

**THE EFFECT OF PROPS ON CHILD SUGGESTIBILITY IN
REPEATED INTERVIEWS**

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The present study investigated the use of props to enhance the recall accuracy of preschool children when misleading suggestions were provided in a repeated interview situation. The subjects were 64 four year old children who participated in a home visit followed by questioning either one day and one week later or one week later. Results showed no significant effects from the provision of props or from misleading suggestions in repeated interviews. That is children's abilities to accurately recall memory for events was not affected from the provision of props, or the inclusion of misleading suggestions in repeated interviews. The implication of these findings are discussed in terms of the reliability of child eye witness memories.

1. INTRODUCTION

Children often witness, or are themselves victims of, crime. However, their evidence is constantly questioned and disregarded in court due to perceived inabilities to accurately recall their memories. This study aims to investigate the role of props to enhance the accuracy of preschool children's recall for events. The role of props is also investigated with misleading suggestions and repeated interviews.

It has been shown that children report only small amounts of information when asked to freely recall an event but this information has been found to be accurate (Ceci, Toglia & Ross, 1987). In contrast, children report more detail when objectively questioned about an event, but this information may not be as accurate or reliable as their free recall (Ceci, Toglia & Ross, 1987). This pattern of recalling information is also found in adult populations; however, the amount of information retrieved increases as a function of age. Research has focussed on the processes of memory and developmental differences (Marin, Holmes, Guth & Kovac, 1979).

The human memory of events is known to fade over a period of time (Goldmeier, 1982). The act of retrieving an event delays the fading effect (Flavell, 1985), although the memory trace is susceptible to the process of reconstruction (Goldmeier, 1982). Reconstruction refers to the importation of associated material into a memory trace

from internal sources, such as expectation about what normally happens in a particular event, and from external sources such as misleading information (Goldmeier, 1982). Reconstruction in this sense has a negative effect on the memory trace.

A number of possible causes for children's inferior memory have been suggested. (1) Children are described as wanting to please their questioners (McCloskey & Zaragoza, 1985). (2) The adult questioning the child is often perceived as the authority by the child (Ceci, Ross & Toglia, 1987). Children are likely to be inhibited by such individuals thus curbing their responses to questions. This has relevance when the child is asked misleading questions, for example in cross examination. Children are likely to doubt their own memories and trust the authoritative figure. (3) When children are repeatedly asked the same question they may change their response presuming the initial response was incorrect (Nelson, Dockrell & McKechnie, 1983). (4) Finally, it is presumed that children's memories may fade more quickly than adults thus predisposing them to accept misleading information (Loftus & Davies, 1984). Any combination of these factors may be present when children are questioned.

Recent research has focussed on retrieval methods to enhance the recall of children and to eliminate the effects of misleading information. These techniques have endeavoured to reinstate the context of a witnessed event. Examples of these techniques include

the cognitive interview (Geiselman Fisher, MacKinnon & Holland, 1986), physical reinstatement (Wilkinson, 1988) and the use of props (Goodman & Reed, 1986) to mentally reinstate the scene. Props have been found to interact with both accurate and inaccurate freely recalled information in young children (four and five year olds), but not necessarily three year olds (O'Callaghan & Sasic, 1993). However, this effect was not found in objective questioning, that is, props neither hindered nor enhanced children's recall.

In addition central events appear to be more resilient in the human memory when compared to peripheral events (Goodman, Aman & Hirschman, 1987; Peters, 1987). Even though a developmental effect can be found for susceptibility to misleading suggestion, it appears that children, and adults alike, are able to resist misleading suggestion when directed at central events.

Child eyewitnesses are subjected to multiple interviews by many professionals. Multiple interviews subject the memory to the effects of reconstruction (Goldmeier, 1982) and authoritarian influences leading to inaccurate memory retrieval (Ceci, Ross & Toglia, 1987). Children are also found to report additional information after a long delay following the first interview (Howe & Brainerd, 1989; Brainerd, 1985). It has been noted that this new information may be inaccurate or accurate. Such influences may be accountable for children's susceptibility to suggestion; however, the memory appears to be only weakened when questions are repeated in a

single session but not necessarily when an interview is repeated (Dent & Stephenson, 1979; Tucker, Mertin & Luszcz, 1990).

This paper reviews current research and theory of children's memory and recall abilities. The provision of props to enhance recall is evaluated in conjunction with misleading suggestion and repeated interviews .

2. MEMORY FOR WITNESSED EVENTS

An understanding of memory processes is essential in appreciating the processes involved in eyewitness memory. The witness of an incident may be actively involved in that incident or may be an onlooker. In either case a memory trace forms in the mind of the witness of the incident. The memory trace is subject to fading over time. Fading refers to the natural decay of aspects of a memory trace over time, with the central information or gist of the memory trace generally remaining while peripheral information is lost (Goldmeier, 1982). The act of retrieving a memory trace reduces the effects of fading, thus facilitating the next attempt to retrieve that memory trace (Flavell, 1985). However, the act of retrieval also allows for the reconstruction of a memory trace. Reconstruction refers to the importation of associated material into a memory trace from internal sources, such as expectations, about what normally happens in a particular event, and from external sources, such as misleading information (Goldmeier, 1982). Therefore, if a witness accepts misleading information, for whatever reason, it is internalized and may be incorporated in the reconstructed memory trace.

The act of remembering involves the combination of three processes; encoding, storing and retrieving. Baddeley (1990) likens these processes to a library. Memory and a library are similar in the extent to which both will only work efficiently if information is stored

in a structured systematic way, with the retrieval of information depending on the initial 'cataloguing' or encoding. An efficient encoding and retrieval system should allow for all memory needs to store information in a way that will allow that memory to be accessed for many different purposes. The flexibility with which we retrieve information from memory for novel and unanticipated reasons is one of the most important and intriguing features of human memory.

2.1 Testimony Memories

Brainerd and Ornstein (1991) have examined closely the type of memories involved in testimony. They describe an interesting combination of incidental and deliberate memory that can be both spontaneous and prompted. When witnesses (child or adult) are interviewed about an eyewitness memory they are asked to describe an event from incidental memory, that is memory that occurs when information is unintentionally processed. A witnessed event may seem unimportant to a child who is often asked questions many months after an incident (Tucker, Mertin & Luszcz, 1990). A child may not expect to remember details of a witnessed event. As a result strategies which enhance the storing of information may not be used at the time of witnessing the event. Therefore, information that is recalled when questioned later is of an incidental fashion. Later this becomes memory as the child is questioned repeatedly. At this point strategies for retrieval are involved and may determine the accuracy of details recalled.

When questioned in a legal context, the memories under consideration are those that typically involve the recall of personally experienced (either as participant or eyewitness) and highly salient or meaningful events. However, these events have usually occurred some time ago and the memories can change due to further development of the child both intellectually and socially (Brainerd & Ornstein, 1991). This poses problems for the questioner in determining which pieces of information are actual memories and which are reconstructed over time.

2.2 Prior knowledge interactions

Research indicates that prior knowledge affects how one monitors the world, how information is coded and placed in memory, and how it is subsequently retrieved (Chi, 1978; Chi & Ceci, 1987). One implication of the literature on children's knowledge is that with the passage of time, information in memory has been shown to be altered and interpreted more consistently in the light of prior and subsequent information. That is to say, memory may become more reconstructive and less reproductive (Brainerd & Ornstein, 1991). Research has also indicated that young children are readily able to construct scripts or event representations of familiar routines (Fivush, 1984; Nelson, 1986; Nelson, Fivush, Hudson & Lucariello, 1983). Scripts are generalized plans for dealing with specific situations (e.g., a restaurant script, a school script). Younger children have concrete, simple scripts which become increasingly abstract and complex with age and experience. Older children are more likely to use the information in their scripts to aid them in

reconstructing a specific event. Thus, they may add script details which may not have been part of a specific experience (Nelson, 1986). Brainerd and Ornstein (1991) warn that we must be concerned with the possibility that their delayed memory reports may be generated on the basis of this underlying knowledge. For example, the details of a particular day in school may be lost, and a child's recollections may quite unconsciously be governed by his or her general knowledge of the routines of school (Myles-Worsley, Cromer & Dodd, 1986).

2.3 Retrieval mechanisms available to children

The number and variety of retrieval mechanisms available to children theoretically affect a child's capacity to recall events. Yuille (1988) has proposed that retrieval strategies are acquired with age and the younger the child the less the number of recall strategies at his/her disposal. It appears that the fewer the pathways to the memory of an event, the poorer the recall for the event. Also, some recall strategies are superior to others in aiding the retrieval of information (Geiselman, Fisher, Mackinnon, & Holland, 1985). The younger the child, the less likely it is that he/she will spontaneously use the most effective recall techniques (Paivio & Yuille, 1966, in Yuille 1988). The development of effective retrieval aids is essential in working with young children.

The importance of appropriate retrieval cues used in questioning children is evident. The encoding specificity principle suggests that

cues are effective for retrieval if, and only if, the cues provided have been encoded as part of the information to-be-retrieved (Tulving & Thomson, 1973). The relevance of this principle to the recall of young children is that cues or questioning posed by adults may be singularly inappropriate, as the child has conceptualized the event very differently from the way an adult would. Further, the meanings the child gives to certain words and sentences may be different from that given by adults. Indeed, failure to recognize differences in conceptual and linguistic systems may result in the child being unable to recall information, available in his or her memory or, even worse, to give irrelevant and inappropriate information (Thomson, 1988). The development of appropriate retrieval cues is essential in utilising children's testimony.

2.4 Salience of original memory trace

There is considerable debate as to whether the initial memory trace is altered as a result of questioning (Loftus, Miller & Burns, 1978; McCloskey & Zaragoza, 1985; Zaragoza, 1987). A number of hypotheses have been developed to explain children's recall when misleading information has been provided and incorporated in the memory trace. The first possibility has been referred to as the "erasure" hypothesis (Loftus & Loftus, 1980; McCloskey & Zaragoza, 1985). According to this hypothesis, the original memory of a child is overwritten by the suggested information. Thus the original trace is permanently lost. Another explanation has been called the "co-existence" hypothesis. According to it, children may remember what

they saw but refrain from selecting it for a variety of reasons, many of them social (i.e., not having to do with memory processes per se in nature). For example, they will choose the alternative information because they remember that the adult suggested it was true, and the adult must know best, even when they actually remember the correct information. Or, children may select the biased information because of a wish to please the adult who made the erroneous suggestion. Finally, they may choose the alternative information if they lost all memory of the event but vaguely remember something having been said. There is no shortage of non-mnemonic explanations for young children's susceptibility to misinformation (Ceci, Toglia & Ross, 1990). This issue is discussed in greater detail in chapter 4.

One of the most important findings of this research is that regardless of the nature of the recall demand, information about activities performed by self is recalled at a significantly higher level than information regarding activities performed by others (Baker-Ward, Hess & Flannagan, 1990). Therefore, children's memories would appear to be influenced by the degree of participation in an incident. This has implications for questioning children and using leading questions.

Recent research has shown that children retain memories for salient and meaningful events, for example, a class trip (Fivush, Hudson & Nelson, 1984); a visit to the dentist (Peters, 1987); an inoculation

(Goodman, Aman & Hirschman, 1987). In addition, these memories can be quite good over extended periods of time. In a study reported by Brainerd and Ornstein (1991) Ornstein, Gordon, and Braddy (in press) examined 3 and 6 year olds' retention of the details of a visit to the pediatrician for a physical examination. Children, at both ages, remembered most of the features of the check up on an immediate test. The performance of the 3 year olds decreased over delay intervals of one and three weeks, but was still impressive. However, the memories of older children were constant over this period. Unfortunately, little research has been conducted to examine children's long term retention abilities, for example, over periods of months and years. Children are often asked to recall events over these periods of time.

Children's abilities to accurately recall memories of events can be influenced by a number of factors; for instance, the type of retrieval method employed by the examiner, misleading suggestions and the number and frequency of interviews. Each of these issues are discussed in the following chapters.

3. INTERVIEWING TECHNIQUES

The need for effective interviewing techniques to enhance children's recall for events is apparant, due to their inferior performance when compared to adults. A variety of approaches have been recommended for use with young children. One method of enhancing children's recall was employed by Moston (1987). In this study children were interviewed in pairs about a witnessed event. The results showed an increase in the amount of accurate recall of these children compared to children interviewed individually. A further study of Moston and Engelberg (1992) extends Moston's previous work. The study proposed that the presence and support of friends during the giving of evidence is not likely to harm, but rather facilitate accurate testimony. Children aged seven and ten years interacted with a stranger. Later they were asked to recall the incident, and to answer a series of questions, some of which were leading. The findings of the study showed that, (1) having the chance to discuss with fellow pupils who had not been present did not in itself facilitate recall, (2) nor did the presence of another pupil at the time of the interview; however, (3) the combination of the two did significantly facilitate recall, and, also increased resistance to leading questions. These effects were found for both age groups.

3.1 Context Reinstatement

Many other innovative approaches to reinstate the child's memory for events have been researched in recent years. These include the cognitive interview which cognitively reinstates the scene for the

witness of a crime. In contrast the method of context reinstatement physically places the witness back into a scene. Finally the use of props provides an avenue for reinstating the scene in the mind by use of imagination. Each of the methods of reinstatement are examined below.

3.1.1 The cognitive interview

Researchers involved in improving police interviewing proposed the cognitive interview technique in order to enhance recall (Geiselman, Fisher, MacKinnon & Holland, 1986). The cognitive interview is an alternative memory enhancing technique, free from the psychological and legal constraints of hypnotically-induced testimony. Two generally accepted cognitive psychological principles of memory underpin the technique. Firstly, the memory trace is composed of several features and the effectiveness of a retrieval cue is related to the amount of feature overlap with the encoded event, which is a statement of encoding specificity, and secondly, there may be several retrieval paths to the encoded event so that information not accessible by one retrieval cue may be accessible by a different cue (Roy, 1991).

The basic cognitive interview consists of four retrieval mnemonics. Two mnemonics increase the feature overlap between the encoding and retrieval. The first mnemonic is mentally to reinstate the environmental (external) and personal (internal) context that existed at the time of the crime. The second mnemonic is to report

everything even partial information, regardless of the perceived importance of the information. Two further mnemonics encourage the use of several retrieval paths; recount the events in a variety of orders and report events from a variety of perspectives. In addition to the four mnemonics, a series of specific techniques was developed to elicit specific information about physical appearance, names, numbers, speech characteristics and conversation.

