Children's Eyewitness Memory [1]

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The current intense interest in the reliability of children's eyewitness testimony represents the second period in recent history when the role of children in legal contexts has come under close scrutiny. Early researchers around the turn of this century debated many of the same issues that are currently being debated, for example, relating to the reliability and suggestibility of children's eyewitness memory (e.g., Ceci & Bruck, 1993). The early characterizations of child witnesses were not particularly flattering (e.g., Binet, 1900; Stern, 1910; Varendonck, 1911) and, ultimately, they lead to a long period during which children's testimony was considered likely to be highly unreliable (see Ceci & Bruck, 1993, for review). Varendonck (1911) was probably one of the most well known and widely cited of the early critics of children's place in the legal system. He had been called as an expert in a case involving the murder of a child in which a 9-year-old friend of the victim had provided investigators with information relating to the murder. Relying on a series of experiments in which he asked children misleading questions, together with a healthy dose of his own personal observation, Varendonck concluded that

"Those who are in the habit of living with children do not attach the least value to their testimony because children cannot observe and because their suggestibility is inexhaustible" (Varendonck, 1911, p. 27). According to Varendonck, when children claim to have observed certain details, we can't trust those observations, their imaginations play tricks on them, and they are easily influenced by those in authority (Varendonck, 1911, p. 29).

Others writing in legal contexts were no more optimistic about the potential of children as witnesses. For example, according to Brown (1926) children were infinitely malleable: "create, if you will, an idea of what the child is to hear or see, and the child is very likely to see or hear what you desire" (p. 133). Even earlier, pre-dating these views, Stephen had described young children as follows:

"... in infancy the strength of the imagination is out of all proportion to the power of the other faculties; and children constantly say what is not true, not from deceitfulness, but simply because they have come to think so, by talking or dreaming what has passed" (Stephen, 1863, cited in Stafford, 1962, p. 309).

Such characterizations of young children went largely unchallenged for a number of decades and it was not until the current wave of interest in children's eyewitness memory that the prevailing zeitgeist began to change. The 1980s, however, saw the beginning of a shift towards the view that, at least under some conditions, young children can be relied upon to recount what has happened to them. Contrary to Varendonck's conclusions, few people today would take issue with this view, at least in relation to children aged 8 or 9 years, the age of the children with whom Varendonck had been concerned.

What brought about this change in the perception of children's abilities as witnesses? It is often assumed to have been driven by the need to obtain information from children when they were the only witnesses, especially in cases of suspected sexual abuse. However, although childhood sexual abuse is an important context in which children give evidence, it is by no means the only one. For example, one estimate suggests that between 10 and 20% of homicides in Los Angeles are witnessed by children (Pynoos & Eth, 1986). Recent cases attracting media attention in NZ illustrate that here, too, children may be critically

[1] Hunter Address presented to the NZ Psychological Society Annual Conference, August 1995. The Hunter Address is an invited paper from the recipient of the Society's Hunter Award in the year following its presentation. The Hunter Award is an award of considerable distinction which aims to recognise and encourage excellence in research in psychology.

important witnesses to such crimes. In one case in Christchurch, a two-and-a-half-year-old child at home at the time his mother was murdered was the only potential witness, and in the case of the woman murdered on Wimbledon Common in England, her young child was present at the time of the murder. In these, and a range of other situations, the observations of children could potentially provide vital evidence. Indeed, children's evidence has always been potentially valuable in a far wider range of cases than those involving sexual abuse.

Although increased awareness of childhood sexual abuse has highlighted the need for children to give testimony, I would argue that critical to the changing view of children as witnesses has been changing views of children's competencies. In particular, the emergence of theories of memory development according to which age differences in memory may reflect differences in the use of strategies, knowledge, and metacognitive abilities (Flavell, 1970, 1985; Naus & Ornstein, 1983) provided the opportunity to reconceptualize the reliability of children's memory and, as a consequence, the place of children's testimony in the legal system.

The past 25 years has been, without doubt, the most active period of research on memory development in the history of the study of child development. It is a period during which there have been very marked changes in our understanding of exactly what it is that develops in memory development, and how memory in young children differs from that in older children and adults (see, for example, Daehler & Greco, 1985; Kail, 1990). As Brown and DeLoache (1978) have pointed out, prior to the 1970s the predominant explanation of memory development, if one was offered at all, was in terms of memory capacity:

"The underlying metaphor, whether explicitly or implicitly stated, was of the mind as a container: Little people have little boxes or jars in their heads, and bigger people have bigger ones" (Brown & DeLoache, 1978, p 4). As they pointed out, although researchers who were more sophisticated, or simply more adventurous, might subdivide the metaphorical containers into slots, spaces, buffer units, and so on, the basic assumption remained that as the child matured, the space increased — more could be, and was, remembered (Brown & DeLoache, 1978, p.4). Piaget's characterization of early memorial abilities added another age difference; he suggested that not only might the container be smaller for younger than older children, its contents were also likely to be in something of a muddle.

