions: immediately following the event, after a 1-month delay, and after a 6-month delay. Children were assigned to one of four interview conditions: a standard verbal interview, a verbal interview combined with pen and paper AD drawings, a verbal interview combined with computer generated AD drawings, or a verbal interview combined with AD dolls and medical props. Irrespective of interview condition, children were asked a series of open-ended and prompted questions about the medical
examination. Children interviewed with props (e.g., AD drawings, or AD dolls and medical items) were asked to use these items to demonstrate what happened during the event. Children interviewed with props were also asked direct yes/no questions about touches to the ear, belly button, penis/vagina, and buttocks/anus.

Steward et al. (1996b) found that children interviewed with props reported approximately two more correct body touches than did those in the standard verbal interview condition across all delays. Despite this increase in reporting, children continued to report less than 30% of the touches that they had experienced. For example, when interviewed immediately after their medical examination, children interviewed with pen and paper AD drawings only reported 26% of the touches that had occurred. Moreover, children interviewed with props reported more incorrect touches than children in the standard verbal interview condition. For example, while children in the verbal interview condition made no errors of commission regarding genital touch when they were interviewed immediately following their medical examination, 7.5% of children interviewed with AD drawings erroneously indicated that they had received a genital touch.

In summary, while there is some theoretical basis for suggesting that AD drawings facilitate complete and accurate accounts of children’s past experiences, the sole empirical study conducted to examine the efficacy of AD drawings found limited support for this hypothesis. Research both replicating the findings of Steward et al. (1996b) and exploring why children are unable to use AD drawings to accurately show where they have been touched is necessary. For example, it may be that while children understand the representational nature of drawings that depict the external environment (i.e.,
DeLoache, 1991), they may find it more difficult to think of themselves as being in two places at the same time (i.e., both physically present and represented in a drawing).

**Real Items and Scale Replicas.** Despite the limited success of AD dolls and AD drawings for facilitating retrieval and reporting of past events, researchers continued to pursue the use of props as retrieval cues and demonstration aids. Specifically, researchers began to examine the efficacy of providing real items, scale replicas, and toy props for facilitating children's recall of past experiences (e.g., Price & Goodman, 1990; Salmon & Pipe, 1997; Salmon, Bidrose, & Pipe, 1995; Smith, Ratner, & Hobart, 1987; Wilson & Pipe, 1989). For example, Salmon et al. (1995) asked 3- to 5-year-old children to participate in a contrived medical event in which the child and the "doctor" examined a sick teddy bear. Following a 3-day delay, children participated in a memory interview. Children were randomly assigned to one of three interview conditions: verbal prompts only, real props, or toy props. Following free recall, children in the verbal condition were prompted with a general statement such as, "I heard there was a bear there. Tell me what happened with the bear." Children in the real and toy props conditions were given the same instructions, but were presented with the prop item (e.g., the original bear or a toy bear, respectively) instead of being given the verbal label. In addition, children in the real and toy props conditions were instructed to use the props to re-enact what happened during the event.

When the information obtained via verbal recall and behavioural re-enactment was combined, Salmon et al. (1995) found that children interviewed with real and toy props reported more information about the event than did children interviewed with verbal prompts. Despite reporting more information, children interviewed with toy props also
made significantly more errors, and were consequently less accurate, than children interviewed with either real props or verbal prompts. As a result, the utility of toy props in applied settings is limited because any information obtained with them must be interpreted with caution.

While providing children with real items from an event facilitates recall, in applied settings, real items may not be available. For example, items may not have been recovered from the crime scene, or they may be unavailable for use because they are being held as evidence. As a result, researchers have explored whether scale replicas of items from an event could be used as an alternative to real items for eliciting information from children (O’Callaghan & D’Arcy, 1989; Priestley & Pipe, 1997). Priestley and Pipe (1997: Experiment 1) examined 5- to 6-year-old’s recall of a novel event (‘Visiting the Pirate’). Following a 10-day delay, children were asked to use either scale replicas of items from the event, or toy items that were prototypically similar but not identical, to show and tell what happened when they visited the pirate. Priestley and Pipe (1997) found that replica props facilitated no more verbal recall or re-enactment than did toy props. Moreover, children interviewed with scale replicas made significantly more errors, and were more inaccurate, during verbal recall than did children interviewed with toy props. That is, children interviewed with replica props not only reported no more verbal or behavioural information, their verbal accounts were also more inaccurate.

Taken together, the findings of Salmon et al. (1995) and Priestley and Pipe (1997) indicate that real items are necessary to facilitate complete and accurate accounts of children’s past experiences. These findings are consistent with the theories of Tulving (1983) and DeLoache (DeLoache, 1987; DeLoache et al., 1991). Recall that Tulving’s
theory of encoding specificity implies that the more closely props resemble original items, the better they will function as retrieval cues, while DeLoache's theory suggests that until children understand dual representation, they will only profit from the provision of real items as demonstration aids.

Having established that real items were necessary to facilitate recall and reporting of past events, researchers began to examine what impact, if any, presenting irrelevant props had on the completeness and accuracy of children's accounts (Gee & Pipe, 1995; Pipe, Gee, Wilson, & Egerton, 1999; Pipe & Wilson, 1994). This research was necessary because, in applied settings, professionals are unlikely to know what items were present during an alleged incident. As a result, they may inadvertently present children with irrelevant items.

To examine the impact of irrelevant props on children's recall, Pipe and Wilson (1994) asked 5- to 10-year-old children to participate in a contrived interaction with a magician. Children were interviewed about their visit with the magician after 10 days and again after 10 weeks. Prior to their initial interview, children were assigned to one of four interview conditions. In the no-cues condition, children were not provided with any contextual or item cues. In the contextual-cues condition, children were interviewed in the setting of the original event. In the relevant-cues condition, children were interviewed in the original setting with all of the items used during the magic show. In the irrelevant-cues condition, the children were interviewed in the original setting with both real items from the magic show and a number of foil items that had not been part of the event. Importantly, children were not permitted to interact with the prop items.
Children were asked open-ended questions (e.g., “Tell me what happened”) about their interaction with the magician.

Pipe and Wilson (1994) found that children in both the irrelevant- and relevant-cues conditions reported more information than did children in the context-cue and no-cue conditions across both delays. Moreover, the number of errors did not differ across any of the four conditions at either delay. That is, children interviewed in the irrelevant-cues condition were as accurate as those in the relevant-cues condition when interviewed over short to moderate delays. Pipe and Wilson (1994) concluded that being presented with real items from the event facilitated children’s recall and that seeing foil items did not compromise the accuracy of children’s accounts.

Laboratory studies have shown that children recall more when allowed to show, as well as tell, what happened during an event. Although the presence of irrelevant props may not compromise children’s verbal reports, allowing children to re-enact the event with irrelevant items may lead to errors. To explore this issue, Gee and Pipe (1995) interviewed 5- to 9-year-old children about a contrived interaction with a magician. Half of the children were interviewed following delays of 10 days and 10 weeks and half were interviewed once, following a 10-week delay. Children were randomly assigned to either a no-props condition or a props (both relevant and irrelevant) condition. Following free recall, the children in the props condition were shown (and allowed to interact with) the relevant and irrelevant items and were asked a series of questions such as, “What did the magician wear?” Children in the no-props condition were asked the same questions, but were not presented with any prop items.
As in the Pipe and Wilson (1994) study, the provision of props facilitated children's recall of the event irrespective of delay. Although overall accuracy was not compromised, children made more errors when interviewed with props, especially after a 10-week delay. Given that Pipe and Wilson (1994) did not find an increase in errors after a 10-week delay, even when children were presented with irrelevant items, it appears that allowing children to interact with irrelevant props may introduce errors into children's accounts.

While the benefits of presenting children with real props are retained over moderate (10 week) delays, in applied settings, children often do not disclose abusive events until months, or even years after they have occurred. Then, having laid charges against the alleged perpetrator, children may be required to wait between 6 and 9 months before their case is heard (Goodman, Taub, Jones, England, Port, & Prado, 1992). Similarly, children in clinical contexts are often not asked to talk about mental health problems until months or years after the precipitating experiences occurred. Hence, it was important to establish the efficacy of props over long delays. With this in mind, Pipe et al. (1999) re-interviewed children from the Gee and Pipe (1995) and the Pipe and Wilson (1994) studies following 1- and 2-year delays, respectively. The procedures used during the follow-up studies were the same as those used during the original studies (see above). The authors replicated the findings of Gee and Pipe (1995) at a 1-year delay (Experiment 2). That is, they found that while props facilitated recall, they also increased errors and reduced accuracy. Following a 2-year delay (Experiment 1), the authors were unable to replicate the findings of Pipe and Wilson (1994). They found that after two years, props did not affect the accuracy of children's accounts, but they also no longer enhanced the
amount of information reported. That is, children interviewed with props did not report any more information than children interviewed without props.

Taken together, empirical evidence indicates that providing children with real items from an event can facilitate retrieval and accurate reporting of past experiences over moderate, but not long, delays. While re-enactment with real props can facilitate reporting (both verbal and non-verbal) of events, re-enactment with irrelevant items may increase the number of errors in children’s accounts. In the absence of any studies that systematically examine the efficacy of props in applied settings, these laboratory studies indicate that prior to using props to interview children, professionals would need to consider the delay between the event and the interview, the types of items they will present (e.g., real or toy, irrelevant or irrelevant), and the manner in which they will present them (e.g., whether they will ask children to use them for re-enactment).

In conclusion, despite the popularity of prop items, including AD dolls and AD drawings, there is limited empirical support for their use. Research has shown that while real items from the to-be-remembered event facilitate retrieval and reporting of past experiences, AD dolls, AD drawings, scale replicas, and toy props typically do not. Unfortunately, the utility of real items is undermined in applied settings because they are typically unavailable for use when interviewing children. Moreover, there is emerging evidence that over long delays, real items no longer facilitate recall.

Context Reinstatement

According to Tulving’s (1983) principle of encoding specificity, memory retrieval improves if the context at the time of retrieval is similar to the context at the time of original encoding. Given this, reinstating the entire setting of an event by returning to the
scene (physical context reinstatement), or by recreating the scene with mental imagery (mental context reinstatement), should facilitate retrieval and enhance the content of children’s reports.

Alternatively, physical and mental context reinstatement may undermine the integrity of children’s accounts by altering their memory of the event. Because physical environments are dynamic, physical context reinstatement may result in children being returned to a setting that no longer appears as it did during original encoding. In such instances, the child’s memory may be altered such that he or she erroneously includes post-event details in his or her account of the event (Loftus & Loftus, 1980; McSpadden, Schooler, & Loftus, 1988). Mental context reinstatement may also alter a child’s report of an event. Specifically, children may incorrectly infer the presence or absence of certain items, people, behaviours, and/or feelings based on prior expectations and knowledge (Bekerian & Conway, 1988; Johnson & Foley, 1984). For example, when asked to imagine the lounge in which an alleged offence occurred, children might, based on prior experience, incorrectly imagine that there was a television in the room.

Although a gamut of research has been conducted examining the effect of context reinstatement on the retention of adults (see Davies & Thomson, 1988), researchers have only recently begun to examine the effect of mental and physical context reinstatement on children’s reports of their past experiences.

*Physical Context Reinstatement.* Rovee-Collier and her colleagues (Borovsky & Rovee-Collier, 1990; Butler & Rovee-Collier, 1989) conducted seminal research regarding the effect of physical context reinstatement on children’s memory. For example, Butler and Rovee-Collier (1989: Experiment 1A) examined the effect of context
reinstatement on the retention of 3-month-olds. Infants were trained to move a mobile (by kicking) in distinct contexts (e.g., cribs with coloured and patterned liners). Infants' retention of the task was tested after 1, 3, or 5 days in one of four conditions: same mobile/same crib liner, different mobile/different crib liner, same mobile/different crib liner, or different mobile/same crib liner. At delays of longer than one day, changing the context (i.e., the crib liner or the mobile, or both) resulted in children showing no retention of the task. Conversely, infants tested in the same context used during original training exhibited near perfect retention across all three delays. That is, 3-month-old infants were more likely to remember a past event when the context at retrieval was the same as the context present at original encoding.

As a result of Rovee-Collier and her colleagues' findings with infants, researchers began to examine the efficacy of using physical context reinstatement to facilitate older children's reports of their experiences. For example, Wilkinson (1988) examined whether physical context reinstatement enhanced 4-year-olds' recall of a trip to the park after a 1-day delay. Half of the children were interviewed about the trip while taking the same walk through the park and half were interviewed at nursery school.

Wilkinson (1988) found that children interviewed in the park reported more information about the event than did children interviewed at nursery school. Although Wilkinson did not examine the accuracy of the children's reports, she concluded that physical context reinstatement effectively elicited verbal accounts of children's past experiences after a short delay.

Given that children are frequently not interviewed about their experiences until months or even years after the event occurred, researchers recognised the importance of
establishing the efficacy of physical context reinstatement over long delays. For example, Priestley, Roberts, and Pipe (1999: Experiment 1) examined whether physical context reinstatement facilitated recall of a novel event ("Visiting the Pirate") following a 6-month delay. During the event, 5- to 7-year-old children completed four activities: becoming a real pirate, making a map, winning a key, and finding treasure. Following a 6-month delay, children were assigned to one of three interview conditions: a standard verbal interview condition, a reminder condition in which children were re-exposed to the set and props from the pirate event 24-hours prior to being interviewed, or a context reinstatement condition in which children were interviewed on the set of the pirate event, with props present. Irrespective of interview condition, children provided a free narrative account of the event before being prompted to report information about each of the four activities (e.g., becoming a pirate). Finally, all children re-enacted the pirate visit in the pirate set.

Re-exposure to the context in which the event took place facilitated children's verbal reports during both free and prompted recall. Specifically, children in both the reminder condition and the context reinstatement condition reported approximately 35% more correct information than those children who participated in the standard verbal interview condition. Additionally, children in the context reinstatement conditions made no more errors than did children interviewed under standard conditions. Unexpectedly, allowing children to show rather than to tell about the event (re-enactment) failed to elicit additional information (but see Priestley et al., 1999: Experiment 2).

On the basis of these findings, Priestley et al. (1999) concluded that physical context reinstatement was effective for facilitating the verbal recall of 5- to 7-year-old
children. Unfortunately, however, this conclusion was premature. Given that exposure to the setting of the pirate event was always coupled with exposure to prop items (e.g., the treasure chest), it is impossible to establish whether context reinstatement per se was responsible for facilitating children’s reports of the event. Arguably, the provision of explicitly encoded prop items was more likely to have produced the positive effects observed than the provision of implicitly encoded contextual information (Smith, 1988).

To ascertain the independent contribution of context reinstatement in eliciting complete and accurate accounts of children’s past experiences, Pipe and Wilson (1994) asked 5- to 10-year-old children to participate in a contrived interaction with a magician. Children were interviewed 10 days and again 10 weeks after the event, in one of four conditions. In the no-cues condition, children were not provided with any contextual information or item cues. In the contextual-cues condition, children were interviewed in the same setting that the event took place, but no prop items relevant to the magic show were present. In the relevant-cues condition, children were interviewed in the original setting with all of the items used during the magic show. In the irrelevant-cues condition, children were interviewed in the original setting of the event with both relevant and irrelevant prop items present.

Pipe and Wilson (1994) found that, while children in the relevant- and irrelevant-cues conditions recalled more information about the event, children in the contextual-cues condition recalled no more information than children in the no-cues condition across both delays. Further, the number of errors did not differ across any of the four conditions at either delay. It appears, therefore, that physical context reinstatement failed to facilitate children’s reports of their interaction with the magician.
Taken together, preliminary laboratory studies have produced conflicting results regarding the efficacy of using context reinstatement for facilitating children’s verbal reports of their past experiences. While some studies indicate that physical context reinstatement facilitates recall over short delays (e.g., Wilkinson, 1988), other studies suggest that context reinstatement does not facilitate recall relative to standard verbal interview techniques (e.g., Pipe & Wilson, 1994).

Despite ambiguous laboratory findings, researchers have begun to examine the efficacy of context reinstatement in applied settings (Hershkowitz, Orbach, Lamb, Sternberg, Horowitz, & Hovav, 1998; Orbach, Hershkowitz, Lamb, Sternberg, & Horowitz, 2000b). For example, Orbach et al., (2000b) examined whether interviewing 4- to 13-year-old alleged victims of child sexual abuse at the scene of the offence would elicit more complete reports of the incident. To this end, half of the children in the study were interviewed at child protection agencies and half were interviewed at the scene of the alleged offence. All of the children were interviewed using the NICHD Interview protocol.

Contrary to expectation, children interviewed at the scene of the offence did not report any more information than children interviewed at child protection agencies. That is, physical context reinstatement failed to facilitate reporting of alleged sexual abuse. Orbach et al. (2000b) suggested that differences between the scene at the time of encoding and the scene at the time of recall, coupled with the disruption associated with the journey to the scene of the offence, might have interfered with memory retrieval. Alternatively, the stress of returning to the scene of the crime may have increased children’s reticence about disclosing their experiences. Orbach et al. (2000b) suggest that
this is unlikely because none of the children refused to return to the scene of the offence. Given the large body of literature showing that children are sensitive to the social demands of the investigative interview, however, it may be that children simply did not express their reluctance to return to the scene (Bruck et al., 1998; Poole & Lindsay, 1995).

In summary, both laboratory and field studies have produced limited empirical support for the utility of physical context reinstatement. Given the small number of methodologically sound studies completed to date, however, it is impossible to draw definitive conclusions regarding the efficacy of this procedure for facilitating complete and accurate accounts of children’s past experiences.

Mental Context Reinstatement. Although neither mental nor physical context reinstatement has been subjected to rigorous empirical scrutiny, it has been argued that mental context reinstatement is superior to physical context reinstatement for eliciting children’s reports of episodic memories. Mental context reinstatement is considered superior because it encourages children to reconstruct all elements of the event including what they saw, who was present, what they smelled, and how they felt. As a result, children are potentially provided with more retrieval cues to facilitate event recall.

While several researchers have examined the effect of mental context reinstatement as one of the components of the CI (e.g., Geiselman & Padilla, 1988; Geiselman et al. 1993), few researchers have examined the efficacy of mental context reinstatement when used independently to facilitate children’s recall (e.g., Dietze & Thomson, 1993; Gibling & Davies, 1988; Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz, 2001; McCauley & Fisher, 1995, 1996). McCauley and Fisher (1995) examined the efficacy of mental
context reinstatement by asking 7-year-old children to participate in a Simon Says game led by an adult confederate. Children were interviewed after the event using either a standard verbal interview, in which they responded to a series of free recall and prompted questions, or a mental context reinstatement interview, in which children provided a free narrative account of the event both prior to, and following, being instructed to mentally reinstate the context of the event.

McCauley and Fisher (1995) found that children in the mental context reinstatement condition reported 64% more correct information about the event than did children interviewed with the standard verbal interview. Children in the mental context reinstatement condition also made more errors than did children in the standard interview condition, however, accuracy was not compromised. The authors concluded that mental context reinstatement was an effective technique for facilitating children’s recall of past experiences.

The innocuous nature of McCauley and Fisher’s (1995) event (e.g., the Simon Says game) is not analogous, however, to the experiences of children interviewed in applied settings. As a result, it is impossible to draw conclusions about the utility of mental context reinstatement in field settings based on these research findings. To overcome the limited ecological validity associated with laboratory settings, Hershkowitz et al. (2001) examined the efficacy of mental context reinstatement in the field. Alleged victims of child sexual abuse (4- to 13-year-olds) were interviewed using either the standard NICHD interview protocol or a NICHD interview protocol adapted to include mental context reinstatement techniques. The mental reinstatement instructions used included asking children to “close your eyes and think about that time, as if you were there again.”
Children were then asked to provide details about what they saw, heard, and smelled during the alleged event.

Hershkowitz et al. (2001) found that the amount of information provided by children interviewed with or without mental context reinstatement did not differ. That is, mental context reinstatement failed to facilitate children's reporting of their experiences. Recall that, because the study was conducted in the field, the authors were unable to determine the accuracy of children's accounts.

In summary, like physical context reinstatement, research examining the efficacy of mental context reinstatement has produced conflicting results. While research conducted in the laboratory indicates that mental context reinstatement facilitates recall (e.g., McCauley & Fisher, 1995), research conducted in the field indicates that it does not (e.g., Hershkowitz et al., 2001). Thus, the prediction that mental context reinstatement would be superior to physical context reinstatement for eliciting complete and accurate accounts of children's past experiences was not supported by early empirical studies.

To directly compare the efficacy of mental and physical context reinstatement, Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz (2002) interviewed alleged victims of child sexual abuse (4- to 13-year-olds) about their experiences using a standard NICHD interview, mental context reinstatement, or physical context reinstatement. Unfortunately, the authors did not find any difference in the total amount of information reported across the three interview conditions. That is, neither mental nor physical context reinstatement facilitated children's verbal reports of their past experiences.

In conclusion, preliminary research has provided only limited empirical support for the efficacy of mental and physical context reinstatement. A large number of empirical
questions, however, are yet to be addressed regarding the utility of context reinstatement. For example, research is necessary to examine whether the effect of physical context reinstatement is diluted because children in control conditions spontaneously mentally reinstate the context of an event (Smith & Vela, 2001). In addition, the relative contribution of mental imagery verses verbal retrieval cues (e.g., “think about what you heard”) in mental context reinstatement needs to be explored (Elischberger & Roebers, 2001; Poole & Lamb, 1998). Further, studies investigating whether there are individual differences in children’s ability to attend to contextual information are necessary (Emmett, Clifford, & Gwyer, 2003). Until these, and a myriad of other empirical questions are answered, it would be premature to conclude that context reinstatement does not facilitate children’s accounts of their past experiences. At present, however, caution should be exercised when attempting to use context reinstatement to facilitate complete and accurate accounts of children’s past experiences.

**Drawing**

Children’s drawing has been a main focus in the field of developmental psychology for almost a century. Researchers interested in children’s drawings have made three general claims. The first claim is that the level of sophistication in children’s artwork is a direct reflection of their intellectual development. According to this claim, individual differences in children’s drawing skill can be used to infer individual differences in intellectual ability (e.g., Abell, von Briesen, & Watz, 1990; Abell, Wood, & Liebman, 2001; Goodenough, 1926; Prewett, Bardos, & Naglieri, 1989). The second claim is that children’s artwork is “a window through which we can observe the artist’s innermost thoughts and feelings” (Briggs & Lehmann, 1989, p. 131). According to this
psychodynamic claim, the psychological wellbeing of a child can be inferred by examining the content of his or her drawings (e.g., Burgess & Hartman, 1993; Burgess, McCausland, & Wolbert, 1981; DiLeo, 1973; Fox & Thomas, 1990; Goodwin, 1989; Hagood, 1992; Kelley, 1985; Koppitz, 1966, 1968, Machover, 1949; Thomas & Silk, 1990; Trowbridge, 1995; Yates, Beutler, & Crago, 1985). The third claim, which has direct relevance to the present thesis, is that drawing can enhance children's verbal reports of their past experiences (Butler et al., 1995; Gross & Hayne, 1998, 1999).

Historically, researchers focused on drawing as a measure of intelligence and as a projective measure of psychological wellbeing. Only recently have researchers begun to explore the use of drawing as an ancillary aid to augment children's verbal accounts of past experiences. In the first empirical investigation of the effect of drawing on children's verbal accounts, Butler et al. (1995) interviewed 3- to 6-year-old children about a visit to the fire station. Children were interviewed about the event either 1 day or 1 month following the visit. Half of the children were asked to draw and tell about the event and half were only asked to tell what happened. Irrespective of interview condition, free recall was followed by a series of direct questions (e.g., “Draw [or tell] me where you went”). Importantly, Butler et al. (1995) only scored children's verbal responses. Information that was contained in the drawings, but was not verbally described by the children, was omitted from any analysis.

Butler et al. (1995) found that while 3- to 4-year-olds did not benefit from drawing, 5- to 6-year-old children who drew about the event reported nearly twice as much information during directed recall as children who merely told about their experiences. Moreover, drawing was not associated with an increase in errors. That is, the information
provided by children who drew about the fire station visit was as accurate as the
information provided by children who merely told about the same event.

In the Butler et al. (1995) study, drawing enhanced 5- to 6-year-old children’s
reports when they were interviewed after a 1-day or a 1-month delay. In clinical and
legal settings, however, children are often required to recall events that occurred months
or even years earlier. As a result, Hayne and her colleagues turned their attention to
establishing the efficacy of the drawing technique over longer delays. For example,
Gross and Hayne (1999: Experiment 2) interviewed 5- to 6-year-old children about a
class visit to Cadbury’s chocolate factory following a 1-year delay. Children had
previously been interviewed 1 day or 6 months after the event in one of two conditions:
draw and tell or tell only (Experiment 1). At the 1-year delay, children were assigned to
one of four interview conditions. Of the children who participated in the tell condition
during the original interview, half were asked to draw and tell at the 1-year delay, and
half were merely asked to tell. Of the children originally asked to draw about the event,
half were asked to tell about the event during the second interview, and half were
provided with their original drawing prior to completing the verbal interview.
Irrespective of interview condition, all children provided a free narrative account of the
event prior to being asked a series of direct questions. As in Butler et al. (1995), only
children’s verbal responses were analysed.

Gross and Hayne (1999) found that children who drew about the event at the 1-year
delay recalled significantly more information than did children in the other three
interview conditions. Importantly, the increase in recall did not occur at the expense of
accuracy. That is, children interviewed with the drawing technique were as accurate as children in the other three interview conditions.

Taken together, the findings of Hayne and her colleagues indicated that drawing facilitated complete and accurate accounts of educational events over both short and long delays. In clinical settings, however, children are often asked to talk about personally salient, emotionally laden, events (Gross & Hayne, 1998; Wesson & Salmon, 2001). To determine whether drawing facilitated children’s reports of their own emotional experiences, Gross and Hayne (1998: Experiment 1) asked 3- to 6-year-old children to draw and tell, or only tell, about a time when they felt happy, sad, and scared. Irrespective of emotion type, children who drew about their emotional experiences reported more than twice as much verbal information as children merely asked to tell. Interestingly, in contrast to the findings of Butler et al. (1995), Gross and Hayne (1998) found that drawing facilitated reports by 3- to 4-year olds. In a second experiment in the same study, Gross and Hayne (1998: Experiment 2) explored the accuracy of children’s accounts of their emotional experiences by seeking corroborative information from the children’s caregivers. In Experiment 2, children were either asked to draw and tell about a time when they were happy, sad, scared, or angry, or to simply tell about their experiences. The children’s caregivers were then shown transcripts of their child’s verbal interviews and were asked to indicate whether the event had actually happened, may have happened, or definitely never happened. Caregivers also indicated whether each detail in their child’s transcript had definitely happened, might have happened, or definitely did not happen.
Again, Gross and Hayne (1998) found that children who drew reported twice as much information about their emotional experiences (irrespective of emotion type) as did children who told about their experiences. Moreover, the parental reports indicated that children rarely made errors in their accounts. Children who drew and told about their emotional experiences were as accurate as children who merely told.

Research has also shown that drawing facilitates children’s reports in actual clinical settings. For example, Drucker, Greco-Vigorito, Moore-Russell, Avaltroni, and Ryan (1997: Experiment 2) examined the efficacy of the drawing technique with 5- to 9-year-old children of substance abusers. Children in the study were asked to draw and tell or merely tell about the last time that they saw their mother or father taking drugs or drinking alcohol. Consistent with the findings of laboratory studies, children asked to draw about their experiences reported three times as much information as those merely asked to tell. Because the study was conducted in the field, information regarding the accuracy of children’s accounts was unavailable.

In summary, empirical studies have consistently found that drawing facilitates children’s accounts of past experiences. Moreover, when information pertaining to accuracy is available, the increase in information reported does not occur at the expense of accuracy. Furthermore, as shown in Table 2.1, the drawing technique is superior to other techniques developed to facilitate children’s accounts of past experiences.
Table 2.1

The Efficacy of Structured Interview Protocols and Ancillary Techniques.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Author</th>
<th>Participants</th>
<th>Procedure</th>
<th>Results</th>
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<tbody>
<tr>
<td>Step-Wise Interview (SWI)</td>
<td>Yuille, Marxsen, &amp; Menard (1993; cited in Marxsen, Yuille, &amp; Nisbet, 1995)</td>
<td>Not specified</td>
<td>Field Study: Children interviewed with the SWI or a standard verbal interview (SI).</td>
<td>SWI reduced interviewers’ use of statements that potentially contaminated children’s accounts (raw data unavailable). SWI did not increase reporting of substantive information.</td>
</tr>
<tr>
<td>NICHD Interview</td>
<td>Orbach, Hershkowitz, Lamb, Sternberg, Esplin, &amp; Horowitz (2000)</td>
<td>105 4- to 13-year-old alleged victims of sexual abuse</td>
<td>Field Study: Children interviewed with the NICHD Interview or a SI.</td>
<td>NICHD Interview produced 237% more open-ended questions ($M_{NICHD} = 14.53, M_{SI} = 4.30$) &amp; 103% fewer focused questions ($M_{NICHD} = 40.64, M_{SI} = 82.66$) than the SI. NICHD Interview did not increase reporting of substantive information.</td>
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<tr>
<td>Cognitive Interview (CI)</td>
<td>Geiselman &amp; Padilla (1988)</td>
<td>15 7- to 12-year-olds</td>
<td>Lab Study: Simulated liquor store hold-up. Following a 3-day delay, children were interviewed with the CI or a SI.</td>
<td>CI produced 21% more correct information than the SI ($M_{CI} = 37.1, M_{SI} = 30.70$). 61% of errors in CI were the result of “changing perspectives.” No decrease in accuracy associated with the CI.</td>
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<tr>
<td>Cognitive Interview (CI)</td>
<td>Geiselman, Saywitz, &amp; Bornstein (1990)</td>
<td>38 7- to 11-year-olds</td>
<td>Lab Study: Games with the experimenter. Following a 2-day delay, children were interviewed with the CI or a SI.</td>
<td>CI produced 26% more correct information than the SI (raw data unavailable). Children had difficulty reporting the event in different temporal orders. No decrease in accuracy associated with the CI.</td>
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<tr>
<td>Cognitive Interview (CI)</td>
<td>Geiselman, Saywitz, &amp; Bornstein (1993)</td>
<td>92 8- to 12-year-olds</td>
<td>Lab Study: Slide show. Children assigned to 1 of 3 conditions: CI with practice, CI without practice, or SI. Children were interviewed following a 2-day delay.</td>
<td>CI with practice produced 48% more correct information than the SI ($M_{CI \text{ w practice}} = 50.42, M_{SI} = 34.00$). CI without practice produced 24% more correct information than the SI ($M_{CI \text{ w no practice}} = 42.13, M_{SI} = 34.00$ items). No increase in errors associated with the CI with practice.</td>
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Table 2.1 continued