The value of the basic cognitive interview in enhancement of recall is suggested by research evidence. Geiselman et al. (1986) found the cognitive interview to heighten the witness's resistance to misleading questions as evidenced by the large number of unsolicited comments by the eyewitness regarding the misleading information.

It is suggested that the cognitive interview either prevents the original memory trace from being altered or prevents a competing trace from being stored (Roy, 1991). The usefulness of the cognitive interview has been tested, only minimally, with children (Geiselman & Padilla, 1988). Children aged seven and twelve years were subjects and seemed capable of employing the specific procedures necessary to use the technique. Overall they showed a twenty one per cent improvement in recall relative to uninstructed control subjects. However, the cognitive interview groups also showed increased levels of confabulation, suggesting further development of the cognitive interview may be necessary before advocating its use with children (Davies, 1991). A more recent review has

suggested that the cognitive interview requires modification and further testing if it is to be used successfully with child witnesses (Memon & Kohnken, 1992). These findings are based on work with children no younger than six years of age and therefore the likelihood of success with younger children is minimal.

3.1.2 Physical reinstatement

Wilkinson (1988) has been studying a technique to overcome some of the difficulties children have in reporting their memories. This retrieval technique re-instates a scene physically. Results indicate a much higher level of accuracy and completeness in the children's recall. The study involved pre-school children, aged three to four years from whom it is particularly difficult to obtain verbal testimony. The children were taken on a walk during which they witnessed an incident. The following day half of the children were walked around the same route, whilst being asked questioned about the witnessed event. These children produced superior recall compared to a control group who were asked questions about the incident, in a room of their nursery school. The presence of contextual cues, available on the walk, increased total recall from the 48 per cent recorded by the control group, to an average of 80 per cent from the experimental group. In addition, this increase did not appear to be associated with an increase in confabulation engendered by the presence of cues. Whilst these results are impressive their practical application in the witness context is limited. That is, it would not always be possible to take children back to the scene of the crime

either due to stress factors placed on the child, or lack of knowledge about the actual scene.

The exciting features of the studies by Wilkinson (1988) and Moston (1987) are pointed out by Dent (1988) who suggested that access to children's recall can be obtained without the distorting effect of standard interviewing procedures. In addition the physical and social setting of an interview appear to have a potentially strong influence on levels of recall. Young children's recall of events experienced in natural settings and embedded in their daily lives leads to much higher estimates of their memory competence than that based on artificial tasks learned in the laboratory (Davies, 1991).

3.1.3 Props Reinstatement

A further retrieval technique which may have more success with very young children was suggested by Goodman and Reed (1986) based on previous work by Price (1984) is the use of props. Such props may consist of miniature figures and settings. These researchers recommended the use of these props to facilitate young children's reports by mentally (rather than physically) placing children back in the original context of the event. Early support for the investigation of such general props to enhance the reliability of report from children younger than 5 years of age came from Cole and Loftus (1987). However, props have been found to be more complex than originally thought.

One controversial use of cues concerns the employment of

anatomically correct dolls in investigation of abuse. Some empirical support is now emerging for the use of such cues with child sexual abuse cases (Goodman & Aman, 1990) although these dolls may invite predictable play patterns which do not necessarily represent actual experienced or witnessed events (King & Yuille, 1987). There is concern however, that more investigation is needed to establish the appropriate conditions for their use (Cashmore & Bussey, 1987). Some therapists argue that the dolls should be banned on the grounds that they act as a catalyst for the release of misleading and fantasy based testimony (Yates & Terr, 1988). Recent research suggests lack of the development of appropriate norms for the use of anatomically correct dolls limits their suitability (Skinner & Bery, 1993).

Recent research has found that general props including miniature figures and furnishings increased quantity recalled by four and five year olds, but not necessarily by three year olds. It was found that props may significantly increase the amount inaccurately recalled by three year olds while only marginally increasing the amount accurately recalled (O'Callaghan & D'Arcy, 1989; O'Callaghan & Sosic, 1993). In addition it was noted that descriptive details were more accurately reported than either dialogue or action questions. Accuracy for the detail of action type questions was diminished when props were utilised (O'Callaghan & D'Arcy, 1989). Developmental trends suggest that props do not appear to be as useful as originally thought at least for three and four year olds.

Within free recall props appear to encourage some fantasy. Further evidence suggests that the younger children may be susceptible to perceived task demands when caregivers were present under props testing conditions, for instance producing some response, even though not accurate, to please the caregiver (O'Callaghan & Sosic, 1993).

Price and Goodman (1990) found that props did facilitate recall in two and a half, four and five and a half year old children, compared to when props were not provided, but not as much as when children were replaced in the original context of an incident. The experiment involved children in a series of tasks which they later recalled using props. The props were exact replicas of materials used in the tasks, leaving no doubt for the children that the models represented the materials used in the tasks. Therefore, the findings have limited application when children are the only witnesses of an event where such detailed information would not be available to an interviewer. In direct contrast, the studies by O'Callaghan and D'Arcy and O'Callaghan and Sosic used props that were not as specific. That is only general non detailed props were used in these studies which required the children to make use of transference abilities. Such abilities are discussed in the following section. The adaptability of such general props could be more useful in an unknown crime situation. However, the positive benefits would only be produced if the children were able to understand the use of general props. Many children lack the abilities to adequately understand the use of props and may therefore become confused about why the general

props are present. Confusion may lead to reduced accuracy in the children's recall.

3.1.3.1 Children's understanding of props

Some insight into the problems, mentioned above, that children may have in utilising props to enhance recall has been provided by DeLoache (1991a), DeLoache, Kolstad & Anderson (1991). Detection of correspondence is central to a child's understanding of a scale model as representing life-size objects. This involves the classical areas of transfer and analogical reasoning. Both transfer and analogical reasoning depend on recognition of the correspondence between two entities, x and y . Something about one's perception of y provides access to one's knowledge representation of x . That knowledge can then be used to help achieve a better understanding of y . If y fails to activate x , one's existing skills and knowledge are not brought to bear to comprehend or solve y . Transfer and reasoning by analogy require flexible access, the activation of a representation by a variety of objects or contexts similar, but not identical, to those involved in acquisition.

The flexible application and accessibility of knowledge appear to be problematic for individuals of any age. These processes have long been considered especially unreliable early in development, that is, children's knowledge often seems restricted to the specific context in which it was acquired (DeLoache, 1991b). Developmental researchers are continually attracted to the puzzle of

predicting when young children will succeed, or fail, in applying what they know of one situation to a different one.

A developmental shift was demonstrated in children's ability to utilise models from two and a half years to 3 years of age (DeLoache, 1991a; DeLoache et. al., 1991). Children showed little evidence of transference at age two and a half, but by age three evidence of transference was observed. The basic experimental format involved a child watching as a toy was hidden in a scale model room. Then the child was asked to find not the small toy, but a larger toy hidden in the analogous location in the room itself. In order to find the larger toy, the child has to (1) recognize the correspondence between the scale model and the larger room and (2) map the location of the hidden toy in the model onto the corresponding location in the room (DeLoache, 1991b). The results of the imitation study support the argument that the underlying factor responsible for young children's performance in the model task is whether they realise there is any correspondence between the two spaces in the first place. As DeLoache (1991b) has pointed out, children who were aware of the correspondence were able to transfer the stipulated action across the spaces, whether it is placing, hiding, or finding a toy, whereas children who were unaware of the correspondence have no basis for knowing what to do. DeLoache (1991b) found evidence that even three year olds needed direct instruction about the correspondence between the models and the real objects in order to use the model as a representation. In light of this suggestion, it is possible that the three

year old children in the O'Callaghan and Sosic study were unable to use the props as memory aids, because their function as representations of life sized objects was not directly highlighted, or the correspondence between the props and original objects was not salient enough.

To address this concern Heath (1992) attempted to incorporate the findings of DeLoache (1991a; DeLoache, 1991b) in her study by providing training in the use of props. She proposed that children who were shown the use of props by having them modelled would have less fantasy play, and that children with high rates of comprehension may be able to use props more effectively. Unlike Price and Goodman (1991) who found children were capable of using props to enhance recall, children in the Heath study did not utilise the props as effectively as hoped. Future research should focus on the limitations of young children's understanding of scale models. However, investigators of crimes should be wary of the limitations of reinstating an unknown scene through the use of such general props. Props need to be of a nature that enables use in a wide variety of situations but this development is yet to be made.

The development of effective retrieval techniques for use with young children is one of great importance. The methods mentioned above offer innovative approaches to reinstating an event. Of particular interest is the effectiveness of the use of props with preschool children. This technique will be investigated with particular emphasis on situations that provide misleading suggestions in repeated interviews.

4. LEADING QUESTIONING

Many references have been made throughout this review of children's susceptibility to being misled. This area is of importance in eyewitness testimony, and is the source of a large body of research. For many reasons, it would appear that misleading information impairs subjects' ability to remember what they originally witnessed. Results of many studies have led to the development of the memory impairment hypothesis (Loftus, 1979a; Loftus & Loftus, 1980). This hypothesis assumes that misleading information alters the original information in memory, so that the original information is lost from memory. This new information overrides previous information. An alternative version of the memory impairment hypothesis (Bekerian & Bowers, 1983; Christiaansen & Ochalek, 1983) assumes that the misleading information renders the original information inaccessible.

The research investigating suggestibility of children has been met with contradictory findings (Warren, Hulse-Trotter & Tubbs, 1991). In some previous studies children and adults were found to be equally suggestible (Marin, Holmes, Guth & Kovac, 1979), whereas Cohen and Harnick (1980) found children were more susceptible than adults to suggestive questioning.

In a related study, Goodman and Reed (1986) had three year olds, six year olds and adults interact with an unfamiliar adult for five minutes. Four or five days later the subjects were asked to answer

both objective and suggestive questions, to give free recall of the event, and to identify the unfamiliar adult from a line up. The three year old children remembered less of the event, and were found to be more suggestible than the older groups.

The results of other studies in the area were in direct contrast. These studies failed to find any developmental differences in suggestibility, or have even found younger children to be less suggestible than older persons. Marin et al. (1979) exposed subjects, ranging in age from five to twenty two years of age, to a live altercation. Each subject was asked to give a narrative account of the event, answer some questions (both leading and non leading) about the event, and identify the assailant from a lineup. Although a strong suggestibility effect was found, the effect did not vary with the age of the eyewitness. Subjects of all ages performed worse on the leading question. Murray (1983, cited in Loftus & Davies, 1984) presented seven to eleven year old children with a picture story. Children's memory of the story was probed with either neutral or leading questions. A day later the children were given a forced-choice recognition memory task to evaluate the impact of the type of questioning, and no developmental differences were found for suggestibility. In another study college students and six, eight, and ten year old children were shown a slide sequence of cartoons (Duncan, Whitney & Kunen, 1982). Subjects were given different types of questions about the slides (informational, suggestive, or factual). After controlling for the amount of information remembered the authors reported that younger children's visual memories were less susceptible to distortion by misleading verbal cues.

Several reasons for the apparent discrepancies in the findings of these studies were suggested by Loftus and Davies (1984). These included the different types of events witnessed, length of exposure to the event, length of retention intervals, and the type of questioning used to evaluate the child's memory. This latter point is one of interest also to Goodman and Reed (1986). One of the most important basic differences of these studies of suggestibility is that they used very different age groups that are known to differ in memory performance (Chi & Ceci, 1986, in Ceci, Ross & Toglia, 1987a). The age of subjects is also an important variable to consider in studies where developmental differences in suggestibility were not found. In the majority of these studies very young children (ages three to four years old) were not sampled. It may be that this age group is among the most vulnerable to suggestibility effects (Ceci et al., 1987).

Preschoolers were assessed for susceptibility to suggestion (Ceci, Ross & Toglia, 1987b). Subjects were as young as three year olds to four year olds. In a story telling task children were given misinformation one day later by both an adult, and a seven year old child and then examined three days later for suggestibility effects. The seven year old examiner produced decreased suggestibility but the result did not conclusively show a prestige effect reported for an adult examiner. In addition, McCloskey and Zaragoza's (1985) modified testing procedure was used. In this case adults were also included. Ceci et al. (1987b) found that adults were also suggestible in contrast to McCloskey and Zaragoza's result when

using the modified testing procedure. However, the most obvious difference between these authors studies were the age of their subjects. Ceci et al. (1987b) suggest it could be that preschoolers are especially vulnerable to suggestion because they lack the meta mnemonic awareness needed to protect their memory against intrusive suggestion, and or are less knowledgeable about the need to be vigilant to information that is counter intuitive or goes against ones' experiences. However, according to Goodman and Helgeson (1985), children are not necessarily more suggestible than adults, but they can be, especially when their memory is weaker or the questioner is of relatively higher status. It would appear that other factors are influencing susceptibility to suggestion in young children. These include whether events are of central importance to children as well as mnemonic and social factors.

4.1 Central versus Peripheral Events

The findings of studies by Goodman, Aman and Hirschman (1987) and Peters (1987) consistently indicate that children and adults alike are better able to recall central events, activities they have taken part in, than peripheral events. In addition to these findings, memories appear to be more resistant to suggestion directed at central events. One major difference of studies of suggestibility lies in their ecological validity, In addition these studies tried to improve on ecological validity, that is an attempt to improve the relationship with real life events. Some studies have included a stressful event when assessing event memories (Goodman, Aman & Hirschman,

1987; Peters, 1987). Given the findings it would be expected that even preschoolers may be able to resist misleading suggestions when the information is central to their own activities when they are participants of the event.

4.2 Mnemonic and Social Factors in Suggestibility

Mnemonic factors in suggestibility include the well-known misinformation effect, in which misleading information presented after the original event interferes with witnesses' subsequent reports of recognition of the original information (Loftus, 1975; McClosky & Zaragoza, 1985). However, memory impairment may be only one of several causes for the misinformation effect (McCloskey & Zaragoza, 1985). For example, misleading information may be presented to subjects who want to be viewed favourably by the experimenter. If this experimenter has misled these subjects, then they are likely to report the misinformation and not the original information (Weinberg, Wadsworth & Baron 1983). Alternatively subjects may trust the experimenter more than their memory and will hence report the misinformation as the original details. Dodd and Bradshaw (1980) found adult subjects to be more suggestible when the misleading information was presented by a purportedly neutral bystander to the event than when it originated from a biased source. Some subjects will remember the critical details of an event and some other subjects will not. Failure in these cases may be due to subjects not encoding or forgetting this information. The effect of repeated questionings may also account for children's apparent susceptibility to suggestion (Moston, 1990).