"The memory of the two or three year old child is still a medley of made-up stories and exact but chaotic reconstructions, organised memory developing only with the progress of intelligence as a whole" (Piaget, 1962, p. 187).

Such views did little to challenge the characterizations of children as unreliable observers and untrustworthy witnesses. The prevailing theories, such as they were, were of young children having very limited abilities and, as such, provided a theoretical rationale for believing in intractable age differences in the reliability of children's memory and testimony. Studies of adults' memories of their childhoods only confirmed these views. The observation that adults generally could not recall experiences from their earliest years, the phenomenon known as childhood amnesia (e.g., Pillemer & White, 1989), added weight to the perception that during early childhood memory is fickle, fragmentary, and not long-lasting.

In the 1970s, two important trends in research on memory development laid the ground for the current re-evaluation of the potential of children as witnesses. First, researchers began to study children's memory for events and past experiences. Prior to the 1970s, no-one had actually studied young children's memories for events in which they had participated and which were meaningful and significant (Nelson, 1993). In the late 1970s and 1980s this began to change. In particular, Katherine Nelson, Robyn Fivush, Judy Hudson and others began examining children's memories of familiar experiences, such as going to school, what happens at dinner time, memories for holidays, visits to disneyland, for birthday parties, and so on (see Fivush & Hudson, 1990; Hudson, Fivush & Kuebli, 1992; Nelson, 1986, for reviews). This work showed that even preschoolers formed quite organized memories of events, on the basis of even a single experience. Although young children's accounts of events tended to be very brief, they were by no means the chaotic muddle proposed by Piaget. To the contrary, they frequently reflected the structure and goals of the event being recalled (Hudson et al., 1992; Nelson, 1986). Moreover, if children were provided with adequate support they could recall much more information than they did spontaneously in response to general prompts.

The second important trend in research was that laboratory-based studies began to examine exactly what develops in memory development and, in particular, the role of strategies for remembering and the acquisition of knowledge (e.g., Flavell, 1985; Kail, 1990; Ornstein, 1978; Perlmutter, 1980). For example, Flavell and others demonstrated that older children were more likely to use strategies than were younger children, strategies that help to encode information such as the rehearsal of material to be remembered, and strategies that help to retrieve information such as the use of retrieval cues

(e.g., Flavell, 1985; Kobasigawa, 1974, 1977; Moely, 1977). Younger children could use these strategies, if instructed to do so, and when they did use them they remembered more, often eliminating age differences in memory (e.g., Kobasigawa, 1974, 1977). However, young children seldom spontaneously used the strategies and did not use them as effectively as did the older children (Kobasigawa, 1974; 1977)

The importance of the acquisition of knowledge in developmental differences in memory was also clearly demonstrated. For example, in Chi's (1978) study, adults and children were asked to recall lists of digits and, as expected, adults recalled more than children. Chi then compared the memory of these same children and adults for legitimate chess positions. The twist was that in this case the children were children expert chess players, and the adults novices. That is, she reversed the usual relation between age and knowledge. Now the children recalled more than the adults, indicating that knowledge rather than age was the more important determinant of memory. Insofar as children are "universal novices", their lack of expertise may contribute substantially to their poorer performance on many memory tasks.

These studies suggested that age differences in children's ability to remember occur not only because young children have less to remember or because their memories are inherently disorganized compared to older children but, in part at least, it is because young children have less knowledge and are less effective in finding and using strategies that might help them exploit the contents of their memory. It was now possible to re-formulate questions relating to children's eyewitness memory. Instead of asking whether children are reliable or at what age they are reliable or credible, it was possible to ask, what are the conditions under which there age differences in the children's eyewitness memory and why? It was also now possible to ask about the conditions under which children might provide reliable accounts of their experiences, and how to support their sometimes fragile competencies.

This is the general question we have been addressing in our research — what are the conditions under which young children provide the most complete and accurate accounts of past events? We have focused on three specific questions relating to this more general question: First, how can we enhance children's accounts of past events? Second, what are the effects of very long delays on children's accounts of their experiences? Third, what factors contribute to the suggestibility of young children and how might their impact be reduced?

How can we enhance children's accounts of past events?