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<th>Participants</th>
<th>Procedure</th>
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<tr>
<td>Narrative Elaboration Technique (NET)</td>
<td>Saywitz &amp; Snyder (1996)</td>
<td>132 7- to 11-year-olds</td>
<td>Lab Study: Classroom event. Children assigned to 1 of 3 conditions: NET, instruction-based control (IBC), or control. Children were interviewed following a 2-week delay.</td>
<td>NET produced 34% more correct information than the IBC ($M_{NET} = 39.00, M_{IBC} = 29.00$ items) &amp; 30% more correct information than the control group ($M_{NET} = 39.00, M_{Control} = 30.00$). No increase in errors associated with the NET.</td>
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<tr>
<td>Narrative Elaboration Technique (NET)</td>
<td>Brown &amp; Pipe (2003a)</td>
<td>22 6- to 8-year-olds</td>
<td>Lab Study (Exp. 2): Safety presentation. Following a 9-month delay, children were assigned to either a NET or a control condition.</td>
<td>NET produced no more correct information than the control. No decrease in accuracy associated with the NET. NET produced 412% more errors with the conversation/affect card ($M_{NET} = 2.82, M_{Control} = 0.55$) &amp; 722% more errors with the people card ($M_{NET} = 6.00, M_{Control} = 0.73$) than did the control group.</td>
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<td>Anatomically Detailed Dolls (AD dolls)</td>
<td>Leventhal, Hamilton, Rekedal, Tebano-Micci, &amp; Eyster (1989)</td>
<td>60 7-year-old alleged victims of sexual abuse</td>
<td>Field Study: Hospital records. All verbal interviews were followed by re-enactment with AD dolls.</td>
<td>Eight children (13%) provided a detailed description of abuse without AD dolls. Twenty nine children (48%) provided a detailed description with AD dolls.</td>
</tr>
<tr>
<td>Anatomically Detailed Dolls (AD dolls), Toy Props</td>
<td>Goodman &amp; Aman (1990)</td>
<td>80 3- to 5-year olds</td>
<td>Lab Study: Play session. Following a 1-week delay, children were interviewed in 1 of 4 conditions: re-enactment with AD dolls &amp; props, re-enactment with non-AD dolls &amp; props, AD dolls &amp; props as visual cues, or control.</td>
<td>The 3 prop conditions did not produce any more correct information (verbal or non-verbal) than the control condition. No increase in errors associated with props &amp; AD dolls.</td>
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<tr>
<td>Anatomically Detailed Dolls (AD dolls)</td>
<td>DeLoache &amp; Marzolf (1995)</td>
<td>72 2.5- to 4-year-olds</td>
<td>Lab Study: Sticker task, Simon Says game. Children used AD dolls to replicate sticker placement &amp; to show where they were touched during the Simon Says game.</td>
<td>68% of stickers were correctly placed on the AD dolls. 63% of children accurately showed where they were touched during the Simon Says game.</td>
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<td>Technique</td>
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<tr>
<td>Anatomically Detailed Dolls (AD dolls)</td>
<td>Gordon, Ornstein, Nida, Follmer, Crenshaw, &amp; Albert (1993)</td>
<td>113 3- to 5-year-olds</td>
<td>Lab Study: Physical examination. Following a 3-week delay, children were interviewed in 1 of 3 conditions: verbal, role-play with AD dolls, or self-representation with AD dolls.</td>
<td>AD dolls did not facilitate 3-year-olds recall. For 5-year-olds, self-representation increased the proportion of correct information by 9% compared to role-playing ($M_{self-rep.} = 0.87$, $M_{role-play} = 0.80$), &amp; by 19% compared to verbal recall ($M_{self-rep.} = 0.87$, $M_{verbal} = 0.73$). No decrease in accuracy associated with AD dolls (irrespective of protocol).</td>
</tr>
<tr>
<td>Anatomically Detailed Dolls (AD dolls)</td>
<td>Saywitz, Goodman, Nicholas, &amp; Moan (1991)</td>
<td>72 5- to 7-year-old girls</td>
<td>Lab Study: Physical examination. Following a 1-week or 1-month delay, children were interviewed with AD dolls &amp; medical props.</td>
<td>AD dolls &amp; props produced 108% more correct information (verbal + non-verbal) than free recall across both delays ($M_{props} = 104$, $M_{free recall} = 50$). AD dolls &amp; props produced 250% more errors than free recall ($M_{props} = 7.70$, $M_{free recall} = 2.20$) across both delays. Accuracy remained “respectably high.”</td>
</tr>
<tr>
<td>Anatomically Detailed Drawings (AD drawings)</td>
<td>Steward et al. (1996)</td>
<td>130 3- to 6-year-olds</td>
<td>Lab Study: Physical examination. Children were interviewed immediately, after 1-month, &amp; after 6-month’s in 1 of 4 conditions: SI, SI with pen &amp; paper AD drawings, SI with computerised AD drawings, or SI with AD dolls &amp; props.</td>
<td>The 3 enhanced interview conditions yielded approximately 2 more correct body touches than the SI across all three delays. AD drawings failed to eliminate errors of omission and encouraged errors of commission.</td>
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<tr>
<td>Real &amp; Toy Props</td>
<td>Salmon, Bidrose, &amp; Pipe (1995)</td>
<td>66 3- to 5-year-olds</td>
<td>Lab Study: Examined a “sick” teddy bear. Following a 3-day delay, children were interviewed in 1 of 3 conditions: verbal prompts, real props, or toy props.</td>
<td>Real props produced 168% more correct information than verbal prompts ($M_{real} = 33.05$, $M_{verbal} = 12.32$). Toys produced 143% more correct information than verbal prompts ($M_{toys} = 30.05$, $M_{verbal} = 12.32$). Toys produced 114% more errors than real items ($M_{toys} = 8.86$, $M_{real} = 4.14$) and 874% more errors than verbal prompts ($M_{toys} = 8.86$, $M_{verbal} = 0.19$). Decrease in accuracy associated with toy props.</td>
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<tr>
<td>Scale Replica &amp; Toy Props</td>
<td>Priestley &amp; Pipe (1997)</td>
<td>32 5- to 6-year-olds</td>
<td>Lab Study (Exp. 1): Visiting the pirate. Following a 10-day delay, children were interviewed with either scale replica props or toy props.</td>
<td>Scale replicas produced no more correct information (verbal or non-verbal) than toys. Scale replicas produced 227% more errors during verbal recall than did toys ($M_{Scale} = 1.44$, $M_{Toy} = 0.44$). Decreased verbal accuracy associated with scale props, but no decrease in total accuracy (verbal + non-verbal).</td>
</tr>
<tr>
<td>Real Props, Physical Context Reinstatement (PCR)</td>
<td>Pipe &amp; Wilson (1994)</td>
<td>176 5- to 10-year-olds</td>
<td>Lab Study: Visiting the magician. Following a 10-day or a 10-week delay, children were interviewed in 1 of 4 conditions: no-cues, context-cues, relevant-cues, or irrelevant-cues.</td>
<td>Irrelevant &amp; relevant cues produced more correct information than the context &amp; no-cue conditions, across both delays (raw data unavailable). No increase in errors across the four conditions at either delay.</td>
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<tr>
<td>Real Props</td>
<td>Gee &amp; Pipe (1995)</td>
<td>95 5- to 9-year-olds</td>
<td>Lab Study: Visiting the magician. Children were interviewed with real props or a SI after both 10 days &amp; 10 weeks, or only after 10 weeks.</td>
<td>Props produced 46% more correct information than the SI across delays ($M_{Props} = 18.30$, $M_{SI} = 12.50$). Props produced 194% more errors than the SI across delays ($M_{Props} = 5.00$, $M_{SI} = 1.70$). No decrease in accuracy associated with props.</td>
</tr>
<tr>
<td>Real &amp; Scale Replica Props</td>
<td>Pipe, Gee, Wilson, &amp; Egerton (1999)</td>
<td>88 7- to 8-year-olds, 83 6- to 10-year-olds (Exp. 1), 83 6- to 10-year-olds (Exp. 2)</td>
<td>Lab Study: Re-interviewed children from Gee &amp; Pipe (1995) &amp; Pipe &amp; Wilson (1994) following delays of 1 &amp; 2 years, respectively.</td>
<td>Following a 1-year delay (Exp. 2), props produced 52% more correct information than the SI ($M_{Props} = 16.00$, $M_{SI} = 10.50$). Props produced 660% more errors than the SI ($M_{Props} = 5.70$, $M_{SI} = 0.75$) &amp; decreased accuracy. Following a 2-year delay (Exp. 1), props no longer facilitated recall (or increased errors).</td>
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<tr>
<td>Physical Context Reinstatement (PCR)</td>
<td>Wilkinson (1988)</td>
<td>14 4-year-olds</td>
<td>Lab Study: Park visit. Following a 1-day delay, children were interviewed while walking in the park (PCR) or at nursery school.</td>
<td>PCR produced 65% more correct information than the nursery school ($M_{PCR} = 16.30$, $M_{Nursery} = 9.90$). No information was reported regarding errors or accuracy.</td>
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<tr>
<td>Physical Context Reinstatement (PCR)</td>
<td>Priestley, Roberts, &amp; Pipe (1999)</td>
<td>43 5- to 7-year-olds</td>
<td>Lab Study (Exp. 1): Visiting the pirate. Following a 6-month delay, children were interviewed in 1 of 3 conditions: SI, a reminder condition, or a PCR condition.</td>
<td>The reminder produced 41% more correct information than the SI ($M_{Reminder} = 20.20$, $M_{SI} = 14.30$). PCR also produced 36% more correct information than SI ($M_{PCR} = 19.50$, $M_{SI} = 14.30$). No increase in errors associated with the reminder or PCR conditions.</td>
</tr>
<tr>
<td>Physical Context Reinstatement (PCR)</td>
<td>Orbach, Hershkowitz, Lamb, Sternberg, &amp; Horowitz (2000)</td>
<td>104 4- to 13-year-old alleged victims of sexual abuse</td>
<td>Field Study: Children interviewed at child protection offices or at the scene of the alleged offence (PCR).</td>
<td>PCR produced no more information than an interview at child protection offices.</td>
</tr>
<tr>
<td>Mental Context Reinstatement (MCR)</td>
<td>McCauley &amp; Fisher (1995)</td>
<td>86 7-year-olds</td>
<td>Lab Study: Simon Says game. Children were interviewed with a SI or a MCR Interview.</td>
<td>MCR produced 64% more correct information than the SI ($M_{C3} = 19.91$, $M_{SI} = 12.13$). MCR produced 94% more errors than the SI ($M_{C3} = 2.19$, $M_{SI} = 1.13$). No decrease in accuracy associated with MCR.</td>
</tr>
<tr>
<td>Mental Context Reinstatement (MCR)</td>
<td>Hershkowitz, Orbach, Lamb, Sternberg, &amp; Horowitz (2001)</td>
<td>96 4- to 13-year-old alleged victims of sexual abuse</td>
<td>Field Study: Children were interviewed with the standard NICHD interview or an NICHD interview adapted to include MCR.</td>
<td>NICHD with MCR produced no more information than the standard NICHD interview.</td>
</tr>
<tr>
<td>Mental Context Reinstatement (MCR) &amp; Physical Context Reinstatement (PCR)</td>
<td>Hershkowitz, Orbach, Lamb, Sternberg, &amp; Horowitz (2002)</td>
<td>142 4- to 13-year-old alleged victims of sexual abuse</td>
<td>Field Study: Children were interviewed in 1 of 3 conditions: NICHD interview, MCR, or PCR.</td>
<td>Neither MCR nor PCR produced more information than the NICHD interview.</td>
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<tr>
<td>Drawing</td>
<td>Butler, Gross, &amp; Hayne (1995)</td>
<td>96 3- to 6-year-olds</td>
<td>Lab Study: Fire station visit. Following a 1-day or a 1-month delay, children were asked to draw &amp; tell or tell only about the event.</td>
<td>Drawing did not facilitate 3- to 4-year-olds’ recall. For 5- to 6-year-olds, drawing produced 92% more correct information than telling ($M_{Draw} = 15.75$, $M_{Tell} = 8.19$) after 1 day and 103% more correct information ($M_{Draw} = 14.63$, $M_{Tell} = 7.19$) after 1 month. No increase in errors associated with drawing.</td>
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<tr>
<td>Drawing</td>
<td>Gross &amp; Hayne (1999)</td>
<td>55 5- to 6-year-olds</td>
<td>Lab Study (Exp. 2): Chocolate factory visit. Following a 1-year delay, children were interviewed in 1 of 4 conditions based on group assignment in a prior interview: tell (prior interview)/tell (current interview), tell/draw, draw/picture recognition, or draw/tell.</td>
<td>Drawing produced at least 71% more correct information than the other three interview conditions ($M_{\text{Draw}} = 33.86$, $M_{\text{Other}} &lt; 19.75$). No decrease in accuracy associated with drawing.</td>
</tr>
<tr>
<td>Drawing</td>
<td>Gross &amp; Hayne (1998)</td>
<td>60 3- to 6-year-olds</td>
<td>Lab Study: Emotions interview. Exp. 1, children were asked to draw &amp; tell, or tell only about being happy, sad, and scared. Exp. 2, children were asked to draw &amp; tell about one emotion (happy, sad, scared or angry) &amp; to tell about another. Caregivers rated their child's accuracy.</td>
<td>Exp. 1, drawing produced 177% more correct information than telling ($M_{\text{Draw}} = 8.02$, $M_{\text{Tell}} = 2.89$). Exp. 2, drawing produced 117% more correct information than telling ($M_{\text{Draw}} = 14.15$, $M_{\text{Tell}} = 6.50$). No increase in errors associated with drawing.</td>
</tr>
<tr>
<td>Drawing</td>
<td>Drucker, Greco-Vigorito, Moore-Russell, &amp; Avaltroni (1997)</td>
<td>21 5- to 9-year-olds</td>
<td>Field Study: Children were asked to draw &amp; tell, or tell only about their parents last drinking or drug-taking episode.</td>
<td>Drawing produced 195% more information than telling ($M_{\text{Draw}} = 8.27$, $M_{\text{Tell}} = 2.80$).</td>
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*Note.* The term *error* refers to the absolute number of incorrect responses made, while *accuracy* is the proportion of correct facts reported. Percent change was calculated using the following formula: $\text{Experimental Group} - \text{Control Group} \times 100$.
The drawing technique consistently elicits at least 100% more information than a standard verbal interview. That is, children given the opportunity to draw typically report at least twice as much information as children merely asked to tell about their experiences. No other technique consistently produces such large increases in recall. Additionally, drawing rarely introduces errors into children’s verbal accounts. As shown in Table 2.1, other techniques that have been shown to facilitate children’s reports of past experiences (e.g., props) are often also associated with a decrease in accuracy. These findings clearly indicate that drawing is superior to other interview techniques for eliciting complete and accurate accounts of children’s past experiences.

There are a number of reasons why the drawing technique may be superior to other interview procedures. First, drawing may facilitate children’s reports because aspects of the drawing act as a retrieval cue for other aspects of the same event (Butler et al., 1995; Gross & Hayne, 1998, 1999). Second, drawing may help children structure their narratives because their drawings provide a visual reminder of what they have and have not told the interviewer (Gross & Hayne, 1999). Third, drawing may remove typical conversational constraints, allowing children to report information that would typically not be discussed, such as the size, shape, and colour of items present during an event (Butler et al., 1995). Fourth, drawing may put the child at ease, allowing him or her to more readily think about and discuss the target event (Gross & Hayne, 1999). Finally, drawing may facilitate recall simply because it extends the time that children are willing to engage in the interview process (Gross & Hayne, 1999).

Although drawing consistently produces more complete and accurate recall than other interview techniques, the efficacy of the drawing procedure differs between studies.
For example, while some studies indicate that drawing only facilitates children’s reports during directed recall (Butler et al., 1995), other studies have shown that drawing facilitates both free and directed recall (Drucker et al., 1997; Gross & Hayne, 1998, 1999). Further, although Gross and Hayne (1998) found that drawing enhanced reports by 3- to 4-year-old children, Butler et al. (1995) found that 3- to 4-year-old children did not benefit from the drawing procedure. The efficacy of the drawing procedure also differs within studies. Close inspection of the data (i.e., the standard errors) reveals that although the drawing technique consistently elicits more information from children than a standard verbal interview, some children profit more from the opportunity to draw than do others.

What might account for the variability observed between and within studies? Methodological manipulations may account for some of the variability. Given that researchers examining the efficacy of the drawing technique typically adopt the experimental procedures developed by Hayne and her colleagues (see above), different findings between studies are likely to be due to experimental manipulations (e.g., event salience and delay), rather than due to procedural variations.

Manipulating the salience of the to-be-remembered event may account for why the drawing technique facilitated 3- to 4-year-olds’ recall of happy, sad, and scared experiences (Gross & Hayne, 1998), but not their recall of a trip to the fire station (Butler et al., 1995). That is, young children may remember personally relevant emotional experiences more readily than they recall educational events.

The length of the delay between the event and the memory interview may also contribute to between-study variability. Insofar as children are most likely to profit from
the drawing technique when their memories for an event have eroded, the efficacy of the drawing technique may not become apparent until a significant period of time has lapsed. This may account for why children only benefited from provision of the drawing technique during directed recall after a short delay (Butler et al., 1995, but see Gross & Hayne, 1999), while children benefited from the drawing procedure during both free and directed recall following a 1-year delay (Gross & Hayne, 1999).

While methodological differences between studies may account for some of the variability in the research findings, they fail to account for all of the variability. Even within a single study where the test procedure is identical for all children and a homogeneous age group is used, some children benefit more from the provision of drawing materials than do others. Such within-study variability suggests that individual differences in child characteristics may contribute to any explanation for the efficacy of the drawing procedure. For example, individual differences in drawing skill have been found to be related to the amount of information that children report when they are given the opportunity to draw (Gross & Hayne, 1998). In Chapter 3, I will examine the contribution that individual differences in cognitive ability, drawing skill, temperament, and socioeconomic status make to children’s ability to talk about their prior experiences. The role of these individual differences in children’s ability to profit from the drawing technique will be one main focus of my empirical research.
Chapter 3

Individual Differences in the Abilities of Children

As professionals working with children in clinical and legal settings are only too aware, obtaining complete and accurate accounts of past experiences from children can be difficult. While a myriad of child-friendly interview procedures have been developed to facilitate children’s recall (see Chapter 2), the value of any given technique varies across children. To maximize the amount of information that an individual child is able to provide, professionals must tailor the interview to meet the needs of that child. To assist with this process, recent empirical research has begun to examine the relation between individual characteristics of the child and the relative efficacy of various interview techniques. In Chapter 3, research examining the impact of individual differences in cognitive ability, drawing skill, temperament, and socioeconomic status on the efficacy of various interview techniques will be discussed.

Individual Differences in Cognitive Ability

Individual differences in cognitive abilities, such as intelligence, memory, language development, and children’s understanding of mind, might impact on the efficacy of interview techniques designed to enhance children’s verbal reports. Each of these sources of individual variability will be discussed in turn.
Intellectual Ability

Intelligence, the ability to adapt to the environment, to reason, to understand complex ideas, and to learn from experience (Neisser et al., 1996), is likely to influence children’s understanding, encoding, retrieval, and reporting of past experiences. Specifically, children who understand their experiences are more likely than those who do not, to attend to and encode pertinent aspects of a to-be-remembered event (Chi & Ceci, 1987; Goodman, Quas, Batterman-Faunce, Riddlesberger, & Kuhn, 1994; Ornstein, Shapiro, Clubb, Follmer, & Baker-Ward, 1997; Stein, 1996; see Schneider & Bjorklund, 1998 for a review). Further, to the extent that intelligence is related to processing speed, intelligent children are likely to encode more information about an experience than less intelligent children (see Fry & Hale, 2000 for a review). Moreover, although there are age-related improvements in children’s ability to implement memory strategies during both encoding and retrieval (see Chapter 1), it is likely that intelligence contributes to both the early onset and the sophistication of these strategies (Alexander, Carr, & Schwanenflugel, 1995; Miller, 1994). With respect to the completeness and accuracy of children’s verbal reports, intelligence is likely to influence the ability to understand an interviewer’s questions, and the ability to structure complete and coherent narrative accounts of past events. Finally, a child’s understanding of what information the interviewer requires to fully appreciate his or her experiences may also be related to intelligence (Imhoff & Baker-Ward, 1999).

Although intelligence is likely to be central to the encoding, retrieval, and reporting of autobiographical memories, to date few empirical studies have examined the impact of intelligence on children’s ability to provide narrative accounts of past experiences.
(Brown & Pipe, 2003b; Elischberger & Roebers, 2001; Geddie, Fradin, & Beer, 2000; Roebers & Schneider, 2001). Geddie et al. (2000) conducted the first systematic investigation of the relation between intelligence and children’s event memory. They examined the impact of intelligence (as measured by a short form of the Wechsler Preschool and Primary Scale of Intelligence – Revised: Wechsler, 1989) on 4- to 7-year-old children’s recall of a “circus day” that they had participated in 10 days earlier. Multiple regression procedures revealed that intelligence was predictive of correct recall. That is, the more intelligent the child, the more correct information he or she reported about the circus day. The authors concluded that intelligence may be a useful predictor of children’s capacity to provide complete and accurate accounts of their past experiences.

While preliminary research suggests that intelligence is an important predictor of complete and accurate recall during standard verbal interviews, the impact of intelligence on children’s ability to profit from the provision of ancillary aids remains largely unknown. Given that ancillary techniques are typically employed to help children overcome developmental limitations in cognitive skill (e.g., the failure to self-generate retrieval cues), the effect of intelligence on children’s ability to use these aids is an important empirical question. Recently, Brown and Pipe (2003b) conducted the first systematic investigation into the effect of intelligence on children’s ability to profit from the provision of ancillary aids. Specifically, they examined the relation between intelligence and the efficacy of the NET.

Brown and Pipe (2003b) obtained estimates of 6- to 8-year-old children’s intelligence using Wechsler’s Intelligence Scale for Children-Third Edition (Wechsler,
Brown and Pipe (2003b) found that while intelligence predicted the recall of children in the cards-only condition, it did not predict the recall of children in either the verbal labels or the NET conditions. Moreover, when the data were divided to form two subgroups on the basis of intelligence (high verses low), it became apparent that children in the cards-only condition in the low intelligence group reported less information than children in the cards-only condition in the high intelligence group. This finding was not evident for children in the NET or the verbal labels conditions. The relation between intelligence and recall in the cards-only condition suggested that, consistent with prior research, intelligence was positively associated with children’s recall under the standard verbal interview condition. The provision of ancillary techniques (NET training or verbal labels), however, ameliorated the impact of intelligence on children’s ability to recall verbal information. Brown and Pipe (2003b) hypothesised that the NET and the verbal labels conditions bolstered the performance of children with low intelligence.
because, under these conditions, children were provided with retrieval cues that they would not generate independently.

Based on the literature, intelligence may affect children’s ability to profit from the drawing technique. While the impact of intelligence may differ depending on the type of ancillary aid employed (e.g., cue cards, AD dolls, toy props, drawings), it is possible that, like the NET, the drawing technique facilitates the verbal recall of children with lower intelligence. That is, drawings may act as retrieval cues that children with lower intelligence would otherwise fail to generate. Moreover, drawing may facilitate the verbal reports of lower functioning children by providing them with an external reminder of the information that they have, and have not, reported to the interviewer. It is also tenable, however, that children of higher intelligence will profit the most from the drawing technique because these children may more readily and efficiently use their drawings as an aid to retrieval and reporting.

Memory

As mentioned in Chapter 1, there are age-related improvements in children’s memory performance. The ability to remember events increases with age due to more rapid and efficient encoding, the use of more sophisticated memory strategies, and an increased ability to retain information in memory over a delay (Baker-Ward et al., 1984; Burgwyn-Bailes et al., 2001; Ceci & Howe, 1978; Flin et al., 1992; Perlmutter & Myers, 1979; Peterson, 2002). While mnemonic competence improves with age, there are individual differences in both when children develop these capacities (Bjorklund, Coyle, & Gaultney, 1992) and in children’s biologically determined memory potential (Schneider & Pressley, 1997).
Although memory skill seems intuitively important to children’s ability to provide complete and accurate accounts of past experiences, only one study has examined the impact of general differences in memory on children’s recall. Baker-Ward, Gordon, Ornstein, Larus, and Clubb (1993) examined the impact of memory on 3- to 7-year-old children’s recall of a paediatric examination. Children were interviewed about their experiences on either two occasions, immediately following their examination and again following a delay of 1, 3, or 6 weeks, or on a single occasion, 3 weeks after their check-up. Following their final (or only) interview, children completed four subtests (digits forwards, digits backwards, story memory, and sentences) from the Memory Scale of the McCarthy Scales of Children’s Abilities (McCarthy, 1972).

Irrespective of the child’s age and the interview condition, Baker-Ward et al. (1993) failed to find any relation between children’s memory scores on the McCarthy Scales and their recall of the paediatric examination. The authors acknowledge, however, that their results should be interpreted with caution given the limited range of memory scores obtained on the McCarthy Scales. Further, while the McCarthy Scales have a Memory Index, the test does not represent a comprehensive measure of memory skill. Aspects of memory that are important in predicting event recall may not have been assessed. Given these methodological limitations, it would be premature to draw conclusions regarding the impact of memory on children’s event recall.

The lack of conclusive research into the relation between general memory and children’s verbal reports makes it difficult to make predictions about the impact of memory on children’s ability to profit from the drawing technique. Tentatively, because drawings may act as retrieval cues for other aspects of the to-be-remembered event,
drawing may provide children with poor memories with retrieval cues that they would otherwise fail to generate. Moreover, drawing may encourage children with poor memories to complete an exhaustive search of their memory. Alternatively, because drawing does not provide an initial external retrieval cue (unlike presenting a prop item), the child must be able to remember something of the event to generate his or her first drawing. Further, if a picture does not naturally cue retrieval for another aspect of the event, the child must then generate another retrieval cue independently. As a result, children with good memories may be better able to take advantage of the opportunities that the drawing technique provides.

Language Skill

Obviously language skill is central to children's ability to provide complete and accurate verbal accounts of past experiences. The more advanced a child's linguistic skill, the more information that he or she can potentially provide about his or her experiences. Language skill is not only important for reporting about events, however, it also has implications for the encoding, storage, and retrieval of information. Specifically, the ability to talk about experiences either overtly with others, or covertly to oneself, consolidates the encoding and storage of memories (see Fivush, 1991, 1995; Hudson, 1990; Nelson, 1993, 2000). Moreover, children who are able to encode memories verbally (as opposed to visually) make more efficient use of their memory capacity and hence can retain more information in memory (Schneider & Pressley, 1997). With respect to retrieval, recent research has shown that children find it difficult to verbally recode visually encoded information (Simcock & Hayne, 2002). As a result,
it is not until children have sufficient language skills to verbally encode complex information that they are able to provide complex verbal accounts of past events.

Despite the intuitive importance of language skill as a source of individual variation in children's ability to provide complete and accurate accounts of past experiences, the few studies that have been conducted in this area have produced inconsistent results. While Gordon et al. (1993) found that language was a significant predictor of 5-year-olds', but not 3-year-olds' verbal elaboration, Greenhoot, Ornstein, Gordon, and Baker-Ward (1999) and Burgwyn-Bailes et al. (2001) failed to find any relation between children's language skill and their event recall. Given that each of these studies examined the impact of language using different interview techniques (e.g., a standard verbal interview, a re-enactment procedure, and AD dolls), the lack of consistent findings is not unexpected. Of relevance to the current thesis, however, two studies have examined the impact of children's language skill on the efficacy of the drawing technique.

Gross and Hayne (1999: Experiment 1) interviewed 5- to 6-year-old children about a class visit to Cadbury's chocolate factory following a delay of 1 day or 6 months. Half of the children were asked to draw and tell about the event and half were only asked to tell what happened. Irrespective of interview condition, all children provided a free narrative account of the event before being asked a series of direct questions. Prior to completing the verbal interview, children completed the Peabody Picture Vocabulary Test-Revised (PPVT-R: Dunn & Dunn, 1981), a measure of receptive language skill (the ability to understand verbally presented information).
Gross and Hayne (1999) found that receptive language skill was not related to the amount of information reported by children in either the draw or the tell condition. The procedures used during the Gross and Hayne (1999) study were, however, designed to be child-friendly. The task instructions were very simple and clear. It may be, therefore, that an effect of receptive language skill failed to emerge because the interview procedure was so simple that even children with poor receptive language skills were able to understand the task demands. As such, expressive language skill (the ability to verbally respond to information) may be a more important predictor of the efficacy of the drawing technique.

Salmon, Rancolato, and Gleitzman (2003) examined the effect of expressive language on the efficacy of the drawing technique using the Expressive Vocabulary Test (EVT: Williams, 1997). Salmon et al. (2003) asked 5- to 7-year-old children to report about two emotional experiences: a time when they were happy and a time when they were scared. Children were randomly assigned to a standard verbal interview condition, a drawing interview condition in which children were asked to draw and tell about their emotional experiences, or a re-enactment condition in which children were asked to show (act) and tell about their experiences. Each interview consisted of free recall followed by direct questions. Following completion of the emotion interviews, children completed the EVT.

While expressive language ability predicted the recall of children in the verbal condition, it was not related to the performance of children in the drawing or the re-enactment conditions. Salmon et al. (2003) concluded that both the drawing technique
and the re-enactment procedure ameliorated the impact of poor expressive language on children’s verbal performance.

Salmon et al.’s (2003) findings suggest that the drawing technique may help children with poor expressive language to provide more complete accounts of past experiences, possibly because drawing helps these children to structure their narratives. Specifically, children can refer back to the images that they have drawn to remind themselves of what they have discussed and of what they have yet to report, reducing the impact of narrative ability and expressive language skill (Gross & Hayne, 1999). Further, drawing may facilitate reporting of past experiences in children with poor language skills by providing external support for recoding visual memories into the verbal domain.

**Theory of Mind (ToM)**

Recently, researchers have argued that ToM has important implications for children’s ability to provide complete and accurate accounts of their past experiences (Nelson, 1993, 2000; Perner, 2000, 2001; Welch-Ross, 1997). Children’s ability to reason about their own and others’ mental states is thought to be critical to event recall for two primary reasons. First, an improved understanding of mind, which often occurs around 5 years of age, may contribute to children’s ability to understand the relation between what they know (i.e., knowledge) and how they know it (e.g., personal experience, being told by someone else). Complete and accurate event recall may be related to children’s understanding of the relation between experience and knowledge insofar as it helps children to understand the source of their knowledge, to distinguish between their own knowledge and the knowledge of others’, and to distinguish between
events that they have personally experienced and those that they have merely been told about (Perner, 2000, 2001; Perner & Ruffman, 1995).

Second, an understanding of mind is associated with the ability to represent more than one mental state in memory, even when these representations conflict with one another, with reality, and with current beliefs (Welch-Ross, 1997). The ability to reason about conflicting mental representations is typically assessed via false belief tasks; specifically, location change and unexpected contents tasks (see Gopnik & Astington, 1988; Perner, 1991; Wellman, 1990; Wimmer & Perner, 1983). Location change tasks require the child to observe an interaction in which two participants see an object being placed in location A. While one of the participants is out of the room, the object is moved to location B. Children who are able to reason about conflicting mental representations appreciate that the participant who was absent when the item was moved will hold a belief about the location of the item that is both different from reality and from their (the child's) knowledge of the location (Wimmer & Perner, 1983). Unexpected contents tasks involve showing the child a box that looks like it typically contains a certain item (e.g., lollies), but which actually contains something different (e.g., crayons). Children who are able to reason about conflicting mental representations acknowledge that their own initial expectation regarding the contents of the box was incorrect and that another naïve observer would also mistake the contents of the box (Hogrefe, Wimmer, & Perner, 1986).

The ability to reason about conflicting mental states has implications for event recall because providing complete accounts of past experiences is contingent upon children understanding the mental state (i.e., knowledge) of the person they are
conversing with and upon them being able to co-ordinate their understanding of their conversational partners' knowledge with their own understanding of the event (Nelson, 1993, 2000; Welch-Ross, 1997).

To determine the impact that ToM has on children's event recall, Welch-Ross (1997) asked 48 mothers and their children to talk about three shared experiences (e.g., going to the doctor). Children then completed a series of ToM tasks designed to test their understanding of the relation between experience and knowledge and their understanding of false belief. Welch-Ross (1997) found that children who passed the ToM tasks provided more information during conversations with their mothers than children who did not pass the ToM tasks. Welch-Ross (1997) concluded that children with high scores on the ToM tasks appreciated that the events being discussed related to their personal history, allowing them to actively participate in the discussion. Further, children with high scores on the ToM tasks were able to take their mothers mental representation of the event into account ensuring a "meeting of the minds" (p. 626).

Given that ToM has important implications for children's event recall, what impact might ToM have on children's ability to profit from the drawing technique? Due to the absence of research in this area, the following comments are speculative.

Drawing may facilitate the verbal reports of children who are unable to reason about others mental states because the explicit nature of the drawing task reduces the need for children to reason about, and co-ordinate, the interviewer's understanding of the event with their own understanding of the event. Alternatively, however, children who are able to reason about others mental states may be better able to take advantage of the opportunities that drawing provides because they have the skills, such as the ability to
monitor the source of their knowledge and an understanding of mental representation, that are necessary to fully engage in a conversation about the past.

In summary, research concerning children's cognitive development suggests that individual differences in intelligence, memory, language skill, and ToM may be important predictors of children's ability to recall and describe past experiences. A lack of research specifically examining the impact of individual differences on the efficacy of the drawing technique makes it difficult to make specific a priori predictions about the contribution of cognitive variables to the efficacy of the drawing procedure.

**Individual Differences in Drawing Skill**

Most academics and professionals agree that there is a highly predictable pattern to children's drawing development (Thomas & Silk, 1990). Early scribbles are thought to be motor activities unguided by visual planning. As motor co-ordination improves, scribbles become more complex and increasing attention is paid to aesthetic considerations such as colour and balance (Thomas & Silk, 1990). It is not until children are between 3 and 4 years of age, however, that they begin to produce pre-planned representational drawings that can often, but not always, be recognised by an observer (Adi-Japha, Levin, & Solomon, 1998; Thomas & Silk, 1990). Drawings completed by children between the ages of 5 and 8 years are increasingly differentiated and realistic, although they still tend to contain elements of items that they know exist, but which typically cannot be seen, such as internal organs. Finally, between the age of 8 and adolescence, children begin to draw from a particular angle using proportion and depth (Thomas & Silk, 1990). Despite developmental improvements in drawing skill, there are individual differences in exactly when children meet these drawing milestones.
Individual differences in drawing skill may be an important source of variability that can be used to predict which children will benefit from the opportunity to draw. Specifically, there is evidence that children with superior drawing skills have superior memories for visual information (Rosenblatt & Winner, 1988). Hence, children with more advanced drawing skills may encode more information about a visual event. Moreover, individual differences in drawing skill may impact on children’s ability to pictorially reinstate the event, which in turn, is likely to affect how well the images act as retrieval cues. Drawing skill may, therefore, impact on children’s verbal recall of past experiences.

To examine the relation between drawing skill and children’s event recall, Butler et al. (1995) interviewed 3- to 6-year-old children about a visit to the fire station. Half of the children were asked to draw and tell about the event and half were only asked to tell what happened. Subsequently, 20 adults ranked the quality of the children’s drawings from best to worst. Each drawing was assigned a final rank based on the average of the adults’ rankings.

As a group, children who drew about their experiences at the fire station reported more information than children who merely told about their experiences. Butler et al. (1995) also found, however, that the total amount of information children reported was positively correlated with the representational quality of their drawings ($r = .65$). That is, the higher the adult’s ranking of the drawing, the more information children reported about their experiences (but see Wesson & Salmon, 2001).