Misleading suggestions appear to have their greatest impact on

events that are weakly held in memory; that is, for whatever reason the memories have not been encoded and processed sufficiently to resist misleading suggestions. The present investigation examines the effects of misleading suggestion with the provision of props to enhance recall for preschool children.

5. REPEATED INTERVIEWS

Children are known to be routinely subjected to multiple interviews about the witnessing of a crime. In addition, more than one professional may question the witness. A number of important issues needs investigation with regard to repeated interviews, (1) the impact on the memory trace of repeated questioning, (2) the effects of the same questions repeatedly asked in the one session and (3) the effect of multiple interviews over a period of time. These issues will be discussed in greater detail below.

The impact on the memory trace has positive and negative effects. As mentioned above the memory is subject to fading over a period of time. However, retrieving the memory trace reduces the effects of fading, hence questioning witnesses about memories will maintain that memory (Flavell, 1985). This clearly is a positive effect of repeated questioning. A level of processing approach accounts for how information can be affected by multiple interviews (Craik & Lockhart, 1972; Tucker et. al. 1990). That is to say, the more processing occurs with information, the more likely it will be retrieved. This has both positive and negative results. Aspects of the memory trace that are called on under questioning are more likely to be recalled, however, those parts of the memory trace that are not regularly called on will not be as likely to be recalled at a later time due to fading. Reconstruction may also be of a negative influence as distortion by means of incorporating additional pieces of information may occur and that information may not be accurate (Goldmeier, 1982). Such additional information may be the result of

expectation or suggestion. For example, when misleading questions are posed in one interview, the misleading information may be reported in a subsequent interview due to reconstruction of the memory trace.

The effects of repeating a question in an interview with a child have been reported by numerous researchers (Baker-Ward et al., 1990; Dent & Stephenson, 1979; Moston, 1987; Neilson, Dockrell & McKechnie, 1983). There is ample evidence in Piagetian-based studies of conservation that question repetition within a single session decreases accuracy when emerging cognitive skills are tested (Neilson et al. 1983). In addition, Gelman, Meck and Merkin (1986) demonstrated that children's numerical competence is underestimated when repeated requests lead to changed responses.

There is also evidence to suggest that repeated testing, after a lengthy forgetting interval, may have positive effects on the recovery of information. Indeed, children seem to be able to refurbish their memories of witnessed events purely as a consequence of having those memories tested. In addition, the evidence suggests that children demonstrate as much improvement, as a function of repeated testing, as adults do (Brainerd, 1985; Brainerd, Kingma & Howe, 1985; Howe & Brainerd, 1989). In these studies children and adults were given a series of four retention tests at intervals of one to two weeks, after the target material had originally been acquired,

and recall performance improved approximately 10 per cent across the test. However, the positive effects of repeated testing will become negative consequences if the experimenter or interviewer attempts to mislead the subject (Ceci, Ross & Toglia, 1987a; 1987b).

Moston (1990) concludes in his review that the studies of repeated questions show that when an adult repeats a question that has elicited a response, children may take this as an indication that their first answer was wrong and that they should offer a new one. It would appear that young children change their responses in order to make social sense of the interview situation. Donaldson (1982) pointed out that even young children try to understand the purpose of a repeated question. Rather than taking the question at face value, they try to satisfy the intent of the experimenter. Siegal, Waters and Dinwiddy (1988) creatively illustrated this process by asking children to explain the nonconversation responses of puppets in a one-question or two-question task: Even four year olds assumed that puppets, who erred in the two-question task, were trying to please the adult questioner.

While children are susceptible to response change within a single session, they are more resistant to change in repeated interview situations (Dent & Stephenson, 1979; Tucker, Martin & Luszcz, 1990). Although young children can interpret a repeated question as an implicit request for a response change, there is no reason to

believe that requests to repeat testimony will always prompt children to become less accurate. For example, repeated testing is associated with improvements in recall on serial-learning tasks, even when subjects are given no opportunity to restudy items, and this phenomenon has been documented for children as well as adults (Brainerd, Reyna, Howe & Kingma, 1990 in Howe, 1991). In an attempt to explain this phenomenon Payne (1987) suggests improvements in recall at longer retention intervals (or hypermnesia) are only obtained when subjects have the opportunity to retrieve items during the retention interval.

Repetition in eyewitness procedures has produced mixed results. In several studies, children who recalled an event on two occasions actually remembered more than eyewitnesses who participated in a single, delayed interrogation (Baker-Ward et al. 1990; Fivush & Hammond, 1989; Goodman, Bottom, Schwartz-Kenney, & Rudy, 1991; Hudson, 1990; Tucker et al. 1990). Thus, between-session repetition may help preserve event memories, particularly when questions in the initial interview prompt for specific information. In contrast, Moston (1987) found that repetition reduced the number of correct, but not the number of incorrect replies for children age six to ten. Because repetition after a period of one day does not negatively affect children's testimony (Dent & Stephenson, 1979), Moston concluded that his subjects deliberately changed responses when the question was repeated, a finding consistent with explanations of repetition induced errors on Piagetian tasks.

Together the studies mentioned above illustrate no uniform effect of question repetition on children's performance. Rather, repetition effects are probably a function of many variables, including timing (within session or between session), the nature of the material to be reported (central events or details), and the pragmatic meaning associated with repetition for subjects of various ages. In a current review (Bussey, Steward, Pipe, Peterson & Lawrence, 1992) one finding was that after delays of one year after initial interviews children's free recall was brief. In addition, children recalled similar amounts of detail but half of this was new information. Of this new information half was inaccurate.

A further factor affecting the testimony over repeated interviews is the stress involved of such interviews. Goodman and Helgeson (1985) suggest that repeated interviews may produce emotional trauma for children in a witness interview situation. The result of this trauma may be reduced reliability of children's testimony. They offer a solution to this problem by suggesting that one highly trained individual should interview children. This recommendation is an attempt to collapse the cooperative efforts of police officers, social workers, psychologists and attorneys and reduce the number of interviews into one. They recommend one neutral interviewer engage the child in testimony, while the others remain out of view.

The impact of repeated questioning can be seen in a number of different ways. Questions that are repeated within one testing

session clearly confuse the child, whereas repeated interviews effects are not as clear. Factors including the duration of time prior to the initial interview, the length of delay before further interviews also appear to affect the quality of children's recall for events.

The present study investigates the effects of repeated interviews with a one week delay between the first and second interview. The provision of props and misleading suggestions are also investigated with repeated interviews. Props may aid children by positively reinstating the scene they are asked to recall. It is expected that the children's recall may be affected negatively by the time factor. That is new information may be included in the recall which may be both accurate and inaccurate. Misleading suggestions may also negatively influence the accuracy level. The effects of the provision for props may interact with the effects of misleading suggestion and repeated interviews.

6. AIMS OF RESEARCH

The present study aims to investigate the use of props with preschool children when misleading information is provided in repeated interviews.

It was hypothesized that;

1a. Children who used props will provide greater quantity details of the event .

1b. Children who used props will provide more accurate recall of the event .

1c. Differences in the responses to the different question types; 'dialogue', 'action', 'description' will be found.

2a. Children who received misleading questions will produce a decreased in quantity of details recalled.

2b. Children who received misleading questions will produce a decreased in accuracy.

2c. The provision of props will aid children in resisting the misleading suggestions.

3a.Children in the repeated interview will report less quantity when compared to the initial interview.

3b.Children in the repeated interview will be less accurate when compared to the initial interview.

Method

Design A 2 (cue type: props or no props) x 2 (question type: objective questions or misleading questions) x 2 (interval type: single interview or repeated interviews) factorial design was employed in this study in analysing the quantity and accuracy of reports. Subjects were tested under one of eight experimental conditions as shown in Table 1:

Table 1 Pattern of Subject Allocation in Experimental Conditions

CONDITIONS				
Groups	Baseline	Props	Mislead	Repeated
1	*			
2		*		
3			*	
4		*	*	
5				*
6			*	*
7		*		*
8		*	*	*

Additional analysis were performed on the types of item content; 'dialogue', 'description' and 'action'.

Subjects Subjects (N = 64, age range 4.0-4.11 years), were recruited from eleven child-care centres and three kindergartens within Hobart and suburbs. Individual children participated in the study after their parents or guardians gave written consent (Appendix A). Mean CA of subjects was 4.5 years (SD = 0.03 months). The male subjects (n=32) had a mean CA of 4.5 years (SD = 0.29 months). The female subjects (n=32) had a mean CA of 4.6 years (SD = 0.25 months).

Materials

Matching tasks for Groups

Equal numbers of children (n=8) were assigned to experimental conditions on the basis of their performance on a simple memory task. Age and sex differences were balanced by assigning subjects evenly to conditions on the basis of these short term memory scores. Each condition had an equal number of high and low memory scores (Appendix B for subjects profiles).

A Memory for Objects task (O'Callaghan & D'Arcy, 1989) was employed for this procedure. The task consisted of an array of ten, three-dimensional objects mounted on cardboard inside a box (Standardized instructions and scoring procedures for 'Memory for Objects' test are presented in Appendix C).

Materials Relevant to Conditions

Free Recall All conditions required the subject to give a free recall account of a home visit. Subjects were visited in their own home by an experimenter who followed the visitor script (appendix J) The tester followed instructions from a 'Standardized Questioning Procedure' form (Appendix D). Responses were recorded on a sheet, verbatim.

Objective Questioning All conditions required the subject to answer objective questions concerning the home visit. The tester followed standardised instructions. Questions were specific to 'dialogue', 'description' and 'action' item types with a total of eight questions in each category (Appendix E).

Misleading Questions Four conditions required the subjects to answer misleading questions concerning the home visit. These questions were specific to action item type as previous research has shown these details to more susceptible to distortion (O'Callaghan & D'Arcy, 1989). A total of four misleading questions replaced four original questions (Appendix F).

Props Condition Four conditions required the child to manipulate props from an adapted version (O'Callaghan & Sosic) of the Driscoll Play Kit (Driscoll, 1959). The kit is an

attractive assessment tool for children providing concrete retrieval cues to facilitate memory of events that occurred in the child's household. The kit consists of a portable carry case which folds out into an open floor plan of multiple room household. Rooms are appropriately furnished with durable, miniature pieces designed to discourage unrelated play. All the furnishings were simple, non decorative representations of standard household items. For example, the doors on the wardrobe do not open, but provide representative details. Nine miniature dolls representing parents, grandparents, two boys, two girls and a baby were available. One of the adult dolls was used to represent the visitor. See Appendix D for relevant instructions used to orchestrate the deployment of the play kit. (Appendix G presents a photographic record of the Driscoll Play Kit and the miniature dolls as well as dimensional information).

Repeat Condition Four conditions involved the child in two interviews. The first interview was the day after the home visit as in other conditions, the second was one week later.

A 'Checklist for the Observer' form was completed during and immediately after the home visit, to record information regarding the presence of others and movements made by the child and visitor (See Appendix H).

Other materials introduced during the visit included a small quantity of green playdough, a small box of 12 colour pencils and a blank sheet of paper for the child to illustrate a modelled octopus.

A photo-lineup of five photos was used to identify the visitor (Appendix I). One additional photo was casually shown in an attempt to mislead the children.

Procedure

Experimental Procedure

Matching Task

The 'Memory for Objects Task' was administered for a period of two minutes with the child being required to recall as many of the objects as possible after a five minute distractor period with the tester. Scores were rated out of ten, and designated as high (6 or more) or low (5 or less) for allocation to conditions. The distractor period consisted of conversation with the tester about daily activities at creche/school.

Home Visit

Visits to home were arranged between two to seven days in advance by telephone. All families were encouraged to engage in their normal activities and routines during the home visit. Parents were requested to inform their child only that they were going to receive a special visitor and the child was

encouraged by their parents to be present when the visitor was received at the door.

Each subject received a home visit by the research assistant known as 'Marie' who entered the child's home and followed a specific script (See Appendix J). In a play interaction, Marie constructed an octopus with playdough. The child was requested to 'draw a picture of the octopus' with the materials provided. The drawing and the octopus were exchanged on the termination of the visit. Marie asked the parent for 'a glass of water', and asked the child to take her to the bathroom to 'wash her hands' after making the octopus.

Centre Visits

On the day following the home visit, children were tested at their respective child-care centres/schools by an independent research assistant.

Procedures Specific to Condition

1. Under free recall, subjects were encouraged to report as much as possible concerning the home visit and activities they engaged in. Only neutral prompts were used, such as 'Is there anything else you can tell me about what you and the lady did?'
2. Under objective questioning conditions, subjects were asked 24 questions concerning the home visit. Questions were objective in nature, and were equal in number of dialogue, description and action. In addition the questions were not intended to mislead the subject.

3. Under misleading questions condition, subjects were asked 24 questions concerning the home visit. Twenty were identical to those in the objective questioning condition. Four were misleading about actions that did not take place. Subjects were also casually shown another photo from the photo line up in an attempt to mislead them when identifying the visitor.

4. Under props condition, subjects were presented with the prop setting which they were encouraged to construct as much as possible like their own home. Subjects were also presented with miniature figures which they named as those individuals present during the visit. Subjects were then requested to report their information concerning the visit using the figures and setting to re-enact the events. More directive prompts to encourage interaction with the props, e.g. 'can you show me' were used than in previous studies (O'Callaghan & D'Arcy, 1989; O'Callaghan & Susic, 1993).

Scoring Procedure

Quantity The total number of correct, incorrect and 'Don't Know' responses were added as separate totals.

Accuracy Under each experimental condition the following formulae were used to calculate the percentage accuracy of report:

(1)% Accuracy Score

$$\frac{\text{Number of Correct Responses}}{\text{No. Correct + Incorrect Responses}} \times \frac{100}{1}$$

In order to accommodate concerns for the contribution from 'Don't Know ' responses an analysis of accuracy including these responses was also calculated.

(2)% Accuracy Score + Don't Know Responses

$$\frac{\text{Number of Correct Responses}}{\text{No. Correct + Incorrect Responses + Don't Knows}} \times \frac{100}{1}$$

The concern for 'Don't Know' responses is that when scored as incorrect in objective questions there is no parallel when children provide no response in free recall. However, in the present study both free recall and question responses, whether to objective or misleading, were calculated as one memory score, and therefore the issue of 'Don't Know' responses was controlled.