This question arises because one of the most consistent findings in the memory literature is that young children spontaneously remember less, whether word lists, pictures, or things that have happened to them, than do older children. In the context of children's eyewitness memory, in particular, when young children are asked for a free narrative account of something that has happened, the kind that follows from a request such as "tell me what happened when ....", their accounts, although typically very accurate, are also typically very brief. It is seldom the case that children recount enough information that these free narrative accounts will, on their own, be satisfactory in clinical or legal contexts. Young children frequently need more cues and for the cues to be more specific if they are to access, retrieve and report specific memories in detail.

We have found evidence for this conclusion in several studies of children's event memory. In one of our first studies (Pipe & Wilson, 1994), children aged 6 and 9 years were interviewed about an event, visiting the magician. Some of the children were interviewed in a verbal interview without any props or non-verbal cues whereas others were taken back into the situation where there were the items and objects from the event present as props. Because in real-life situations we seldom know exactly what would have been present at the time of the event, we also included distractor items and objects — items that had not been there but might have been. Both younger and older children reported more information when the props were present than without props.

We had expected props to have a greater effect for younger children, based on the assumption that the problem for younger children was one of retrieving information that had been encoded and stored, yet both age groups benefitted to the same extent from the presence of the props (Pipe & Wilson, 1994). In that study, however, children weren't invited to use the items to show what happened and we didn't explicitly draw their attention to the prop items — they were simply there. When we did ask children what happened with the prop items in a subsequent study, drawing their attention to them (Gee & Pipe, 1995), both age groups still benefitted, but now younger children benefitted to a greater extent, with the result that the age difference in recall was significantly reduced (Gee & Pipe, 1995). In particular, the younger children interviewed with props recalled as much information as the older children without such support. These findings are, of course, consistent with laboratory studies, that when props are available young children can use them, but they don't

do so as effectively as older children unless explicitly instructed to use them (Kobasigawa, 1974).

In general, the most effective props are those that are very specific. For example, in one study (Old, 1994), we took children back through the environmental context in which an event had taken place — the event began inside and moved through three different, distinctive, outside locations. During the interview we reinstated the different environmental contexts either physically — taking children back through the different contexts — or mentally, by asking them to imagine each context in turn. Neither strategy had an effect. Simply reinstating environmental context without the specific items and objects involved in the event did not improve recall compared to using verbal prompts alone (Old, 1994; see also Pipe & Wilson, 1994).

Together these studies indicate that prop items — actual items from an event — have the potential to facilitate the retrieval of information and enhance children's verbal accounts. Whether and how well they do so, however, depends on the specificity of the props and how they are presented.

Props may be useful not only because they help retrieve information from memory, but also because they can be used as aids to communication. This is, of course, how they have been most frequently used in clinical contexts (cf. Vizard, 1991). We know that children's verbal accounts seldom exploit the full contents of their knowledge or memory of an event and when children are asked to re-enact something they have experienced, they can provide more information than when they simply give us a verbal account. In this context, the props most commonly used with children are toys or model items. Their potential advantage is that they are a very familiar medium for young children to act out, or show, what they know. In the context of talking to children about past events, however, toys may also have disadvantages. For one thing, toys do not necessarily provide very good retrieval cues insofar as retrieval cues are likely to be effective to the extent they match the conditions present when the information is encoded (Tulving, 1983; Tulving & Thomson, 1973). Consistent with this, we have recently shown that the extent to which toys facilitate retrieval depends on the similarity of the toy items to items from the event in terms of physical appearance of the items and their spatial arrangement (Priestley & Pipe, in press). Frequently, however, toys may provide little specific or unique information useful for aiding the retrieval of information about an event.

When children are asked to show as well as tell what happens, toys can be quite effective in increasing the amount of information reported although this increase may be at the expense of accuracy. Salmon, Bidrose and Pipe (1995), for example, interviewed 3 and 5-year-old children about a quasi medical event with either real items — actual items from the event, with toys — representations of the items used, or with no props but verbal prompts. Children asked to show and tell what happened with toys and props recalled more in verbal recall than those interviewed without the prop items, but they also made more errors. Similarly, both toys and real items enabled children to show what had happened — to give new information over and above that in verbal recall — but again the numbers of errors also increased.

Why do toys lead to an increase in errors compared to, say, actual items from the event? A potentially important disadvantage with toys as props is suggested by the work of DeLoache and colleagues (e.g., DeLoache, 1995; DeLoache & Marzolf, 1995; DeLoache, Kolstad & Anderson, 1991). In using toys to facilitate communication about a past event, we are asking children to use them as representations, or symbols, of items or people from that event. As DeLoache's work on the use of models as representations has shown, this is not necessarily an easy task for young children. At least part of the problem, according to DeLoache, is that toys have their own identities, their own associations, and in order for the child to use them to talk about the past, they have to put aside these other identities. That is, the child must treat the toy no longer as a toy, but as a representation of something else, a person or object from an event that may have happened a long time ago. This may be a challenge for young children — even some five to six year olds — and may, in fact, divert them from the task of talking about the past. With very young children who are relatively inexperienced in talking about the past, diverting them from the task may be all too easy.