Although obtaining a positive correlation between children’s drawings of an event and their recall is interesting, in clinical and legal settings, it would be of benefit to know
which children are likely to profit from the opportunity to draw prior to conducting an interview. Thus, to determine whether children’s drawing skill per se was predictive of children’s recall of an event, Gross and Hayne (1998) administered the Draw-A-Person Test (Naglieri, 1988) to children before interviewing them about their emotional experiences. They found that, in addition to adults’ rankings of the drawings predicting how much children told, so too did their general drawing ability. That is, children who had more advanced drawing skills benefited more from the opportunity to draw than did children with less advanced drawing skills.

In contrast to the findings of Gross and Hayne (1998), when Gross and Hayne (1999) administered the Draw-A-Person Test to children prior to interviewing them about a trip to Cadbury’s chocolate factory, they found no relation between children’s drawing skill and the amount of information that they reported about their experiences. Gross and Hayne (1999) suggested that their findings, coupled with the findings of Butler et al. (1995), indicated that children’s ability to pictorially represent the unique event in question, rather than drawing skill per se, influenced children’s ability to profit from the drawing technique.

Taken together, these studies provide conflicting results regarding the impact of drawing skill of children’s ability to provide narrative accounts of their past experiences. The relation between drawing skill and children’s ability to profit from the drawing technique remains an empirical question.

*Individual Differences in Temperament*

Research suggests that temperament (an enduring behavioural style) may be an important factor contributing to children’s ability to provide narrative accounts of past
experiences. Indeed, children’s temperament may affect the way that experiences are appraised, encoded, retrieved, and reported. It is likely, however, that different dimensions of temperament predict performance during different phases of the memory process. For example, while distractibility may predict how well a child encodes information about an event, persistence (the length of time that activities are pursued) may affect how much information the child ultimately reports about their experiences.

Research examining the impact of temperament on children’s event recall has failed to produce a consistent pattern of findings. For example, Gordon et al. (1993) found that hesitate in new situations (the ‘approach’ dimension of temperament) was negatively related to 3-year-old’s free recall performance (also see Merritt, Ornstein, & Spicker, 1994), while expression of negative emotions was positively related to 5-year-old’s total event recall. In contrast, Geddie et al. (2000) found that flexibility in new situations (the ‘adaptability’ dimension of temperament) was positively related to 3- to 6-year-old’s event recall. Counterintuitively, Greenhoot et al. (1999) found that that less persistent children reported more information during recall than more persistent children. Finally, Burgwyn-Bailes et al. (2001) found that temperament had no impact on children’s recall at all.

Given the conflicting results regarding the effect of temperament on children’s event recall, what impact might individual differences in temperament have on children’s ability to profit from the drawing technique? Salmon et al. (2003) examined the effect of temperament on the efficacy of the standard verbal interview, the drawing technique, and behavioural re-enactment. Five- to 7-year-old children were randomly assigned to one of the three interview conditions and were asked to tell (or draw and tell, or show and tell)
about a time when they were happy and a time when they were scared. In addition, the
children's caregivers were asked to complete the Children's Behavior Questionnaire
(Rothbart, Ahadi, Hershey, & Fisher, 2001) to assess individual differences in
temperament.

Children who exhibited more effortful control (self-regulation) during re-enactment
reported more information than children who demonstrated less effortful control,
suggesting that the efficacy of the re-enactment procedure may be contingent upon children
being able to overcome the embarrassment associated with acting out details of their
experiences. Temperament was not, however, related to children's performance in either
the verbal or the drawing interview conditions. Salmon et al. (2003) suggested that the
absence of any relation between temperament and the efficacy of the drawing and the
verbal interview techniques possibly reflected the innocuous nature of these interview
practises. That is, because verbal interviews and the drawing procedure place limited
social demands on the child, temperament does not influence their performance.

Although the findings of Salmon et al. (2003) suggest that the efficacy of the drawing
technique is not affected by individual differences in temperament, given the inconsistent
pattern of previous findings relating to temperament, these results require replication.

*Individual Differences in Socioeconomic Status*

There is increasing recognition that socioeconomic status influences children's access
to educational and social opportunities and that this, in turn, impacts on children's
cognitive development (Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman, 2003).
Moreover, there is now considerable evidence that parenting styles and the way that
experiences are talked about and remembered within the family varies as a function of
socioeconomic status (Hudson, 1990). Thus, socioeconomic status may be an important source of individual variability that contributes to children’s ability to provide complete and accurate narrative accounts of their past experiences.

Unfortunately, most researchers interested in children’s event recall recruit participants from average and high socioeconomic backgrounds. As a result, the effect of socioeconomic status on children’s event reports remains largely unknown. Recently, however, Geddie et al. (2000) interviewed 56 3- to 5-year-old children from upper, upper-middle, middle, and lower-middle socioeconomic homes about a “circus day” participated in 10 days earlier. Although socioeconomic status was positively correlated with children’s event recall, regression analyses revealed that socioeconomic status alone was insufficient to predict children’s recall of the circus event. Socioeconomic status was only predictive of the amount and the accuracy of information that children reported when it was considered in conjunction with other variables (e.g., intelligence). Similarly, when Brown and Pipe (2003b) interviewed 6- to 8-year-old children about a safety presentation conducted at their school two weeks earlier, they failed to find any relation between children’s verbal recall and socioeconomic status.

Despite the findings of Geddie et al. (2000) and Brown and Pipe (2003b), it would be premature to conclude that socioeconomic status cannot independently predict children’s event recall. There may not have been enough between-group variability in the two studies to produce significant effects based on socioeconomic status. For example, Geddie et al. (2000) recruited a sample of children from upper to lower-middle class homes, while children in the Brown and Pipe (2003b) study attended average and high socioeconomic primary schools. It is unlikely that either of these samples contained enough children from
the extreme ends of the economic spectrum to produce significant effects on the basis of socioeconomic status.

Owing to the adverse effect that poverty has on children's cognitive development (Turkheimer et al., 2003), coupled with the lack of opportunities that children from low socioeconomic homes have to observe how experiences are discussed and remembered (Hudson, 1990), children from low socioeconomic homes may be particularly likely to benefit from the opportunity to draw. Specifically, the drawing technique may facilitate the verbal reports of children from low socioeconomic homes by providing them with retrieval cues that they would otherwise fail to generate and by encouraging them to complete an exhaustive search of their memory. Moreover, drawing may help these children to structure their verbal accounts by providing them with an external reminder of the information that they have, and have not, reported to the interviewer.

In summary, the findings of recent empirical studies indicate that individual differences in cognitive ability (e.g., intelligence, memory, language development, and ToM), drawing skill, temperament, and socioeconomic status may be predictive of children's ability to provide complete and accurate accounts of past experiences. While preliminary research has examined the impact of language, drawing skill, and temperament on the efficacy of the drawing technique, the effect of intelligence, memory, ToM, and socioeconomic status is yet to be examined. Moreover, most of the research that has examined the impact of individual differences on children's ability to profit from the drawing technique has been correlational in design. Correlational studies only show the relation between two variables, not the degree to which one variable (e.g., drawing skill) can predict children's ability to profit from the opportunity to draw during a verbal
interview (Tabachnick & Fiddell, 2000). Further, the one study that has employed more sophisticated statistical procedures (i.e., regression analyses) only examined the predictive power of two variables (temperament and language: Salmon et al., 2003). A larger scale study that examines both the combined and the unique contribution of all of the aforementioned interrelated individual difference variables might provide more informative results regarding which types of children profit from the opportunity to draw during a verbal interview.

The Present Study

Research has consistently shown that providing children with the opportunity to draw during verbal interviews facilitates complete and accurate accounts of their past experiences (Butler et al., 1995; Drucker et al., 1997; Gross & Hayne, 1998, 1999; Salmon et al., 2003). Moreover, the drawing technique is clearly superior to a number of other interview strategies developed to facilitate children’s verbal reports (see Table 2.1). Despite the efficacy of the drawing technique, some children profit more from the opportunity to draw than do others. To ensure that professionals only employ the drawing technique with children likely to benefit from the opportunity to draw, research examining the impact of individual differences on children’s ability to use the drawing technique is necessary. Thus, the primary goal of the present research is to examine whether intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status can be used to explain individual differences in children’s performance when they are given the opportunity to draw during a memory interview. Specifically, in the Fire Station Experiment (Chapter 6), I investigate which individual difference factors predict children’s ability to use the drawing technique to report about an
educational event, while in the Emotions Experiment (Chapter 7), I examine which individual difference variables predict children’s ability to use the drawing technique to provide accounts of three emotional experiences (happy, sad, scared).

A second goal of the present research is to examine children’s ability to use AD drawings to provide complete and accurate accounts of bodily touch. Preliminary evidence suggests that children are unable to use AD drawings to show where they have been touched (Steward et al., 1996b). Despite the far-reaching ramifications of obtaining incomplete and inaccurate accounts of bodily touch (e.g., the accused being wrongfully acquitted or wrongfully convicted), professionals in clinical and legal settings continue to use AD drawings during their assessments of child sexual abuse (Conte et al., 1991; Kendall-Tackett, 1992). The dearth of published research replicating the findings of Steward et al. (1996b) may have contributed to professionals’ ongoing use of AD drawings. To address this issue, in two experiments (Chapter 8), I examine children’s ability to use body maps to show where they were touched during a staged event. I also examine whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status can be used to predict which children profit from the opportunity to use body maps.

3 Consistent with clinical and legal practice in New Zealand, the human figure drawings used in the current study were clothed (see Figure 4.2). Because the clothing obscures the genitalia on the drawings, it would be misleading to refer to them as AD drawings. Hence, the human figure drawings used in the current thesis are called body maps.
Chapter 4

General Method

Participants

A total of 125 5- and 6-year-old children were recruited from four local primary schools in Dunedin, New Zealand. The schools were selected on the basis of the decile ratings that they had been assigned by the New Zealand Ministry of Education. This rating is a socioeconomic indicator based on national census data obtained from households within each school’s catchment area (Ministry of Education, 1997). Schools assigned decile ratings of 8-10 are classified as high socioeconomic schools. Schools assigned decile ratings of 4-7 are classified as average socioeconomic schools. Schools assigned decile ratings of 1-3 are classified as low socioeconomic schools.

In the current study, 40 children (29 males, 11 females; mean age = 5.99 years, SD = 0.51 years) attended a school assigned a decile rating of 10, 46 children (32 males, 14 females, mean age = 5.93, SD = 0.61 years) attended a school assigned a decile rating of 5, and 39 children (23 males, 16 females, mean age = 5.88 years, SD = 0.60 years) attended schools assigned a decile rating of 1 or 2. The children in the present study were predominantly Pakeha (New Zealanders of European descent) and all had written consent from their parents to participate in the study.

An additional 16 children were invited to participate in the study but were excluded from the final sample. Nine children were excluded because their parents
failed to give consent for their child to take part in the study. A further seven children were excluded due to illness on the day of the class trip to the fire station \( (N = 2) \), leaving the school prior to the completion of data collection \( (N = 3) \), or because English was their second language \( (N = 2) \).

Procedure Overview

Each of the 125 children who participated in the study took part in a class trip to the Dunedin Central Fire Station. During the month following their visit to the fire station, children individually participated in two assessment sessions with a female interviewer. Over the two sessions, children completed a battery of assessment measures designed to identify individual differences in intelligence, memory, language ability, and drawing skill. In addition, the children’s caregivers were asked to complete a questionnaire to assess individual differences in temperament. Then, 1 month after the class trip, each child individually participated in a final interview session with a female interviewer. The interview was conducted in four parts. First, each child was interviewed about his or her experiences during the fire station visit. Half of the children were asked to draw while they talked about the fire station and half were not. Second, part of the fire station event involved a male confederate touching the children in innocuous places as he dressed them in a fire service costume. During the interview, each child was asked to show the location of these touches using a body map. Third, children completed a series of six false belief tasks developed to assess individual differences in ToM. Finally, each child was asked to talk about a time when he or she had been happy, sad, and scared. Half of the children were asked to draw while they talked about their emotions and half were not.
Memory Event

A male confederate, dressed in a blue fire-service uniform, arrived in the children’s classroom and invited them to visit Dunedin Central Fire Station. The confederate helped each child to dress in a toy fireman’s hat and a yellow top that had the words “Fire Service” emblazoned in red on the front (see Figure 4.1). During this interaction, the confederate touched each child on the head when his or her hat was put on, under the arms when his or her top was tied up, and on the shoulders when he or she was turned around three times to “turn you into a fire fighter.”

Figure 4.1. The fire service costume.
The children then travelled with the confederate by double-decker bus to the Dunedin Central Fire Station. When they arrived at the fire station, a legitimate member of the fire service who was dressed in a fire service uniform greeted them. He then showed the children around the station and explained the types of things that fire fighters did there. During the tour, the children were told a safety message: “In the event of a fire get down, get low, get out, and shout fire, fire, fire.” The children were also shown the living and recreational facilities, the tower where the firemen practice their fire fighting skills, where the equipment (e.g., hoses and ladders) was repaired, and the protective clothing and breathing apparatus that fire fighters wear. The fireman showed the children the fire poles, both from the top, by the living quarters and from the bottom, by the fire engines. At this point, the children witnessed a “painter,” a second male confederate dressed in white overalls, slide down the pole. The fireman reprimanded the confederate stating that the pole was only to be used by fire fighters in emergencies. The confederate said that he was in a hurry and apologized before rushing off. The children were then allowed to sit in a fire engine.

The tour of the fire station concluded with a visit to the kitchen facilities. During the visit to the kitchen, the fireman gave each of the children a biscuit. He asked the children not to tell anyone that he had given them the biscuits because they were actually meant to be for the other firemen’s morning tea. The children then returned to school in the double-decker bus.

When they returned to the school, a female confederate thanked each child for being so good at the fire station and placed a brightly coloured cardboard medal around the child’s neck. The children were allowed to take this medal home. To enable
verification of the children’s subsequent recall of their trip to the fire station, the event was videotaped.

*Individual Differences Assessment*

The day after the trip to the fire station, two female interviewers who had completed two-thirds of a Postgraduate Diploma in Clinical Psychology, went to the children’s classroom. Importantly, the interviewers had not been present during the event. The teacher introduced the interviewers to the children stating that they were visiting the school and that they would be asking children to go and do fun things with them. Over the following month, each child completed a battery of tasks designed to assess individual differences in intelligence, memory, language development, and drawing skill. The assessment battery was individually administered to the children in a quiet room during two 45-minute sessions. To establish and maintain rapport, each session began with the child and the interviewer talking about what the child had been doing at school, what they had done during the weekend, and about the child’s siblings. When the child appeared at ease, the interviewer informed him or her that they would be asked to complete a number of different tasks, some of which he or she would find easy and some of which he or she would find hard. The child was told that most people were unable answer every item, but that he or she should give their best effort at all times. Once the experimenter had answered the child’s questions, the assessment session began.

Interesting, enjoyable, and frequently changing tasks helped to ensure that the child’s attention was maintained during all sessions. Frequent breaks were offered to prevent fatigue. At the completion of each session, the child was given a small novelty gift.
Intelligence and Language Skill

During the first assessment session, estimates of the child’s intelligence and language development were obtained.

**Intelligence.** To obtain estimates of each child’s intellectual ability, he or she completed either a short form of the Wechsler Pre-School and Primary Scale of Intelligence-Revised (WPPSI-R: Wechsler, 1989), or the Wechsler Abbreviated Scale of Intelligence (WASI: The Psychological Corporation, 1999). The Wechsler Scales of intelligence are widely used, standardized measures of intellectual functioning (Kaufman & Lichtenberger, 2000). Empirical studies have repeatedly demonstrated the sound psychometric properties of both the WPPSI-R and the WASI. Wechsler (1989) reported the reliability and validity coefficients associated with the WPPSI-R to be $r_u = .96$ and $r = .74$, respectively (also see Alfonso & Flanagan, 1999; Faust & Hollingsworth, 1991; Gerken & Hodapp, 1992; Gyurke, Marmor, & Melrose, 2000; Sattler, 1992), while The Psychological Corporation (1999) reported the reliability and validity coefficients associated with the WASI to be $r_u = .96$ and $r = .87$, respectively (also see Kaufman & Kaufman, 2001; Saklofske, Caravan, & Schwartz, 2000).

The WPPSI-R was developed for use with children aged between 3 years and 7 years, 3 months of age. The WASI was developed for use with individuals aged between 6 and 89 years. For the purposes of the current study, the WPPSI-R was administered to children aged between 5 years, 0 months and 5 years, 11 months and the WASI was administered to children aged between 6 years, 0 months and 6 years, 11 months. The measures of intelligence were divided in this manner to prevent children performing
above the level expected for their age from succumbing to ceiling effects on the WPPSI-R (Kaplan, 1992; Sattler, 1992).

The children who completed the WPPSI-R were administered a four sub-test short-form of the test. They each completed two subtests that tap perceptual-motor abilities: Geometric Design and Block Design, and two subtests that tap verbal skills: Vocabulary and Similarities. Given that the short forms of the WPPSI-R are, for all practical purposes, mutually interchangeable (Sattler, 1992), these four subtests were chosen because they provided the best match to the four sub-tests present in the WASI: Vocabulary, Similarities, Block Design, and Matrix Reasoning (two verbal and two performance scales, respectively). Both the WPPSI-R and the WASI took approximately 30 minutes to administer.

Language Skill. To assess language development, each child completed the Test of Early Language Development-Third Edition (TELD-3), a psychometrically sound, standardized measure of language skill (Hresko, Reid & Hammill, 1999). The reliability and validity coefficients associated with the TELD-3 are \( r_h = .95 \) and \( r = .79 \), respectively (Hresko et al., 1999). The TELD-3 was designed to assess the receptive and expressive language abilities of children aged between 2 years, 0 months and 7 years, 11 months. The TELD-3 took approximately 15 minutes to administer.

Memory and Drawing Ability

The second assessment session involved examining children’s memory and drawing ability.

Memory. To assess general memory ability, each child completed the Children’s Memory Scale (CMS: Cohen, 1997). The CMS is a standardized measure that assesses
children’s ability to recall immediate and delayed verbal and visual information. Additionally, the ability to attend, to learn, and to recognize information after a delay, is examined. Empirical studies of the psychometric properties of the CMS have found that it is a reliable \( r_u = .91 \) and valid \( r = .64 \) measure of children’s memory (Cohen, 1997, also see Vaupel, 2001).

The CMS was developed for use with children between 5 and 16 years of age. During the current study, each child completed two visual memory tasks: Dot locations and Faces, two verbal memory tasks: Stories and Word Pairs, and two tasks that assess attention/concentration: Numbers and Sequences. The CMS took approximately 40 minutes to administer.

Drawing Ability. Following completion of the CMS, children completed the Draw-A-Person Test to assess their drawing ability (DAP: Naglieri, 1988). Historically the DAP has been used to obtain estimates of intellectual ability (Abell et al., 2001). During the current study, however, the DAP was not used for this purpose, rather it was used because Naglieri’s Quantitative Scoring System for the DAP provided a psychometrically sound, standardized procedure for assessing the quality of children’s drawings. The reliability and validity coefficients associated with the DAP are \( r_u = .88 \) and \( r = .77 \), respectively (Naglieri, 1988).

The DAP was developed for use with people between 5 and 17 years of age. During this task, the children were given a lead pencil and a rubber, and were asked to draw three pictures (man, woman, and self). Each picture was drawn on a separate piece of white construction paper (21 X 30 cm). The children were allowed a maximum of 5 minutes in which to complete each drawing.
Temperament

The final phase of the individual differences assessment process involved asking the caregivers of children taking part in the study to complete the Behavioral Style Questionnaire (BSQ). The BSQ is a standardized measure of temperament (McDevitt & Carey, 1978). Empirical studies of the BSQ have demonstrated the sound psychometric properties of this measure. The reliability coefficients associated with the BSQ are, on average, $r_a = .81$, while the validity of the BSQ is “moderate” (McDevitt & Carey, 1978, also see Carey & McDevitt, 1989).

The BSQ is designed for use with children between 3 and 7 years of age and contains 100-items that assess nine different domains of temperament (Activity, Rhythmicity, Approach, Adaptability, Intensity, Mood, Persistence, Distractibility, and Threshold). See Appendix A for an overview of each domain. Each of the items is rated on a 6-point scale. Low scores on the BSQ domains reflect behaviours typically considered to be desirable (e.g., being more adaptable and having a more positive mood).

The caregivers of each child participating in the study were sent a copy of the BSQ. If they had not returned the BSQ within two weeks, they were sent a reminder letter asking them to complete the questionnaire. Overall, 81% of the sample returned the questionnaire. There were, however, different response rates as a function of socioeconomic status, $\chi^2 (2, N = 101) = 12.04, p < .01$. Caregivers of children from the low socioeconomic school returned 66.7% (26 out of 39) of their questionnaires, caregivers of children from average socioeconomic schools returned 78.3% (36 out of 40) of their questionnaires, and caregivers of children from high socioeconomic schools returned 97.5% (39 out of 40) of their questionnaires.
Interview

One month following the trip to Dunedin Central Fire Station, each child participated in a third and final session with the interviewer. This session was conducted in four parts and took approximately one hour to complete.

Fire Station Interview

First, the child's memory for the trip to the fire station was assessed. Within each school, children were assigned to one of two experimental groups. Half of the children were asked to tell the interviewer everything that they could remember about their trip to the fire station (tell group). The remaining half of the children were given 12 felt pens and a piece of white construction paper (30 X 42 cm) and asked to draw and tell about the trip to the fire station (draw group). Children were assigned to each experimental group to ensure that intelligence, memory, language development, and drawing ability was approximately equal for each group. As a result, any differences demonstrated in recall could be attributed to the manipulation of interview condition rather than to pre-existing differences in the groups.

The memory interview was conducted in two distinct phases: free recall and directed recall.

**Free Recall.** The memory interview always started with the interviewer asking the following open-ended question:

I heard that you did something really special a while ago and were given a medal just like this one [the interviewer then showed the child a medal identical to the one that he or she was given following the visit to the fire station]. I wasn't there. I want you to tell me what happened. Tell me everything that you can remember about when you got the medal.
Children in the draw group were asked the same open-ended question at the start of the interview, but the word ‘tell’ was substituted with the word ‘draw.’ Children often spontaneously narrate as they draw (Butler et al., 1995; Gross & Hayne, 1998, 1999), however, if a child did not spontaneously describe the content of his or her pictures, he or she was asked to do so. The interviewer maintained the conversational flow by using utterances such as “uh huh” and “really,” or by repeating part of the child’s previous statement. The only additional prompt given to the children during the free recall phase of the interview was, “Can you tell (draw) me anything more about that?”

**Directed Recall.** When the child indicated that he or she could not recall any more information about the event, the interviewer said, “Now I have some other questions to ask you. You might have told me some of the answers to these questions already, but even if you have, I just want you to give me the answers again.” The interviewer then prompted the children’s recall of the event with the following direct questions: (a) Tell (or draw) me where you went, (b) Tell (or draw) me how you got there, (c) Tell (or draw) me who went with you, (d) Tell (or draw) me what you saw there, and (e) Tell (or draw) me what you were taught. If the child failed to respond to this last question, he or she was prompted with “I heard that you were taught a fire safety message. Tell (or draw) me about that.” As in free recall, the interviewer only offered enough verbal reinforcement to maintain the flow of the conversation and the only additional prompt given to the children was “Can you tell (or draw) me anything more about that?”
Body Maps

During the second part of the interview, the children’s ability to use a body map (see Figure 4.2) to show the location of innocuous touches was assessed. Recall that prior to arriving at the fire station, a male confederate helped each child dress in a fire service costume. During this interaction, the children were touched in a series of innocuous places (on the head, on both shoulders, and under both arms). During the interview, each child was presented with a piece of white construction paper (21 X 30 cm) that showed a body map (19 X 15 cm) matched to his or her gender and asked to point to the places where the male confederate had touched him or her.

Figure 4.2. Male and female body maps.
In order to maintain the flow of the interview, children who had previously recalled putting on a costume during the fire station interview were given the following instructions:

You have already told me that you had to put on a costume when you visited the fire station. I heard that [the male confederate’s name] helped you put on the costume. What I want you to do now is I want you to use this picture to show me where [the male confederate’s name] touched you when he put the costume on. Point to where he touched you.

For those children who did not recall putting on a costume during the fire station interview, the interviewer introduced the task by saying:

I heard that [the male confederate’s name] helped you put on a costume to wear when you went to the fire station. What I want you to do now is I want you to use this picture to show me where [the male confederate’s name] touched you when he put the costume on. Point to where he touched you.

The interviewer then drew a cross on the drawing where the child indicated that he or she had been touched. The only additional prompt provided by the interviewer was “Did [the male confederate’s name] touch you anywhere else?”

Theory of Mind (ToM)

During the third part of the interview, each child completed a series of false belief tasks designed to assess individual differences in ToM. Researchers frequently use a false belief paradigm as a litmus test for ToM based on the premise that if a child can understand that others may hold beliefs different to their own then he or she must have a representational ToM (Jenkins & Astington, 1996; Naito, 2003; Perner, 2000, 2001).

The methodology for this part of the experiment was identical to that used by Holmes, Black, and Miller (1996). Each child was given six problems to complete: two contents tasks (one visual and one verbal), each of which included a question about his
or her own belief and a question about others’ beliefs, and two locations tasks (one visual and one verbal). The order of the contents and locations tasks was counterbalanced, as was the presentation of the verbal and visual problems.

Contents Tasks. The stimulus for one of the contents tasks was a crayon box that actually contained birthday candles. The stimulus for the other contents task was a band-aid box that contained cello tape. The target of the “others” judgment was Bob the Builder, a character from a popular children’s television program (see Figure 4.3).

Figure 4.3. Materials used during the false belief contents tasks.
Each child was presented with the unopened box and asked, “What do you think is inside this box?” During the visual trials, after the child had responded, the interviewer showed him or her the contents of the box and then closed the box again. During the verbal tasks, the child was verbally told the contents of the box. The interviewer then asked the child, “Can you remember what is inside the box?” If the child failed to recall the contents of the box, the interviewer showed (or told) the child again. This element of the procedure was necessary to ensure that the child understood the critical information necessary to correctly answer the contents tasks. The memory question was then repeated. Next, the own belief question was asked: “What did you think was inside the box before I showed (or told) you what was in it?” Finally, Bob the Builder was brought out and the interviewer said, “Bob the Builder has never looked inside this box. I am going to show him the box (tell him what is inside this box) for the very first time with the box still shut. Tell me, what will Bob the Builder think is inside the box before I show (tell) him what is inside the box?” See Appendix B for the procedure and dialogue used during the contents tasks.

Locations Tasks. The characters in one of the locations tasks were Mickey Mouse and Donald Duck. In the story, Mickey Mouse has just received a new toy car. He shows the new car to Donald Duck when he comes around to visit, however, when Donald Duck leaves, Mickey Mouse hides the car in a new location so that Donald Duck will not be able to play with it when he returns. Next, Donald Duck returns to Mickey Mouse’s house. At this point, the child was asked two questions. First, the child was asked if he or she could recall where the car actually was. If the child was unable to recall the location of the car, Donald Duck was temporarily removed from the situation
and the child was shown where the car was again. This procedure was necessary to ensure that the child understood the critical information necessary to successfully complete the locations task. Donald Duck was then brought back into the situation and the child was again asked where the car was. Finally, the child was asked, “Where does Donald think the car is?”

The toys used in the second locations task were Jake and Fizz, two characters from a popular children’s television program, “The Tweenies.” In this scenario, Jake hides his new toy, a slinky (i.e., a spring) from Fizz in her absence. When Fizz returns to play with Jake’s new toy, the child is asked, “Where is the slinky now?” and “Where does Fizz think the slinky is?” Figure 4.4 shows the materials used during the locations tasks.
In the visual condition of each locations task, the child observes the items being moved from one location to the other. In the verbal condition of each locations task, the critical information about the scenario, such as the actual and pseudo locations of the items is conveyed verbally. See Appendix C for the procedure and dialogue used during the locations tasks.

*Emotions Interview*

In the fourth and final part of the interview, children were asked to provide a narrative account of three emotional experiences (happy, sad, and scared). The interviewer started the interview by asking each child, “Can you think of a time when you felt really, really happy (or sad, or scared)?” When the child indicated that he or she could think of a time that he or she had experienced the given emotion, he or she was asked to describe the event in as much detail as possible. Those children who had been given the opportunity to draw during the fire station interview were asked to tell the interviewer about the time that they felt happy, sad, or scared (tell group). The children who had been asked to tell during the fire station interview were now given the opportunity to draw while they told about the time that they felt happy, sad, or scared (draw group).

The children in the draw group were given 12 felt pens and a piece of white construction paper (30 X 42 cm). As with the fire station interview, if the child did not spontaneously describe the content of his or her drawing, he or she was asked to do so. The conversational flow of the interview was maintained by the interviewer making utterances such as “uh huh” and “really,” or by repeating portions of the child’s previous
statement. The only additional prompt was, “Can you tell (or draw) me any more about the time that you were really, really happy (or sad, or scared)?”

If the child indicated that he or she was unable to recall a time that he or she had experienced a given emotion, the interviewer moved on to another emotion. At the conclusion of the emotions interview, the interviewer gave the child another opportunity to recall the emotion that he or she had been unable to describe. The same procedure was utilized for all three emotions. The order in which children were asked to recount the emotions was counterbalanced across the test groups.

Coding

*Individual Difference Measures*

The WPPSI-R subtest raw scores were converted into scaled scores using the WPPSI-R manual. Deviation quotients were then computed as estimates of IQ scores as recommended by Sattler (1992). The WASI, the TELD-3, the CMS, and the BSQ were scored according the guidelines set out in their respective manuals.

*Theory of Mind (ToM).* Each of the six false belief tasks were scored as a pass or a fail depending on whether the child provided the correct or incorrect response to the task, respectively. Each child was then assigned a total ToM score between 0 and 6 depending on the number of correct responses that he or she had provided.

*Drawing Skill.* Children’s drawings of a man, woman, and self were coded using Naglieri’s (1988) quantitative scoring system. Each drawing was assessed on 14 components: arms, attachment, clothing, ears, eyes, feet, fingers, hair, head, legs, mouth, neck, nose, and trunk. Each of these components was scored based on the presence of the body part, inclusion of extra detail (e.g., teeth, eyelashes), and whether the item was
in proportion with the rest of the drawing. Each drawing yielded a separate score out of 64. The scores from the three drawings were then summed and converted into a standard drawing score according to the guidelines set out in Naglieri’s (1988) manual. In the present study, two experimenters independently scored 25% of the drawings. A Pearson product-moment correlation produced an interobserver reliability coefficient of .99 ($p < .01$).

**Verbal Interviews: Fire Station and Emotions**

The verbal interviews were audio- and videotaped and transcribed verbatim.

**Clauses.** In order to determine the amount of verbal information that children reported, each transcript was divided into clauses. A clause corresponded roughly to a simple sentence, with one explicit or implicit verb per clause. Children were only given credit for clauses that were related to the actual event. Moreover, information that was contained in children’s drawings, but was not verbally described, was omitted from any analysis. The total number of clauses of verbal information that each child reported was obtained for both free and directed recall during the fire station interviews, and for each of the three different emotion types (happy, sad and scared) during the emotions interviews.

**Errors.** Because I had no way of corroborating the children’s verbal reports of their emotional experiences, errors were only calculated for the fire station interviews. Errors included statements such as “We went in an ambulance” instead of “We went in a fire truck.”

**Interviewer Turns.** The number and type of conversational turns taken by interviewers during the interviews was examined because differences in the way the
interviewer interacted with children across the two interview conditions (draw or tell) may provide some insight into why drawing yields more complete reports than telling alone. To this end, each interviewer turn was coded for both the fire station and the emotions interviews using the coding scheme outlined below:

1. **Coded Turns.** Turns in which the interviewer prompted the child for information (e.g., “Tell me where you went” and “Can you tell me any more about that?”).

2. **Prompts.** The interviewer inadvertently asked a leading question. For example, prompts occurred when the interviewer asked, “Who is this?” when the child had not previously indicated that his or her drawing was of a person.

3. **Minimal Responses.** Interviewer utterances that maintained the flow of the conversation, such as “uh huh” and “really,” or when the experimenter repeated parts of the child’s preceding statement, such as “You went to the fire station!”

4. **Off Topic.** The interviewer discussed immediate distractions during the interview process (e.g., the felts, noises outside the interview room). Because these types of turns do not provide any insight into the mechanisms behind the efficacy of the drawing technique for eliciting information about educational events or emotional experiences, they are not discussed further.