Under free recall condition, the total points possible were dependent on the extent of interaction which occurred during the visit and were identified on the 'Checklist for the Observer form (see Appendix K for examples of scoring forms and procedures).

Under question conditions, a total of 24 points was possible

with extra points allocated for further correct information given which was not specifically asked for.

Scoring of Item Content Categories

Under each condition, statements provided under the item type categories (action, dialogue, and description) were analysed separately for accuracy using the formulae mentioned above. (See Appendix K for examples of scoring procedures)

Reliability Ratings of Scoring Procedures.

Two independent raters scored the protocols.
The formula used was as follows;

number of agreements		100
-----	X	----
no. of agreements + no. of disagreements		1

Initial interrater reliability was 85.5%. Consultation was entered into over disagreements until 100% agreement was achieved.

8. RESULTS

Correct and incorrect scores were calculated separately for four conditions: free recall with objective questions with and without props and free recall with misleading questions with and without props. ANOVAs showed no significant differences for both the quantity and accuracy of detail recalled in free recall for all four conditions. This suggests any further findings are the result of Objective Questions and Misleading Questions for which props were used. Quantity of recall and the percentage of accurate recall were calculated separately for the same four conditions. ANOVAs were performed on two types of data those which included 'Don't Know' responses as incorrect and those which did not include 'Don't Know' responses. Findings did not differ significantly between the two analyses therefore all results reported here do not include 'Don't Know' responses. This allows for a tighter comparison of subjects' accurate report as scoring a 'Don't Know' response as incorrect may have a confounding effect. The means and standard deviations for quantity of recall in all conditions are shown in Table 1:

Table 1. Mean Quantity of Recall and Standard Deviations for all Conditions (N=64)

Condition	1st Interview		2nd Interview		Single Interview	
	X	SD	X	SD	X	SD
Baseline	20.31	7.64	14.44	3.83	20.31	7.64
Props	21.22	7.07	15.50	4.19	22.13	6.56
Misleading	16.00	3.8	15.00	4.65	20.06	7.20
Props Mislead	18.50	4.73	20.19	7.41	19.25	5.80

The means and standard deviations for percentage accuracy of recall in all conditions are shown in Table 2.

Table 2. Mean Percentage Accuracy of Recall and Standard Deviations for all Conditions (N=64)

Condition	1st Interview		2nd Interview		Single Interview	
	X	SD	X	SD	X	SD
Baseline	74.88	16.61	73.25	11.53	74.88	16.61
Props	77.03	13.03	74.06	14.09	77.25	10.12
Misleading	73.38	14.48	78.75	12.50	82.25	8.48
Props Mislead	72.88	10.58	82.25	8.48	75.88	15.88

ANOVAs were also used to establish main effects and interactions for props, misleading questions and interview conditions on the separate quantity and accuracy of the children's recall of events.

8.1 Effects of objective Questions and Props

Data were analysed between subjects for either the single condition and/or the second interview in order to remove any confounding effects.

Analysis of variance revealed no main effect for props, $F(1,28) = .686$, $p > .05$. This result indicates that the quantity of the recall did not differ significantly whether props were provided for use or not. Children did not report significantly more detail of the home visit with props.

Analysis of the effect of props on total percentage accuracy recall indicated no significant difference, $F(1,28) = .011$, $p > .05$, whether props were provided or not. The accuracy of children's report of the home visit was not significantly enhanced with the provision of props.

8.2 Effects of Misleading Questions and Props

Data were again analysed between subjects for either the single condition and/or the second interview in order to remove any confounding effects from the repetition.

The inclusion of misleading questions did not significantly affect the quantity recalled by the subjects, $F(1,28) = .002$, $p > .05$. When misleading questions were used with props there was also no significant effect on the quantity recalled, $F(1,28) = 1.49$, $p > .05$.

Analysis of variance revealed no significant effects of misleading questions on subjects' total percentage accurate recall, $F(1,28) = 1.81, p > .05$. The inclusion of props with misleading questions was found not to influence the total accurate recall of children, $F(1,28) = 1.72, p > .05$. The children were able to resist influences of the misleading questions when props were provided to enhance their recall, for example showing Marie going into the bathroom when it was misleadingly suggested she went into the bedroom.

8.3 Effects of Repeated Interview and Props

In order to remove confounding effects from misleading and repeated interview conditions the data were tallied with misleading questions and the corresponding objective questions removed. Analysis of variance revealed subjects reported significantly more detail in the first interview than in the second interview, $F(1,60) = 15.47, p = .0002$. The use of props was not found to significantly affect the amount of detail recalled by the children in the repeated interview condition, $F(1,60) = 1.83, p > .05$. No significant interaction between interviews and props was found, $F(1,60) = .012, p > .05$. That is children reported greater quantity of detail in the initial interview than on the second interview regardless of whether props were provided or not.

Props were found not to significantly affect the percentage accuracy of the childrens' recall in repeated interviews, $F(1,60) = .74, p > .05$. Analysis of variance revealed no significant effect on the accuracy of information recalled by children whether in the first interview or second interview, $F(1,60) = .090, p > .05$. While the quantity of detail was significantly greater in the first interview this effect did not carry through to the accuracy of the children's total recall. The analysis also revealed no significant interaction with props $F(1,60) = .03, p > .05$. That is props neither enhanced nor hindered the accuracy of the children's recall over repeated interviews.

8.4 Additional Findings

Question Type and Props

Manova performed on the different type of questions employed revealed a significant effect for descriptive type questions $F(1,56) = 11.3, p = .001$. That is the children who were provided with the use of props recalled greater quantity of detail in response to descriptive questions.

Investigation of the accuracy of response for the different question type revealed no significant effect of props for 'action' $F(1,56) = .11, p > .05$, 'description' $F(1,56) = 1.01, p > .05$, or 'dialogue' $F(1,56) = .10, p > .05$. ANOVAs also revealed no significant effects of misleading questions for quantity or accuracy of report and the different questions types.

No ANOVAs of the effect of repeated interviews on quantity and accuracy of question type were performed due to all of the misleading questions being of 'action' type.

Photo line up

Subjects identified the visitor from a photoline up with 72% accuracy. Only one child was successfully misled by the distractor photograph indicating that children's memory for the visitor was generally resistant to misleading visual suggestion. Three children identified the visitor on the second interview when they had been incorrect on the first interview.

9. DISCUSSION

Results confirmed only two of the hypotheses. Children recalled greater quantity of details in the initial interview when compared to the second interview. Differences in the quantity of report for the different question types with props were found. The provision of props neither improved nor hindered the percentage accuracy of children when exposed to misleading suggestion or repeated interviews.

9.1 Props: Effect on the quantity and accuracy of recall

The findings suggest that the use of props by preschool children does not facilitate increases in the quantity or accuracy of recalled details of an event. Children who were provided with props were not superior in performance when compared to children who were not provided with props. These findings are consistent with those of O'Callaghan and Sosic (1993) but not those of Price and Goodman (1990). The present study was modelled on, but refined the O'Callaghan and Sosic experiment and so it is not surprising that results were consistent. The Price and Goodman (1990) study differed in two important ways to the present study. Firstly, the props used by Price and Goodman (1990) were miniature replicas of actual experimental materials used in the controlled experimental environment. Such directive cues left little to the children's imaginations, that is the similarities between

the props and the actual materials were obvious. Such specific props would be of little use in situations where the only witness was a child because it would not be possible to replicate unknown situations. Secondly, children were visited in their own home environments in the present study and were offered more general props that might potentially be useful in a number of different home settings. General props provide flexibility allowing for details to be added in the mind of the witness. It would appear that without more specific detail, props have limited value as retrieval cues for this age group. This finding has significance due to the nature of the crimes that are investigated, that is, without specific details of the crime scene. The implications of these findings is that specific props are not practical when a child is the only witness of a crime, replication of the scene would not normally be possible to reconstruct to the level that Price and Goodman (1990) used in their study.

Findings by DeLoache (1991a; b) inferred that children have difficulty in detecting the correspondence between a scene and models depicting that scene. In addition difficulty also arises when children attempt to transfer the knowledge of one scene to a props situation. In situations where children have these difficulties it would not be expected that props would enhance recall of events. The results of the present study suggest that the children may have experienced some of these difficulties.

However, comments made by the children indicated that they were attempting to make the transfer from the home visit to the props. This point will be discussed in more detail in section 9.4.

9.2 Misleading Suggestions: Effects on the Quantity and Accuracy of Recall

The results indicate that children who were misled in the present study did not report less quantity and were not less accurate in recalling the home visit than children who were not misled. This would imply that children resisted misleading suggestion for the events of this study. One possible reason for this resistance may lie in the fact that the misleading suggestions in this study were generally of central events for example; children were asked where they hung the picture of the octopus they had drawn, whereas the visitor had asked to take the picture home. Earlier research has demonstrated that children and adults alike are more inclined to resist misleading suggestions about central details compared to peripheral details (Goodman, Aman & Hirschman, 1987; Peters, 1987). In addition to these findings, the results indicate that the presence of props had no effect on children's ability to resist misleading suggestion.

9.3 Repeated Interviews: Effects on the Quantity and Accuracy of Recall

Children did report more detail in the first interview when compared to the quantity reported in the second interview. However, the accuracy level of children in the present study did not change significantly from one interview to the next. That is children's memory for events remained constant over a one week interval. One explanation for this finding is that the act of retrieving a memory trace reduces the effects of fading, thus facilitating ongoing memory for events (Flavell, 1985). However, the experimenter did notice a tendency for the children to include more detail in the second interview. For example some children were able to recall the visitor's name on the second interview when this information was not elicited in the first interview. This phenomenon has been observed in previous research (Brainerd et al., 1990). It is possible that on the second interview children felt more comfortable due to familiarity which provided a more conducive atmosphere for recalling events. Some children when given a second chance, were also able to make a positive identification of the visitor after failure to do so initially. Such improvements in recall and recognition lend support to the practice of interviewing witnesses more than once. It would appear that for some witnesses conditions are more suitable to accurately recalling memories on subsequent interviews. The use of video deposition, in which a witness has only one interview, may not allow for these improvements

in recall. It would appear that children have most difficulty in understanding a repeated question when the question is repeated within the same interview.

Whilst the provision of props in conjunction with repeated interviews did show a decrease in the quantity recalled on a repeated interview it was not shown to influence the accuracy level of children's memory for the home visit. Props therefore, were not a contributing factor to the maintenance of children's memory for events.

Differences were found for the quantity recalled by children and the different question types when props were provided for use. Children provided greater quantity of details for 'descriptive' type questions than for 'action' or 'dialogue' questions. These findings are consistent with those of O'Callaghan and D'Arcy (1989) and provide valuable insight in to the type of detail interviewers can expect to receive from preschool children. However, this finding was not apparent for the accuracy of recall for the different question types.

9.4 Limitations of current study and future directions

The present study has shown that children can recall accurate memories for events when props are provided. The presence of props did not improve recall accuracy nor did they hinder recall accuracy. Preschool children were also shown to be able

to maintain the accuracy of recall when they were subjected to misleading suggestions. The accuracy with which children reported their memories was not contingent on being interviewed the next day or one week later. Repeated interviews did not result in less accurate recall but in some instances resulted in recall improvements and accurate additions. Overall the study has also shown that preschool children can provide accurate recall for events that are of central interest.

One limitation of the study is the particular type of props setting utilised. Children were requested to make the play kit as much like their own house as possible. Many children made comments to indicate that they had difficulty in transferring details of their own home to the play house, for instance children said, "we have upstairs" and "where is the front door?". The play kit has no front door so children could not show how the visitor arrived or departed from the house. However, such comments indicate that the children were trying to make the connection between the props and their own homes thus suggesting that they understood the task at hand.

In response to comments made by research assistants in a previous study (O'Callaghan & Sosic, 1993), that the activity of the home visit limited the need to use props, changes were made in this study to the home visit scenario to include more

activity. This was in an attempt to allow for increased use of the props. In addition, children were more actively encouraged to make use of the props. However, even with these additional prompts and encouragement children were limited in their use of the props. One of the limitations is that much of the activity of the experimental procedure took place at the kitchen table. Thus as children answered questions about activities there was little need for them to move the props about the play kit. As DeLoache has commented children have difficulty in transferring similarity of one object to another object. The constraints of the present study may have increased this difficulty. These issues may have limited the effect of props in reinstating the context of the experimental setting.

On a more positive note children did not engage in fantasy play with the props as was possible given that there were some rooms in the kit that were not utilised in the home visit. Children were able to contain their use of the props in the rooms appropriate for the home visit activities. Many children appropriately showed the visitor moving to the bathroom and back to the kitchen table. These factors support the findings of DeLoache that children over the age of three and a half can start to transfer similarities of one scene to another and therefore the props may have some promise with the preschool age group.

Future research in the area of props as age appropriate retrieval cues could investigate the effects of longer delay between repeated interviews. Studies have now begun looking at delays of one and two years between interviews (Bussey, Steward, Pipe, Peterson & Lawrence, 1992). However, such studies have not looked at the effectiveness of props or the impact of misleading suggestions with such delays.

9.5 Summary and Conclusions

This study adds valuable findings in the area of props as age appropriate retrieval cues experimentation. General props do not appear to interfere nor help with the recall accuracy of preschool children when being questioned about their memories for events. The addition of misleading questions and repeated interviews have added to earlier studies in this area. This study has shown that children can provide accurate recall when faced with misleading suggestion and that some improvement in recall can occur over time in memory for events and recognition. Our understanding of the development of children's ability to perceive and transfer similarities for objects has been further developed. However, this study has outlined some concerns for the adaptability of props in many eyewitness situations. Further development of props and the optimal conditions for their use is necessary in order to be confident of their benefits to young children when recalling memories.

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APPENDIX A

Letter to Parent re Child Witness Studies

Dear

The request has come to seek your assistance in some current research which is evaluating the most appropriate ways for interviewing young children. Our centre has agreed to be involved by contacting you as we consider it to be valuable research.

The research is being conducted from the Psychology Department at the University of Tasmania (Hobart), under the supervision of Gemma O'Callaghan, and is funded for two years by the Criminology Research Council.

It is now being suggested that even very young children can give good information if certain procedures are followed, in appropriate atmospheres. This study is examining different ways in which children are asked to report on events they have witnessed. Although it has implications for cases such as child abuse, and should lead to more appropriate interviewing there, it does not actually use any approach or material associated with abuse. It is merely gathering information about the reliability of young children's memory for more everyday events they may have witnessed.

The study involves a brief (10 minute) visit to the child's home, during which the visitor plays a short game (with playdough), then requests to use the bathroom to wash her hands, and the child makes a drawing of the activity. Next day the child is interviewed (approx. 10 minutes) at the childcare centre and is asked to retell the events of the home visit, and to answer questions about it. Half of the children will be revisited one week later for an identical interview.

Your assistance is requested by agreeing to allow your child to participate. A consent form is attached for your signature and details for contact to be made for the visit. The research assistants involved are Mrs Athalie Lane and Ms Ros Badcock. Any concern you have about the study or its details could be directed to Miss Gemma O'Callaghan (Uni: 20 2243; AH: 34 5726). No identifying information about any child or family will appear in the finished report, but it will be available for you to read, if you wish it.

CONSENT FORM - CHILD WITNESS STUDY (4 YEAR OLDS)

I have read the description of the study and I know it involves a brief visit to our home and a brief interview the next day at the centre with the possibility of a second interview one week later.

I understand the content of the home visit and the interview is all about everyday events the child has witnessed during the home visit, and has no reference to any disturbing events or personal/family matters.

I understand that no identifying information about our family will be included in the report. I can ask to read the full report at the end of the study.

I understand that we can withdraw from this study at any time.

I am willing for my child to be involved in this study.

N A M E O F
PARENT.....

PARENT'S
SIGNATURE.....

ADDRESS.....

PHONE.....

CHILD'S NAME.....

CHILD'S DATE OF BIRTH.....

CHILD'S DAYS AND TIMES AT CENTRE.....

.....

.....

Appendix B
Subject Profiles

Subject No.	C. A.	Sex	Memory Score	Condition
1	4.10	Male	4	8
2	4.4	Male	5	8
3	4.5	Male	4	8
4	4.3	Male	6	8
5	4.6	Female	6	8
6	4.11	Female	0	8
7	4.8	Female	8	8
8	4.6	Female	7	8
9	4.11	Female	3	2
10	4.4	Female	5	2
11	4.3	Male	2	2
12	4.11	Male	6	2
13	4.11	Male	4	2
14	4.1	Male	3	2
15	4.11	Female	6	2
16	4.6	Female	6	2
17	4.2	Male	2	1
18	4.6	Male	5	1
19	4.2	Male	5	1
20	4.10	Male	2	1
21	4.4	Female	7	1
22	4.6	Female	4	1
23	4.3	Female	4	1
24	4.4	Female	4	1
25	4.6	Male	4	3
26	4.8	Female	5	3
27	4.5	Male	6	3
28	4.1	Male	4	3
29	4.2	Male	6	3
30	4.2	Female	7	3
31	4.7	Female	2	3
32	4.3	Female	1	3

Subject No.	C. A.	Sex	Memory Score	Condition
33	4.9	Male	4	6
34	4.11	Male	5	6
35	4.4	Male	4	6
36	4.4	Male	4	6
37	4.8	Female	5	6
38	4.7	Female	5	6
39	4.5	Female	4	6
40	4.4	Female	7	6
41	4.11	Female	5	4
42	4.3	Female	6	4
43	4.7	Male	6	4
44	4.11	Male	3	4
45	4.8	Male	4	4
46	4.5	Male	6	4
47	4.5	Female	5	4
48	4.2	Female	4	4
49	4.4	Male	4	7
50	4.11	Female	6	7
51	4.4	Male	3	7
52	4.4	Male	4	7
53	4.4	Male	6	7
54	4.3	Female	5	7
55	4.9	Female	7	7
56	4.6	Female	6	7
57	4.6	Female	3	5
58	4.3	Female	3	5
59	4.2	Male	6	5
60	4.3	Female	6	5
61	4.6	Male	7	5
62	4.10	Male	3	5
63	4.3	Male	8	5
64	4.8	Female	5	5

APPENDIX C
'MEMORY FOR OBJECTS' MATCHING TASK INSTRUCTIONS AND
SCORING PROCEDURE

Display card with 10 objects to child, having obtained interest in the task.

'Look carefully at each of these things. We will name them...(Do so, one at a time). Keep looking at them for a little while longer. (Expose for 2 minutes). Now we're going to do something different.'

Five minutes later: **"Do you remeber we looked at some things in a box? Try hard and see how many you can remember.**

Allow only such prompts as **"Are there any others you can remember?"** or **"Do you think you can remember another one?"**

Release subject from task when obviously not recalling any more (but do not rush).

Scoring: Order is not important; and if the child uses alernative names for object, but is correct, score as 1. Score only 1 or 0 (no partial credit)

CHAIR:..... SCISSORS:.....

DOG:..... DOLL:.....

CUP:..... FLOWER:.....

BOAT:..... CAR:.....

BUTTON:..... HORSE:.....

Child's name:.....C.A.....Test Date.....

Centre.....

Behavioural notes:.....

Rapport:.....

Score:...../10

APPENDIX D: Standardised Questioning Procedures and Response Sheets for all Conditions

1) Free Recall

- 1) Direct the child to their seat where they will be sitting during the interview.
- 2) The tester will initially prompt the child by asking,
"I believe that your family had a visitor yesterday/last week at your house.....(child's name). I want you to tell me as much as you can remember about that. (30 seconds max.).
- 3) Allow the child to start recalling the visit. Record verbatim responses. (10 minutes max. Stop when the child is obviously not recalling).
40. During the course of the narrative, the child will only be given neutral prompts such as;
"Tell me anything about the visitor that you can remember"
"Is there anything else that you can remember?"
"Did anything else happen at the visit that you can tell me?"

2) Objective Questioning

- 1) The tester will initially prompt the child by saying,
"I believe that your family had a visitor yesterday/last week at your house.....(child's name). I am going to ask you some questions about that visit and I want you to answer the questions and you can.
- 2) Record the child's verbatim answers and prop movements on the objective question sheets provided.

3) Objective Questioning/ Props

- 1) Introducing the playkit to the child in front of the child in a position that can be easily reached by the child and say;
"I have a house here and it has little pieces of furniture that most homes have like a chair (pick up the chair and show it to the child) and a bed (display the bed to the child). We can even move all the pieces in the house and make it look like your house as much as we can. We can do that now." Join the child in making the kit resemble their home. On the completion of the house say; "O.K. this is your house now." (3 min. max.).
- 2) At this stage introduce and agree on which dolls will represent which persons as were present during the visit. Check the 'CHECKLIST

FOR OBSERVER' sheet to determine during the visitation then say;
"These dolls belong to the house and we can say that the dolls are the people that were at the house when the lady came to visit you. Who was at the house when the lady came? (Record the answer on the Objective Questions sheet for question 1). Which doll can we say is the lady? Which one can be you? Which one can be your mother and also one for your father? What about your sister(s) and brother(s)?" Demonstrate the movements of the dolls. (2 mins.max.).

3) The tester will initially prompt the child by saying,

"I believe that your family had a visitor yesterday/last week at your house.....(child's name). I am going to ask you some questions about that visit and I want you to answer the questions and you can use the house and the dolls to help you. While you are answering my questions about the lady and what you and the lady did together, you can move the dolls in the house". (30 sec. max.).

4) Record the child's verbatim answers and prop movements on the objective question sheets provided.

4) Misleading Questioning

1) The tester will initially prompt the child by saying,

"I believe that your family had a visitor yesterday/last week at your house.....(child's name). I am going to ask you some questions about that visit and I want you to answer the questions and you can.

2) Record the child's verbatim answers and prop movements on the misleading question sheets provided.

5) Misleading Questioning/ Props

1) Introducing the playkit to the child in front of the child in a position that can be easily reached by the child and say;

"I have a house here and it has little pieces of furniture that most homes have like a chair (pick up the chair and show it to the child) and a bed (display the bed to the child). We can even move all the pieces in the house and make it look like your house as much as we can. We can do that now." Join the child in making the kit resemble their home. On the completion of the house say; "O.K. this is your house now." (3 min. max.).

2) At this stage introduce and agree on which dolls will represent which persons as were present during the visit. Check the 'CHECKLIST FOR OBSERVER' sheet to determine during the visitation then say;

"These dolls belong to the house and we can say that the dolls are the people that were at the house when the lady came to visit you. Who was at the house when the lady came? (Record the answer on the Objective Questions sheet for question 1). Which doll can we say is the lady? Which one can be you? Which one can be your mother and also one for your father? What about your sister(s) and brother(s)?" Demonstrate the movements of the dolls. (2 mins.max.).

3) The tester will initially prompt the child by saying,

"I believe that your family had a visitor yesterday/last week at your house.....(child's name). I am going to ask you some questions about that visit and I want you to answer the questions and you can use the house and the dolls to help you. While you are answering my questions about the lady and what you and the lady did together, you can move the dolls in the house". (30 sec. max.).

4) Record the child's verbatim answers and prop movements on the misleading question sheets provided.

6) Photo Identification

1) The tester will show the child at the end of the testing session the photo-lineup and say;

"Look carefully and tell me if you can see the lady here."

7) Photo Identification - Misleading

1) The tester will show the child at the end of the testing session the photo -lineup and say;

"Look carefully and tell me if you can see the lady here."

2) While the tester is packing up the child will view an additional photo of one on the photo lineup.(10 secs. max.). The tester will say;

"This is another friend of mine."

APPENDIX E
OBJECTIVE QUESTIONING SERIES

1 Who was at your house when the lady came?

.....

.....

.....

2 Which person answered the door when the lady visited your house?

.....

.....

.....

3 What was the lady's name?

.....

.....

.....

4 What colour bag did the lady carry?

.....

.....

.....

5 What did the lady ask your mother/father when she came into the house?

.....

.....

.....

6 Where did the lady say she wanted to sit to play with you?

.....

.....

.....

7 Where did you and the lady sit down together?

.....

.....

.....

8 What did the lady have to play with?

.....

.....

.....

OBJECTIVE QUESTIONING

9 What did the lady say she was going to do with the playdough?

.....

.....

.....

10 What did the playdough come in?

.....

.....

11 What did you and the lady make with the playdough?

.....

.....

.....

12 What colour was the playdough?

.....

.....

.....

13 When you made the octopus, did you make the legs or the head first?

.....

.....

.....

14 How many legs did the octopus have?

.....

.....

.....

15 Did the lady go to any other rooms while she was at your house? Which room?

.....

.....

.....

16 What did the lady say she would do in the bathroom?

.....

.....

.....

OBJECTIVE QUESTIONING

17 What did the lady ask you to do after you made the octopus out of the playdough?

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.....
.....

18 What did you do after you made the octopus?

.....
.....
.....

19 What did the lady say she was going to do with the drawing that you made of the octopus?

.....
.....
.....

20 What did the lady give you to keep?

.....
.....
.....

21 Where did you put the playdough when you were finished with it?

.....
.....
.....

22 Where did the lady leave her glass when she finished her drink?

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.....
.....

23 What clothes were you wearing when the lady visited you?

.....
.....
.....

24. Where did the lady say she was going when she left you?

.....
.....
.....

APPENDIX F
MISLEADING QUESTIONS SERIES

1 Who was at your house when the lady came?

.....

.....

.....

2 Which person answered the door when the lady visited your house?

.....

.....

.....

3 What was the lady's name?

.....

.....

.....

4 What colour bag did the lady have?

.....

.....

.....

5 What did the lady ask your mother/father when she came into the house?

.....

.....

.....

6 Where did the lady say she wanted to sit to play with you?

.....

.....

.....

7 Where did you and the lady sit down together?

.....

.....

.....

8 What did the lady have to play with?

.....

.....

.....

MISLEADING QUESTIONING SERIES

9 What did the lady say she was going to do with the playdough?

.....
.....
.....

10.What did the playdough came in?

.....
.....
.....

11 What did you and the lady make with the playdough?

.....
.....
.....

12 What colour was the playdough?

.....
.....
.....

13 When you made the octopus, did you make the legs or the head first?

.....
.....
.....

14 How many legs did the octopus have?

.....
.....
.....

15 Did the lady go to the bedroom when she was with you?

.....
.....
.....



16 What did the lady say she would do in the bathroom?

.....
.....
.....

MISLEADING QUESTIONING SERIES

17 What did the lady ask you to do after she made the octopus out of the playdough?

.....

.....

.....

18.What did you do after you made the octopus?

.....

.....

.....

19 Where did the lady tell you to hang the picture in your house?

.....

.....

.....

X

20 What did the lady give you to keep?

.....

.....

.....

21 Did you put the playdough in the oven when you were finished with it?

.....

.....

✓

22 Did the lady leave her glass on the sink?

.....

.....

.....

✓

23 What clothes were you wearing when the lady visited you?

.....

.....

^

24.Where did the lady say she was going when she left you?