Two experimenters independently coded 25% of the transcripts for both the fire station and the emotions interviews. A Pearson product-moment correlation produced an interobserver reliability coefficient of .99 ($p < .01$) for the number of clauses for the fire station interview, and .98 ($p < .01$) for the number of clauses in the emotions interviews. Reliability coefficients of 1.00 were obtained for the number of interviewer turns taken during both the fire station and the emotions interviews.
Body Maps

The body maps were scored to obtain the number and the location of the touches that the children indicated had occurred when they were dressed in the fire service costume. Touches located on the shoulders, on the sides of the figure (above the waist), and on the top of the head were scored as correct touches. Touches located on any other part of the body map were scored as incorrect. Furthermore, the number of genital touches, touches reported to have occurred within 1 square centimetre of the genital area, and “breast touches,” touches within 1.5 centimetres of the breast region, were recorded. Two experimenters independently coded 25% of the body maps. A Pearson product-moment correlation produced an interobserver reliability co-efficient of .99 ($p < .01$).
Chapter 5

Individual Difference Measures: DescriptiveAnalyses

Individual Differences and Group Assignment

Recall that children who drew during the fire station interview told during the emotions interview (draw/tell), while children who told during the fire station interview drew during the emotions interview (tell/draw). Although children were assigned to these test groups on the basis of their scores on the individual difference measures, to ensure that the two test groups were indeed matched across these variables, a series of 1-way analyses of variance (ANOVAs) were conducted. As shown in Table 5.1, the test groups did not differ on any of the individual difference measures. Moreover, although there were approximately twice as many males as there were females in the sample (84 males, 41 females), chi square analyses revealed that the ratio of males to females was the same irrespective of test group and socioeconomic status.
Table 5.1

Means and Standard Deviations for Each Individual Difference Measure as a Function of Test Group (Fire Station Interview/Emotions Interview)

<table>
<thead>
<tr>
<th>Individual Difference Measure</th>
<th>Draw/Tell</th>
<th>Tell/Draw</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Intelligence (WPPSI-R/WASI)</td>
<td>96.98</td>
<td>13.44</td>
</tr>
<tr>
<td>Memory (CMS)</td>
<td>98.11</td>
<td>17.57</td>
</tr>
<tr>
<td>Language (TELD-3)</td>
<td>97.71</td>
<td>10.45</td>
</tr>
<tr>
<td>Drawing Skill (DAP)</td>
<td>96.68</td>
<td>15.23</td>
</tr>
<tr>
<td>Theory of Mind (ToM)</td>
<td>4.79</td>
<td>1.58</td>
</tr>
<tr>
<td>Temperament (BSQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>3.54</td>
<td>.65</td>
</tr>
<tr>
<td>Rhythmicity</td>
<td>3.06</td>
<td>.71</td>
</tr>
<tr>
<td>Approach</td>
<td>3.09</td>
<td>.92</td>
</tr>
<tr>
<td>Adaptability</td>
<td>2.92</td>
<td>.83</td>
</tr>
<tr>
<td>Intensity</td>
<td>4.30</td>
<td>.61</td>
</tr>
<tr>
<td>Mood</td>
<td>3.33</td>
<td>.75</td>
</tr>
<tr>
<td>Persistence</td>
<td>3.09</td>
<td>.69</td>
</tr>
<tr>
<td>Distractibility</td>
<td>3.74</td>
<td>.65</td>
</tr>
<tr>
<td>Threshold</td>
<td>3.73</td>
<td>.57</td>
</tr>
</tbody>
</table>

Note. Normative data for the WPPSI-R/WASI, CMS, TELD-3, and DAP are based on a mean of 100 and a standard deviation of 15. As can be seen in Table 5.1, the scores obtained from children in the present study closely match those expected in the general population. WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children’s Memory Scale, TELD-3 = Test of Early Language Development-Third Edition, DAP = Draw-A-Person Quantitative Scoring System, BSQ = Behavioral Style Questionnaire.
Relation Between Individual Difference Variables, Socioeconomic Status, and Gender

To explore the effect of socioeconomic status and gender on each of the individual difference variables, scores obtained on the measures of intelligence, memory, language development, drawing skill, ToM, and temperament were submitted to separate 3 (socioeconomic status: low, average, high) X 2 (gender) ANOVAs. Only effects that were significant at the $p < .05$ level are reported. All significant effects were further examined using Student Newman-Keuls post hoc tests.

Prior research has consistently found that males and females differ in their ability to perform many cognitive tasks. For example, males frequently perform better on spatial and quantitative tasks (Halpern, 1992; Law, Pellegrino, & Hunt, 1993), while females perform better on verbal tasks (Fenson et al., 1994), and marginally better on memory tasks (Schneider & Pressley, 1997). Gender differences were not expected to emerge on the measures of intelligence, memory, and language, however, because the WPPSI-R/WASI, the CMS, and the TELD-3 are all standardised to 'correct' for gender differences.

Intellectual Functioning

Figure 5.1 shows the mean estimated intelligence scores (Full Scale Intelligence Quotients) obtained on the WPPSI-R and WASI as a function of socioeconomic status and gender. There was a significant main effect of socioeconomic status, $F(2, 119) = 10.81$. Overall, children attending the low socioeconomic schools obtained significantly lower WPPSI-R/WASI scores ($M = 89.31, SE = 1.87$) than the children attending both the average ($M = 98.20, SE = 1.94$, Cohen’s $d = .71$) and the high ($M = 103.38, SE =$
2.22, Cohen's $d = 1.09$) socioeconomic schools. The WPPSI-R/WASI scores of children attending the average and high socioeconomic schools were not significantly different from each other. There was no main effect of gender and no interaction.

Figure 5.1. The mean estimated intelligence scores (+1 SE) for males and females as a function of socioeconomic status. WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence.

Memory

Figure 5.2 shows the mean memory scores (General Memory Index score) obtained on the CMS as a function of socioeconomic status and gender. There was a significant main effect of socioeconomic status, $F(2, 119) = 8.58$. Overall, children attending both the low ($M = 91.64, SE = 2.98$, Cohen’s $d = .92$) and average ($M = 95.02, SE = 2.45$, Cohen’s $d = .76$) socioeconomic schools obtained lower scores on the CMS than children.

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4 Cohen's $d$ effect sizes: > 0.8 large effect, 0.5 to 0.7 medium effect, < 0.4 small effect.
attending the high socioeconomic school \((M = 106.95, SE = 2.30)\). The CMS scores of children attending the low and average socioeconomic schools were not significantly different from each other. There was no main effect of gender and no interaction.

![Bar chart showing memory scores for males and females across socioeconomic statuses.](Image)

*Figure 5.2. The mean memory scores (+1 SE) for males and females as a function of socioeconomic status. CMS = Children’s Memory Scale.*

**Language**

Figure 5.3 shows the mean language scores (Spoken Language Quotients) obtained on the TELD-3 as a function of socioeconomic status and gender. There was a significant main effect of socioeconomic status, \(F(2, 119) = 3.46\). Overall, children attending the low socioeconomic schools \((M = 95.59, SE = 1.60)\) obtained significantly lower TELD-3 scores than children attending the high socioeconomic school \((M = 101.28, SE = 1.65, \text{Cohen’s } d = .56)\). The TELD-3 scores of children attending the average socioeconomic school \((M = \)
98.54, $SE = 1.51$) were intermediate between these extremes and were not different from either. There was no main effect of gender and no interaction.

![Diagram of mean language scores for males and females as a function of socioeconomic status.](image)

**Figure 5.3.** The mean language scores (+1 SE) for males and females as a function of socioeconomic status. TELD-3 = Test of Early Language Development-Third Edition.

**Drawing Skill**

Figure 5.4 shows the mean human figure drawing scores (DAP Total score) obtained on the DAP as a function of socioeconomic status and gender. There was a significant main effect of gender, $F(1, 119) = 4.05$, Cohen’s $d = .38$. Overall, females ($M = 99.15, SE = 2.55$) obtained significantly higher scores on the DAP than males ($M = 93.42, SE = 1.45$). There was no main effect of socioeconomic status and no interaction.
Figure 5.4. The mean human figure drawing scores (+ 1 SE) for males and females as a function of socioeconomic status. DAP = Draw-A-Person Quantitative Scoring System.

Theory of Mind

Figure 5.5 shows the total number of correct responses that children made on the six false belief tasks as a function of socioeconomic status and gender. Statistical analyses indicated that performance on the false belief tasks did not differ across socioeconomic status or gender.
Figure 5.5. The mean number of correct responses on the theory of mind tasks (+ 1 SE) for males and females as a function of socioeconomic status. ToM = Theory of Mind.

Temperament

Children’s scores on each of the nine BSQ domains of temperament (Activity, Rhythmicity, Approach, Adaptability, Intensity, Mood, Persistence, Distractibility, and Threshold) were submitted to separate 3 (socioeconomic status) X 2 (gender) ANOVAs. Because the caregivers of 24 children failed to return the BSQ, the following analyses were conducted on data supplied by the caregivers of 101 children. There was a significant main effect of gender on the Approach domain of the BSQ, $F(1, 95) = 4.84$. Recall that high scores on the Approach domain indicate withdrawal, while low scores indicate that the child is not reluctant to approach new stimuli. Overall, females ($M = 2.86, SE = .15$) obtained significantly lower scores on the Approach domain than males.
(\(M=3.22, SE=0.10\)), indicating that females were more likely than males to approach new stimuli. While there was no main effect of socioeconomic status, there was a significant Gender X Socioeconomic Status interaction on the Approach domain, \(F(2, 95) = 3.14\). To evaluate this interaction, separate 1-way ANOVAs were conducted across gender for each socioeconomic group. As shown in Figure 5.6, although there was no effect of gender for the children attending the high and average socioeconomic schools, there was an effect of gender for children attending the low socioeconomic schools, \(F(1, 24) = 8.61\), Cohen’s \(d = .94\). Males attending low socioeconomic schools were less likely to approach new stimuli (\(M = 3.53, SE = 0.17\)) than females (\(M = 2.65, SE = 0.26\)) attending low socioeconomic schools. There were no significant main effects of gender or socioeconomic status and no interactions on the Activity, Rhythmicity, Adaptability, Intensity, Mood, Persistence, Distractibility, and Threshold domains of the BSQ.

![Figure 5.6](image-url)

*Figure 5.6.* The mean Behavior Style Questionnaire Approach score (+ 1 SE) for males and females as a function of socioeconomic status. BSQ = Behavioral Style Questionnaire.
Table 5.2

*Pearson Product-Moment Correlations Between Individual Difference Measures*

<table>
<thead>
<tr>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
<th>13.</th>
<th>ToM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intelligence (WPPSI-R/WASI)</td>
<td>.59**</td>
<td>.59**</td>
<td>.34*</td>
<td>-.18</td>
<td>-.17</td>
<td>-.01</td>
<td>.09</td>
<td>-.09</td>
<td>-.32*</td>
<td>-.20</td>
<td>-.10</td>
<td>.30*</td>
</tr>
<tr>
<td>2. Memory (CMS)</td>
<td>.52**</td>
<td>.30*</td>
<td>-.11</td>
<td>-.18</td>
<td>.04</td>
<td>-.24</td>
<td>.05</td>
<td>-.17</td>
<td>-.25</td>
<td>-.16</td>
<td>.01</td>
<td>.41*</td>
</tr>
<tr>
<td>3. Language (TELD-3)</td>
<td>.17</td>
<td>.00</td>
<td>-.17</td>
<td>.05</td>
<td>-.08</td>
<td>.15</td>
<td>.01</td>
<td>-.03</td>
<td>-.08</td>
<td>.07</td>
<td>.44*</td>
<td></td>
</tr>
<tr>
<td>4. Drawing Skill (DAP)</td>
<td>.08</td>
<td>-.02</td>
<td>-.10</td>
<td>-.03</td>
<td>.18</td>
<td>.05</td>
<td>-.14</td>
<td>.04</td>
<td>-.02</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Temperament (BSQ)**

5. Activity | .22 | -.18 | .26* | .28* | .35* | .50** | .25 | .19 | -.07 |
6. Rhythmicity | .16 | .41* | .03 | .24 | .29* | -.02 | -.04 | -.05 |
7. Approach | .56** | .15 | .44* | .17 | -.04 | .07 | .11 |
8. Adaptability | .31* | .65** | .47* | .02 | .11 | -.10 |
9. Intensity | .49* | .16 | .19 | .37* | .18 |
10. Mood | .43* | .04 | .18 | .02 |
11. Persistence | .15 | .14 | -.11 |
12. Distractibility | .40* | .00 |
13. Threshold | .13 |

*Note.* *r > 0.25,* moderate linear relation; **r > 0.5,** strong linear relation (Harraway, 1993). WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children’s Memory Scale, TELD-3 = Test of Early Language Development – Third Edition, DAP = Draw-A-Person Quantitative Scoring System, BSQ = Behavioral Style Questionnaire, ToM = Theory of Mind.
Relation among Cognitive Measures

Pearson product-moment correlations were computed to explore the relation among the measures of cognitive ability (intelligence, memory, language development, and ToM). As shown in Table 5.2, there were moderate to strong correlations among the cognitive measures (Harraway, 1993)\(^5\).

Interestingly, there was a moderate positive correlation between intelligence (as measured by the WPPSI-R/WASI) and drawing skill (as measured on the DAP) \((r = .34)\). This finding is consistent with other studies that have found correlations between scores on the DAP and measures of intellectual and academic functioning (Naglieri, 1988). Findings of correlations between drawing skill and intelligence/academic ability have been used to argue that the DAP can be used as a rapid, non-verbal screen of intellectual functioning and academic ability (Abell et al., 1990, 2001; Scott, 1981).

Although significant correlations between the DAP and measures of intelligence and achievement have been established, these findings do not indicate how closely a given individual's scores on the DAP and their scores on measures of intelligence approximate each other. Significant correlations can exist when individual's scores are very discrepant.

To ascertain the accuracy of the DAP as a screen of intellectual functioning, I compared the scores of children identified as being of borderline intellectual functioning on the WPPSI-R or WASI (scores of 79 or below) to their scores on the DAP. Of the children in the current study who obtained intelligence scores of 79 or below on the WPPSI-R or the WASI, 75% (9 of 12) were not identified as having borderline

\(^5\) Because the present study employed a reasonably large sample \((N = 125)\), weak correlations (i.e., \(r < .2\)) emerged as significant. As a result, I focus on the strength of the relation between the variables, not the significance (Tabachnick & Fiddell, 2000).
intellectual functioning using the DAP. Next, I compared the scores of children identified as being of borderline intellectual functioning on the DAP with their scores on the WPPSI-R/WASI. Of the children in the current study who obtained standard scores of 79 or below on the DAP, 82% (14 of 17) were not of borderline intellectual functioning as measured by the WPPSI-R or the WASI. Given that the WPPSI-R and the WASI are standardised, psychometrically sound measures of intelligence, these findings clearly demonstrate that the DAP is of little utility as a screen of intellectual functioning (also see Aikman, Belter, & Finch, 1992; Lassiter & Bardos, 1995).

Relation among Temperament Domains

Pearson product-moment correlations were computed to explore the relation among the nine domains of temperament (Activity, Rhythmicity, Approach, Adaptability, Intensity, Mood, Persistence, Distractibility, and Threshold). As shown in Table 5.2, there were moderate to strong relations among many of the temperament domains.

Relation between Temperament Domains and Cognitive Measures

Pearson product-moment correlations were computed to explore the relation between the measures of cognitive ability and the nine domains of temperament measured by the BSQ. As shown in Table 5.2, there was a moderate negative correlation between Persistence and intelligence \(r = -.32\). Because high scores on the Persistence domain of the BSQ indicate less persistence, the negative correlation indicates that the more persistent a child is, the higher his or her scores are likely to be on measures of intelligence. No other relations emerged between the measures of cognitive ability and temperament.
Discussion

The principle goal of the present study was to examine whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status were predictive of children's ability to profit from two drawing procedures: the drawing interview and body map technique. Although each of the individual difference variables used in the present research examined different child characteristics thought to be predictive of the ability to profit from the drawing procedures, prior empirical research suggests that a number of the variables are related (e.g., intelligence and memory: Hildebrand & Ledbetter, 2001). Understanding how the individual difference measures are interrelated affects how the current data are analysed and how the results are interpreted. As a result, prior to examining the impact of the individual difference variables on children's ability to use the drawing procedures, I had to examine the relation among the individual difference variables.

Exploration of the relation between socioeconomic status and the measures of cognitive development indicated that children attending low socioeconomic schools performed more poorly than their peers from high socioeconomic schools on the major measures of cognitive development (intelligence, memory, and language). There was also a non-significant trend towards children from low socioeconomic schools performing more poorly on the ToM tasks. Children attending average socioeconomic schools performed at a level intermediate between these extremes. These findings suggest that the impact of intelligence, memory, and language development on children's ability to profit from the drawing procedures may be mediated by socioeconomic status.
The relation between socioeconomic status and cognitive ability was consistent with previous studies that have found abject poverty, the associated lack of educational and social opportunities, and malnutrition, overwhelm genetic potential for cognitive development (Turkheimer et al., 2003). Although research has consistently demonstrated that socioeconomic status is related to cognitive development, the robust nature of the current findings was somewhat unexpected because the welfare system in New Zealand is such that abject poverty and malnutrition are rare. Unfortunately, it appears that even moderate poverty adversely affects cognitive development.

The relation between gender and performance on each of the individual difference measures was also examined. Recall that, gender differences were not expected to emerge on the measures of intelligence, memory, and language because the WPPSI-R/WASI, the CMS, and the TELD-3 are standardised to correct for gender differences. Statistical analyses confirmed that children’s scores on the major measures of cognitive development did not differ as a function of gender. With respect to temperament, females attending low socioeconomic schools were more likely to approach new stimuli than males attending low socioeconomic schools. The Approach scores of males and females attending the average and high socioeconomic schools did not differ. Although researchers have failed to find consistent interrelations between socioeconomic status and temperament, one of the most consistent findings to emerge with respect to gender and temperament is that females are typically less likely to approach new stimuli (Maziade, Boudreault, Thivierge, Capéraà, & Côté, 1984; Rothbart, 1988). The unexpected results found in the current study may reflect differences in parents’ style of reporting on the
BSQ and differences in parental perceptions of children’s behaviour (Sanson, Smart, Prior, Oberklaid, & Pedlow, 1994).

Gender differences also emerged in drawing skill. Contrary to my expectations, females were significantly better at drawing than males. Given that drawing is related to spatial ability, it was anticipated that if a gender effect emerged for drawing ability, the effect would favour males (Sappington, Martin, Smith, & Cowan, 1996). The current findings suggest that, if drawing skill is predictive of the ability to profit from the drawing procedures, females are likely to profit more than males.

Memory capacity may also mediate any relation between drawing skill and the ability to profit from the drawing procedures. Consistent with prior research, a moderate positive correlation was found between memory and drawing skill ($r = .30$). Working memory is primarily responsible for the relation between memory and drawing skill because as working memory improves children become increasingly able to deal with the complex problem solving situations that drawing creates (Bensur, Eliot & Hegde, 1997; Morra, Moizo, & Scopesi, 1988).

Consistent with a plethora of previous research, children’s intelligence, memory, language skill, and ToM development were positively related with one another (Austingon & Jenkins, 1999; Buitelaar, van der Wees, Swaab-Barneveld, & van der Gaag, 1999; Cohen, 1997; Davis & Pratt, 1995; Fry & Hale, 1996, 2000; Garfield, Peterson, & Perry, 2001; Happé & Loth, 2002; Jenkins & Astington, 1996; Keenan, 1998; Lewis, Freeman, Hagestadt, & Douglas, 1994; Miller & Vernon, 1996; Nelson, 2000). In addition to the correlations observed between cognitive measures in the current study, 6

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6 Although there are moderate to strong correlations between each of the cognitive variables, they are of insufficient strength to cause difficulties with multicollinearity in regression analyses (Tabachnick & Fiddell, 2000).
researchers have also found complex interrelations among the variables. For example, the achievement of a ToM is related to both language development and memory (Buitelaar et al., 1999), while memory is related to intelligence and language development (Fivush, 1991, 1995; Hudson, 1990; Miller & Vernon, 1996; Nelson, 1993, 2000; Schneider & Pressley, 1997; Simcock & Hayne, 2002). That is, cognitive abilities appear to be fundamentally related and interdependent. Given that there are interrelations among the cognitive variables, examining both the combined and the independent contribution of the individual difference measures to the efficacy of the drawing procedures will be necessary.

To further complicate the issue of interrelations among the individual difference measures, exploratory analyses revealed interrelations among many of the temperament domains, and a positive relation between intelligence and Persistence (a domain of temperament measured by the BSQ). The positive relation between Persistence and intelligence may be interpreted in two primary ways. Children who are persistent may be more intelligent than less persistent children by virtue of the fact that they have more opportunities to learn new information. Alternatively, persistent children may not be more intelligent per se, but they obtain higher scores on standard measures of intelligence because they persevere with the tasks even when they become difficult (Strelau, Zawadski, & Piotrowska, 2001). Although the relation between intelligence and Persistence was consistent with expectations, in general, relations between the cognitive variables and temperament were less robust than expected. Previous research has found associations between multiple domains of temperament and intelligence (Kubicek, Emde,
& Schmitz, 2001; Martin, Olejnik, & Gaddis, 1994), memory (Wachs, Morrow, & Slabach, 1990), and language (Dixon & Smith, 2000; Kubicek et al., 2001).

The interrelations that emerged among the temperament domains were unexpected because Thomas and Chess (1977), who originally identified the nine domains temperament measured in the BSQ, proposed that each of the domains characterised an independent behavioural trait. Recent factor analytic studies suggest, however, that there are fewer than nine dimensions of temperament (Ball, Pelco, Havill, & Reed-Victor, 2001; Martin, Wisenbaker & Huttunen, 1994; McClowry, Hegvik, & Teglasi, 1993; Sanson et al., 1994). While it has been argued that the lack of a clearly evident factor structure undermines the validity of temperament measures based on a nine-factor model, proponents of the nine-dimensional model argue that the lack of a clearly evident factor structure is unimportant because each of the dimensions have concurrent and predictive utility for a wide range of clinical outcomes (Carey, 1989; Earls & Jung, 1987; McDevitt, 1994).

In summary, preliminary analyses revealed complex interrelations among many of the individual difference measures. As a result, regression techniques that examine both the combined and the independent contribution of each of the variables to the efficacy of the drawing procedures will be used in the current study. Further, because there is a lack of research examining the relation between a number of the individual difference variables and the efficacy of the drawing procedures, it is impossible to make a priori hypotheses about which individual difference variables will be most predictive of children’s ability to profit from the drawing technique. Therefore, the individual

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7 Although there are moderate to strong correlations between many of the temperament domains they are of insufficient strength to cause difficulties with multicollinearity in regression analyses (Tabachnick & Fiddell, 2000).
difference measures will be entered into regression analyses simultaneously when ascertaining which variables predict children's ability to profit from the drawing procedures (Tabachnick & Fiddell, 2001).
Chapter 6

Children’s Memory for an Educational Event: Individual Differences and the Drawing Interview

Professionals in both clinical and legal settings are frequently confronted with the difficult task of eliciting information from children. In legal settings, obtaining complete and accurate verbal evidence from children is crucial because in cases of suspected maltreatment, especially sexual abuse, there is often a lack of physical evidence and no eyewitness to corroborate the child’s allegations (Reed, 1996). In clinical settings, because children are privy to information about their experiences that is not readily apparent to others, the accurate assessment and effective treatment of mental health problems depends upon the professional’s ability to elicit information from the child (Wesson & Salmon, 2001). Due to the importance of obtaining complete and accurate information from children, researchers have explored the association between various interview techniques and the quantity and the quality of the information provided by children.

Prior research has consistently shown that when children are interviewed about their past experiences, those given the opportunity to draw about their experiences report more verbal information than those merely asked to tell (Butler et al., 1995; Gross & Hayne, 1998, 1999). For example, Gross and Hayne (1999) assessed 5- to 6-year-old’s recall of an educational event after delays of 1 day, 6 months, and 1 year. Across all
delays, children who were given the opportunity to draw verbally reported more information than children merely asked to tell. Importantly, the increase in recall did not occur at the expense of accuracy. Children who drew about their experiences were as accurate as those who merely told.

Despite these group effects, there were also large individual differences in the children’s memory performance. That is, some children clearly profited more from the opportunity to draw than others. If professionals are to use drawing as an ancillary aid to augment children’s verbal accounts, it is imperative that they are able to identify which children are likely to benefit from the provision of such an aid. With this in mind, the present experiment was conducted to examine whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status could be used to predict which children were likely to benefit from the opportunity to draw during a verbal interview. Given the lack of research examining the impact of individual differences on the efficacy of the drawing technique, it was impossible to make specific a priori predictions about the contribution of these individual difference measures to children’s event reports.

**Fire Station Experiment**

**Method**

Recall that, 125 5- to 6-year-old children took part in a class trip to the Dunedin Central Fire Station. Over the following month, each child completed measures to assess intelligence, memory, language development, and drawing skill. To assess children’s temperament, caregivers were asked to complete the BSQ. One month after the class trip to the fire station, each child was interviewed about his or her experiences.
During the verbal interview, half of the children were given the opportunity to draw while they talked about the fire station and half were not. Each interview began with an open-ended question that invited the child to tell (or draw and tell) about everything that he or she could recall about the event. When the child was unable to provide any additional free narrative information, he or she was asked a series of direct questions (e.g., “Tell me how you got there”). Following the interview, each child completed a series of false belief tasks to assess his or her ToM.

To determine the amount of information that children reported, each transcribed interview was divided into clauses. A clause corresponded roughly to a simple sentence, with one explicit or implicit verb per clause. Children were only given credit for clauses that were related to the actual event. The number of errors that children made (e.g., “We saw an ambulance” instead of a fire engine) was recorded and the number and type of turns taken by the interviewer was coded (see Chapter 4 for coding details).

Results

Memory Interview

Initially, the normality of the data was explored. While the number of clauses of information obtained during free recall was normally distributed, the distribution of the directed recall data was distorted by the presence of two outliers. Two children reported twice as much information during directed recall as did any other child (80 and 85 clauses as opposed to a previous high of 46 clauses). To prevent these outliers from exerting undue influence on subsequent analyses, according to statistical convention, the number

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8 Both of the outliers were interviewed using the drawing technique.
of clauses these two children reported was changed to 50 in the data set (Tabachnick & Fiddell, 2000).

Across the entire sample, four different people interviewed children. Preliminary analyses conducted using 1-way ANOVAs indicated that there was no effect of interviewer on any of the outcome measures. Given these findings, the data were collapsed across interviewer for all subsequent analyses.

**Correct Information Reported.** Figure 6.1 shows the mean number of clauses of correct information that children reported during the fire station interview as a function of interview condition (draw or tell), and interview phase (free or directed). These data were submitted to a 3 (socioeconomic status: high, average, low) X 2 (gender) X 2 (interview condition) X 2 (interview phase) ANOVA with repeated measures over interview phase (Greenhouse-Geisser correction factor). Only effects that were significant at the $p < .05$ level are reported. All significant effects were further examined using Student Newman-Keuls post hoc tests.

Overall, there was a significant main effect of interview condition, $F(1, 113) = 12.54$, Cohen's $d = .59$. Children who had the opportunity to draw and tell about their experiences at the fire station reported more information ($M = 39.08$ clauses, $SE = 2.82$) than children merely asked to tell ($M = 27.03$ clauses, $SE = 2.26$). There was also a significant effect of interview phase, $F(1, 113) = 7.29$, Cohen's $d = .27$. Children reported more information during the directed recall phase ($M = 18.18$ clauses, $SE = .96$) than during the free recall phase of the interview ($M = 14.92$ clauses, $SE = 1.20$). There were no main effects of socioeconomic status or gender and no interactions.
Figure 6.1. The mean number of clauses reported (+ 1 SE) as a function of interview condition and interview phase.

Accuracy. For each child, accuracy was calculated by dividing the correct information reported by the total (correct + incorrect) information reported. Separate 3 (socioeconomic status) X 2 (gender) X 2 (interview condition) ANOVAs were conducted for each interview phase (free or directed). The analyses revealed that there was no main effect of interview condition for either free or directed recall. Although children in the draw condition reported more correct information about the fire station than children in the tell condition, the increase in recall did not occur at the expense of accuracy. Children in the draw condition were as accurate as children in the tell condition. As shown in Figure 6.2, there was a significant main effect of socioeconomic status for both free recall, $F(2, 106) = 3.86$ and directed recall, $F(2, 112) = 4.64$. For free recall,
children attending the low socioeconomic schools were significantly less accurate ($M = 88\%$ accuracy, $SE = 4$) than children attending either the average ($M = 96\%$ accuracy, $SE = 1$, Cohen’s $d = .25$) or the high ($M = 95\%$ accuracy, $SE = 1$, Cohen’s $d = .21$) socioeconomic schools. The accuracy of children attending the average and the high socioeconomic schools did not differ. For directed recall, children attending the low socioeconomic schools were significantly less accurate ($M = 82\%$ accuracy, $SE = 3$) than the children attending the high socioeconomic school ($M = 96\%$ accuracy, $SE = 1$, Cohen’s $d = .56$). The accuracy of children attending the average socioeconomic school was intermediate between these extremes and not significantly different from either ($M = 89\%$ accuracy, $SE = 3$). Overall, children attending the low socioeconomic schools made 161 of the 359 errors (45%) that occurred during the fire station interviews.

Finally, $t$-tests were conducted to examine the effect of interview phase on accuracy for each socioeconomic status. Children attending the average socioeconomic school were significantly more accurate during free recall ($M = 96\%$ accuracy, $SE = 1$) than during directed recall ($M = 92\%$ accuracy, $SE = 2$), $t(41) = 2.17$, Cohen’s $d = .68$. The accuracy of children attending the low and the high socioeconomic schools did not differ as a function of interview phase.

Given that gender was not significantly related to either the amount or the accuracy of information reported by children, the data were collapsed across gender for all subsequent ANOVAs.
Interviewer Behaviour

Turn Type. The present findings are highly consistent with prior work on drawing. When interviewed about a wide range of events after delays ranging from 1 day to 1 year, children who are given the opportunity to draw report more correct information than children who are merely asked to tell (Butler et al., 1995; Drucker et al., 1997; Gross & Hayne, 1998, 1999). Although this effect is highly replicable, the mechanism behind the effect is not clear. Why do children report more information when they are given the opportunity to draw?

Differences in the way the interviewer interacted with children across the two interview conditions (draw or tell) may provide an explanation for why drawing yields
more complete reports than telling alone. To examine the impact of interviewer behaviour on the efficacy of the drawing technique, the interviewer turns data were submitted to a 3 (socioeconomic status) X 2 (interview condition) X 2 (interview phase) X 3 (turn type: coded turns, prompts, minimal responses) ANOVA with repeated measures over interview phase and turn type (Greenhouse-Geisser correction factor). Only effects that were significant at the $p < .05$ level are reported.

The analysis revealed a significant main effect of interview condition, $F(1, 119) = 47.19$. Interviewers took over twice as many turns during the draw interviews ($M = 133.79$ interviewer turns, $SE = 9.93$) than they did during the tell interviews ($M = 57.34$ interviewer turns, $SE = 4.91$). A significant main effect of interview phase, $F(1, 119) = 26.17$, indicated that interviewers took more turns during the directed recall phase of the interview ($M = 57.86$ interviewer turns, $SE = 3.82$) than during the free recall phase ($M = 38.86$ interviewer turns, $SE = 3.57$). There was also a significant main effect of turn type, $F(2, 119) = 109.74$. Post-hoc $t$-tests revealed that interviewers took significantly more minimal responses ($M = 54.52$ minimal responses, $SE = 5.13$) than coded turns ($M = 39.89$ coded turns, $SE = 1.75$), $t(124) = 3.51$, Cohen’s $d = .63$, and prompts ($M = 1.46$ prompts, $SE = 1.97$), $t(124) = 10.45$, Cohen’s $d = 1.88$. Further, interviewers took significantly more coded turns than prompts, $t(124) = 23.43$, Cohen’s $d = 4.21$. Of note, there was no main effect of socioeconomic status, indicating that interviewers did not treat children differently as a function of socioeconomic status. Significant Turn Type X Interview Condition, $F(2, 119) = 19.71$, and Turn Type X Interview Phase, $F(2, 119) = 13.74$ interactions also emerged.
To evaluate the Turn Type X Interview Condition interaction, post-hoc $t$-tests were used to compare each pair of bars in Figure 6.3. Each $t$-test produced a significant result (smallest $t(123) = 5.13$, Cohen's $d = .93$), indicating that interviewers used significantly more coded turns, prompts, and minimal responses during the draw interviews than during the tell interviews. As shown in Figure 6.3, the source of the interaction was reflected in the degree of difference between the draw and tell groups for each turn type. The drawing technique clearly had the largest effect on minimal responses.

![Figure 6.3](image)

*Figure 6.3.* The number of interviewer turns ($+1 SE$) as a function of interviewer turn type and interview condition.

Post-hoc $t$-tests were also conducted to examine the Turn Type X Interview Phase interaction. To do this, $t$-tests were used to compare each pair of bars in Figure 6.4. Interviewers used significantly more coded turns, $t(124) = 10.95$, Cohen’s $d = 1.97$, and
minimal responses, $t(124) = 2.41$, Cohen's $d = .43$, during the directed recall phase of the interview than during the free recall phase. Interviewers did not differ in their use of prompts across the free and the directed recall phases of the interview.

![Graph showing interviewer turn type and test phase](image)

**Figure 6.4.** The number of interviewer turns (+ 1 SE) as a function of interviewer turn type and test phase.

*Information per Turn.* Clearly, the drawing technique exerted a significant effect on the interviewers' behaviour. That is, when interviewing a child in the draw condition, interviewers took more coded turns, provided more prompts, and made more minimal responses than when interviewing a child in the tell condition.

Given that the draw condition elicited more correct information from children and more turns from interviewers than the tell condition, the amount of information provided by children (i.e., clauses) per interviewer turn was examined. A 1-way ANOVA was conducted...
on the number of clauses provided as a function of the total number of interviewer turns (coded turns, prompts, and minimal responses combined) with interview condition as the between-subjects factor. Children in the tell condition reported more correct information as a function of the total number of interviewer turns \( (M = .49 \text{ clauses per interviewer turn}, SE = .03) \) than children in the draw condition \( (M = .32 \text{ clauses per interviewer turn}, SE = .02) \), \( F(1, 124) = 23.78 \), Cohen's \( d = .83 \).