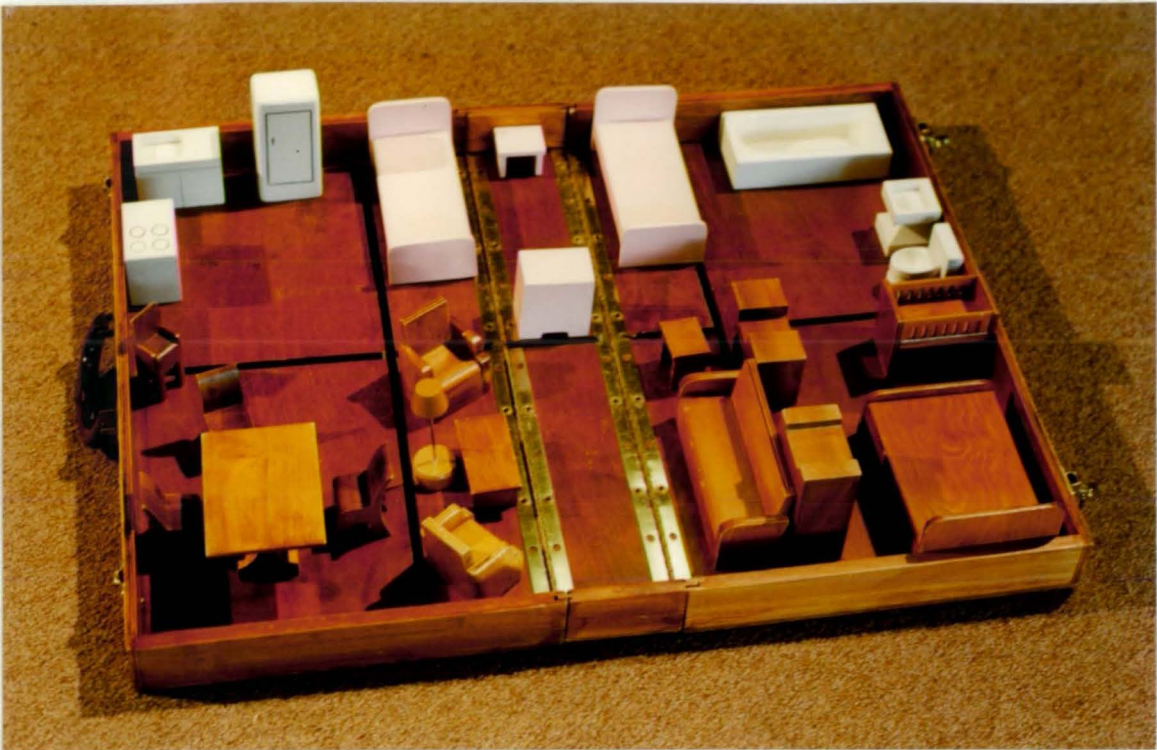
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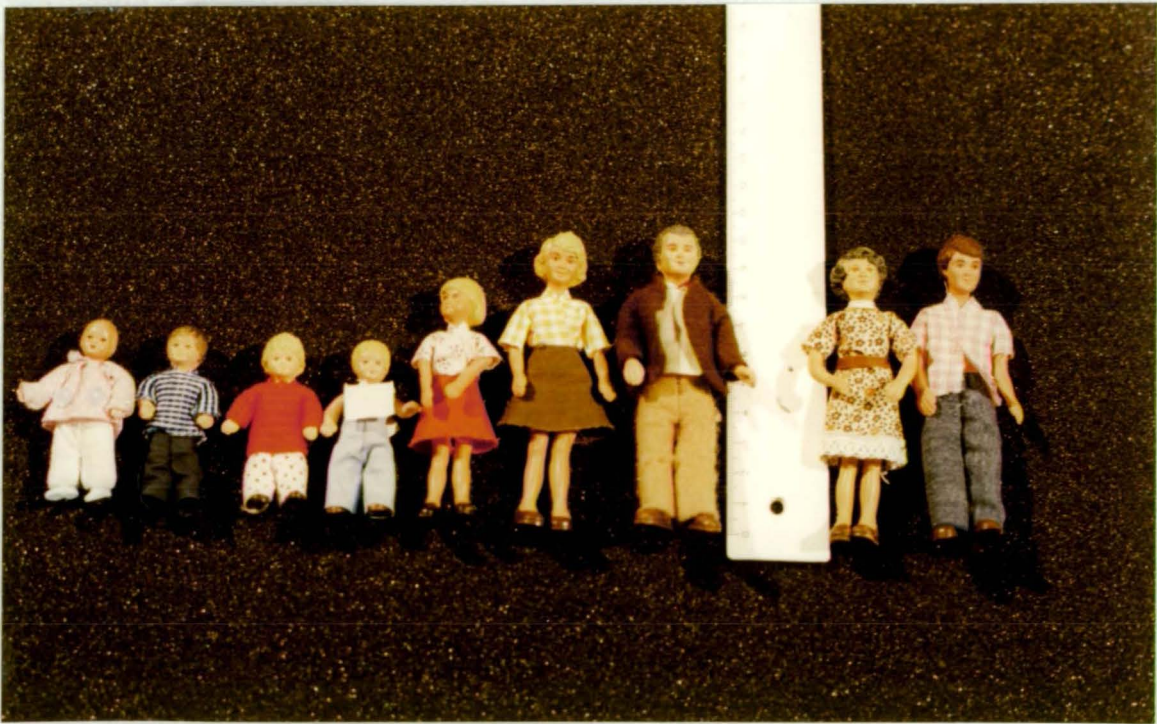
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APENDIX G THE DRISCOLL PLAYKIT AND MINIATURE FIGURES



Photograph 1. The Driscoll Play Kit



Photograph 2. Miniature Figures

APPENDIX H
CHECKLIST FOR OBSERVER

- 1) Name of the child.....
- 2) Age.....
- 3) Child care centre.....
- 4) Who answered the door?.....
- 5) Besides the mother/father who else was present?.....
.....
.....
- 6) Was the child present at the time of entry?.....
- 7) If no to the above, when did the child arrive on the scene?.....
.....
- 8) Did the child direct you to the kitchen table? If not, who showed you to a table and in which room was the table in?.....
.....
.....
- 9) Check each question that was asked and the response;
How old are you?.....
Did you have a nice day today?.....
Do you go to creche /kinder?.....
What is your teachers/carers name?.....
Do you like going to creche/kinder?.....
- 10) What was the colour of the play dough?.....
- 11) Did you go to the bathroom?.....
- 12) Did the child show you to the bathroom? If not, who did?.....
.....
.....
- 13) Did you have a glass of water? Describe how you got it

.....
14) Did the child keep the play dough?.....

15) Did you keep the drawing?.....

16) Who was present when you left?.....

17) Give the time of arrival and departure:

Arrive:.....

Depart:.....

18) Describe child's attire.....

.....

.....

19) What colour was your bag?.....

20) Where did you tell the child you would go when you left them?.....

.....

21) Other comments.....

.....

.....

APPENDIX I PHOTO LINE UP



Photograph 3: Photo line up

Photograph 4:
Misleading photo



Appendix J : Visitors Script

1) (The time of the visit will be arranged in consultation with the family so as to least disrupt their routine). Visitor knocks on the door of the house in which the subject lives. The visit will be at a pre-determined time so as the door can be answered by one of the parents and the child who is to be questioned about the incident. Regardless of who answers the door, the visitor will ask to see the child. She will say; "Hello. My name is Marie and I would like to see.....(child's name)". When the child is present the visitor will say to the child; "Hi.....(child's name), my name is Marie and I am here because I have something that I want to show to you".

If anyone else is present at the time of the initial introduction the visitor will say; "Hello. My name is Marie and I am here to visit.....(child's name)".

2) At this stage the visitor will ask the child to show her to a table in the kitchen (or any other appropriate place) so that they can commence the activity. She will say; "Could you show me where your kitchen table is so that we can do some things together?" At this point the visitor will settle herself at a table with the child sitting at the table next to her.

3) While the visitor is busy organising the play dough she will involve the child in general conversation and will ask the following questions; "How old are you?"

"Did you have a nice day today?"

"Do you go to creche/school?"

"What is your teachers name?"

"Do you like going to creche/school?"

4) The visitor will have the play dough out and placed on the protective bag. With the play dough in hand the visitor will ask the child; "Do you know what this is?" Regardless of whether the child answered the question correctly, the visitor will say; "This is called play dough and it is nice and soft so that we can make some things out of it with our hands. Today I am going to make an octopus, Do you know what an octopus is? Can you tell me how many legs an octopus has?" While asking these questions the visitor will start rolling the legs out first and placing them in a cartwheel form on the plastic bag.

If the child is not sure what an octopus is, the visitor will

explain that; "An octopus is an animal that lives in the sea and it has eight legs, but we will make one with six legs."

After the legs are made, ask the child to help you count the legs to make sure that it has six legs, say; "We should count the legs together to make sure that it has six legs." After counting the legs out with the child, make the head and place it on the legs and put a face on the head and say to the child; "Look, I am going to make a face on the octopus. It will have two eyes and a big smile."

5) Ask " Could I have a glass of water please?" Leave the glass on the table when the water is finished.

6) The visitor will give the child a piece of paper and colouring pencils and say; "Here is a piece of paper and some colouring pencils. See if you can draw the octopus for me. Try to draw it just like it is." After the drawing is completed, the visitor will ask the child to help spell his/her name on the drawing while also using the opportunity to repeat her (the visitor's) name. Say; "We will write your name on the drawing so that I know who made the drawing. See if you can help me write/spell your name. "My name is Marie,is spelt like this." The visitor will write the child's name on the drawing and will write her own name on the back of the paper.

7) The visitor will then say to the child; "You can keep the play dough so that you can make some of your own animals or any other things that you can think of. May I keep the picture as it is a very good picture."

8) The visitor will ask the child to show her to the bathroom to wash her hands. Say; " Could you take me to the bathroom please? I'd like to wash my hands."

9) The visitor will then say to the child that she has to go home and will also ask for the mother (or the father), so that she can say goodbye to them Say; "I have to go now. Could you please get your mother/father so that I can say goodbye? Thankyou for the visit. It has been very nice meeting you all."

APPENDIX K

S: _____ CA: _____ DATE _____ COND: P/NP MISL: Y/N NO. WDS: _____
 RAPPORT: _____ SPEECH _____ VISIT NO: _____ RECOG 1: Y/N: 2: Y/N/M

Q	CORECT										DK	INCORRECT									
	DI			DE			AC			TOT		DI			DE			A			TOT
*Mis1	✓	✓0	✓0	✓	✓0	✓0	✓	✓0	✓0	✓+✓0		X	X0	X0	X	X0	X0	X	X0	X0	X+X0
1de																					
2a																					
3di																					
4de																					
5di																					
6di																					
7de																					
8de																					
9di																					
19de																					
11a																					
12de																					
13a																					
14de																					
15a*																					
16di																					
17di																					
18a																					
19di*																					
20a																					
21a*																					
22a*																					
23de																					
24di																					
FR																					
TOTAL																					

Rater _____

ANALYSIS BETWEEN SUBJECTS

ANOVA QUANTITY FREE RECALL

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	1.000	1.000	.036	.8503
INTERVIEWS	1	16.000	16.000	.575	.4513
MISLEAD	1	10.562	10.562	.380	.5402
PROPS * INTE...	1	5.062	5.062	.182	.6713
INTERVIEWS *...	1	.250	.250	.009	.9248
PROPS * MISL...	1	2.250	2.250	.081	.7771
PROPS * INTE...	1	45.562	45.562	1.638	.2058
Residual	56	1557.250	27.808		

Dependent: FR QUANT

ANOVA PERCENTAGE ACCURATE FREE RECALL

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	668.222	668.222	.566	.4551
INTERVIEWS	1	15.249	15.249	.013	.9099
MISLEAD	1	1281.282	1281.282	1.085	.3021
PROPS * INTE...	1	343.732	343.732	.291	.5917
INTERVIEWS *...	1	1820.729	1820.729	1.542	.2195
PROPS * MISL...	1	92.448	92.448	.078	.7807
PROPS * INTE...	1	392.238	392.238	.332	.5667
Residual	56	66129.002	1180.875		

Dependent: FR % ACC

ANALYSIS BETWEEN SUBJECTS

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	13.781	13.781	.686	.4145
HISLEAD	1	.031	.031	.002	.9688
PROPS * HISLEAD	1	30.031	30.031	1.495	.2316
Residual	28	562.375	20.085		

Dependent: TOTAL CORRECT 2

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	361.250	361.250	1.870	.1823
HISLEAD	1	348.613	348.613	1.805	.1899
PROPS * HISLEAD	1	331.531	331.531	1.716	.2008
Residual	28	5408.125	193.147		

Dependent: TOTAL CORRECT 2

ANALYSIS WITHIN SUBJECTS

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	62.016	62.016	1.834	.1808
INTERVIEWS	1	523.266	523.266	15.473	.0002
PROPS * INTE...	1	.391	.391	.012	.9148
Residual	60	2029.062	33.818		

Dependent: CORREP-20

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	141.016	141.016	.743	.3923
INTERVIEWS	1	17.016	17.016	.090	.7657
PROPS * INTE...	1	5.641	5.641	.030	.8637
Residual	60	11394.188	189.903		

Dependent: CORREP-20%

ANALYSIS BETWEEN SUBJECTS

QUANTITY QUESTION TYPE

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	.391	.391	.082	.775
INTERVIEWS	1	1.266	1.266	.266	.608
MISLEAD	1	.141	.141	.030	.864
PROPS * INTERVIEWS	1	5.641	5.641	1.184	.281
INTERVIEWS * MISLEAD	1	.766	.766	.161	.690
PROPS * MISLEAD	1	.141	.141	.030	.864
PROPS * INTERVIEWS * ...	1	11.391	11.391	2.390	.127
Residual	56	266.875	4.766		

Dependent: DIA SING=2ND

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	58.141	58.141	11.300	.00
INTERVIEWS	1	3.516	3.516	.683	.41
MISLEAD	1	11.391	11.391	2.214	.14
PROPS * INTERVIEWS	1	.016	.016	.003	.95
INTERVIEWS * MISLEAD	1	6.891	6.891	1.339	.25
PROPS * MISLEAD	1	6.891	6.891	1.339	.25
PROPS * INTERVIEWS * ...	1	3.516	3.516	.683	.41
Residual	56	288.125	5.145		

Dependent: DESC SING=2ND

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
PROPS	1	.250	.250	.032	.858
INTERVIEWS	1	6.250	6.250	.802	.374
MISLEAD	1	1.000	1.000	.128	.721
PROPS * INTERVIEWS	1	5.062	5.062	.650	.423
INTERVIEWS * MISLEAD	1	18.062	18.062	2.319	.133
PROPS * MISLEAD	1	.062	.062	.008	.928
PROPS * INTERVIEWS * ...	1	9.000	9.000	1.155	.287
Residual	56	436.250	7.790		