The analyses conducted thus far suggested that the efficacy of the drawing technique was not due to drawing per se: children in the draw condition did not provide more information in response to each interviewer turn. Moreover, the efficacy of the drawing procedure appeared to be due, at least in part, to changes in the interviewer's behaviour during the interview process (i.e., taking more turns). Hierarchical regression analyses were conducted to determine the impact of drawing and the number of interviewer turns on the efficacy of the drawing technique. When interview condition (draw or tell) was entered as the first step in the model, drawing or telling predicted the number of clauses of correct information reported by children \( (B = -12.05, SE = 3.62) \), accounting for 8.2% of the variance in the data. When interviewer turns was entered as the second step, however, interview condition was no longer a significant predictor of children's recall; the number of interviewer turns was the only significant predictor of the amount of information provided by children \( (B = .22, SE = .02) \). The model including interview condition and the total number of turns taken by the interviewer accounted for 51.6% of the total variance in the data.

**Individual Differences**

Consistent with previous studies that have examined the efficacy of the drawing technique, some children benefited more from the opportunity to draw than did others
(Butler et al., 1995; Gross & Hayne, 1998, 1999). In the present experiment, the number of clauses of information reported by children in the draw condition ranged from 0 to 97 (0 to 91 in the tell condition). Pearson product-moment correlations were performed to explore the relation between each individual difference measure (intelligence, memory, language development, drawing skill, ToM, temperament, socioeconomic status, and gender) and the total number of correct clauses reported (free + directed) and accuracy, for each interview condition (draw or tell). Given that the number of interviewer turns impacted on children’s event recall, interviewer turns were also included in the analyses.

**Correct Information Reported.** As shown in Table 6.1, there was a moderate to strong positive relation between the number of interviewer turns and the amount of information reported by children in both the draw and the tell conditions indicating that, as previously suggested, increasing the number of questions asked by the interviewer facilitated children’s verbal reports. Moreover, there were moderate to strong positive correlations between the amount of correct information reported during the fire station interviews and intelligence, memory, and language development for both the draw and the tell interview conditions. Children who were more advanced on these cognitive domains reported more correct information about their experiences than children less advanced on these cognitive domains. There was also a moderate positive correlation between drawing skill and the amount of information reported by children in the drawing, but not the telling, interview condition ($r = .30$). That is, children with more advanced drawing skills reported more information when interviewed with the drawing technique than children with less advanced drawing skills. A moderate negative correlation between distractibility and the amount of information reported during drawing interviews
(r = -.36) indicated that distractible children reported less information when interviewed with the drawing technique than children who were less distractible.

Table 6.1

Pearson Product-Moment Correlations between Individual Difference Measures, Interviewer Turns, Correct Information Reported, and Accuracy as a Function of Interview Condition

<table>
<thead>
<tr>
<th>Individual Difference Measure</th>
<th>Draw Correct Clauses</th>
<th>Draw Accuracy</th>
<th>Tell Correct Clauses</th>
<th>Tell Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligence (WPPSI-R/WASI)</td>
<td>.29*</td>
<td>.31*</td>
<td>.51**</td>
<td>.03</td>
</tr>
<tr>
<td>Memory (CMS)</td>
<td>.27*</td>
<td>.46*</td>
<td>.60**</td>
<td>.15</td>
</tr>
<tr>
<td>Language (TELD-3)</td>
<td>.30*</td>
<td>.31*</td>
<td>.29*</td>
<td>.18</td>
</tr>
<tr>
<td>Drawing (DAP)</td>
<td>.30*</td>
<td>.23</td>
<td>.17</td>
<td>-.04</td>
</tr>
<tr>
<td>Theory of Mind (ToM)</td>
<td>.16</td>
<td>.38*</td>
<td>.31*</td>
<td>.49*</td>
</tr>
<tr>
<td>Temperament (BSQ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>-.12</td>
<td>-.11</td>
<td>.15</td>
<td>.11</td>
</tr>
<tr>
<td>Rhythmicity</td>
<td>-.13</td>
<td>-.14</td>
<td>-.05</td>
<td>.11</td>
</tr>
<tr>
<td>Approach</td>
<td>-.08</td>
<td>-.13</td>
<td>-.19</td>
<td>.05</td>
</tr>
<tr>
<td>Adaptability</td>
<td>-.14</td>
<td>-.14</td>
<td>-.32*</td>
<td>-.09</td>
</tr>
<tr>
<td>Intensity</td>
<td>.12</td>
<td>-.17</td>
<td>-.14</td>
<td>-.05</td>
</tr>
<tr>
<td>Mood</td>
<td>-.08</td>
<td>-.08</td>
<td>-.17</td>
<td>-.01</td>
</tr>
<tr>
<td>Persistence</td>
<td>-.15</td>
<td>-.13</td>
<td>-.22</td>
<td>-.06</td>
</tr>
<tr>
<td>Distractibility</td>
<td>-.36*</td>
<td>-.18</td>
<td>.02</td>
<td>-.22</td>
</tr>
<tr>
<td>Threshold</td>
<td>-.16</td>
<td>.07</td>
<td>.16</td>
<td>-.11</td>
</tr>
<tr>
<td>Gender</td>
<td>.05</td>
<td>.05</td>
<td>-.03</td>
<td>-.09</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td>.12</td>
<td>.33*</td>
<td>.19</td>
<td>.31*</td>
</tr>
<tr>
<td>Interviewer Turns</td>
<td>.66**</td>
<td>-.07</td>
<td>.81***</td>
<td>-.02</td>
</tr>
</tbody>
</table>

Note. * r > 0.25 moderate correlation, ** r > 0.5 strong correlation, *** r > 0.75 very strong correlation (Harraway, 1993). WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children’s Memory Scale, TELD-3 = Test of Early Language Development-Third Edition, DAP = Draw-A-Person Quantitative Scoring System, BSQ = Behavioral Style Questionnaire.
For children asked to tell about their experiences at the fire station, there was a moderate positive correlation between ToM performance and the amount of information reported ($r = .31$), and a moderately negative correlation between Adaptability and the amount of information reported ($r = -.32$), indicating that children who understood others’ beliefs and who were adaptable in new situations reported more information than children who did not have these qualities when asked to tell about their experiences.

Given that there are intercorrelations between several of the individual difference measures, it was difficult to determine which of the variables contributed to the amount of information that children were able to report using the drawing technique. To further delineate which individual difference variables contributed to the completeness of children’s verbal reports, hierarchical regression analyses were conducted. Only those variables that had moderate (or higher) correlations with the amount of information reported during the draw and/or the tell interviews were included as predictors in the regression analyses: intelligence, memory, language development, drawing skill, ToM, Distractibility, Adaptability, and number of interviewer turns.

Initially, the regression analyses were conducted across the two interview conditions (draw and tell combined). Given its importance in children’s memory performance, the number of interviewer turns was entered as the first step in the model. The second step examined the unique contributions of intelligence, memory, language development, drawing skill, ToM, Distractibility, and Adaptability beyond the impact of interviewer turns. Interviewer turns (Step 1) significantly predicted the amount of information reported by children ($B = .20, SE = .02$), accounting for 51.9% of the variance. The inclusion of intelligence, memory, language development, drawing skill,
ToM, Distractibility, and Adaptability into the model (Step 2) yielded no significant independent contribution to the prediction of the amount reported, although all of the variables entered into the model accounted for 60.3% of the variance in the data.

Prior research by Salmon et al. (2003) has shown that the impact of individual difference measures may vary as a function of interview condition. Therefore, I conducted separate hierarchical regression analyses for each interview condition. The number of interviewer turns was entered into the model at Step 1, and intelligence, memory, language development, drawing skill, ToM, Distractibility, and Adaptability were entered at Step 2 for both the draw and the tell analyses. As shown in Table 6.2, for children in the draw condition, interviewer turns (Step 1) was a significant independent predictor of recall ($B = .19, SE = .03$), accounting for 48.6% of the variance. The addition of intelligence, memory, language development, drawing skill, ToM, Distractibility, and Adaptability into the model (Step 2) revealed that distractibility added significantly to the prediction of children’s recall ($B = -9.32, SE = 3.66$). When all variables were included in the model, 61.5% of the variance in the data was accounted for.
Table 6.2

**Hierarchical Regression Analysis for Variables Predicting Event Reports in the Draw Condition**

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>$R^2$</th>
<th>Change $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interviewer Turns</td>
<td>.19</td>
<td>.03</td>
<td>.70</td>
<td>.49</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td>.62</td>
<td>.13</td>
</tr>
<tr>
<td>Interviewer Turns</td>
<td>.17</td>
<td>.03</td>
<td>.62</td>
<td>.62</td>
<td></td>
</tr>
<tr>
<td>Intelligence (WPPSI-R/WASI)</td>
<td>-.21</td>
<td>.24</td>
<td>-.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory (CMS)</td>
<td>-.13</td>
<td>.18</td>
<td>-.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language (TELD-3)</td>
<td>.42</td>
<td>.26</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawing (DAP)</td>
<td>.27</td>
<td>.16</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theory of Mind (ToM)</td>
<td>1.12</td>
<td>1.68</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distractibility (BSQ)</td>
<td>-9.32</td>
<td>3.66</td>
<td>-.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptability (BSQ)</td>
<td>-3.80</td>
<td>2.71</td>
<td>-.14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. * $p < .05$, ** $p < .01$, *** $p < .001$. WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children’s Memory Scale, TELD-3 = Test of Early Language Development-Third Edition, DAP = Draw-A-Person Quantitative Scoring System, BSQ = Behavioral Style Questionnaire.*

As shown in Table 6.3, for children in the tell condition, interviewer turns (Step 1) was a significant independent predictor of children’s recall ($B = .36, SE = .05$), accounting for 55.0% of the variance. The addition of intelligence, memory, language development, drawing skill, ToM, Distractibility, and Adaptability into the model (Step 2) revealed that memory added significantly to the prediction of children’s recall ($B = .25, SE = .12$). When all variables were included in the model, 68.7% of the variance in the data was accounted for.
Table 6.3

Hierarchical Regression Analysis for Variables Predicting Event Reports in the Tell Condition

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>$R^2$</th>
<th>Change $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interviewer Turns</td>
<td>.36</td>
<td>.05</td>
<td>.73</td>
<td>***</td>
<td>.55</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.69</td>
</tr>
<tr>
<td>Interviewer Turns</td>
<td>.29</td>
<td>.05</td>
<td>.60</td>
<td>***</td>
<td>.14</td>
</tr>
<tr>
<td>Intelligence (WPPSI-R/WASI)</td>
<td>-.01</td>
<td>.15</td>
<td>-.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory (CMS)</td>
<td>.26</td>
<td>.12</td>
<td>.27</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Language (TELD-3)</td>
<td>-.01</td>
<td>.20</td>
<td>-.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawing (DAP)</td>
<td>.05</td>
<td>.11</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theory of Mind (ToM)</td>
<td>2.07</td>
<td>1.33</td>
<td>.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distractibility (BSQ)</td>
<td>2.96</td>
<td>2.48</td>
<td>.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptability (BSQ)</td>
<td>-2.94</td>
<td>2.12</td>
<td>-.13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children’s Memory Scale, TELD-3 = Test of Early Language Development-Third Edition, DAP = Draw-A-Person Quantitative Scoring System, BSQ = Behavioral Style Questionnaire.

The finding that the number of interviewer turns was a strong predictor of the amount of information that children reported about their trip to the fire station underscores the importance of interviewer turns for eliciting complete verbal accounts from children. In addition, the regression analyses indicated that individual differences in memory and distractibility contributed to children’s ability to provide complete accounts of their past experiences.

To more thoroughly explore the effect of distractibility on the amount of information reported, two subgroups of children were formed for each interview condition (draw or tell) using a median split based on distractibility. New subgroups
were established using a cut-off score of 3.8 on the Distractibility dimension of the BSQ. A 2 (distractibility) X 2 (interview condition) ANOVA conducted on the number of correct clauses reported revealed significant main effects for interview condition, $F(1, 97) = 7.36$, and distractibility (high or low), $F(1, 97) = 5.16$. That is, children in the draw condition reported more correct information ($M = 39.29$ clauses, $SE = 2.82$) than children in the tell condition ($M = 27.03$ clauses, $SE = 2.82$), and highly distractible children reported less information ($M = 27.32$ clauses, $SE = 3.00$) than less distractible children ($M = 36.72$ clauses, $SE = 2.08$). A significant Interview Condition X Distractibility Score interaction also emerged, $F(1, 97) = 9.71$. To evaluate the interaction, separate 1-way ANOVAs were carried out between the two interview conditions (draw or tell) for each distractibility group (high or low). As shown in Figure 6.5, distractibility did not impact on the amount of correct information reported by children in the tell condition. In contrast, in the draw condition, children who were not distractible reported significantly more correct information ($M = 47.06$ clauses, $SE = 4.31$) than children who were distractible ($M = 26.57$ clauses, $SE = 3.1$), $F(1, 52) = 12.11$, Cohen's $d = 1.03$. While children in the draw condition who were not distractible reported almost twice as much information as children in each of the other conditions, children in the draw condition who were distractible failed to report any more information than children in the tell condition. That is, drawing did not facilitate recall in children who were rated has distractible by their caregivers.
To more thoroughly explore the effect of memory on children’s verbal reports, two subgroups of children were formed for each interview condition (draw or tell) using a median split based on children’s memory scores. New subgroups were established using a cut-off score of 97 on the General Memory Index of the CMS. A 2 (memory score) X 2 (interview condition) ANOVA conducted on the number of correct clauses reported revealed significant main effects for interview condition, $F(1, 121) = 8.85$, and memory score (high or low), $F(1, 121) = 9.42$. As in previous analyses, children in the draw condition reported more correct information ($M = 39.29$ clauses, $SE = 2.82$) than children in the tell condition ($M = 27.03$ clauses, $SE = 2.82$). Moreover, children with high memory scores reported more information ($M = 39.28$ clauses, $SE = 2.70$) than children
with low memory scores ($M = 27.22$ clauses, $SE = 2.43$). A significant Interview Condition X Memory Score interaction also emerged, $F(1, 121) = 4.60$. To evaluate the interaction, separate 1-way ANOVAs were carried out between the two interview conditions (draw or tell) for each memory group (high or low). As shown in Figure 6.6, children in the tell condition with low memory scores reported significantly less information ($M = 19.39$ clauses, $SE = 1.98$) than children with high memory scores ($M = 37.62$ clauses, $SE = 3.79$), $F(1, 61) = 21.05$, Cohen’s $d = 1.14$. In contrast, the amount of information reported by children in the draw condition did not differ as a function of memory. That is, the drawing interview ameliorated the effect of memory on the amount of information that children were able to report.

![Figure 6.6](image)

*Figure 6.6.* The number of clauses reported ($\pm 1\ SE$) as a function of interview condition and memory performance.
**Accuracy.** As shown in Table 6.1, the accuracy of children in both the draw and the tell interview conditions was positively related to children's performance on the ToM tasks and to socioeconomic status, indicating that children who understood their own and others' mental states and children who attended high socioeconomic schools were more accurate than children who did not understand their own and others' mental states and who attended low socioeconomic schools. There was also a moderate positive correlation between the accuracy of children in the draw condition and intelligence, memory, and language development, indicating that children in the draw condition who were more advanced in these cognitive domains provided more accurate accounts of their experiences at the fire station than children who were less advanced in these domains.

Initially, standard regression analyses were conducted across the two interview conditions. Only those variables that had moderate (or higher) correlations with the accuracy of information reported during the draw and/or the tell interviews were included as predictors in the regression analysis: intelligence, memory, language development, ToM, and socioeconomic status. Both socioeconomic status (B = .08, SE = .003) and ToM (B = .03, SE = .01) emerged as significant predictors of the accuracy of children's event reports, accounting for 26.5% of the variability in the data. Prior research by Salmon et al. (2003) has shown, however, that the impact of each individual difference measure may vary as a function of interview condition. Therefore, I conducted separate standard regression analyses for each interview condition.

As shown in Table 6.4, for children in the draw group, a model including intelligence, memory, language development, ToM and socioeconomic status accounted for 31.1% of the variance in the data, however, none of these variables independently
predicted the accuracy of children's verbal reports. For children in the tell group, while the model accounted for 30.7% of the variance, ToM was the only variable that significantly predicted the accuracy of children's verbal reports (B = .05, SE = .01).

Table 6.4

Results of the Regression Analyses for Accuracy as a Function of Interview Condition.

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Tell Condition</th>
<th>Draw Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
</tr>
<tr>
<td>Intelligence (WPPSI-R/WASI)</td>
<td>-.002</td>
<td>.001</td>
</tr>
<tr>
<td>Memory (CMS)</td>
<td>-.00003</td>
<td>.001</td>
</tr>
<tr>
<td>Language (TELD-3)</td>
<td>-.003</td>
<td>.002</td>
</tr>
<tr>
<td>Theory of Mind (ToM)</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td>.008</td>
<td>.004</td>
</tr>
</tbody>
</table>

R² = .311

R² = .307

Note. * p < .05, ** p < .01, *** p < .001. WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children's Memory Scale, TELD-3 = Test of Early Language Development-Third Edition.

To more thoroughly explore the effect of ToM on accuracy, two subgroups were formed for each interview condition (draw or tell) on the basis of children's scores on the six false belief tasks. Because the literature suggests that the onset of false belief understanding is a discontinuous and stage-like phenomenon, children who passed all 6 false belief tasks formed one group (N = 65), while children who failed at least one false belief task were assigned to the second group (N = 60). A 2 (ToM score) X 2 (interview condition) ANOVA conducted on the accuracy data revealed no significant main effects and no interaction. As shown in Figure 6.7, while the main effect of ToM score approached significance, F(1, 114) = 3.78, p < .054, accuracy was very high irrespective
of children's ToM performance. Thus, the impact of failing to successfully complete the false belief tasks on the accuracy of children in applied settings is likely to be minimal.

![Figure 6.7. Percent accuracy (+ 1 SE) as a function of ToM performance.](image)

**Discussion**

A number of recent studies have demonstrated that children who are given the opportunity to draw during a verbal interview report more information about their experiences than children merely asked to tell. Moreover, these studies have found that the increase in children's verbal reports does not occur at the expense of accuracy (Butler et al., 1995; Gross & Hayne, 1998, 1999). The efficacy of drawing as a technique for eliciting complete and accurate accounts of children's past experiences was reinforced in the present experiment. Five- to 6-year-old children given the opportunity to draw and
tell about a class trip to the Dunedin Central Fire Station reported significantly more correct information than children merely asked to tell. Importantly, the increase in the amount of information reported did not occur at the expense of accuracy. Children who drew and told about their experiences were as accurate as those who merely told.

Hayne and her colleagues (Butler et al., 1995; Gross & Hayne, 1998, 1999) suggested a number of mechanisms by which the drawing technique may elicit complete and accurate verbal accounts of children’s past experiences. First, drawing might facilitate children’s reports because aspects of the drawing act as retrieval cues for other aspects of the same event. Second, drawing might help children structure their narratives by providing an external reminder of what they have, and have not, reported. Third, drawing might remove typical conversational constraints, allowing the child to report aspects of the event such as the size, shape, and colour of items that would typically not be discussed. Fourth, drawing may put the child at ease, allowing him or her to think about and discuss an event more thoroughly. Finally, drawing may facilitate recall by extending the time that children are willing to engage in the interview process.

Each of the mechanisms proposed by Hayne and her colleagues centre on the impact of drawing in the interview situation, and/or on how drawing may alter children’s behaviour such that they report more information about an event. Contrary to all expectations, the results of the fire station study indicate that the efficacy of the drawing technique is largely due to changes in the interviewer’s behaviour during the interview process. As expected, children provided more information about their experiences at the fire station when they were given the opportunity to draw and when, irrespective of interview condition, they were asked direct questions (Bruck et al., 2002; Butler et al.,
Importantly, interviewers also took significantly more conversational turns during drawing interviews and during directed recall. The relation observed between the number of interviewer turns and the amount of information reported suggested that the efficacy of the drawing technique might have been due, at least in part, to interviewers taking more turns during the interview process. Hierarchical regression analyses confirmed this assumption. While interview condition (draw or tell) was predictive of children's verbal reports when entered as the first step in the regression model, when both interview condition and interviewer turns were entered into the model, interview condition no longer contributed significantly to the prediction of children's recall. Interviewer turns was the only significant predictor. That is, the number of interviewer turns, not drawing during the interview process, was predictive of the amount of information provided by children.

As mentioned in Chapter 2, there is an extensive body of literature indicating that open-ended and direct questions elicit more accurate accounts from children than leading and misleading questions (Dent, 1991; Dent & Stephenson, 1979; Hershkowitz et al., 1997; Lamb & Fauchier, 2001; Peterson & Bell, 1996). Given that the efficacy of the drawing interview is largely dependent upon the interviewer having more conversational turns, it was encouraging to note that large increases in the number of minimal responses and coded turns (open-ended and direct questions) appeared to drive this effect.

Despite interviewers using more prompts (i.e., leading questions) in the drawing interviews than in the telling interviews, prompts were rarely used. Moreover, the increased number of prompts in the drawing interviews was an artefact of the coding
schedule. When children in the drawing condition had clearly drawn a human figure, interviewers occasionally asked, “Who is that?” Because the child had not explicitly stated that the drawing was of a person prior to the interviewer asking this question, it was coded as a leading question. Given that the drawings were clearly of people, in an applied setting, asking “leading” questions of this nature would not inflate the number errors in children’s accounts. Indeed, the findings of the current experiment indicate that despite interviewers using more prompts during drawing interviews, children were as accurate when they were asked to draw about their experiences as they were when they were merely asked to tell.

Although the number of conversational turns taken by the interviewer was not anticipated to be the primary factor contributing to the efficacy of the drawing technique at the outset of the fire station study, the relation between increased recall and the number of interviewer turns is not surprising. It is important to preface this discussion by emphasizing that the interview protocol was standardised across the draw and the tell interview conditions. As a result, the impact of interviewer turns on the amount of information children report arises from the frequency with which questions were asked (direct questions), were acknowledged (e.g., with minimal responses), and were followed up (e.g., “You said you went to the fire station. Tell me all about that”), not from different interviewing procedures per se.

Recall that coded turns are requests for information such as “Tell me where you went” (a direct question), or “Tell me more about that” (an open-ended follow-up). In the current experiment, interviewers asked twice as many coded turns when interviewing children with the drawing technique ($M = 52.78$), as when interviewing children with the
standard verbal technique ($M = 26.79$). In addition to providing structure and retrieval cues (benefits associated with direct questions in both the draw and the tell interviews), taking more coded turns during the drawing interviews may have facilitated children’s verbal reports for two reasons. First, researchers have found that increasing social support during an interview has beneficial effects for children’s performance (Goodman, Rudy, Bottoms, & Aman, 1990; Moston & Engelberg, 1992). Taking more coded turns may signal to a child that what he or she is saying is of interest, reinforcing the child and encouraging him or her to engage in the interview for longer. Engaging in the interview for longer, in turn, provides greater opportunity for the child to report information, and for interviewers to take conversational turns.

Second, taking more coded turns may encourage the child to complete an exhaustive search of his or her memory, increasing the chance of recalling and reporting additional details (Butler et al., 1995; Roediger & Thorpe, 1978; Wixted & Rohrer, 1994). Consistent with the supposition that increasing the number of coded turns encourages children to complete a more exhaustive memory search is the finding that increasing the number of interviewer turns reduces the amount of information that children provide per turn. Because children are conducting an exhaustive search of their memory, as the interview progresses, the amount of additional information they are able to report is reduced. Thus, on average, children provide less information per turn.

Researchers have repeatedly demonstrated the deleterious effects of repeated questioning on the accuracy of children’s reports (see Poole & Lamb, 1998). As such, it is important to note that the increase in coded turns during the drawing interviews was not solely due to the interviewer repeatedly asking the same direct question. Once the
child had responded (correctly or incorrectly) to a direct question, the interviewer
typically began to follow up the child's responses with statements such as, "You said you
went to the fire station. Can you tell me more about that?"

Interestingly, although taking more coded turns was important for eliciting verbal
reports from children, increasing the number of minimal responses appears to be even
more important. While interviewers used twice as many coded turns during drawing
interviews (M = 52.77) as during standard verbal interviews (M = 26.79), interviewers
used nearly three times as many minimal responses when interviewing children in the
drawing condition (M = 78.33) as when interviewing children in the standard verbal
interview condition (M = 30.32). It appears that, as with coded turns, making minimal
responses signals to the child that the interviewer is interested in the information that he
or she is reporting. Hence, he or she stays engaged in the interview process, giving him
or her a greater opportunity to complete an exhaustive memory search.

The finding that minimal responses increase the amount of information reported by
children is very encouraging. Although coded turns also increase verbal reports, asking
questions (either direct or follow-up) increases the chance that the interviewer will
inadvertently ask a leading or a misleading question. In contrast, minimal responses, by
their very nature, do not expose interviewers to this risk. Further research is necessary to
determine whether increasing the number of minimal responses, without increasing the
number of coded turns, can effectively elicit more complete verbal reports from children.

The results of the Fire Station Experiment indicate that increasing the number of
interviewer turns facilitates complete and accurate recall of children's past experiences.
Importantly, drawing during verbal interviews appears to be an effective way to increase
the number of interviewer turns: although the mechanisms underlying this effect remain unclear. Drawing may increase the number of interviewer turns for at least three reasons. First, Gross and Hayne (1998) suggested that because drawing is enjoyable for most children, drawing might put the child at ease and increase the length of time that he or she is willing to engage in the interview process. While this may be the case, the current findings suggest that the drawing technique puts the interviewer at ease, possibly because he or she perceives that, in contrast to standard verbal interviews, drawing during the interview process is child-friendly, engaging, and non-threatening. As a result, interviewers may be more willing to extend the length of the interview by repeatedly taking coded turns. Moreover, feeling relaxed, coupled with the desire to maintain the flow of the conversation while the child is drawing, may facilitate interviewer’s use of minimal responses. Finally, being at ease may make interviewers more comfortable with silence, allowing the child more time to complete a thorough memory search.

Second, in contrast to the suggestion that drawing helps children structure their narratives (Hayne & Gross, 1998), drawing may help interviewers structure their interviews. Specifically, because the child draws his or her experiences, the interviewer has a visual record of which aspects of the event he or she needs to follow up. As a result, the interviewer does not have to retain as much information in memory, allowing him or her to more thoroughly follow-up one element of the event, without the risk of forgetting to follow-up another. Further, as Gross and Hayne (1998) suggested, children draw more detail than they typically disclose during verbal interviews. For example, in the current experiment, children in the verbal condition would often say that they went to the fire station with their classmates, while children in the draw condition would draw
specific people who were present. The greater detail provided by children when they are asked to draw about their experiences gives interviewers more opportunity to take coded turns.

Finally, drawing may slow the pace of the interview. In addition to giving the child time to complete a thorough search of his or her memory, slowing the pace of the interview may give the interviewer time to think about what aspects of the child’s verbal responses to follow up. Moreover, it may give the interviewer more time to make comments (e.g., minimal responses) likely to keep the child engaged in the interview.

In summary, increasing the number of interviewer turns elicited more complete verbal reports from children. While the mechanisms behind the efficacy of the drawing technique are not yet clear, drawing appears to be an easily implemented, time effective, technique for encouraging interviewers to take more conversational turns.

Despite evidence that the drawing technique effectively elicited complete and accurate accounts of children’s past experiences, it was also apparent that some children benefited more from the provision of this technique than others. To ensure that the drawing technique is only used with children likely to benefit from the opportunity to draw, it was necessary to understand the relation between child characteristics and the efficacy of the drawing technique. To this end, I examined whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status were predictive of children’s ability to profit from the opportunity to draw during a verbal interview about an educational event. The results of the Fire Station Experiment indicated that children’s distractibility, memory,
and ToM were independently predictive of the ability to profit from the drawing technique even when the number of interviewer turns had been accounted for.

Distractibility, as measured by the BSQ, predicted independent variance in the ability to profit from the drawing technique. Median split data analyses revealed that while distractibility did not impact on the performance of children in the tell condition, children who were less distractible reported nearly twice as much information during drawing interviews ($M = 47.06$ clauses) as children who were more distractible ($M = 26.57$ clauses). Importantly, children who were highly distractible in the draw condition reported the same amount of information as children in the tell condition.

These findings suggest that the drawing technique is of little benefit to children who are highly distractible, possibly because being distractible impaired their ability to engage in drawing interviews for long enough for them to receive all of the benefits associated with the interviewer taking more conversational turns. Although drawing does not facilitate the performance of children rated as distractible by their caregivers, it is important to note that the drawing technique was not deleterious to the interview performance of these children.

Although not surprising, the current findings were unexpected because Salmon et al. (2003) found no relation between children's performance with the drawing technique and their temperament. A number of factors may have contributed to these inconsistent findings. First, the nature of the events being discussed differed. Children in the Salmon et al. (2003) study were interviewed about emotional experiences (happy and scared), while children in the current experiment were interviewed about an enjoyable, educational event. It seems unlikely, however, that the different event types account for
the discrepant findings. While the impact of temperament traits, such as mood and intensity, might be expected to differ when children are discussing emotional, as opposed to educational events, one would expect the impact of distractibility on the efficacy of the drawing technique to be reasonably consistent across both event types. Second, the use of different measures to assess temperament may account for the different findings. In contrast to the nine-dimensional BSQ employed in the current experiment, Salmon et al. (2003) employed the Children's Behaviour Questionnaire (CBQ), which measures 15 domains of temperament. Nevertheless, the use of different measures fails to account for the discrepant findings, because the CBQ measures impulsivity, a construct similar to distractibility. Third, children in the current experiment often talked about the fire station for up to 25 minutes. While the length of the interviews conducted in the Salmon et al. (2003) study are unknown, it may be that distractibility emerged in the current study, while it did not emerge in the Salmon et al. (2003) study, because the interviews in the current experiment were longer. Finally, the current experiment examined the impact of numerous variables on the efficacy of the drawing technique, while Salmon et al. (2003) only examined the impact of temperament and language. That is, examining both the combined and the unique contribution of intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status on the efficacy of the drawing technique may have allowed the impact of distractibility on children’s performance to emerge.

In contrast to prior research, memory ability emerged as a significant independent predictor of the ability to profit from a standard verbal interview (Baker-Ward et al., 1993). When interviewed in the tell condition, children with low memory scores on the
CMS reported less information \((M = 19.39 \text{ clauses})\) than children with high memory scores \((M = 37.62 \text{ clauses})\). It appears that, as Baker-Ward et al. (1993) suggested, the limited range of memory scores they obtained on the Memory Index of the McCarthy Scales when they examined the relation between memory and children’s event reports undermined the integrity of their findings.

Importantly, memory ability did not impact on children’s performance in the drawing interviews. Median split data analyses revealed that the drawing technique ameliorated the impact of poor memory on the ability to provide complete accounts of past experiences. Children with low memory scores who were given the opportunity to draw reported as much information as children with high memory scores merely asked to tell about their experiences. Drawing may help children overcome memory limitations in two primary ways. First, drawing might provide children with poor memories with retrieval cues that they would otherwise fail to generate (Gross & Hayne, 1998). Second, drawing might slow the pace of the interview giving children with poor memories more time to search their memories for event-related details. That is, although neither drawing per se, nor drawing skill, is independently predictive of the efficacy of the drawing technique, drawing does appear to mediate the impact of memory on the ability to profit from the drawing technique.

Finally, children’s performance on the ToM tasks was independently predictive of children’s ability to accurately report information in a standard verbal interview. The finding that ToM was related to children’s accuracy in the verbal interview was consistent with literature that suggests children who are unable to reason about their own and others’ mental states do not recognize that they personally experienced the event
being discussed. As a result, these children are more vulnerable to inaccurate reporting
because they discuss what typically happens during an event (e.g., fire alarms going off at
the fire station), rather than what actually happened (Perner, 2000, 2001; Perner &
Ruffman, 1995). Despite the significance of this finding, when median split data
analyses were conducted, no significant main effects and no interaction emerged between
performance on the false belief tasks and the accuracy of children’s accounts. Accuracy
was very high irrespective of children’s ToM performance. In applied settings, therefore,
the impact of ToM on the accuracy of children interviewed with standard verbal or
drawing interviews is likely to be minimal.

Although distractibility, memory, and ToM were the only variables to emerge as
significant independent predictors of the completeness and accuracy of children’s verbal
accounts after the impact of interviewer turns had been taken into account, the other
individual difference measures (e.g., intelligence, language development, drawing skill,
and socioeconomic status) did contribute to the total variance accounted for in the
regression analyses. It is likely that these characteristics failed to emerge as independent
predictor variables because they are highly interrelated (see Chapter 5). Although
socioeconomic status did not emerge as an independent predictor of the ability to profit
from the drawing technique, socioeconomic status was related to children’s accuracy (at
the group level). As such, the results pertaining to socioeconomic status warrant further
discussion.