Dependent: ACT SING=2ND

RAW DATA

	INITIAL	SEX	STM	PROPS	INTERVIEWS	MISLEAD	RECOGNITION	RECOGNITION 2	QUANTITY 1	QUANTITY 2	QUANTITY FR	RAPPORT
1	1	1	4.000	1	2	1	2	3	167.000	112.000	9.000	26
2	2	1	5.000	1	2	1	2	2	108.000	101.000	20.000	37
3	3	1	4.000	1	2	1	1	1	82.000	57.000	14.000	40
4	4	1	6.000	1	2	1	2	2	129.000	102.000	65.000	33
5	5	2	6.000	1	2	1	1	1	91.000	101.000	17.000	40
6	6	2	0	1	2	1	2	1	93.000	63.000	14.000	40
7	7	2	8.000	1	2	1	1	1	73.000	72.000	3.000	40
8	8	2	7.000	1	2	1	1	1	73.000	70.000	13.000	26
9	9	1	3.000	1	1	2	1	*	77.000	*	4.000	28
10	10	1	5.000	1	1	2	2	*	118.000	*	9.000	40
11	11	1	2.000	1	1	2	2	*	108.000	*	14.000	30
12	12	1	6.000	1	1	2	1	*	88.000	*	14.000	10
13	13	2	4.000	1	1	2	1	*	73.000	*	18.000	40
14	14	2	3.000	1	1	2	1	*	200.000	*	6.000	40
15	15	2	6.000	1	1	2	1	*	67.000	*	25.000	20
16	16	2	6.000	1	1	2	1	*	89.000	*	19.000	40
17	17	1	2.000	2	1	2	1	*	77.000	*	13.000	20
18	18	1	5.000	2	1	2	2	*	133.000	*	33.000	35
19	19	1	5.000	2	1	2	1	*	67.000	*	14.000	40
20	20	1	2.000	2	1	2	1	*	120.000	*	9.000	23
21	21	2	7.000	2	1	2	2	*	150.000	*	41.000	40
22	22	2	4.000	2	1	2	1	*	75.000	*	25.000	40
23	23	2	4.000	2	1	2	1	*	100.000	*	8.000	40
24	24	2	4.000	2	1	2	1	*	108.000	*	10.000	36
25	25	1	4.000	2	1	1	1	*	69.000	*	10.000	40
26	26	2	5.000	2	1	1	1	*	155.000	*	45.000	40
27	27	1	6.000	2	1	1	2	*	89.000	*	31.000	40
28	28	1	4.000	2	1	1	2	*	59.000	*	6.000	36
29	29	1	6.000	2	1	1	1	*	62.000	*	22.000	40
30	30	2	7.000	2	1	1	1	*	95.000	*	7.000	21
31	31	2	2.000	2	1	1	1	*	67.000	*	26.000	40
32	32	2	1.000	2	1	1	2	*	98.000	*	18.000	22
33	33	1	4.000	2	2	1	2	1	107.000	77.000	9.000	40
34	34	1	5.000	2	2	1	1	1	90.000	82.000	3.000	40
35	35	1	4.000	2	2	1	2	2	94.000	85.000	18.000	29
36	36	1	4.000	2	2	1	1	1	80.000	83.000	6.000	40
37	37	2	5.000	2	2	1	1	1	82.000	55.000	25.000	40
38	38	2	5.000	2	2	1	1	1	62.000	51.000	8.000	40
39	39	2	4.000	2	2	1	1	1	113.000	110.000	34.000	40
40	40	2	7.000	2	2	1	1	1	81.000	159.000	29.000	36
41	41	2	5.000	1	1	1	1	*	68.000	*	10.000	40
42	42	2	6.000	1	1	1	2	*	68.000	*	5.000	34
43	43	1	6.000	1	1	1	1	*	91.000	*	37.000	40
44	44	1	3.000	1	1	1	1	*	73.000	*	3.000	19
45	45	1	4.000	1	1	1	1	*	122.000	*	32.000	22
46	46	1	6.000	1	1	1	1	*	210.000	*	34.000	40
47	47	2	5.000	1	1	1	1	*	80.000	*	31.000	40
48	48	2	4.000	1	1	1	1	*	50.000	*	7.000	16
49	49	1	4.000	1	2	2	1	1	54.000	63.000	10.000	24
50	50	2	6.000	1	2	2	1	1	75.000	79.000	43.000	40
51	51	1	3.000	1	2	2	2	2	83.000	54.000	0	16
52	52	1	4.000	1	2	2	1	1	147.000	87.000	11.000	40
53	53	1	6.000	1	2	2	1	1	112.000	63.000	22.000	40
54	54	2	5.000	1	2	2	2	1	78.000	92.000	10.000	40
55	55	2	7.000	1	2	2	1	1	120.000	124.000	39.000	34
56	56	2	6.000	1	2	2	1	1	95.000	65.000	12.000	40
57	57	2	3.000	2	2	2	1	1	75.000	73.000	18.000	33
58	58	2	3.000	2	2	2	1	1	139.000	147.000	22.000	40
59	59	1	6.000	2	2	2	1	1	104.000	87.000	4.000	26
60	60	2	6.000	2	2	2	1	1	72.000	71.000	5.000	22
61	61	1	7.000	2	2	2	2	2	113.000	139.000	20.000	33
62	62	1	3.000	2	2	2	2	2	74.000	53.000	12.000	28
63	63	1	8.000	2	2	2	2	2	151.000	163.000	24.000	40
64	64	2	5.000	2	2	2	1	1	105.000	73.000	67.000	40

RAW DATA

	SPEECH 1	RAPPORT 2	SPEECH 2	DIALOGUE CORRECT 1	DIALOGUE CORRECT 2	DESC CORRECT 1	DECS CORRECT 2	ACTION CORRECT
1	18.000	18.000	17.000	2.000	6.000	5.000	3.000	10.000
2	17.000	25.000	20.000	3.000	3.000	7.000	5.000	12.000
3	40.000	20.000	18.000	5.000	6.000	9.000	8.000	8.000
4	40.000	20.000	20.000	11.000	10.000	9.000	11.000	6.000
5	40.000	20.000	20.000	9.000	7.000	7.000	9.000	9.000
6	40.000	20.000	20.000	5.000	6.000	8.000	11.000	7.000
7	20.000	40.000	20.000	8.000	8.000	10.000	10.000	7.000
8	13.000	32.000	16.000	2.000	6.000	7.000	5.000	9.000
9	20.000	*	*	5.000	*	6.000	*	7.000
10	20.000	*	*	3.000	*	10.000	*	4.000
11	19.000	*	*	5.000	*	7.000	*	4.000
12	20.000	*	*	7.000	*	9.000	*	9.000
13	20.000	*	*	6.000	*	8.000	*	7.000
14	20.000	*	*	5.000	*	10.000	*	7.000
15	20.000	*	*	9.000	*	9.000	*	8.000
16	20.000	*	*	6.000	*	11.000	*	4.000
17	17.000	*	*	3.000	*	2.000	*	3.000
18	20.000	*	*	3.000	*	8.000	*	7.000
19	20.000	*	*	4.000	*	5.000	*	5.000
20	18.000	*	*	3.000	*	3.000	*	3.000
21	20.000	*	*	7.000	*	8.000	*	5.000
22	20.000	*	*	4.000	*	6.000	*	5.000
23	20.000	*	*	3.000	*	5.000	*	6.000
24	20.000	*	*	7.000	*	9.000	*	6.000
25	18.000	*	*	4.000	*	7.000	*	7.000
26	20.000	*	*	8.000	*	4.000	*	23.000
27	20.000	*	*	7.000	*	6.000	*	5.000
28	20.000	*	*	5.000	*	5.000	*	6.000
29	20.000	*	*	3.000	*	6.000	*	5.000
30	18.000	*	*	5.000	*	7.000	*	7.000
31	20.000	*	*	6.000	*	5.000	*	3.000
32	12.000	*	*	1.000	*	3.000	*	1.000
33	20.000	40.000	20.000	5.000	4.000	6.000	6.000	9.000
34	20.000	40.000	20.000	6.000	5.000	7.000	7.000	6.000
35	18.000	27.000	20.000	5.000	6.000	8.000	4.000	6.000
36	20.000	30.000	17.000	7.000	5.000	4.000	4.000	5.000
37	20.000	40.000	20.000	6.000	6.000	12.000	11.000	7.000
38	20.000	34.000	20.000	3.000	4.000	5.000	4.000	6.000
39	20.000	40.000	20.000	5.000	6.000	4.000	4.000	2.000
40	20.000	40.000	20.000	6.000	5.000	9.000	8.000	5.000
41	20.000	*	*	4.000	*	5.000	*	5.000
42	20.000	*	*	5.000	*	7.000	*	6.000
43	20.000	*	*	5.000	*	5.000	*	9.000
44	16.000	*	*	2.000	*	7.000	*	6.000
45	15.000	*	*	7.000	*	7.000	*	9.000
46	20.000	*	*	6.000	*	7.000	*	8.000
47	20.000	*	*	5.000	*	7.000	*	5.000
48	15.000	*	*	5.000	*	4.000	*	6.000
49	12.000	28.000	15.000	2.000	0	3.000	10.000	1.000
50	20.000	30.000	20.000	6.000	6.000	9.000	10.000	6.000
51	11.000	10.000	8.000	3.000	2.000	6.000	3.000	5.000
52	20.000	40.000	20.000	5.000	7.000	9.000	9.000	5.000
53	20.000	40.000	20.000	4.000	6.000	11.000	9.000	6.000
54	20.000	40.000	20.000	4.000	6.000	8.000	7.000	5.000
55	20.000	*	*	2.000	1.000	9.000	8.000	3.000
56	20.000	40.000	20.000	5.000	7.000	9.000	9.000	3.000
57	20.000	27.000	18.000	3.000	7.000	10.000	11.000	7.000
58	20.000	40.000	20.000	2.000	2.000	11.000	7.000	6.000
59	16.000	38.000	20.000	6.000	6.000	4.000	4.000	4.000
60	20.000	30.000	20.000	4.000	6.000	8.000	2.000	6.000
61	20.000	40.000	20.000	6.000	9.000	7.000	7.000	6.000
62	19.000	40.000	20.000	3.000	5.000	9.000	6.000	6.000
63	20.000	40.000	20.000	5.000	4.000	5.000	4.000	8.000
64	20.000	40.000	20.000	7.000	7.000	7.000	7.000	11.000

RAW DATA

	ACTION CORRECT 2	TOTAL CORRECT 1	TOTAL CORRECT 2	TOTAL CORRECT 1 WEEK	DIAL INCORRECT 1	DIAL INCORRECT 2	DESC INCORRECT 1
1	4.000	17.000	15.000	15.000	6.000	3.000	6.000
2	7.000	22.000	15.000	15.000	3.000	3.000	2.000
3	6.000	22.000	20.000	20.000	0	1.000	3.000
4	5.000	26.000	26.000	26.000	0	0	3.000
5	4.000	25.000	20.000	20.000	0	0	3.000
6	6.000	20.000	23.000	23.000	3.000	0	2.000
7	5.000	25.000	23.000	23.000	1.000	1.000	1.000
8	5.000	18.000	16.000	16.000	3.000	0	3.000
9	*	18.000	*	18.000	2.000	*	5.000
10	*	17.000	*	17.000	2.000	*	2.000
11	*	16.000	*	16.000	2.000	*	3.000
12	*	25.000	*	25.000	0	*	2.000
13	*	21.000	*	21.000	1.000	*	2.000
14	*	22.000	*	22.000	2.000	*	3.000
15	*	26.000	*	26.000	1.000	*	1.000
16	*	21.000	*	21.000	0	*	2.000
17	*	8.000	*	8.000	2.000	*	5.000
18	*	18.000	*	18.000	1.000	*	2.000
19	*	14.000	*	14.000	0	*	1.000
20	*	9.000	*	9.000	2.000	*	3.000
21	*	20.000	*	20.000	1.000	*	3.000
22	*	15.000	*	15.000	1.000	*	3.000
23	*	14.000	*	14.000	2.000	*	4.000
24	*	22.000	*	22.000	0	*	1.000
25	*	18.000	*	18.000	4.000	*	2.000
26	*	11.000	*	11.000	1.000	*	2.000
27	*	18.000	*	18.000	1.000	*	
28	*	16.000	*	16.000	0	*	2.000
29	*	14.000	*	14.000	2.000	*	2.000
30	*	19.000	*	19.000	1.000	*	2.000
31	*	14.000	*	14.000	2.000	*	4.000
32	*	5.000	*	5.000	7.000	*	7.000
33	4.000	20.000	14.000	14.000	2.000	1.000	2.000
34	7.000	19.000	19.000	19.000	1.000	2.000	1.000
35	5.000	19.000	15.000	15.000	2.000	1.000	3.000
36	5.000	16.000	15.000	15.000	1.000	0	2.000
37	6.000	25.000	23.000	23.000	1.000	2.000	
38	4.000	14.000	12.000	12.000	2.000	0	5.000
39	5.000	11.000	15.000	15.000	5.000	4.000	3.000
40	6.000	20.000	19.000	19.000	1.000	1.000	1.000
41	*	14.000	*	14.000	0	*	4.000
42	*	19.000	*	19.000	1.000	*	3.000
43	*	19.000	*	19.000	3.000	*	7.000
44	*	15.000	*	15.000	2.000	*	1.000
45	*	23.000	*	23.000	0	*	4.000
46	*	21.000	*	21.000	2.000	*	2.000
47	*	17.000	*	17.000	1.000	*	5.000
48	*	15.000	*	15.000	1.000	*	6.000
49	3.000	6.000	13.000	13.000	3.000	5.000	8.000
50	7.000	21.000	23.000	23.000	1.000	1.000	2.000
51	5.000	14.000	10.000	10.000	1.000	1.000	2.000
52	9.000	19.000	25.000	25.000	1.000	0	1.000
53	5.000	21.000	20.000	20.000	3.000	0	3.000
54	6.000	17.000	19.000	19.000	0	1.000	1.000
55	4.000	14.000	13.000	13.000	4.000	7.000	3.000
56	4.000	17.000	20.000	20.000	2.000	1.000	1.000
57	8.000	20.000	26.000	26.000	1.000	1.000	1.000
58	8.000	19.000	17.000	17.000	5.000	5.000	3.000
59	5.000	14.000	15.000	15.000	0	1.000	4.000
60	7.000	18.000	15.000	15.000	1.000	0	4.000
61	8.000	19.000	24.000	24.000	0	1.000	3.000
62	4.000	18.000	15.000	15.000	4.000	1.000	1.000
63	6.000	18.000	14.000	14.000	0	1.000	3.000
64	8.000	25.000	22.000	22.000	1.000	1.000	1.000