Children attending low socioeconomic schools were significantly less accurate
during both free and directed recall than their peers attending high socioeconomic
schools. The accuracy of children attending the average socioeconomic schools was
intermediate between these extremes. Indeed, children attending the low socioeconomic schools made 45% of the errors that occurred during the fire station interviews. Despite the relation observed between socioeconomic status and accuracy at the group level, the impact of socioeconomic status was obviated in the regression analyses because of its relation to intelligence, memory, and language development (see Chapter 5). Although socioeconomic status failed to emerge as an independent predictor of children's event reports, socioeconomic status is often the most readily available information that professionals have about a child's ability to provide a complete and accurate account of his or her experiences. The availability of socioeconomic information, coupled with an awareness that children from low socioeconomic homes are over represented in clinical and legal settings, and knowledge of the adverse impact that being from a low socioeconomic school has on accuracy, it is imperative that researchers design studies that recruit participants from across the economic spectrum.

In conclusion, the results of the Fire Station Experiment add to a growing body of evidence indicating that drawing facilitates complete and accurate reports of children's past experiences. The current findings also extend prior research on the role of drawing during verbal interviews. The data indicated that the efficacy of the drawing technique was largely due to interviewers taking more conversational turns during the interview process. Moreover, the current experiment revealed a relation between individual differences in distractibility and memory and children's performance when interviewed with the drawing technique. Specifically, children who are highly distractible report the same amount of information during both drawing and telling interviews because distractibility impairs children's ability to profit from the drawing technique. In contrast,
the drawing technique ameliorates the impact of poor memory. Children with poor
memories who are given the opportunity to draw report as much information as children
with good memories who are asked to tell.

Although the findings of Fire Station Experiment indicate the utility of the drawing
technique for eliciting complete and accurate accounts of children’s past events, it is
important to note that the current results only relate the impact of drawing when children
have been asked to talk about an educational event. For the drawing technique to be
useful in clinical and legal settings, it must also facilitate children’s reports of
emotionally laden events. Although previous research has shown that drawing elicits
complete and accurate accounts of emotionally laden events, some children profit from
the opportunity to draw about their emotional experiences more than do others (Drucker
et al., 1997; Gross & Hayne, 1998). To ensure that the drawing technique is only
employed with those children likely to benefit from the opportunity to draw, in the
Emotions Experiment (Chapter 7), I will examine the impact of individual differences in
intelligence, memory, language development, drawing skill, ToM, temperament, and
socioeconomic status on the efficacy of the drawing technique when children are asked to
discuss emotionally laden experiences. In addition, given that the number of interviewer
turns was not anticipated to be a primary factor contributing to the efficacy of the
drawing technique in the Fire Station Experiment, I will attempt to replicate this finding
in the Emotions Experiment.
Chapter 7

Children’s Memory for Emotional Experiences: Individual Differences
and the Drawing Interview

Taken together, the results described in Chapter 6 indicate that drawing increases
the amount of information that children report about an educational, emotionally neutral
event. In both clinical and legal settings, however, children are often asked to talk about
emotionally laden events. In legal settings, children are often asked to describe
distressing episodes of violence and degradation that they have witnessed or experienced.
In clinical settings, children may be required to discuss past trauma; they may also be
asked to discuss times when they have been happy, sad, scared, and/or angry.

Despite the importance of obtaining children’s accounts of past emotional
experiences, empirical studies have shown that many children are reluctant to discuss
emotional events because they are embarrassed (Saywitz et al., 1991), or because they are
aware that talking about negative events may be unpleasant for the adult listener. For
example, Jones and McQuiston (1988) found that when a child begins to disclose
particularly unpleasant events to an interviewer, if the interviewer reacts in a manner that
shows his or her distaste for the events being described, the child might discontinue his or
her disclosure.

Due to the importance of obtaining complete and accurate information about
children’s emotional experiences, researchers have explored the association between
various interview techniques and the quantity and the quality of the information provided by children. Recent empirical studies have shown that drawing facilitates children's verbal reports of emotional experiences (Drucker et al., 1997; Gross & Hayne, 1998; Salmon et al., 2003). For example, Gross and Hayne (1998) asked 3- to 6-year-old children to draw and tell, or only tell about a time when they felt happy, sad, scared, and angry. Irrespective of emotion type, children who drew about their emotional experiences reported more than twice as much verbal information as children merely asked to tell. Moreover, parental report indicated that the children rarely made errors in their accounts. Children who drew and told about their emotional experiences were as accurate as children who merely told.

Despite these group effects, there were also large individual differences in children's ability to report emotional events. Some children clearly profited more from the opportunity to draw than others. To ensure that professionals only employ the drawing technique with children who are likely to benefit from the opportunity to draw, research examining the impact of individual differences on the efficacy of the drawing technique is necessary. With this in mind, the present experiment was designed to examine whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status could be used to predict which children would benefit from the opportunity to draw during verbal interviews about emotional experiences. Given the lack of research examining the impact of individual differences on the efficacy of the drawing technique for eliciting narrative accounts of emotional experiences, it was impossible to make specific a priori predictions about the contribution of these individual difference measures to children's event reports.
In addition, given the strong relation between the number of interviewer turns and the efficacy of the drawing technique in the Fire Station Experiment, I will attempt to replicate this finding in the Emotions Experiment.

**Emotions Experiment**

**Method**

Recall that, 125 5- to 6-year old children were interviewed about events in their daily lives during which they felt happy, sad, and scared. Children who had previously drawn about the trip to the fire station were now asked to tell about their emotional experiences, while children who told about the trip to the fire station drew about their emotional experiences. Immediately prior to the emotion interview, each child completed a series of false belief tasks designed to assess their ToM. During the month preceding the interview, the intelligence, memory, language development, and drawing skill of each child was assessed. Further, to assess children’s temperament, caregivers were asked to complete the BSQ.

To determine the amount of information that children reported, each transcribed interview was divided into clauses. A clause corresponded roughly to a simple sentence, with one explicit or implicit verb per clause. Because the validity of the children’s emotional experiences could not be substantiated, data pertaining to accuracy was not available. The number and type of turns taken by the interviewer were also coded (see Chapter 4 for coding details).
Results

Memory Interviews

The data from the sad emotion interviews were distorted by the presence of three outliers. Three children reported at least one third more information than any other child in the group (23, 26, and 31 clauses of information as opposed to a previous high of 17 clauses). To prevent these outliers from exerting undue influence on subsequent analyses, according to statistical convention, the number of clauses that these three children reported was changed to 18 in the data set (Tabachnick & Fiddell, 2000).

Across the entire sample, four different people interviewed children. Preliminary analyses conducted using 1-way ANOVAs indicated that there was no effect of interviewer on any of the outcome measures. Given these findings, all subsequent analyses were collapsed across experimenter.

Information Reported. Figure 7.1 shows the mean number of clauses of information that children reported for each emotion type (happy, sad, scared) as a function of interview condition (draw or tell). These data were submitted to a 3 (socioeconomic status: high, average, low) X 2 (gender) X 2 (interview condition) X 3 (emotion type) ANOVA with repeated measures over emotion type (Greenhouse-Geisser correction factor). Only effects that were significant at the $p < .05$ level are reported. All significant effects were further examined using Student Newman-Keuls post hoc tests.

Overall, there was a significant main effect of emotion type, $F(2, 113) = 7.19$. Post-hoc $t$-tests revealed that children reported significantly more information about happy ($M = 6.57$ clauses, $SE = .54$, Cohen's $d = .42$) and scary events ($M = 5.55$ clauses, $SE = .30$, Cohen's $d = .31$) than about sad events ($M = 4.32$ clauses, $SE = .41$). There was

\footnote{All three of the outliers were interviewed using the drawing technique.}
no difference in the amount of information that children reported when discussing happy and scary events. There was also a significant effect of interview condition, $F(1, 113) = 9.31$, Cohen’s $d = .60$. Irrespective of emotion type, children who had the opportunity to draw and tell reported significantly more information ($M = 19.77$ clauses, $SE = 1.97$) than children merely asked to tell about their emotional experiences ($M = 13.16$ clauses, $SE = 1.05$). There were no main effects of socioeconomic status or gender and no interactions.

Given that gender was not significantly related to the amount of information reported by children, the data were collapsed across gender for all subsequent ANOVAs.

*Figure 7.1. Mean number of clauses reported (+ 1 SE) as a function of interview condition and emotion type.*
Interviewer Behaviour

Turn Type. The present findings are highly consistent with the findings reported in Chapter 6 and with prior published work on drawing. When interviewed about a wide range of events after delays ranging from 1 day to 1 year, children who are given the opportunity to draw report more information than children who are merely asked to tell (Butler et al., 1995; Drucker et al., 1997; Gross & Hayne, 1998, 1999). The findings reported in Chapter 6 suggested that the effect of drawing was due, in large part, to an increase in the number of interviewer turns. To examine the effect of interview technique on interviewer behaviour, the number of interviewer turns were submitted to a 3 (socioeconomic status) X 2 (interview condition) X 3 (emotion type) X 3 (turn type: coded turns, prompts, minimal responses) ANOVA with repeated measures over emotion type and turn type (Greenhouse-Geisser correction factor). Only effects that were significant at the $p < .05$ level are reported.

The analyses revealed a significant main effect of interview condition, $F(1, 119) = 23.62$. Interviewers took over twice as many turns during the draw interviews ($M = 69.01$ interviewer turns, $SE = 7.18$) as they did during the tell interviews ($M = 33.40$ interviewer turns, $SE = 2.32$). A significant main effect of emotion type also emerged, $F(2, 119) = 10.27$. Post-hoc $t$-tests revealed that interviewers took significantly more turns during happy interviews ($M = 19.90$ interviewer turns, $SE = 1.69$) than during sad ($M = 14.96$ interviewer turns, $SE = 1.29$) and scared interviews ($M = 16.21$ interviewer turns, $SE = 1.49$). There was no difference in the number of interviewer turns between sad and scared interviews.
A significant main effect of socioeconomic status indicated that interviewers took significantly more turns when interviewing children from the low socioeconomic status schools ($M = 64.82$ interviewer turns, $SE = 10.25$) than when interviewing children from the high socioeconomic status school ($M = 40.60$ interviewer turns, $SE = 4.01$). The number of turns taken by the interviewer when interviewing children from the average socioeconomic status school was intermediate between these extremes and not significantly different from either ($M = 48.50$ interviewer turns, $SE = 5.52$), $F(2, 119) = 3.80$.

Finally, there was a main effect of turn type, $F(2, 119) = 96.71$. Post-hoc $t$-tests revealed that interviewers took significantly more coded turns ($M = 24.53$ coded turns, $SE = 1.40$) and made more minimal responses ($M = 25.78$ minimal responses, $SE = 2.88$), than prompts ($M = .76$ prompts, $SE = .14$). There was no difference in the number of coded turns and minimal responses taken by interviewers.

In addition to these main effects, significant Turn Type X Interview Condition, $F(2, 119) = 12.56$, Turn Type X Emotion Type, $F(4, 119) = 4.45$, and Turn Type X Socioeconomic Status, $F(4, 119) = 3.41$ interactions emerged. To evaluate the Turn Type X Interview Condition interaction, post-hoc $t$-tests were used to compare each pair of bars in Figure 7.2. Each $t$-test produced a significant result (smallest $t(123) = 3.95$, Cohen's $d = .71$), indicating that interviewers used significantly more coded turns, prompts, and minimal responses during the draw interviews than during the tell interviews. As shown in Figure 7.2, the source of the interaction was reflected in the degree of difference between the draw and tell groups for each turn type. The drawing technique had the largest effect on minimal responses.
The Turn Type X Emotion Type interaction is shown in Figure 7.3. To examine the Turn Type X Emotion Type interaction, t-tests were used to compare each triad of bars in Figure 7.3. There was a significant difference in the number of coded turns taken by interviewers across the three emotion types. Interviewers took significantly more coded turns during happy interviews ($M = 9.28$ coded turns, $SE = .62$) than during sad ($M = 7.64$ coded turns, $SE = .47$), $t(124) = 3.66$, Cohen's $d = .66$, and scared interviews ($M = 7.61$ coded turns, $SE = .48$), $t(124) = 3.82$, Cohen's $d = .69$. There was no difference in the number of coded turns taken during sad and scared interviews. Further, there were significant differences in the number of minimal responses used by interviewers across the three emotion types. Interviewers used significantly more minimal responses during
happy interviews ($M = 10.29$ minimal responses, $SE = 1.20$) than during sad interviews ($M = 7.08$ minimal responses, $SE = .95$), $t(124) = 3.71$, Cohen's $d = .67$. The number of minimal responses that interviewers used during scared interviews was intermediate between these extremes ($M = 8.41$ minimal responses, $SE = 1.11$) and not significantly different from either. There were no significant differences in the number of prompts used by interviewers across the three emotion types.

![Figure 7.3](image_url)

*Figure 7.3.* Number of interviewer turns ($\pm 1 \ SE$) as a function of interviewer turn type and emotion type.

Finally, the Turn Type X Socioeconomic Status interaction is shown in Figure 7.4. Post-hoc $t$-tests were used to compare each triad of bars in Figure 7.4. There were no significant differences in the number of coded turns or prompts made by the interviewers as a function of socioeconomic status. There were, however, significant differences in
the number of minimal responses made by interviewers as a function of socioeconomic status. Interviewers used significantly more minimal responses when interviewing children from low socioeconomic status schools ($M = 35.41$ minimal responses, $SE = 7.28$), than when interviewing children from the high socioeconomic status school ($M = 17.7$ minimal responses, $SE = 3.40$), $t(77) = 2.24$, Cohen's $d = .51$. The number of minimal responses taken by interviewers at the average socioeconomic status school was intermediate between these extremes and not significantly different from either ($M = 24.63$ minimal responses, $SE = 3.74$).

![Number of interviewer turns (+ 1 SE) as a function of interviewer turn type and socioeconomic status.](image)

*Figure 7.4.* Number of interviewer turns (+ 1 SE) as a function of interviewer turn type and socioeconomic status.

*Information per Turn.* Clearly, the drawing technique exerted a significant effect on the interviewers' behaviour. Across all three emotion types, when interviewing a
child in the draw condition, interviewers took more coded turns, provided more prompts, and made more minimal responses than when interviewing a child in the tell condition.

Given that the draw condition elicited more information from children and more turns from interviewers than the tell condition, the amount of information provided by children (i.e., clauses) per interviewer turn was examined. The number of clauses provided as a function of the total number of interviewer turns (coded turns, prompts, and minimal responses combined) was submitted to separate 1-way ANOVAs for each emotion type (happy, sad, scared), with interview condition as the between-subjects factor. For both the happy, $F(1, 124) = 4.67$, Cohen's $d = .29$ and the scared, $F(1, 124) = 7.31$, Cohen's $d = .36$ emotion interviews, children in the tell condition reported more correct information as a function of the total number of interviewer turns (happy, $M = .46$ clauses per interviewer turn, $SE = .05$; scared, $M = .48$ clauses per interviewer turn, $SE = .05$) than did children in the draw condition (happy, $M = .33$ clauses per interviewer turn, $SE = .03$; scared, $M = .30$ clauses per interviewer turn, $SE = .04$). There was no significant difference in the number of clauses of information provided about sad events as a function of the total number of interviewer turns.

The analyses conducted thus far suggested that the efficacy of the drawing technique was not due to drawing per se; children in the draw condition did not provide more information in response to each interviewer turn. As in Chapter 6, the efficacy of the drawing procedure appeared to be due, at least in part, to changes in the interviewer’s behaviour during the interview process (i.e., taking more turns). Hierarchical regression analyses were conducted for each emotion type (happy, sad, scared) to determine the impact of drawing and the number of interviewer turns on the efficacy of the drawing
technique. When interview condition (draw or tell), was entered as the first step in the model, it predicted the number of clauses of correct information reported by children in happy, sad, and scared interviews, accounting for 3.4%, 4.0%, and 4.6% of the variance in the data, respectively. When interviewer turns was entered as the second step, however, interview condition was no longer a significant predictor of children’s recall; the number of interviewer turns was the only significant predictor of the amount of information provided by children in all three emotion interviews (happy, sad, and scared). The models including both interview condition and the total number of turns taken by the interviewer accounted for 29.5%, 29%, and 34% of the total variance in the happy, sad, and scared interview data, respectively.

Individual Differences

Consistent with previous studies that have examined the efficacy of the drawing technique, some children benefited more from the opportunity to draw when discussing past emotional experiences than did others (Butler et al., 1995; Gross & Hayne, 1998, 1999). In the present experiment, the number of clauses of information reported by children in the draw condition ranged from 0 to 69 (0 to 36 in the tell condition). Pearson product-moment correlations were performed to explore the relation between each individual difference measure (intelligence, memory, language development, drawing skill, ToM, temperament, socioeconomic status, and gender) and the total number of clauses reported during happy, sad, and scared interviews for each interview condition (draw or tell). Given that the number of interviewer turns impacted on children’s event recall, interviewer turns were also included in the analyses.
Table 7.1

Pearson Product-Moment Correlations between Individual Difference Measures, Interviewer Turns, and Correct Information Reported, as a Function of Interview Condition and Emotion Type.

<table>
<thead>
<tr>
<th>Individual Difference Measure</th>
<th>Draw Happy</th>
<th>Draw Sad</th>
<th>Draw Scared</th>
<th>Tell Happy</th>
<th>Tell Sad</th>
<th>Tell Scared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligence (WPPSI-R/WASI)</td>
<td>.10</td>
<td>.26 *</td>
<td>-.03</td>
<td>.03</td>
<td>.06</td>
<td>-.02</td>
</tr>
<tr>
<td>Memory (CMS)</td>
<td>-.03</td>
<td>.35 *</td>
<td>.14</td>
<td>.05</td>
<td>.03</td>
<td>-.02</td>
</tr>
<tr>
<td>Language (TELD-3)</td>
<td>-.12</td>
<td>.14</td>
<td>-.08</td>
<td>.05</td>
<td>.15</td>
<td>.04</td>
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<tr>
<td>Drawing (DAP)</td>
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<td>.09</td>
<td>.06</td>
<td>.16</td>
<td>.06</td>
<td>-.02</td>
</tr>
<tr>
<td>Theory of Mind (ToM)</td>
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<td>.16</td>
<td>-.22</td>
<td>.01</td>
<td>.04</td>
<td>.21</td>
</tr>
<tr>
<td>Temperament (BSQ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>-.03</td>
<td>.38 *</td>
<td>.12</td>
<td>-.22</td>
<td>-.03</td>
<td>-.12</td>
</tr>
<tr>
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<td>.07</td>
<td>-.09</td>
<td>.16</td>
<td>-.05</td>
<td>-.04</td>
</tr>
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<td>-.26</td>
<td>-.02</td>
<td>-.25</td>
<td>.01</td>
</tr>
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<td>Adaptability</td>
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<td>.02</td>
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<td>-.03</td>
<td>-.11</td>
<td>.01</td>
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<td>Intensity</td>
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<td>-.11</td>
<td>-.13</td>
<td>-.06</td>
<td>-.15</td>
</tr>
<tr>
<td>Mood</td>
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<td>.29 *</td>
<td>.06</td>
<td>-.11</td>
<td>-.18</td>
<td>-.07</td>
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<td>Persistence</td>
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<td>.08</td>
<td>.13</td>
<td>-.11</td>
<td>-.04</td>
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<td>.01</td>
<td>-.08</td>
<td>-.04</td>
<td>-.08</td>
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<td>-.02</td>
<td>-.09</td>
<td>-.22</td>
<td>.02</td>
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<td>-.08</td>
<td>.03</td>
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<td>-.06</td>
<td>.00</td>
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<td>-.04</td>
</tr>
<tr>
<td>Interviewer Turns</td>
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<td>.52 **</td>
<td>.59 **</td>
<td>.44*</td>
<td>.54 **</td>
<td>.37 *</td>
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</table>

Note. * r > 0.25 moderate correlation, ** r > 0.5 strong correlation, *** r > 0.75 very strong correlation (Harraway, 1993). WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children's Memory Scale, TELD-3 = Test of Early Language Development-Third Edition, DAP = Draw-A-Person Quantitative Scoring System, BSQ = Behavioral Style Questionnaire.
Information Reported. As shown in Table 7.1, there was a moderate to strong positive relation between the number of interviewer turns and the amount of information reported by children for happy, sad, and scared interviews in both the draw and the tell conditions. There were also moderate positive correlations between intelligence, memory, Activity, and Mood for children interviewed about sad events in the draw condition. That is, during drawing interviews, children who were more intelligent, had better memory skill, and who were more active reported more information about times when they were sad. Interestingly, children rated as having a more negative mood (a high score on the BSQ Mood dimension) by their parents also reported more information about sad experiences during drawing interviews.

To further delineate which individual difference variables contributed to children's reports, separate hierarchical regression analyses were conducted for each emotion type. Those variables that had moderate (or higher) correlations with the amount of information reported during the draw and/or the tell interviews for any of the three emotion types were included as predictors in the regression analyses: intelligence, memory, Activity, Mood, and number of interviewer turns.

As shown in Table 7.2, regression analyses were conducted across the two interview conditions (draw and tell combined) for each emotion type. Given its importance in children's memory performance, the number of interviewer turns was entered as the first step in each model. The second step examined the unique contributions of intelligence, memory, Activity, and Mood beyond the impact of interviewer turns. Interviewer turns (Step 1) significantly predicted the amount of information reported during the happy, sad, and scared interviews, accounting for 29.6%,
21.7%, and 35.1% of the variance, respectively. The inclusion of intelligence, memory, Activity, and Mood in the models (Step 2) yielded no significant independent contribution to the prediction of amount of information reported for any of the three emotion types. Indeed, inclusion of the additional variables in the models produced only small increases in the amount of variance accounted for (range .4% to 4.8%).

Separate hierarchical regression analyses were also conducted for each interview condition (draw or tell). The findings replicated those described above. Interviewer turns significantly predicted the amount of information reported by children during the happy, sad, and scared interviews in both the draw and the tell conditions, while intelligence, memory, Activity, and Mood did not make any significant independent contribution to the prediction of the amount of information reported.
Table 7.2
Hierarchical Regression Analysis for Variables Predicting Event Recall as a Function of Emotion Type.

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>R²</th>
<th>Change R²</th>
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<td><strong>Happy</strong></td>
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<td>Step 1</td>
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<td>.03</td>
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<td></td>
</tr>
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<td><strong>Scared</strong></td>
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<td>.59</td>
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</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001. WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children’s Memory Scale, BSQ = Behavioral Style Questionnaire.
Discussion

Consistent with a small, but growing, body of empirical research, the results of the current experiment clearly demonstrate that drawing during a verbal interview facilitates more complete reports of children's emotionally laden experiences than telling alone (Drucker et al., 1997; Gross & Hayne, 1998). Five- to 6-year-old children given the opportunity to draw about their emotional experiences reported approximately 50% more information than children merely asked to tell. Moreover, while children in both the draw and the tell interview conditions reported significantly less information about sad events than about happy or scared events, children in the draw condition reported as much information about sad events ($M = 5.24$ clauses) as children in the tell condition reported about happy events ($M = 5.46$ clauses). That is, even when the drawing technique is least effective (i.e., during sad interviews), it still elicits as much information as a standard verbal interview when it is most effective (i.e., during happy interviews).

In addition to replicating previous findings regarding the efficacy of the drawing technique, the results of the present experiment reinforce the importance of interviewer turns for facilitating complete accounts of children's past experiences. As in the Fire Station Experiment (Chapter 6), the results of the present experiment showed a relation between the amount of information provided by children and the number of conversational turns taken by the interviewer. Separate hierarchical regression analyses conducted for each emotion type (happy, sad, scared) revealed that while interview condition (draw or tell) was predictive of children's recall when entered as the first step in the regression model, when both interview condition and interviewer turns were entered into the model, interview condition no longer contributed to the prediction of children's recall. Interviewer turns was the only significant predictor of the amount of
information that children reported. That is, the number of interviewer turns, not drawing
during the interview process, was predictive of the amount of information children
provided for each emotion type.

Recall that, open-ended and direct questions are known to elicit more accurate
verbal accounts from children than leading and misleading questions (Dent, 1991; Dent &
Stephenson, 1979; Hershkowitz, et al., 1997; Lamb & Fauchier, 2001; Peterson & Bell,
1996). Given that the efficacy of the drawing technique is due to the interviewer taking
more conversational turns, it was encouraging to note that, as in the Fire Station
Experiment, large increases in the number of minimal responses and coded turns (open-
ended and direct questions) were responsible for this effect (see Chapter 6 for a more
detailed discussion).

As mentioned previously, children reported less information about sad events ($M =
4.32$ clauses) than they did about happy ($M = 6.57$ clauses) or scared ($M = 5.55$ clauses)
events. Interestingly, this main effect of emotion type appears to be due to changes in the
interviewer’s behaviour across the happy, sad, and scared interviews. Specifically,
interviewers took significantly less coded turns and made significantly fewer minimal
responses when interviewing children about sad experiences than when interviewing
children about happy experiences. Given that there is a positive relation between the
number of interviewer turns and the amount of information that children report about
their emotional experiences, these findings indicate that children reported less
information about sad experiences because the interviewers were reluctant to ask about
these events, possibly because they did not want the children to become upset.

Although less robust, the findings with respect to scared emotion interviews were
similar to those that emerged for sad interviews. That is, the non-significant trend for
children to report less information about scary events than about happy events appears to be due to the interviewer's reluctance to discuss scary events. Specifically, interviewers took significantly fewer coded turns when interviewing children about scary events than when interviewing them about happy events. Moreover, there was a non-significant trend towards interviewers making fewer minimal responses when interviewing children about scary events than when interviewing them about happy events.

The non-significant findings for scary interviews may be an artefact of the scary events that children chose to discuss. While some children chose to discuss scary events that were negative (e.g., getting lost), other children chose to discuss scary events that were less averse (e.g., rollercoaster rides). Given the findings from the happy and sad interviews, it is likely that the interviewers behaved differently depending on the type of scary event that children chose to report. Specifically, the interviewers may have taken fewer turns with children who chose to discuss negative scary events (because they did not want to upset them), and more turns with children who chose to discuss less averse events. That is, the trend toward children reporting less information about scary events failed to reach significance because the interviewers' willingness to discuss less averse scary events obscured their reluctance to discuss negative scary events.

Consistent with previous studies, the present research demonstrates that interviewer behaviour impacts on the completeness of children's verbal reports of their past experiences. Not only does reacting with obvious distaste when children are discussing unpleasant events result in children providing less information about their experiences (Jones & McQuiston, 1988), more subtle behaviours (e.g., taking fewer conversational turns) also reduces the likelihood that children will make a full disclosure of unpleasant events.
Interestingly, Gross and Hayne (1998) failed to find a main effect of emotion type during their seminal work on the efficacy of the drawing technique for eliciting children’s accounts of emotional experiences. They found that children reported the same amount of verbal information about their emotional experiences irrespective of emotion type. While empirical research is necessary to determine exactly why the current findings differ from those of Gross and Hayne (1998), the use of clinical psychology graduate students to interview children in the current study may provide an explanation. Unlike the interviewers in Gross and Hayne (1998), each interviewer in the present experiment had received extensive interview training prior to assisting with the study. As such, they were able to elicit over twice as much information from children as the interviewers in the Gross and Hayne (1998) study. The ability to elicit detailed accounts of children’s emotional experiences may, in turn, have provided the context necessary for interviewers to reveal their reluctance to ask children to discuss negative (i.e., sad and possibly scary) experiences.

In addition to changes in the interviewers’ behaviour across the happy, sad, and scared emotions interviews, interviewers’ behaviour also differed as a function of socioeconomic status. Specifically, interviewers made significantly more minimal responses when interviewing children from low socioeconomic schools ($M = 35.41$) than when interviewing children from high socioeconomic schools ($M = 17.7$). The number of minimal responses made when interviewing children from average socioeconomic schools was intermediate between these extremes and was not significantly different from either ($M = 24.63$). There was also a non-significant trend toward interviewers taking more coded turns (open-ended and direct questions) when interviewing children from low socioeconomic schools. Recall that, the number of interviewer conversational turns
predicts the amount of information that children report about their emotional experiences. As such, one would anticipate that children from low socioeconomic schools would report more information than children from average and high socioeconomic schools. Interestingly, no such finding emerged; children from the low socioeconomic schools reported the same amount of information as children from the average and high socioeconomic schools. These findings indicate that the interviewers had to provide significantly more encouragement to children from low socioeconomic schools to elicit the same amount of information as they obtained from the other children. Peterson (1994) found a remarkably similar pattern of findings during her research on the relation between narrative skill and social class. She found that while children from low socioeconomic homes were able to provide as much information about their experiences as children from average and high socioeconomic homes, they required much more encouragement to do so. Peterson (1994) suggested that because children from low socioeconomic homes have fewer opportunities to learn how to provide narrative accounts of past experiences, they require additional support to report all that they know about an event.

Given that children from low socioeconomic schools require additional support to provide complete narrative accounts of their past experiences, it is very encouraging that increasing the number of minimal responses may be sufficient to achieve this goal. Because minimal responses do not require the interviewer to ask a question (in contrast to coded turns), the number of minimal responses could be doubled without increasing the chance that the interviewer would inadvertently ask leading or misleading questions. Given that there was a non-significant trend toward interviewers taking more coded turns when interviewing children from low socioeconomic schools, future research is necessary
to determine whether increasing the number of minimal responses, without increasing the number of coded turns, is sufficient to elicit more complete verbal accounts from children attending low socioeconomic schools.

In summary, the findings of the current experiment indicate that interviewers’ behaviour is affected by the interview context. In some situations, being sensitive to the interview context is advantageous. For example, the ability to identify when children require additional support to provide a complete narrative (e.g., children from low socioeconomic schools) helps ensure that interviewers obtain as much information from children as possible. In other situations, however, being sensitive to the interview context is less beneficial. For example, being reluctant to ask children to provide detailed accounts of sad (and possibly scary) emotional experiences is clearly counterproductive when trying to elicit complete accounts from children.

In applied settings, professionals are typically required to interview children about experiences that are sad and/or scary. Thus, it is important that researchers identify techniques that compensate for interviewers’ reluctance to discuss these kinds of events. Given that all of the interviews conducted in the current experiment employed the same interview protocol, it appears that the interviewers were unaware that their behaviour changed depending on the interview situation. Increasing interviewers’ awareness of how their behaviour alters as a function of the interview context may allow them to compensate for their behaviour.

Unfortunately, a significant body of literature suggests that providing interviewers with information about best practice when interviewing children does little to improve the quality of the verbal interview (Cederborg et al., 2000; Lamb et al., 2000; Orbach et al., 2000a; Sternberg et al., 2001a; Walker & Hunt, 1998; Warren et al., 1996). Hence,
providing education about the effects of the interview context on interviewers’ performance may do little to improve the quality of the interview. As a result, it is necessary to develop interview protocols that overcome interviewers’ reluctance to discuss negative events. While drawing does not eliminate interviewers’ reluctance to discuss unpleasant events, it is encouraging that the drawing technique elicits significantly more turns from interviewers than a standard verbal interview. Moreover, even when the drawing technique is least effective (i.e., during sad interviews), it elicits as much information as the standard verbal interview when it is most effective (i.e., during happy interviews). Clearly, the drawing technique is an easily implemented, effective way of compensating for interviewers’ reluctance to discuss negative events.

Despite evidence that the efficacy of the drawing technique is largely due to increases in the number of interviewer turns, the results of the Fire Station Experiment indicated that children’s memory and their level of distractibility were also important predictors of the ability to provide complete accounts of educational experiences. Given these findings, I examined whether intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status were predictive of the ability to profit from the opportunity to draw during a verbal interview about emotional experiences.

In contrast to the findings of the Fire Station Experiment, in the Emotions Experiment, none of the individual difference variables were independently predictive of the ability to profit from the drawing technique when the number of interviewer turns had been accounted for (also see Salmon et al., 2003). These findings suggest that, when the number of interviewer turns has been accounted for, all children are equally likely to benefit from the opportunity to draw about their emotional experiences.
Memory and distractibility may have failed to emerge as significant predictors of children's ability to profit from the drawing technique because children in the current experiment were allowed to self-nominate the happy, sad, and scared experiences that they discussed. Children self-nominated their emotional experiences to ensure that the event being discussed was personally relevant, and of the appropriate valance (e.g., not all children's birthdays are happy experiences: Stein, 1996). Self-nomination of the events may, however, have reduced the memory demands associated with the task because children chose events that they had experienced on more than one occasion (e.g., falling off a bike). As such, the children may have reported the experience on the basis of a general representation (i.e., a script) of how the event typically progresses, rather than using their memory skills to retrieve the details of a single specific event (Farrar & Goodman, 1992; Hudson & Nelson, 1986; Nelson, 2000).

Self-nomination of the events may have also reduced the impact of temperament in the current experiment. That is, because children were discussing events that they wanted to talk about, the impact of temperament traits, such as distractibility, may have been less likely to emerge. Alternatively, distractibility may not have emerged as a significant independent predictor of the amount of information that children reported about their emotional experiences because the emotion interviews were considerably shorter (\(M = 16.47\) clauses) than the fire station interviews (\(M = 33.05\) clauses). Importantly, these findings were not due to the emotion interviews being conducted at the end of the interview session. Indeed, children in the current experiment reported considerably more information about their emotions than children in other studies that were only interviewed about their emotions (Drucker et al., 1997; Gross & Hayne, 1998).
It appears that allowing children to self-nominate emotional events may have obviated the importance of memory and distractibility as independent predictors of children's ability to profit from the drawing technique. Clearly, in applied settings, children do not self-nominate the events that are discussed. As such, research examining the impact of individual differences on the efficacy of the drawing technique when discussing interviewer-nominated happy, sad, and scary events is necessary.