RAW DATA

	DESC INCORRECT 2	ACTION INCORRECT 1	ACTION INCORRECT 2	TOTAL INCORRECT 1	TOTAL INCORRECT 2	TOTAL INCORRECT 1 WEEK	DON'T KNOW
1	4.000	3.000	2.000	15.000	9.000	9.000	
2	1.000	0	1.000	6.000	6.000	6.000	2.0
3	2.000	1.000	2.000	4.000	5.000	5.000	3.0
4	1.000	1.000	2.000	4.000	3.000	3.000	
5	3.000	0	3.000	3.000	6.000	6.000	2.0
6	0	3.000	1.000	8.000	1.000	1.000	1.0
7	1.000	1.000	2.000	3.000	4.000	4.000	1.0
8	4.000	1.000	1.000	6.000	5.000	5.000	2.0
9	*	1.000	*	8.000	*	8.000	3.0
10	*	2.000	*	6.000	*	6.000	4.0
11	*	4.000	*	9.000	*	9.000	2.0
12	*	2.000	*	4.000	*	4.000	1.0
13	*	1.000	*	4.000	*	4.000	1.0
14	*	3.000	*	8.000	*	8.000	1.0
15	*	1.000	*	3.000	*	3.000	1.0
16	*	2.000	*	4.000	*	4.000	1.0
17	*	3.000	*	10.000	*	10.000	
18	*	2.000	*	5.000	*	5.000	2.0
19	*	0	*	1.000	*	1.000	9.0
20	*	3.000	*	8.000	*	8.000	4.0
21	*	1.000	*	5.000	*	5.000	2.0
22	*	1.000	*	5.000	*	5.000	5.0
23	*	2.000	*	8.000	*	8.000	2.0
24	*	2.000	*	3.000	*	3.000	4.0
25	*	2.000	*	8.000	*	8.000	
26	*	1.000	*	4.000	*	4.000	1.0
27	*	2.000	*	3.000	*	3.000	1.0
28	*	1.000	*	3.000	*	3.000	7.0
29	*	1.000	*	5.000	*	5.000	4.0
30	*	1.000	*	4.000	*	4.000	4.0
31	*	3.000	*	9.000	*	9.000	1.0
32	*	8.000	*	2.000	*	2.000	
33	2.000	1.000	3.000	5.000	6.000	6.000	1.0
34	2.000	1.000	1.000	3.000	5.000	5.000	1.0
35	2.000	2.000	3.000	7.000	6.000	6.000	1.0
36	2.000	2.000	2.000	5.000	4.000	4.000	1.0
37	1.000	0	2.000	1.000	5.000	5.000	1.0
38	5.000	1.000	3.000	8.000	8.000	8.000	2.0
39	4.000	6.000	5.000	14.000	13.000	13.000	1.0
40	1.000	2.000	2.000	4.000	4.000	4.000	
41	*	1.000	*	5.000	*	5.000	5.0
42	*	0	*	4.000	*	4.000	4.0
43	*	1.000	*	11.000	*	11.000	2.0
44	*	2.000	*	5.000	*	5.000	6.0
45	*	3.000	*	7.000	*	7.000	2.0
46	*	2.000	*	6.000	*	6.000	2.0
47	*	3.000	*	9.000	*	9.000	1.0
48	*	1.000	*	8.000	*	8.000	4.0
49	3.000	7.000	5.000	18.000	13.000	13.000	4.0
50	2.000	2.000	1.000	5.000	4.000	4.000	
51	5.000	2.000	2.000	5.000	8.000	8.000	7.0
52	2.000	4.000	0	6.000	4.000	4.000	5.0
53	1.000	1.000	2.000	7.000	3.000	3.000	3.0
54	2.000	2.000	1.000	3.000	4.000	4.000	2.0
55	5.000	4.000	5.000	11.000	17.000	17.000	2.0
56	2.000	3.000	3.000	6.000	6.000	6.000	
57	1.000	0	0	2.000	2.000	2.000	4.0
58	3.000	2.000	2.000	10.000	10.000	10.000	
59	4.000	3.000	1.000	7.000	6.000	6.000	1.0
60	5.000	1.000	1.000	6.000	6.000	6.000	2.0
61	3.000	2.000	2.000	5.000	6.000	6.000	1.0
62	4.000	1.000	3.000	6.000	8.000	8.000	3.0
63	2.000	2.000	1.000	5.000	4.000	4.000	1.0
64	2.000	0	0	2.000	3.000	3.000	

RAW DATA

	DON'T KNOW 2	DON'T KNOW 1 WEEK	TOTAL INCORRECT-DONT KNOW	% MISLEAD 1	% MISLEAD 2	AGE	% OI COR	% DESC I COR	% ACT I COR
1	1.000	1.000	10.00	0	50	4.08	25	45	7
2	7.000	7.000	13.00	0	50	4.33	50	78	10
3	1.000	1.000	6.00	0	25	4.00	100	75	8
4	0	0	3.00	0	25	4.25	100	75	8
5	1.000	1.000	7.00	0	25	4.50	100	70	10
6	1.000	1.000	2.00	0	0	4.92	63	80	7
7	1.000	1.000	5.00	0	25	4.66	89	91	8
8	2.000	2.000	7.00	25	25	4.50	40	70	9
9	*	3.000	11.00	*	*	4.92	71	58	8
10	*	4.000	10.00	*	*	4.33	60	88	7
11	*	2.000	11.00	*	*	4.25	75	72	6
12	*	1.000	5.00	*	*	4.92	100	86	8
13	*	1.000	5.00	*	*	4.92	86	86	9
14	*	1.000	9.00	*	*	4.08	71	79	7
15	*	1.000	4.00	*	*	4.92	90	94	9
16	*	1.000	5.00	*	*	4.50	100	89	8
17	*	0	10.00	*	*	4.02	60	42	5
18	*	2.000	7.00	*	*	4.06	67	71	7
19	*	9.000	10.00	*	*	4.17	100	88	10
20	*	4.000	12.00	*	*	4.80	60	57	6
21	*	2.000	7.00	*	*	4.33	88	85	9
22	*	5.000	10.00	*	*	4.50	80	80	8
23	*	2.000	10.00	*	*	4.25	60	50	7
24	*	4.000	7.00	*	*	4.33	100	91	8
25	*	0	8.00	0	*	4.50	50	57	7
26	*	1.000	5.00	25	*	4.67	90	89	9
27	*	1.000	4.00	50	*	4.42	88	100	8
28	*	7.000	10.00	25	*	4.08	100	71	8
29	*	4.000	9.00	0	*	4.17	60	63	8
30	*	4.000	8.00	0	*	4.17	83	78	8
31	*	1.000	10.00	25	*	4.58	75	55	7
32	*	0	2.00	100	*	4.25	13	56	3
33	1.000	1.000	7.00	25	75	4.75	71	75	9
34	2.000	2.000	7.00	0	0	4.92	86	88	8
35	0	0	6.00	25	50	4.33	71	73	7
36	2.000	2.000	6.00	50	25	4.33	88	67	7
37	0	0	5.00	0	25	4.67	86	100	10
38	6.000	6.000	14.00	0	25	4.58	60	50	8
39	0	0	13.00	50	50	4.42	50	57	2
40	1.000	1.000	5.00	50	50	4.33	86	90	7
41	*	5.000	10.00	0	*	4.92	100	64	8
42	*	4.000	8.00	0	*	4.25	83	75	10
43	*	2.000	13.00	25	*	4.58	63	61	9
44	*	6.000	11.00	25	*	4.92	50	88	7
45	*	2.000	9.00	0	*	4.67	80	67	8
46	*	2.000	8.00	0	*	4.42	75	56	7
47	*	1.000	10.00	25	*	4.42	83	47	6
48	*	4.000	12.00	0	*	4.17	83	50	8
49	1.000	1.000	14.00	*	*	4.33	40	17	1
50	0	0	4.00	*	*	4.92	86	82	7
51	9.000	9.000	17.00	*	*	4.33	75	75	7
52	2.000	2.000	6.00	*	*	4.33	83	90	5
53	3.000	3.000	6.00	*	*	4.33	57	79	8
54	1.000	1.000	5.00	*	*	4.25	100	89	7
55	0	0	17.00	*	*	4.75	33	75	4
56	0	0	6.00	*	*	4.50	71	90	5
57	2.000	2.000	4.00	*	*	4.50	75	91	10
58	1.000	1.000	11.00	*	*	4.25	29	79	7
59	1.000	1.000	7.00	*	*	4.17	100	50	5
60	2.000	2.000	8.00	*	*	4.25	80	67	8
61	0	0	6.00	*	*	4.50	100	70	7
62	1.000	1.000	9.00	*	*	4.80	43	90	8
63	2.000	2.000	6.00	*	*	4.25	100	63	8
64	0	0	3.00	*	*	4.67	88	88	10

RAW DATA

	% TOT 1 COR	% DI 2 COR	%DESC 2 COR	% ACT 2 COR	% TOT 2 COR	% DI 1 INC	% DESC 1 INC	% ACT 1 INC	% TOT 1 INC	% DI 2 INC
1	53	67	42	75	59	75	55	23	47	3
2	81	50	89	92	82	50	22	0	19	5
3	85	86	85	82	84	0	25	11	15	1
4	87	100	95	88	94	0	25	14	13	
5	89	100	82	70	82	0	30	0	11	
6	71	100	100	91	97	37	20	30	29	
7	89	89	85	67	81	11	9	12	11	1
8	72	100	69	89	82	60	30	10	28	
9	71	.	.	.	.	29	42	11	29	
10	79	.	.	.	.	40	12	29	21	
11	72	.	.	.	.	25	28	31	28	
12	88	.	.	.	.	0	14	15	12	2
13	88	.	.	.	.	14	14	8	12	
14	75	.	.	.	.	29	21	27	25	
15	93	.	.	.	.	10	6	8	7	
16	88	.	.	.	.	0	11	20	12	
17	48	.	.	.	.	40	58	50	52	
18	73	.	.	.	.	33	29	24	27	
19	94	.	.	.	.	0	12	0	6	
20	60	.	.	.	.	40	43	37	40	
21	88	.	.	.	.	12	15	8	12	
22	83	.	.	.	.	20	20	11	17	
23	61	.	.	.	.	40	50	25	39	
24	89	.	.	.	.	0	9	20	11	
25	66	.	.	.	.	50	43	22	34	
26	91	.	.	.	.	10	11	6	9	
27	91	.	.	.	.	12	0	17	9	
28	85	.	.	.	.	0	29	12	15	
29	69	.	.	.	.	40	37	12	31	
30	83	.	.	.	.	17	22	12	17	
31	70	.	.	.	.	25	45	22	30	
32	39	.	.	.	.	87	44	67	61	
33	80	80	78	63	73	29	25	10	20	2
34	86	71	80	89	81	14	12	14	14	2
35	73	86	73	64	72	29	27	25	27	1
36	76	100	71	75	81	12	33	29	24	
37	96	80	94	83	86	14	0	0	4	2
38	64	100	50	63	64	40	50	14	36	
39	44	60	47	53	52	50	43	75	56	4
40	83	83	87	83	85	14	10	29	17	1
41	77	.	.	.	.	0	36	14	23	
42	84	.	.	.	.	17	25	0	16	
43	73	.	.	.	.	37	39	7	27	
44	75	.	.	.	.	50	12	25	25	
45	78	.	.	.	.	20	33	20	22	
46	67	.	.	.	.	25	44	23	33	
47	58	.	.	.	.	17	53	38	42	
48	70	.	.	.	.	17	50	11	30	
49	25	0	71	55	55	60	83	87	75	10
50	81	88	92	94	92	14	18	25	19	1
51	74	67	38	71	56	25	25	29	26	3
52	76	100	83	100	93	17	10	44	24	
53	75	100	93	82	90	43	21	14	25	
54	85	86	83	90	86	0	11	29	15	1
55	56	42	48	36	44	67	25	57	44	5
56	74	88	86	67	81	29	10	50	26	1
57	91	88	89	100	92	25	9	0	9	1
58	66	29	71	85	68	71	21	25	34	7
59	67	86	60	86	75	0	50	43	33	1
60	75	100	22	78	63	20	33	14	25	
61	79	90	73	85	82	0	30	25	21	1
62	75	83	54	70	74	57	10	14	25	1
63	78	80	85	91	86	0	37	20	22	2
64	93	88	92	100	93	12	12	0	7	1

RAW DATA

	% DESC 2 INC	% ACT 2 INC	% TOT 2 INC	% TOT 1 COR+OK	% TOT 2 COR+OK	% TOT INC 1+OK	% TOT INC 2+OK
1	58	25	41	52	55	48	45
2	11	8	18	76	62	24	38
3	15	18	16	76	79	24	21
4	5	12	6	87	94	13	6
5	18	30	18	83	80	17	20
6	0	9	3	69	94	31	6
7	15	33	19	86	78	14	22
8	31	11	18	67	77	33	23
9	*	*	*	65	*	35	*
10	*	*	*	69	*	31	*
11	*	*	*	68	*	32	*
12	*	*	*	88	*	12	*
13	*	*	*	85	*	15	*
14	*	*	*	73	*	27	*
15	*	*	*	90	*	10	*
16	*	*	*	86	*	14	*
17	*	*	*	48	*	52	*
18	*	*	*	69	*	31	*
19	*	*	*	63	*	37	*
20	*	*	*	50	*	50	*
21	*	*	*	83	*	17	*
22	*	*	*	71	*	29	*
23	*	*	*	56	*	44	*
24	*	*	*	78	*	22	*
25	*	*	*	66	*	34	*
26	*	*	*	89	*	11	*
27	*	*	*	89	*	11	*
28	*	*	*	63	*	27	*
29	*	*	*	61	*	29	*
30	*	*	*	83	*	17	*
31	*	*	*	68	*	22	*
32	*	*	*	39	*	61	*
33	22	27	27	77	67	23	33
34	20	11	19	83	75	17	25
35	27	36	28	71	72	29	28
36	29	25	19	73	74	27	26
37	6	17	14	93	87	7	13
38	50	37	36	64	36	64	36
39	53	47	48	42	52	58	48
40	13	17	15	83	82	17	18
41	*	*	*	63	*	37	*
42	*	*	*	72	*	28	*
43	*	*	*	69	*	31	*
44	*	*	*	58	*	42	*
45	*	*	*	74	*	36	*
46	*	*	*	63	*	37	*
47	*	*	*	56	*	54	*
48	*	*	*	61	*	39	*
49	29	45	45	21	53	79	47
50	8	6	8	81	92	19	8
51	62	29	44	54	36	46	64
52	17	0	7	63	87	77	13
53	7	18	10	68	82	32	18
54	17	10	14	77	83	23	17
55	52	64	56	52	44	48	56
56	14	33	19	74	81	26	19
57	11	0	8	77	87	23	13
58	29	15	32	66	67	34	33
59	40	14	25	64	72	36	28
60	78	22	37	69	58	31	42
61	27	15	18	76	82	24	18
62	46	30	26	67	73	33	27
63	15	9	14	75	81	25	19
64	8	0	7	93	93	7	7