In conclusion, the results of the Emotions Experiment add to a growing body of empirical evidence indicating that drawing facilitates complete accounts of children's emotional experiences. While the accuracy of children's verbal reports was not examined in the current study, prior research by Gross and Hayne (1998) indicates that children's reports of their emotional experiences are highly accurate. The current findings also replicate and extend the findings of the Fire Station Experiment with respect to the importance of interviewer turns in predicting the efficacy of the drawing technique. Specifically, the current experiment highlighted the fact that subtle changes in the number of interviewer turns impacts on the amount of information children report about their emotional experiences. Increasing the number of minimal responses made by interviewers increased the amount of information reported by children from low socioeconomic schools, while decreasing the number of coded turns and minimal responses reduced the amount of information children provided about sad (and possibly scary) events. Given the impact that interviewer turns has on children's verbal reports, it was encouraging to note that, while the drawing technique does not eliminate the impact of interviewers' reluctance to discuss unpleasant events, it does compensate for this behaviour, eliciting significantly more interviewer turns than the standard verbal
Consequently, even when the drawing technique is least effective, it elicits the same amount of information as a standard verbal interview when it is most effective.

Clearly, the drawing technique facilitates more complete accounts of children’s emotional experiences than a standard verbal interview. Recently, drawings have also been used as a demonstration aid to help children report more information about their past experiences. Specifically, body maps (human figure drawings) have been used as an alternative to AD dolls. Previous research examining the efficacy of body maps has found that, while they increase children’s reports of bodily touch, they fail to eliminate errors of omission and they encourage errors of commission (Steward et al., 1996b). Although mistakes of this nature have far reaching ramifications, professionals continue to use body maps in their clinical practice, possibly because of the dearth of published research replicating the findings of Steward et al. (1996b). To address this issue, I will examine the efficacy of body maps for eliciting children’s reports of body touch in two additional experiments (Chapter 8). Moreover, to ensure that body maps are only employed with children likely to benefit from their use, I will examine the impact of individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status on the efficacy of the body map technique.
Chapter 8

Children’s Ability to Report the Location of Bodily Touch: Individual Differences and Body Maps

Traditionally, drawings have been used in two distinct ways in clinical and legal settings. First, children’s drawings have been used as projective measures of intelligence (e.g., Goodenough, 1926; Prewett et al., 1989) and emotional status (e.g., Burgess & Hartman, 1993; Burgess et al., 1981). Professionals who use children’s drawings in this manner make inferences about a child’s intellect and/or emotional status on the basis of the content of his or her artwork, irrespective of what he or she may have said about the drawing. Second, consistent with the research described in Chapters 6 and 7, drawings have been used to enhance children’s verbal reports of past experiences (Butler et al., 1995; Gross & Hayne, 1998, 1999). In this instance, professionals are interested in drawing as a medium for facilitating children’s verbal reports. The focus is on what the child says rather than on what he or she draws. More recently, drawings have also been used in clinical and legal settings as an alternative to AD dolls. When used in this way, suspected victims of child sexual abuse are presented with AD drawings and are asked to use them to show where they have been touched.

The use of AD drawings has become popular in clinical and legal settings (Kendall-Tackett, 1992). Indeed, Conte et al. (1991) found that 66% of child protection workers surveyed used AD drawings during the assessment process. There are two primary reasons for the popularity of AD drawings. First, like AD dolls, they are thought to allow
children who are unwilling or unable to verbally recount abuse to point to, rather than verbally explain, where an alleged perpetrator has touched them (Groth, 1984). Second, it has been argued that children can more readily use AD drawings than AD dolls to show where they have been touched because their representational nature is more readily apparent. Specifically, because the pictures are not salient as real objects (unlike AD dolls), AD drawings do not require children to think of them both as real objects (i.e., toys) and as representations of themselves (Groth, 1984).

Despite the popularity of AD drawings, only one study has attempted to determine whether children can accurately use them to show where they have been touched. In that study, Steward et al. (1996b) interviewed 3- to 6-year-old children about a medical examination on three occasions: immediately following the event, after a 1-month delay, and after a 6-month delay. Children were assigned to one of four interview conditions: a standard verbal interview, a verbal interview combined with pen and paper AD drawings, a verbal interview combined with computer generated AD drawings, or a verbal interview combined with AD dolls and medical props. Irrespective of interview condition, children were asked a series of open-ended and prompted questions about the medical examination. Children interviewed with props (e.g., AD drawings or AD dolls and medical items) were asked to use these items to demonstrate what happened during the event.

Steward et al. (1996b) found that children interviewed with props reported an average of two more correct body touches than those in the standard verbal interview condition across all three delays. Despite the increased reporting of body touch associated with the use of prop items, children interviewed with props only reported approximately 30% of the touches that they had actually experienced. For example,
when interviewed immediately after their medical examination, children interviewed with pen and paper AD drawings only reported 26% of the touches they had actually experienced. Moreover, children interviewed with props reported more incorrect touches than children interviewed in the standard verbal condition. For example, while children in the verbal interview condition made no errors of commission regarding genital touch when they were interviewed immediately following their medical examination, 7.5% of children interviewed with AD drawings erroneously indicated that they had received a genital touch. These findings suggest that the reports elicited from children using AD drawings may be both incomplete and inaccurate.

The ramifications of obtaining incomplete and inaccurate accounts of events from children in cases of alleged sexual abuse are far reaching. Failure to disclose touches that have occurred may result in the accused being wrongfully acquitted and left free to re-offend. Alternatively, false allegations of inappropriate touching may result in innocent people being wrongfully convicted and children being deprived of loving family members (Reed, 1996). Despite evidence indicating that AD drawings fail to elicit complete and accurate accounts of touching, professionals continue to use them during their evaluations of alleged sexual abuse. The dearth of published research replicating the findings of Steward et al. (1996b) may have contributed to professionals’ ongoing use of AD drawings. In the absence of consistent empirical findings, professionals are unlikely to alter their clinical practice.

With this in mind, the present experiment was conducted to determine whether children could use body maps to indicate the location of bodily touches. Moreover, while some children may be unable to use body maps to show where they have been touched, they may benefit from the use of body maps to guide their accounts of events.

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Recall that, because the human figure drawings used in the current study were clothed (see Figure 4.2), it would be misleading to refer to them as AD drawings. As such, the drawings are called body maps.
touched, other children may be quite successful. Thus, I also examined whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status could be used to predict which children could successfully use body maps to show the location of bodily touches. Given the lack of research examining the impact of individual differences on children's use of body maps, it was impossible to make specific a priori predictions about the contribution of these individual difference measures to children's successful use of the drawings.

**Body Map Experiment A**

*Method*

Recall that, 125 5- to 6-year-old children took part in a class trip to Dunedin Central Fire Station. As part of the trip to the fire station, a male confederate touched each child in five distinct locations (on the head, on both shoulders, and under both arms), as he helped the child to put on a costume (see Figure 4.1). Although each child was touched in five distinct locations, each child was touched three times on each shoulder as he or she was turned around to "turn you into a fire fighter." As such, each child was touched a total of nine times. One month later, the children were asked to use a body map to show where they had been touched during the event (see Figure 4.2 for an example of the body maps). They also completed a series of tasks designed to assess their ToM. During the 1-month delay between the class trip to the fire station and the body map interview, each child completed measures to assess intelligence, memory, language development, and drawing skill. To assess children's temperament, caregivers were asked to complete the BSQ.

To examine children's accuracy when using body maps, touches located on the shoulders, on the sides of the figure (above the waist), and on the top of the head, were
scored as correct touches. Touches located on any other part of the figure were scored as incorrect. Furthermore, touches within 1 square centimetre of the genital area were scored as genital touches, while touches within 1.5 centimetres of the breast region were scored as breast touches.

Results

Body Map Performance

The data from 10 children were omitted from the current analyses because they failed to indicate where they had been touched during the fire station event. Thus, the final sample size was 115.

Across the entire sample, four different people interviewed children. Preliminary analyses conducted using chi square tests indicated that passing or failing the body map task was not related to who interviewed the child. Given these findings, the data were collapsed across interviewer for all subsequent analyses.

Correct Touches. Figure 8.1 shows the number of correct touches that children indicated on the body maps as a function of socioeconomic status and gender. On average, each child reported two correct touches ($M = 1.8, SE = .14$). The data relating to the number of correct touches were submitted to a 3 (socioeconomic status: low, average, high) X 2 (gender) ANOVA. There were no main effects of socioeconomic status or gender and there was no interaction.

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11 Of the 10 children who failed to indicate where they had been touched, 8 were males. Moreover, 9 of the 10 children were from either an average or a high socioeconomic school.
Completeness. When children were dressed in the fire service costume, they were touched in five distinct locations: on the head, under both arms, and on both shoulders. For each child, the completeness of his or her account was calculated by dividing the number of correct touches that he or she reported by five: the number of distinct places that he or she was actually touched. I examined whether children were able to report touches to the five distinct locations, rather than examining their ability to report all nine touches that they experienced because, in applied settings, body maps are used to identify the location (as opposed to the frequency) of bodily touches. Overall, children’s reports were only 37.6% complete. In fact, only 3.4% of children (4 out of 115) reported being touched in all 5 locations. A 3 (socioeconomic status) X 2 (gender) ANOVA revealed no significant main effects of socioeconomic status or gender and no interaction.
Incorrect Touches. Figure 8.2 shows the number of incorrect touches that children indicated on the body maps as a function of socioeconomic status and gender. On average, each child indicated that he or she had been touched in 3 ($M = 3.6, SE = .47$) places where he or she had not been touched. The data relating to the number of incorrect touches were submitted to a 3 (socioeconomic status) X 2 (gender) ANOVA. There were no main effects of socioeconomic status or gender and there was no interaction.

Figure 8.2. The number of incorrect touches (+ 1 SE) indicated on the body maps as a function of socioeconomic status and gender.

Accuracy. For each child, accuracy was calculated by dividing the number of correct touches reported by the total number (i.e., correct + incorrect) of touches reported. Overall, slightly less than half (47.8%) of the responses that children made were accurate.
A 3 (socioeconomic status) X 2 (gender) ANOVA revealed no significant main effects of socioeconomic status or gender and no interaction.

**Body Maps in Applied Settings**

Given that children only reported 37.6% of the touches that they had experienced when using the body maps, the importance of obtaining additional information via other sources, such as verbal interviews, when interviewing children in applied settings is clear. The finding that less than half of children’s responses on the body maps were accurate is more problematic. In clinical and legal settings, professionals are not omniscient to children’s experiences. As such, they are unable to distinguish between reports of touches that are correct and reports of touches that are incorrect. To avoid making false allegations of abuse on the basis of children’s responses on body maps, body maps should only be used in applied settings with children who can use them to report correct touches without reporting any incorrect touches.

**Touch Task Failure.** To explore how often children are able to indicate correct touches without reporting any incorrect touches, the data were recoded to distinguish children who made no errors on the touch study (children who passed the touch task) from those who made one or more errors (children who failed the touch task). Figure 8.3 shows the percentage of children who failed the touch task as a function of socioeconomic status and gender. Overall, 81.7% of children failed the task, indicating at least one incorrect touch. Chi square tests indicated that children’s performance on the touch task did not differ as a function of socioeconomic status or gender. Females attending the low socioeconomic schools, however, were significantly more likely than males attending the low socioeconomic schools to fail the touch task. $\chi^2 (1, N = 38) =$
5.60, \( p < .05 \). The performance of males and females attending the average and the high socioeconomic schools did not differ.

Figure 8.3. The percentage of children who failed the touch study as a function of socioeconomic status and gender.

**Sexual Touch.** Given that false allegations of abuse are only likely to arise when children incorrectly indicate genital or breast touches, I examined the frequency with which children incorrectly indicated that they had experienced these types of touches.

**Genital Touch.** Figure 8.4 shows the percentage of children who indicated that they had received at least one genital touch as a function of socioeconomic status and gender. Overall, 11.3% of the children indicated that they had received at least one genital touch. A series of chi square tests indicated that there was no difference in the number of genital touches indicated by children as a function of socioeconomic status or gender and there was no interaction.
Figure 8.4. The percentage of children who indicated a genital touch as a function of socioeconomic status and gender.

Breast Touch. Figure 8.5 shows the percentage of children who indicated that they had received at least one breast touch as a function of socioeconomic status and gender. Overall, 25.5% of the children indicated that they had received at least one breast touch. A series of chi square tests indicated that there was no difference in the number of children indicating that they had received a breast touch as a function of socioeconomic status. Males did indicate that they had received a breast touch significantly more often than females, $\chi^2 (1, N = 115) = 4.81, p < .05$. The main effect of gender appears to have been primarily due to a significant difference in the number of males and females indicating that they had been touched on the breast at the average socioeconomic status school, $\chi^2 (1, N = 41) = 8.80, p < .01$. Males attending the average socioeconomic school
indicated that they had been touched on the breast significantly more often than females attending the average socioeconomic school.

![Figure 8.5](image)

**Figure 8.5.** The percentage of children who indicated a breast touch as a function of socioeconomic status and gender.

*Individual Differences.* To determine whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, socioeconomic status, and gender were predictive of children's ability to use body maps (i.e., whether children passed or failed the task), a standard logistic regression analysis was conducted. As shown in Table 8.1, having a good memory was the only variable associated with an increased chance of passing the touch task.
Table 8.1

Logistic Regression Analysis of Success on the Touch Task as a Function of each Individual Difference Measure.

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>B</th>
<th>Odds Ratio</th>
<th>Lower</th>
<th>Upper</th>
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<tr>
<td>Intelligence (WPPSI-R/WASI)</td>
<td>-0.07</td>
<td>0.93</td>
<td>0.87</td>
<td>1.01</td>
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<tr>
<td>Memory (CMS)</td>
<td>0.06</td>
<td>1.07 *</td>
<td>1.01</td>
<td>1.13</td>
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<tr>
<td>Language (TELD-3)</td>
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<td>1.08</td>
<td>0.99</td>
<td>1.18</td>
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<tr>
<td>Drawing (DAP)</td>
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<td>1.03</td>
<td>0.98</td>
<td>1.08</td>
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<tr>
<td>Theory of Mind (ToM)</td>
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<td>1.04</td>
<td>0.58</td>
<td>1.86</td>
</tr>
<tr>
<td>Temperament (BSQ)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>-0.69</td>
<td>0.50</td>
<td>0.13</td>
<td>1.87</td>
</tr>
<tr>
<td>Rhythmicity</td>
<td>0.03</td>
<td>1.03</td>
<td>0.32</td>
<td>3.35</td>
</tr>
<tr>
<td>Approach</td>
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<td>0.58</td>
<td>0.19</td>
<td>1.73</td>
</tr>
<tr>
<td>Adaptability</td>
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<td>1.23</td>
<td>0.25</td>
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<td>Intensity</td>
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<td>3.14</td>
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<td>0.14</td>
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<td>1.95</td>
<td>0.57</td>
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<td>Threshold</td>
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<td>0.27</td>
<td>0.06</td>
<td>1.24</td>
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<tr>
<td>Gender</td>
<td>-1.29</td>
<td>0.28</td>
<td>0.05</td>
<td>1.60</td>
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<tr>
<td>Socioeconomic Status (low vs. avg.)</td>
<td>0.70</td>
<td>2.02</td>
<td>0.30</td>
<td>13.47</td>
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<td>Socioeconomic Status (low vs. high)</td>
<td>-0.14</td>
<td>0.87</td>
<td>0.11</td>
<td>7.03</td>
</tr>
</tbody>
</table>

Note. *p < .05. WPPSI-R = Wechsler Pre-School and Primary Scale of Intelligence-Revised, WASI = Wechsler Abbreviated Scale of Intelligence, CMS = Children’s Memory Scale, TELD-3 = Test of Early Language Development-Third Edition, DAP = Draw-A-Person Quantitative Scoring System, BSQ = Behavioral Style Questionnaire.

In summary, the findings of the body map experiment indicated that children were extremely poor at using body maps to show where they had been touched after a 1-month delay. Overall, only 2 children out of 115 (1.7%) successfully completed the touch task,
making no errors of commission or omission. Furthermore, 81.7% of children failed the task alleging that they had been touched in at least one incorrect location, 11.3% of children incorrectly indicated that they had received at least one genital touch, and 25.5% of children incorrectly indicated that they had been touched at least once on the breast.

While the findings of the current experiment suggest that body maps are inappropriate for use in clinical and legal settings because children are unable to use them to report prior touch, examination of the individual difference variables indicates that memory ability is predictive of children's performance on the touch task. Specifically, children with better memories are more likely to pass the touch task. This finding raises the possibility that it was the memory demands associated with asking children to report the location of touch following a 1-month delay that was responsible for children’s poor performance, rather than their inability to map bodily experiences onto body maps per se.

**Body Map Experiment B**

The purpose of the second body map experiment was to examine whether children’s inability to use body maps to show the location of touch is due to their inability to use the body maps as a representation of their own bodies or to forgetting over the 1-month delay. In addition, because the original body map experiment was conducted in the context of another larger event (i.e., visiting the fire station), children’s excitement may have resulted in them failing to attend to where the fireman touched them as he helped them to dress. In Experiment B, I simplified the event considerably to determine the relative contributions of forgetting and representation to children’s performance on the body map task.
Method

Forty-six 5- to 6-year-old children were invited (along with their caregivers) to the Early Learning Project laboratory to take part in the body map experiment. Prior to arrival at the laboratory, the caregivers had been contacted by telephone. At this time, the experimental procedure was explained and oral consent was obtained for their child to take part. Upon arrival at the laboratory, a confederate greeted the child and his or her caregiver. The confederate established rapport with the child and then asked the child if he or she wanted to dress up the fire service costume (see Figure 4.1). After obtaining the child's assent, each child was touched in five distinct locations (on the head, on both shoulders, and under both arms), as he or she put on the fire service costume. As in Experiment A, because each child was turned around three times to turn him or her into a fire fighter, each child was touched a total of nine times. This procedure was identical to that employed in Experiment A when touching was imbedded in the context of a larger event. Each child was then randomly assigned to one of three delay conditions: immediate \((N = 15)\), 24 hours \((N = 15)\), or 1 month \((N = 16)\). Following the assigned delay, an interviewer who had not been present when the child put on the costume, asked the child to use a body map to show where he or she had been touched when he or she dressed in the fire service costume. The interviewer introduced the task by saying:

“I heard that last time you were here (a minute ago, a little while ago) [the confederate’s name] helped you put on a fire service costume. What I want you to do now is I want you to use this picture to show me where [the confederate’s name] touched you when she put the costume on. Point to where she touched you.”

At the conclusion of the experiment, each child was given a small novelty gift.

The criteria used to examine children's performance on the touch task were identical to those used in Experiment A. Touches located on the shoulders, on the sides of the figure (above the waist), and on the top of the head were scored as correct touches.
Touches located on any other part of the figure were scored as incorrect. Furthermore, touches within 1 square centimetre of the genital area were scored as genital touches, while touches within 1.5 centimetres of the breast region were scored as breast touches.

Results

Body Map Performance

The data from 4 children who failed to indicate where they had been touched were omitted from the current analyses leaving a sample size of 42.\(^\text{12}\)

Correct Touches. Figure 8.6 shows the number of correct touches that children indicated on the body maps as a function of delay (immediate, 24 hours, 1 month) and gender. On average, each child correctly showed the location of two touches \((M = 1.7, SE = .20)\). The data relating to the number of correct touches were submitted to a 3 (delay) X 2 (gender) ANOVA. The analyses revealed a significant main effect of delay. A Student Newman-Keuls post hoc test revealed that children indicated more correct touches when interviewed immediately after putting on the fire service costume \((M = 2.47, SE = .32)\) than when interviewed after a 24-hour \((M = 1.33, SE = .31, \text{Cohen's } d = .95)\), or a 1-month delay \((M = 1.25, SE = .31, \text{Cohen's } d = 1.03), F(2, 39) = 4.04, p < .05\). The number of correct touches indicated by children in the 24-hour and 1-month delay conditions did not differ. There was no main effect of gender and no interaction.

\(^{12}\) The data from one child in the 24-hour delay condition and 3 children in the 1-month delay condition were omitted.
Completeness. When children were dressed in the fire service costume, they were touched in five distinct locations: on the head, under both arms, and on both shoulders. For each child, the completeness of his or her account was calculated by dividing the number of correct touches that he or she reported by five: the number of distinct places that he or she was actually touched. As in Experiment A, I examined whether children were able to report touches to the five distinct locations, rather than examining their ability to report all nine touches that they experienced because, in applied settings, body maps are used to identify the location (as opposed to the frequency) of bodily touches. Overall, children's reports were only 33.5% complete. In fact, only 2.3% of children (1 out of 42) correctly reported being touched in all five locations. A 3 (delay) X 2 (gender) ANOVA revealed a significant main effect of delay, $F(2, 39) = 4.04, p < .05$. A Student
Newman-Keuls post hoc test showed that the reports of children interviewed immediately after being touched were more complete \((M = .49, SE = .06)\) than the reports of children interviewed after a 24-hour delay \((M = .27, SE = .07, \text{Cohen's } d = .89)\), or a 1-month delay \((M = .25, SE = .06, \text{Cohen's } d = 1.07)\). The completeness of children’s accounts did not differ between the 24-hour and the 1-month delays. There was no main effect of gender and no interaction.

**Incorrect Touches.** Figure 8.7 shows the number of incorrect touches that children indicated on the body maps as a function of delay and gender. On average, each child indicated that he or she had been touched in 1 \((M = 1.5, SE = .25)\) place where he or she had *not* been touched. The data relating to the number of incorrect touches were submitted to a 3 (delay) X 2 (gender) ANOVA. There were no main effects of delay or gender and there was no interaction.

*Figure 8.7. The number of incorrect touches (+ 1 SE) indicated on the body maps as a function of delay and gender.*
Accuracy. For each child, accuracy was calculated by dividing the number of correct touches reported by the total number (i.e., correct + incorrect) of touches reported. Overall, 52.1% of the responses that children made were accurate. A 3 (delay) X 2 (gender) ANOVA revealed no significant main effects of delay or gender and no interaction.

Body Maps in Applied Settings

Touch Task Failure. Because professionals must only employ the body map technique with children who can use the procedure to accurately show where they have been touched, the data were recoded to distinguish children who made no errors on the touch study (children who passed the touch task) from those who made one or more errors (children who failed the touch task). All subsequent analyses are based on these data.

Figure 8.8 shows the percentage of children who failed the touch task as a function of delay and gender. Overall, 76.2% of children failed the task, indicating at least one incorrect touch. A series of chi square tests indicated that there was no difference in children’s performance on the touch task as a function of delay or gender and there was no interaction.
Figure 8.8. The percentage of children who failed the touch study as a function of delay and gender.

**Sexual Touch.** As in Experiment A, I examined the frequency with which children incorrectly indicated that they had experienced a genital or a breast touch.

**Genital Touch.** Figure 8.9 shows the percentage of children who indicated that they received a genital touch as a function of delay and gender. Overall, 7.1% of children indicated that they had received at least one genital touch. A series of chi square tests indicated that there was no difference in the number of genital touches indicated by children as a function of delay or gender and there was no interaction.
Figure 8.9. Percentage of children who indicated a genital touch as a function of delay and gender.

Breast Touch. Figure 8.10 shows the percentage of children who indicated that they had received at least one breast touch as a function of delay and gender. Overall, 23.8% of the children indicated that they had received at least one breast touch. A series of chi square tests indicated that there was no difference in the number of children indicating that they had received a breast touch as a function of delay. Males, however, indicated that they had received a breast touch significantly more often than females, $\chi^2_{1, N=42} = 6.58, p < .01$. There was no interaction.
In summary, consistent with the findings of Experiment A, the findings of Experiment B indicated that children were extremely poor at using body maps to show where they had been touched. In the present experiment, no child successfully completed the body map task by making no errors of commission or omission. Even when children were interviewed with body maps immediately after they had been touched, they failed the task, indicating at least one incorrect touch 60% of the time. Moreover, across delays, 7.1% of children indicated that they had received at least one genital touch, and 23.8% of children indicated that they had been touched at least once on the breast; both of which had never occurred. These findings suggest that 5- to 6-year-old children are unable to map bodily experiences onto body maps.
Discussion

The present study was designed to examine the efficacy of body maps for eliciting complete and accurate accounts of body touch in 5- to 6-year old children. The results of two experiments clearly demonstrated that children were unable to use body maps to show where they had been touched. Irrespective of socioeconomic status (Experiment A) and the delay between the event and the interview (Experiment B), children failed to report nearly three-quarters of the touches that they had experienced. Moreover, half of the touches that children indicated on the body maps were inaccurate.

In applied settings, the ramifications of making mistakes when using body maps are far reaching. First, failing to report bodily touches that have occurred may result in the accused being wrongfully acquitted and left free to re-offend (Reed, 1996). Fortunately, verbal interviews and physical evidence may, at least partially, compensate for errors of omission. Second, falsely indicating a bodily touch that did not occur may result in the accused being wrongfully convicted (Reed, 1996). Such errors of commission are particularly problematic because professionals are unable to distinguish correct from incorrect indications of touch. Given the ramifications of making an error of commission, it was alarming that all of the females attending the low socioeconomic schools, and 80% of the other children participating in the current experiments made at least one false allegation of touch. Moreover, approximately 10% of children erroneously indicated that they had been touched on the genitals, while 25% of children erroneously indicated that they had been touched on the breast. Clearly, in applied settings, indications of breast touch are most likely to cause concern when alleged by females. As such, it is important to note that although males indicated a breast touch
significantly more often than females, females did erroneously indicate breast touches when using the body maps.

Despite using clothed human figure drawings (see Figure 4.2) instead of AD drawings, the results of the current study are consistent with those of Steward et al. (1996b). Taken together, these studies provide compelling evidence that body maps fail to elicit complete and accurate accounts of bodily touch from most children.

Although children appear to provide incomplete and inaccurate accounts of bodily touch when using body maps, some children may profit from the opportunity to use body maps more than others. To determine whether some children benefited from the opportunity to use body maps, I examined the impact of intelligence, memory, language development, drawing skill, ToM, temperament, socioeconomic status, and gender on children’s ability to use body maps. The results revealed that having a good memory was associated with an increased chance of completing the touch task without making any errors of commission when children were interviewed after a 1-month delay (Experiment A).

Given that children’s memory predicted the ability to use the body maps following a 1-month delay, it was difficult to determine whether children were inaccurate on the touch task because they could not remember being touched or because they failed to understand the representational nature of the body maps. In Experiment B, I manipulated the memory demands associated with the touch task to determine the relative contributions of forgetting and representation to children’s performance on the body map task. The results of Experiment B showed that children interviewed immediately after putting on the fire service costume reported significantly more touches ($M = 2.47$) than
children interviewed following a 24-hour ($M = 1.33$) or a 1-month ($M = 1.25$) delay. These results confirmed that children's memory impacted on their ability to use body maps. Memory was not, however, the only variable effecting children's ability to use body maps; even when children were interviewed immediately following the event, they failed to report all of the touches that they had experienced. Moreover, irrespective of delay, half of the children's responses were incorrect. Clearly, even when memory demands are minimal, children are unable to use body maps to provide complete and accurate accounts of where they have been touched. These findings indicate that 5- to 6-year-old children do not understand the representational nature of body maps.

Recall that, 66% of child protection workers surveyed by Conte et al. (1991) used AD drawings during their assessment process. One of the primary rationales for using AD drawings as an alternative to AD dolls is that their representational nature is more readily apparent. Specifically, because pictures are not salient as real objects (unlike AD dolls), AD drawings do not require children to think of them both as real objects and as representations of themselves (Groth, 1984). The results of the current study suggest that although children can exploit the representational nature of line drawings when they depict external objects or the environmental context (e.g., the location of a toy: DeLoache, 1991; DeLoache & Marzolf, 1992), they find it much more difficult to exploit line drawings when the item represented in the picture is themselves (see Patterson, 1997 for similar findings using individualized photographs instead of body maps). That is, even at 5- to 6-years-of-age, children find it difficult to think of themselves as being in more than one place at a time (i.e., both physically present and represented in a drawing).
Interestingly, despite many professionals considering AD drawings to be a superior alternative to AD dolls, Gordon et al. (1993) found that 5-year-old children could use AD dolls to show where they had been touched. These findings, coupled with children's inability to use body maps in the current research, suggest that contrary to expectation, AD drawings may be inferior to AD dolls for eliciting children's accounts of bodily touch. It appears that children can more accurately demonstrate where they have been touched using AD dolls because children can use them to re-enact their experiences. It is important to remember, however, that the efficacy of AD dolls is undermined by children's inability to understand their representational nature prior to age 5 (DeLoache & Marzolf, 1995). In addition, by the time children can exploit the representational nature of AD dolls, socioemotional factors such as embarrassment begin to interfere with children's willingness to report aspects of their experience (e.g., genital touch: Saywitz et al., 1991). Thus, it appears that neither AD dolls nor body maps effectively elicit complete and accurate accounts of bodily touch from children.

In applied settings, children are often asked to report touches that are violent and degrading. It could be argued, therefore, that the innocuous nature of the event used in the current study undermines the ecological validity of the findings. Research suggests, however, that stress and trauma impair children's ability to form memories of an event (Bruck, Ceci, Francoeur, & Barr, 1995a). As such, conducting the current study in a stress-free, enjoyable environment provided children with optimal conditions for remembering the location of the bodily touches. Given that children were unable to use body maps even under these optimal conditions, it is clear that body maps have little utility in applied settings.
In conclusion, the findings of the current study provide compelling evidence that 5- to 6-year-old children cannot use body maps to report bodily touch. Indeed, only 2 out of 157 children (Experiments A and B combined) successfully completed the touch task making no errors of omission and no errors of commission. Thus, while drawing during a verbal interview facilitates complete and accurate accounts of children’s past experiences (see Chapters 6 and 7), providing children with human figure drawings (i.e., body maps) does not.
Chapter 9

General Discussion

In cases of suspected child maltreatment (neglect, sexual, physical, and emotional abuse), obtaining complete and accurate information from the victim is crucial because there is typically limited physical evidence and no eyewitness to corroborate the child’s allegations. Given this, the child’s account may be the cornerstone of any criminal proceeding (Reed, 1996). In clinical settings, obtaining complete and accurate information from children is also extremely important. Because children possess information about their own experiences that may not be readily apparent to others, conducting a thorough interview with the child is necessary to ensure the accurate assessment and effective treatment of his or her mental health problems (Wesson & Salmon, 2001). Despite the relevance of their accounts in both clinical and legal contexts, children often do not report everything they know. As a result, researchers and professionals have developed a number of interview methods and assessment tools to assist children to provide complete accounts of their past experiences without compromising accuracy.

Drawing consistently ranks as one of the top 10 instruments used by clinicians who work with children (Kendall-Tackett, 1992). Despite the popularity of drawings, empirical studies examining the effect of drawing as a method for eliciting information
from children have only recently begun to emerge. The overarching goal of the current thesis was to examine the effect of two commonly used drawing techniques - the drawing interview and the body map procedure on children's accounts of their prior experiences. In addition to examining group differences in children's performance when they were interviewed with and without drawing, I also examined whether intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status could be used to explain individual differences in children's ability to profit from the provision of drawing procedures.

In the Fire Station Experiment (Chapter 6), I assessed whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status could be used to predict which children might be most likely to benefit from the drawing technique when they were interviewed about an educational event. In the Emotions Experiment (Chapter 7), I assessed whether these same individual difference measures could be used to predict which children might be most likely to benefit from the drawing technique when they were asked to provide accounts of three emotional experiences (happy, sad, and scared). In two additional experiments (Chapter 8), I examined children's ability to use body maps to show where they had been touched. I also examined which child characteristics predicted the ability to use the body map technique. In this final chapter (Chapter 9), I will now review all of the findings and discuss their implications for clinical and legal interviews with children.

**Drawing Interview**

Previous research has shown that when children are interviewed about a wide range of events after delays ranging from 1 day to 1 year, children given the opportunity to
draw about their experiences report more information than children merely asked to tell. Moreover, these studies have shown that the increase in children’s verbal reports does not occur at the expense of accuracy (Butler et al., 1995; Gross & Hayne, 1998, 1999; Salmon et al., 2003; but see Wesson & Salmon, 2001). The efficacy of drawing as a technique for eliciting complete and accurate accounts of children’s past experiences was reinforced in the current study. Five- to 6-year-old children given the opportunity to draw and tell about educational and emotional experiences reported significantly more information than children merely asked to tell. Furthermore, when information pertaining to accuracy was available (i.e., the Fire Station Experiment), the increase in information reported did not occur at the expense of accuracy. Children who drew and told about their experiences were as accurate as children who merely told.

Hayne and her colleagues (Butler et al., 1995; Gross & Hayne, 1998, 1999) have suggested that the drawing technique might elicit complete and accurate verbal accounts of children’s past experiences for at least five reasons. First, drawing might facilitate children’s reports because each item that the child draws might act as retrieval cues for other aspects of the same event. Second, drawing might help children structure their narratives by providing an external reminder of what they have, and have not, reported. Third, drawing might remove typical conversational constraints, encouraging children to report aspects of the event that would typically not be discussed, such as the size, shape, and colour of items. Fourth, drawing may put children at ease, allowing them to think about and discuss an event more thoroughly. Finally, drawing may facilitate recall by extending the time that children are willing to engage in the interview process.
Each of the mechanisms proposed by Hayne and her colleagues centre on how drawing may alter children’s behaviour such that they report more information about an event. Contrary to all of these explanations, the results of the current study indicated that the drawing interview elicited information from children because of the impact that drawing had on the interviewers’ behaviour during the interview process. Specifically, children reported more information because the drawing technique encouraged interviewers to take more conversational turns.

Although the number of conversational turns taken by the interviewer was not anticipated to be the primary factor contributing to the efficacy of the drawing interview, in hindsight, the relation between increased recall and the number of interviewer turns was not surprising. Increasing the interviewer’s involvement in the interview process (i.e., taking more turns) may signal to the child that what he or she is saying is interesting and important (Goodman et al., 1990; Moston & Engelberg, 1992). As a result, the child may remain engaged in the interview for a longer period of time; enhanced interview time has previously been found to correlate with the amount of information provided by children (Butler et al., 1995). Prolonging the interview may facilitate children’s verbal reports because it provides greater opportunity for interviewers to take additional conversational turns. As a result, the child is encouraged to complete an exhaustive search of his or her memory, increasing the chance of recalling and reporting additional event-related details (Butler et al., 1995; Roediger & Thorpe, 1978; Wixted & Rohrer, 1994).

Interestingly, although taking more coded turns (i.e., open-ended and direct questions) was important for eliciting children’s verbal reports, increasing the number of
minimal responses appears to be even more important. At least two findings support this conclusion. First, while interviewers used twice as many coded turns when interviewing children with the drawing technique (Fire Station Experiment, $M = 52.77$ coded turns; Emotions Experiment, $M = 30.91$ coded turns) as when interviewing children with a standard verbal interview (Fire Station Experiment, $M = 26.79$ coded turns; Emotions Experiment, $M = 18.24$ coded turns), they used nearly three times as many minimal responses when interviewing children with the drawing technique (Fire Station Experiment, $M = 78.33$ minimal responses; Emotions Experiment, $M = 36.69$ minimal responses) as when interviewing children with the standard verbal interview (Fire Station Experiment, $M = 30.32$ minimal responses; Emotions Experiment, $M = 15.03$ minimal responses). These findings suggest that, although the total number of interviewer turns predicts the amount of information children report, it is the number of minimal responses that drives this effect.

Second, in the Emotions Experiment, there were several instances in which the number of coded turns and minimal responses varied independently; the amount of information that children reported tracked minimal responses more closely than coded turns. For example, interviewers took fewer coded turns and made fewer minimal responses during interviews about sad events than they did during interviews about happy events. Consequently, children reported less information about sad events than they did about happy events. In contrast, interviewers took fewer coded turns, but retained the number of minimal responses during interviews about scary events compared to interviews about happy events. In this instance, children reported the same amount of information about scary events as they did about happy events. Clearly, minimal
responses played an important role in facilitating children's verbal recall because reducing the number of coded turns during the scary interviews was not sufficient to reduce the amount of information provided by children.

The finding that increases in minimal responses facilitated children's verbal reports has important implications for interviews in legal contexts. Recall that, in cases of alleged child maltreatment where there is an absence of physical evidence and no eyewitnesses to corroborate the child's allegations, the child's verbal account is the cornerstone of any criminal proceeding (Reed, 1996). As such, obtaining complete and accurate testimony from the child is crucial. While coded turns facilitate children's verbal reports, asking additional questions (either open-ended or direct) also increases the risk that interviewers will inadvertently compromise the accuracy of children's accounts by asking leading or misleading questions. Inaccurate verbal accounts may, in turn, lead to the accused being wrongfully convicted (Bruck, Melnyk, & Ceci, 2000; Poole & Lamb, 1998; Strange, Garry, & Sutherland, 2003). Alternatively, if the child's testimony is deemed contaminated by the overuse of leading or misleading questions, his or her verbal account may be inadmissible in court and the accused may be acquitted and left free to re-offend. In the present research, it was encouraging that increasing interviewers' use of minimal responses facilitated children's reports. Minimal responses, by their very nature, reduce the risk of interviewers inadvertently asking leading or misleading questions. From this perspective, encouraging professionals in legal settings to use more minimal responses during verbal interviews may be an effective way of eliciting information from children while minimizing the risk of contaminating children's accounts with leading or misleading questions.
Taken together, the findings from the Fire Station Experiment and the Emotions Experiment indicate that increasing the number of interviewer turns facilitates children's recall of educational and emotional experiences. Importantly, drawing during verbal interviews appears to be an effective way to increase the number of interviewer turns. Although the drawing technique increases interviewers' conversational turns, the mechanisms underlying this effect remain unclear. At the conclusion of the Fire Station Experiment, I hypothesised that drawing may increase the number of interviewer turns for at least three reasons. First, drawing may help interviewers to structure their interviews. Specifically, because the child draws his or her experiences, the interviewer has a visual record of which aspects of the event he or she needs to follow up. As a result, the interviewer does not have to retain as much information in memory, allowing him or her to more thoroughly follow-up one element of the event (e.g., visiting the kitchen at the fire station), without the risk of forgetting to follow-up another (e.g., sitting in the fire engine). Moreover, because children draw more detail than they tell verbally, interviewers have more opportunity to take coded turns.

Second, drawing may slow the pace of the interview, allowing the interviewer more time to think about what aspects of the event to follow-up, and providing more opportunity for interviewers to make minimal responses. In addition, slowing the pace of the interview gives the child time to complete an exhaustive search of his or her memory.

Third, because drawing is perceived to be a child-friendly, engaging, and non-threatening activity, the drawing interview may put the interviewer at ease. As a result, interviewers may be more comfortable with silence, allowing the child more time to complete and exhaustive search of his or her memory. Moreover, interviewers may be
more willing to extend the length of the interview by repeatedly taking coded turns. Finally, feeling relaxed, coupled with a desire to maintain the flow of the conversation while the child is drawing, may facilitate interviewers’ use of minimal responses.

Contrary to my initial supposition, it appears that drawing does not always put the interviewer at ease. For example, during the Emotions Experiment, interviewers took significantly fewer conversational turns when they asked children about sad and scary experiences than when they asked about happy experiences. It appears that the interviewers were reluctant to ask about negative events because they did not want to upset the children that they were interviewing. Clearly, in this instance, drawing did not put the interviewer at ease. Given that professionals working in applied settings are typically required to interview children about sad and/or scary events, it is important that researchers attempt to identify techniques that compensate for interviewers’ reluctance to discuss these kinds of events.

While the interviewers’ sensitivity to the interview context can be a hindrance in some situations (e.g., when asking children to report about negative experiences), in other situations, the interviewers’ sensitivity to the interview context can be advantageous. For example, sensitivity to the interview context allowed the interviewers to identify that children from low socioeconomic schools required additional support to provide a complete narrative. Specifically, during the emotion interviews, interviewers made significantly more minimal responses when interviewing children from low socioeconomic schools than when interviewing children from high socioeconomic schools. Because the number of interviewer turns predicts the amount of information children report, one would anticipate that children from the low socioeconomic schools
would report more information than children from high socioeconomic schools; no such finding emerged. Children from the low socioeconomic schools reported the same amount of information as children from the high socioeconomic schools. These findings indicated that the interviewers were sensitive to the fact that children from the low socioeconomic schools required more encouragement to provide a complete account of their experiences than did children from high socioeconomic schools (also see Peterson, 1994). Peterson (1994) suggested that, because children from low socioeconomic homes have fewer opportunities to learn how to provide narrative accounts of past experiences, they require additional support to report all that they know about an event.

Overall, children reported more information about their trip to the fire station \( M = 33.05 \) clauses than they did about their emotional experiences \( (M = 16.47 \) clauses). There may be a number of reasons for this difference. First, children may have reported more information about their experiences at the fire station simply because of the variety of events that took place there (e.g., seeing the fire pole, going in the fire engine). A variety of events also occur, however, during emotional experiences, such as birthday parties (e.g., playing games, eating birthday cake). As such, the variety of events experienced does not appear to account for the discrepancy in the amount of information children reported across the emotional and the educational events.

Second, children are asked to provide narrative accounts of specific events and activities more often than they are asked to discuss emotional experiences. As such, children may have reported less information about their emotional experiences than about an educational event because they have less experience conversing about these kinds of events.
Third, research has shown that children provide more information about their experiences when they are asked direct questions (e.g., “Tell me what you saw there”) than when they are asked general open-ended questions (“Tell me all about that”; Poole & Lamb, 1998). Direct questions are thought to elicit more information from children because they provide structure and cues about the types of information interviewers are interested in (Brown & Pipe, 2003b; Poole & Lamb, 1998). As such, children may have reported more information during the Fire Station Experiment than during the Emotions Experiment because the use of direct questions during the fire station interviews provided the children with additional retrieval cues and structure.

The use of direct questions during the Fire Station Experiment may also account for why, in contrast to the Emotions Experiment, children from low socioeconomic schools did not require additional assistance (i.e., more interviewer turns) to provide a complete accounts of the educational event. That is, asking children from low socioeconomic schools direct questions may have provided them with the guidance that they needed to overcome their limited knowledge of how to provide a narrative account of their experiences (Peterson, 1994).

Given that, children are typically asked to report about emotional experiences in applied settings, research examining whether direct questions can facilitate children’s (especially children from low socioeconomic backgrounds) verbal accounts of their emotional experiences is clearly necessary.

In summary, consistent with prior research, the present research demonstrated that drawing facilitated children’s verbal reports of novel and emotional experiences without compromising accuracy (Butler et al., 1995; Drucker et al., 1997; Gross & Hayne, 1998,
1999; Salmon et al., 2003). The current studies extend previous research by demonstrating the importance of interviewer turns for predicting the efficacy of the drawing technique. While it is unclear why drawing increases the number of interviewer turns, it is clear that it even when the drawing technique is least effective (e.g., when children are interviewed about negative events), drawing interviews elicit as much information as standard verbal interviews when they are most effective (e.g., during happy events).

Despite evidence that the efficacy of the drawing technique was largely due to increases in the number of interviewer turns, data from both the Fire Station Experiment and the Emotions Experiment indicated that some children profited more from the opportunity to draw during a verbal interview than others. While some children reported no information about their experiences (educational or emotional), other children provided detailed accounts. To ensure that the drawing technique is only used in applied settings with children likely to benefit from the opportunity to draw, I examined whether individual differences in intelligence, memory, language development, drawing skill, ToM, temperament, and socioeconomic status could be used to predict which children profit from the opportunity to draw during a verbal interview. The results of the Fire Station Experiment revealed that distractibility, memory, and ToM were independently predictive of the ability to profit from the drawing technique.

Professionals in applied settings could use a child's level of distractibility to evaluate the likelihood that he or she would benefit from the opportunity to draw during a verbal interview. Specifically, during the Fire Station Experiment, children rated as distractible by their caregivers did not benefit from the drawing interview. Children who
were rated as distractible may have reported less information than their non-distractible peers during drawing interviews because drawing failed to engage these children long enough for them to receive all of the benefits associated with the interviewer taking more conversational turns. Alternatively, interviewers may have terminated interviews with children rated as distractible earlier than they did with children who were not rated as distractible because they were more difficult to interview. Additional empirical research is necessary to determine the impact of children's behavioural style (i.e., temperament) on interviewers' behaviour. It is important to note, however, that while drawing did not facilitate the verbal reports of children who were distractible, drawing was not deleterious to their interview performance.

The results of the Fire Station Experiment indicated that professionals in applied settings should use the drawing interview with children who have poor memories. While children with poor memories reported significantly less information than their peers during standard verbal interviews, children with poor memories provided as much information as their peers when interviewed with the drawing technique. That is, drawing ameliorated the impact of having a poor memory, possibly because drawing provided these children with retrieval cues that they would otherwise fail to generate, or because drawing slowed the pace of the interview giving children with poor memories more time to search their memories for event-related details.

It is important to emphasize that children in the current study were classified as having a “poor” memory if they obtained a General Memory Index score, as measured by the CMS, of less than 97. In applied settings, index scores between 85 and 115 on the CMS are considered “average.” That is, some children included in the “poor memory”
group did not actually have poor memories. Given that the effect of memory emerged even with minor differences in memory performance, it may be that drawing is even more beneficial for children with clinically significant memory impairment. Establishing the efficacy of the drawing interview with children who have clinically significant memory impairment (i.e., children with intellectual disabilities) is an important direction for future research because these children are over-represented in clinical and legal settings (Henry & Gudjonsson, 1999; Michel, Gordon, Ornstein, & Simpson, 2000).

The results of the Fire Station Experiment indicated that the verbal reports of children who passed the false belief (i.e., ToM) tasks were more accurate than those who had not. Despite these findings, accuracy was very high irrespective of children’s ToM performance. In applied settings, therefore, the impact of ToM on the accuracy of children’s accounts is likely to be minimal. That is, assessing a child’s ToM is likely to be of little benefit to professionals trying to evaluate the accuracy of children’s verbal accounts.

In contrast to the ToM findings, the results of the Fire Station Experiment underscore the importance of considering a child’s socioeconomic status when trying to evaluate the accuracy of his or her verbal account. Irrespective of interview condition (draw or tell), children attending low socioeconomic schools provided significantly less accurate accounts of the fire station event than their peers attending high socioeconomic schools. Moreover, children attending the low socioeconomic schools made 45% of the errors that occurred during the fire station interviews. Despite the relation observed between socioeconomic status and accuracy at the group level, socioeconomic status did not emerge as a significant independent predictor of the ability to profit from the drawing
technique. It is possible that the impact of socioeconomic status on children’s accuracy was obviated because of its relation to intelligence, memory, and language (see Chapter 5). These findings suggest, however, that in the absence of any information about a child’s cognitive ability (i.e., intelligence, memory, and language), socioeconomic status could be used to help professionals evaluate the accuracy of a child’s verbal account of a novel event.

The results of the present study underscore the importance of recruiting children from a wide range of socioeconomic backgrounds in studies designed to understand the relation between interview techniques and the content and accuracy of children’s reports. Many prior studies of children’s reports in our laboratory (Butler et al., 1995; Gross & Hayne, 1998, 1999) and others (e.g., Baker-Ward et al., 1993; Salmon & Pipe, 1997, Salmon et al., 2003) have recruited children from middle- and upper-middle-class neighborhoods. These studies have led to the conclusion that when they are asked general and open-ended questions, children’s accounts are highly accurate. Similarly, in the current study, children from average and high socioeconomic schools were highly accurate, but children from low socioeconomic schools were not. In fact, while less than 5% the verbal statements made by children from average and high socioeconomic schools were inaccurate, up to 18% of the verbal statements provided by children from low socioeconomic schools were inaccurate.

Unfortunately, despite the importance of conducting research across the economic spectrum, children from low socioeconomic backgrounds are often omitted from experimental research because of difficulties associated with participant recruitment. Given the impact that such omissions can have on the validity of empirical findings,
coupled with the fact that children from low socioeconomic homes are over represented in clinical and legal settings, the lack of research including children from low socioeconomic backgrounds is alarming. Clearly, the lack of empirical research including a sample of children from low socioeconomic backgrounds needs to be addressed, while conclusions drawn about children's event recall on the basis of studies that have failed to include a low socioeconomic group need to be revisited.

Aside from distractibility, memory, and ToM, none of the other individual difference variables measured here predicted children's ability to profit from the opportunity to draw during a verbal interview about an educational event (i.e., the fire station). Previous research has, however, found significant relations between children's intelligence and their performance during standard verbal interviews (Geddie et al., 2000; Brown & Pipe, 2003b), children's language development and their performance during standard verbal interviews (Salmon et al., 2003), and children's drawing skill and their performance during drawing interviews (Gross & Hayne, 1998). Interestingly, intelligence, language, and drawing skill are all positively related to memory ability (Bensur et al., 1997; Hildebrand & Ledbetter, 2001; Morra et al., 1988; Schneider & Pressley, 1997). Thus, it appears that the impact of general memory on children's verbal reports may have mediated or moderated the potential impact of intelligence, language development, and drawing skill in the current study.

Given that a child's temperament is likely to affect the way that events are appraised, encoded, retrieved, and reported, the failure to find a relation between children's temperament and their verbal reports (with the exception of distractibility) was somewhat unexpected. It may be, however, that because the interviews were conducted
in a stress-free, friendly environment the impact of temperament domains, such as Approach and Mood, were mitigated. Conducting research under more ecologically valid conditions will provide more insight regarding the impact of temperament on children’s verbal reports.

Perhaps the most surprising finding to emerge from the drawing interview experiments was that, despite there being variability in children’s performance during the Emotions Experiment, none of the individual difference factors measured predicted which children would profit from the opportunity to draw about happy, sad, and scary emotional experiences. These finding suggested that, when the number of interviewer turns had been accounted for, all children were equally likely to benefit from the opportunity to draw about their emotional experiences. It appears, however, that allowing children to self-nominate the emotional events that they discussed may have undermined the impact of distractibility and memory on children’s verbal reports. Specifically, distractibility may have failed to emerge as a significant predictor of children’s ability to profit from the drawing technique because the children were discussing events that they found interesting and engaging. Moreover, because children chose events that they were familiar with, the memory demands associated with the task were reduced. Obviously, the impact of ToM was not evident during the Emotions Experiment because information about children’s accuracy was unavailable. Further research is needed to establish the impact of distractibility and memory on children’s verbal reports when the interviewer nominates the happy, sad, and scary events that children discuss. The impact of ToM (and socioeconomic status) on children’s accuracy also needs to be established in future research.
The Fire Station Experiment and the Emotions Experiment were not intended to provide a comprehensive account of all of the variables that contributed to the efficacy of the drawing technique. It was interesting to note, however, that between 40% and 70% of the variability in the data remained unaccounted for even when all of the individual difference variables that correlated with children's performance had been included in regression analyses. Clearly, a number of other individual difference variables such as parenting style (Salmon & Pereira, 2002), attachment (Goodman et al., 1994; Quas et al., 1999), ethnicity (Geddie et al., 2000), source monitoring ability (Quas, Qin, Schaaf, & Goodman, 1997) and parent-child conversational style (Hudson, 1990; Nelson, 1993; Quas et al., 1999) may contribute to children's ability to profit from the opportunity to draw during a verbal interview.

Although the variables measured in the current study did not provide a complete account of the variables contributing to the efficacy of the drawing technique, the results of the drawing interview experiments are very encouraging. The increase in recall associated with the drawing interview was not only statistically significant; it was also clinically significant. In legal settings, obtaining up to 50% more information from a child could result in a child sex offender being convicted. In clinical settings, obtaining up to 50% more information from a child would allow the clinician to more clearly understand the child's mental health problems. Improving a professionals' understanding of their client's difficulties, in turn, helps the professional to develop an effective intervention.

Despite the promise of these preliminary findings, before definitive conclusions can be drawn about the effect of the drawing interview on children's verbal reports, future
research needs to address a number of issues. First, despite replicating the relation between interviewer turns and the amount of information provided by children in both the Fire Station and the Emotions Experiments, because regression analyses were used, it would be premature to conclude that there is a causal relation between these variables. Indeed, it is possible that the relation between interviewer turns and children's verbal reports is due to the influence of other, as yet unmeasured, variables. To definitively conclude that there is a causal relation between interviewer turns and the amount of information reported by children, research manipulating the number and type (i.e., coded turns, minimal responses, prompts) of interviewer turns taken during both the drawing and the standard verbal interviews is necessary.

Second, because children are highly sensitive to interviewers' behaviour (Jones & McQuiston, 1988), the efficacy of minimal responses may, at least partially, depend on the interviewers' intonation when making a minimal response. For example "Wow!!" may elicit more information from a child than "mmm." In applied settings children will rarely be asked to recount events where it would be appropriate for interviewers to sound overly enthusiastic. As such, the impact of interviewer intonation on the efficacy of minimal responses needs to be examined in future research.

Third, given that interviewer behaviour was a major predictor of the efficacy of the drawing technique, the absence of research employing the professionals who will ultimately use the procedure (e.g., police, psychologists, social workers) needs to be addressed.

Fourth, to ensure that professionals only use the drawing interview when it is likely to assist the individual to report more information about his or her experiences, research
establishing the effect of the drawing interview when used with a variety of age groups (including adults) is necessary. The impact of interviewer behaviour and the impact of the individual differences on the completeness and accuracy of verbal reports may change as a function of age. Age-related changes in verbal skill and increased experience providing narrative accounts of past experiences may, for example, reduce the impact of interviewer behaviour on the verbal reports of older children and adults. Alternatively, people may benefit from the interviewer taking additional conversational turns irrespective of age.

Finally, research examining the efficacy of the drawing technique under more ecologically valid conditions is necessary. The innocuous events used to explore the efficacy of the drawing technique (e.g., visiting the fire station and child-nominated emotional experiences) do not provide insight into the impact of stress and trauma on children’s ability to profit from the drawing technique (Bruck et al., 1995; Merritt et al., 1994). It may be, for example, that because drawing is highly effective with children who have poor memories, children who have experienced trauma may be especially likely to benefit from the opportunity to draw. Alternatively, children who have experienced a traumatic event may report less information than children merely asked to tell because they are reluctant to draw their experiences. While additional research is necessary, preliminary research examining the efficacy of the drawing interview in applied settings has produced very encouraging results. Drucker et al. (1997) found that children asked to draw about their parent’s substance abuse reported significantly more information than children merely asked to tell.
Traditionally, researchers have proposed that obtaining complete and accurate information from children depends upon interviewers being able to capitalize on children’s strengths, while compensating for their weaknesses (Saywitz, 1995). The finding that interviewer turns was the primary variable predicting the efficacy of the drawing technique suggests, however, that researchers also need to work from alternative theory whereby, obtaining complete and accurate information from children is contingent upon being able to capitalize on interviewers’ strengths, while compensating for their weaknesses.

In summary, consistent with previous research, children given the opportunity to draw and tell about educational and emotional experiences reported more information than children merely asked to tell. Importantly, the increase in the amount of information reported did not occur at the expense of accuracy (Butler et al., 1995; Gross & Hayne, 1998, 1999, Salmon et al., 2003). The current research also contributed to our understanding of the mechanisms behind the efficacy of the drawing technique. Specifically, the drawing interview increased children’s verbal reports because it encouraged interviewers to take more conversational turns. Finally, it is now clear that assessing distractibility and memory may help professionals evaluate whether a child is likely to profit from the opportunity to draw. Irrespective of a child’s characteristics, however, the evidence to date suggests that professionals in applied settings should employ the drawing interview as frequently as possible; drawing is never less effective than a standard verbal interview, but it is often more effective.
Body Maps

In the 1980's, there was a dramatic increase in the number of reported cases of child sexual abuse. Because professionals had no guidelines or specific training regarding how to evaluate these cases, they were forced to develop ad hoc methods, such as AD drawings, to aid the assessment process (Koocher et al., 1995). Developing assessment tools in this manner meant that the efficacy of these tools was not empirically assessed prior to their use in applied settings. Unfortunately, the one study that has examined the efficacy of AD drawings found that the reports elicited from children using AD drawings were both incomplete and inaccurate (Steward et al., 1996b). Despite evidence indicating that AD drawings fail to elicit complete and accurate accounts of bodily touch, professionals continue to use them during their evaluations of alleged child sexual abuse. The dearth of published research replicating the findings of Steward et al. (1996b) may have contributed to professionals' ongoing use of AD drawings. In the absence of consistent empirical findings, professionals are unlikely to alter their clinical practice.

With this in mind, the Body Map Experiments were conducted to determine whether children could use body maps to indicate the location of a touch. In addition, I examined whether individual differences in intelligence, memory, language development, ToM, drawing skill, temperament, and socioeconomic status could be used to predict which children could successfully use body maps to show the location of a touch.

Given that children’s responses on body maps contribute to professionals’ decisions regarding the guilt or innocence of alleged child sex offenders, the results of the body map experiments were alarming. Irrespective of socioeconomic status (Experiment A)
and the delay between the event and the interview (Experiment B), children failed to report nearly three-quarters of the touches that they had experienced and half of the touches that children did indicate on the body maps were incorrect. Moreover, approximately 10% of children erroneously indicated that they had been touched on the genitals, while 25% of children erroneously indicated that they had received a touch to the breast. In total, only 2 out of 157 children (Experiments A and B combined) successfully completed the touch task making no errors of omission and no errors of commission.

Importantly, while memory predicted children’s ability to profit from the use of the body map technique, even when the memory demands associated with the task were removed (Experiment B), 5- to 6-year-old children were still unable to use the body maps to provide complete and accurate accounts of bodily touch. These findings suggested that children’s inability to use the body maps stemmed from a failure to understand the representational nature of the body maps. That is, children did not understand that the body maps were intended as a representation of themselves.

The current findings are testament to the importance of empirically assessing the validity of ancillary aids prior to implementing them in applied settings. Indeed, there is compelling evidence that professionals working in applied settings should not be using body maps to elicit children’s accounts of bodily touch.

Unfortunately, because professionals have been using body maps in applied settings for two decades, they are unlikely to relinquish the use of body maps based on the findings of the current study. To convince child protection workers that the use of body maps is inappropriate in applied settings, research addressing the lack of ecological
validity associated with the current study is necessary. First, in applied settings, children are likely to be asked to report touches that are violent and degrading. Although conducting the current study in a stress-free, enjoyable environment provided children with optimal conditions for remembering the location of the bodily touches, professionals may suggest that the innocuous nature of the event used in the current study undermines the validity of the findings. As such, researchers will need to examine the efficacy of body maps when children are asked to report touches that are more consistent with those experienced by children in applied settings. Clearly, it would be unethical to touch children on the genitals and breasts for the purposes of this research. The use of medical checkups that include a genital touch may, however, provide an appropriate analogue for these experiences.

Second, although professionals in New Zealand use clothed body maps identical to those employed in the current study when assessing cases of alleged sexual abuse, the use of clothed body maps differs from international practice. If professionals in applied settings are to accept the validity of research exploring the efficacy of body maps, research employing Groth's (1984) AD drawings will be necessary. In addition, the current research only used a front view of the body maps. In applied settings, children are often supplied with both front and back views of the human figure. As such, research employing this methodology is necessary.

Finally, in applied settings children are not asked to use the body maps until they have verbally disclosed bodily touch. In the current study, all children were asked to demonstrate where they had been touched on the body map irrespective of whether they had verbally reported a touch. While conducting the experiments in this manner allowed
me to establish whether children could use the body maps, the results may not reflect the accuracy of children who clearly recall being touched.

Given that children do not understand the representational nature of body maps, it is unlikely that improving the ecological validity of the current research will alter the conclusion that children are unable to use body maps to show the location of touch. To convince child protection workers that the use of body maps is inappropriate in applied settings, however, research addressing the lack of ecological validity associated with the current study is necessary.

**Conclusion**

Taken together, the findings for the current thesis indicate that, although children can remember considerable amounts of information about their experiences, the efficacy of drawing as a medium for eliciting this information varies as a function of the way that drawing is employed. Specifically, while drawing was highly effective when used as a medium for eliciting verbal information from children, providing children with a pre-drawn body map failed to facilitate children’s accounts of bodily touch.

In closing, Saywitz (1995) suggested that obtaining complete and accurate information from children depends upon interviewers being able to capitalize on children’s strengths, while compensating for their weaknesses. The findings of the current thesis indicate that interviewers achieve these goals when using the drawing interview. Slowing the pace of the interview provides children with more time to recall the information that they have encoded into memory. Moreover, the drawing interview compensates for children’s failure to generate their own retrieval cues. In addition, however, the results of the current research suggest that obtaining complete and accurate
information from children is also contingent upon being able to capitalize on
interviewers' strengths, while compensating for their weaknesses. The drawing interview
achieves these goals by encouraging interviewers to take more conversational turns and
by compensating for their reluctance to discuss negative events without eliminating their
sensitivity to the interview context.
References


Appendix A*

Behavioral Style Questionnaire Temperament Domains

Activity: The amount of physical motion during daily activities (e.g., sleep, play, and eating).

Rhythmicity: The regularity of physiologic functions such as sleep, elimination, and hunger.

Approach/Withdrawal: The nature of initial responses to new stimuli (e.g., people, places, and foods).

Adaptability: The ease or difficulty with which reactions to stimuli can be modified in a desired way.

Intensity: The energy level of responses regardless of the quality or direction.

Mood: The amount of pleasant and friendly or unpleasant and unfriendly behaviour in various situations.

Persistence/Attention Span: The length of time that particular activities are pursued by the child with or without obstacles.

Distractibility: The effectiveness of extraneous environmental stimuli in interfering with ongoing behaviours.

Sensory Threshold: The amount of stimulation, such as sounds or light, necessary to evoke discernable responses in the child.

Appendix B*

Procedure and Dialogue for the False Belief Contents Tasks

Visual Contents Task:
1) Present the unopened crayon (Band-Aid) box to the child and ask him/her, “What do you think is inside this box?”
2) Open the box and show him/her what is really inside.
3) “Can you remember what is inside the box?” If the child provides an incorrect response, repeat steps 2 & 3.
4) “What did you think was inside the box before I showed you what was in it?” (Own belief question).
5) “Bob the Builder has never looked inside this box. I am going to show him the box for the very first time with the box still shut. Tell me, what will Bob the Builder think is inside the box before I show him what is inside the box?” (Others’ belief question).

Verbal Contents Tasks:
1) Present the unopened crayon (Band-Aid) box to the child and ask him/her, “What do you think is inside this box?’’

2) "Now I am going to tell you what is inside the box. There are (is) candles (tape) inside the box."

3) "Can you remember what is inside the box?" If the child provides an incorrect response, repeat steps 2 & 3.

4) "What did you think was inside the box before I told you what was in it?" (Own belief question)

5) "Bob the Builder has never looked inside this box. I am going to tell him what is inside this box for the very first time with the box still shut. Tell me, what will Bob the Builder think is inside the box before I tell him what is inside the box?" (Others’ belief question).
Appendix C*

Procedure and Dialogue for the False Belief Locations Tasks

Visual Locations Task:

Scenario 1:

*Mickey Mouse:* “I just got a new toy car. I love to play with it. It’s here in my toy box. Wanna see it?”

*Donald Duck:* “Sure!”

*Mickey Mouse:* “Here it is.” (Mickey shows Donald the car in the box).

*Donald Duck:* “That’s nice, Mickey. Well, I have to go home now, but I’ll come back later to play with your new toy car. Bye.” (Donald leaves).

*Mickey Mouse:* “Hmmm, when Donald comes back, he’ll want to play with my car. But I don’t want him to play with it. I know, I’ll hide it in the closet.” (Mickey hides the car in the closet).

*Interviewer:* “Donald comes back from his house and wants to play with Mickey’s car. When Donald was here before, he saw the car in the toy box.” “Well, where is the car now?” (Reality Question)

If the child answers incorrectly, the child is shown the correct location of the car.

“Where does Donald think the car is?” (Belief Question).

Visual Locations Task:

Scenario 2:

*Jake:* “Look, Fizz, I just got a new slinky. I love to play with it. It’s here in my box. Wanna see it?”

*Fizz:* “Yeah, that’s nice Jake. Well, I have to go to the store now, but when I come back, I’ll play with your slinky.” (Fizz leaves).

*Jake:* “Hmm, when Fizz comes back, she’ll want to play with my slinky. But I don’t want her to play with it. I know, I’ll hide it. Fizz saw the slinky in the box, so I’ll hide it here in the cabinet.” (Jake hides the slinky in the cabinet).

*Interviewer:* “Fizz comes back from the store and wants to play with Jake’s slinky. When Fizz was here before, she saw the slinky in the box.” “Well, where is the slinky now?” (Reality Question)

If the child answers incorrectly, the child is shown the correct location of the slinky.

“Where does Fizz think the slinky is?” (Belief Question).

Verbal Locations Task:

Scenario 1:

*Mickey Mouse:* “I just got a new toy car. I love to play with it. Donald Duck is coming over soon to play with me. If he finds out that I got a new toy car, he’ll want to play with it. But I don’t want him to play with it. My car is here in my toy box, but I won’t tell Donald that.
I’ll tell him it’s in the closet. Really my car is in the toy box, but I’ll tell Donald it’s in the closet.”

Interviewer: “Donald comes over to play with Mickey.”

Donald Duck: “Hi, Mickey! Can I play with your toy car?”

Mickey Mouse: “Yeah...it’s in my closet.”

Donald Duck: “Oh, thanks for telling me.”

Interviewer: “Mickey told Donald that his toy car is in the closet.”

“Where is the toy car really?” (Reality Question).

If the child answers incorrectly, the child is told the correct location of the car.

“Where does Donald think the car is?” (Belief Question).

Verbal Locations Tasks:

Scenario 2:

Jake: “I just got a new slinky. I love to play with it. Fizz is coming over soon to play with me. If she finds out that I got a new slinky, she’ll want to play with it. But I don’t want her to play with it. My slinky is in the box, but I won’t tell Fizz that. I’ll tell her it’s in the cabinet. Really my slinky is in the box, but I’ll tell Fizz it’s in the cabinet.”

Interviewer: “Fizz comes over to play with Jake.”

Fizz: “Hi Jake! Where is your new slinky?”

Jake: “Here, in the cabinet.”

Fizz: “Oh, thanks for telling me.”
Interviewer: "Jake told Fizz that his slinky was in the cabinet."

"Where is the slinky really?" (Reality Question).

If the child answers incorrectly, the child is told the correct location of the slinky.

"Where does Fizz think the slinky is?" (Belief Question).