What are the effects of very long delays on children's event reports?

In real life contexts, children are frequently called upon to recount events that happened months, even years, earlier, yet relatively little research has addressed the impact of long delays on children's accounts. Those studies that do exist suggest that the effects may be quite marked. Hudson and Fivush (1991), for example, showed that the amount of information children recount about an event in response to an open-ended prompt decreased markedly over long delays. The children, aged five-and-a-half at the time of the event, visited a Jewish museum, and were interviewed immediately, 6 weeks, 1 year and 6 years later. After a delay of 6 years, children reported very little information spontaneously and many didn't remember the event at all in

response to an open-ended prompt. In general, children needed very specific prompts and cues, including photographs of themselves actually doing things at the museum, in order to remember it.

Even over substantially shorter delays than 6 years, there may be significant changes in what children remember, and in the accuracy of their reports. For example, when children from the study involving the quasi medical event (Salmon et al., 1995) were interviewed again one year later, they remembered significantly less information about the event than they had when interviewed shortly after (Salmon & Pipe, in press). With respect to errors, however, the older children made the same number following the delay, and the younger children made more errors one year later than they had soon after. Together, the decrease in accurate recall and stable or increasing errors resulted in a decrease in overall accuracy for both age groups, and especially for the younger children. Indeed, accuracy (measured as the amount of information correctly reported as a proportion of the total amount of information reported — correct and incorrect) declined to unacceptable levels. Errors were not restricted to children interviewed with toys and real items, since children interviewed without props were also less accurate following the one year delay.

When children are interviewed following long delays, they frequently report new information — information not reported at an earlier time. This is, of course, the phenomenon known as reminiscence and is often observed when adults are repeatedly tested in memory tests (e.g., Payne & Roediger, 1987). How reliable is this new information, particularly when children are interviewed following very long delays since the event in question? We have now followed up children from four earlier studies, one or two years after children took part in the original event. Following such very long delays, children report relatively little information in free recall but what is recalled is generally quite accurate. Although information repeated across interviews is more accurate than information reported for the first time following a long delay, even new information, information recalled for the first time at the long delay, was still over 70% accurate (Pipe, 1992; Salmon & Pipe, in press). However, when children were prompted, either verbally or in combination with props, the picture was quite different. Information repeated from an interview shortly after an event and a year later remained very accurate, but now the new information — information reported for the first time at the long delay — was very inaccurate. We have consistently found that nearly half of the new information did not relate to the particular event of interest. Although not a lot of new information was reported at the long delay, what was reported was highly unreliable.

There are clear implications of these findings in applied contexts. New information reported for the first time following a long delay may be significantly less reliable than that reported soon after the event or that repeated over successive interviews. The kinds of errors children make tend to suggest that they may be confusing similar episodes, or incorporating information from their knowledge about similar events. Nonetheless, the important point here is that over long delays children's reports can change; the amount of information freely recalled decreases, and there is a risk that accuracy, too may decrease. At present we know little about how best to cue retrieval of information following very long delays and how to provide support without decreasing the accuracy of the information provided.

When are young children suggestible?

One of most common means of facilitating children's (and adults') recall is to provide verbal cues by asking questions. But the concern frequently raised in respect to questions is that questions will decrease the accuracy of children's reports. That is, there is concern that children will be mislead by suggestions contained in questions and their accounts contaminated. The problem is that for questions to be effective they need to be specific, and specific questions are likely to be misleading because we don't always know, or even have a very good idea, of what happened. That free narrative reports tend to be more accurate than reports obtained through questioning has been widely accepted for decades.

There are at least two potential sources of the errors that may be introduced when children are asked questions. First, children may go along with misleading questions at the time they're asked — they accept the interviewer's suggestion at the time it is made. Second, they may incorporate the misinformation into subsequent accounts when later interviewed about the event. Both kinds of errors are frequently described as reflecting the suggestibility of young children, although it is probably useful to distinguish the former as compliance.

There is ample evidence that if young children are asked misleading questions such as "The lady was wearing a watch, wasn't she?" they are more likely to go along with the question than are older children or adults. Indeed, the likelihood that children will resist a misleading suggestion like this decreases linearly with age, up to age approximately 8 years (Gee, 1994). Why do children comply so readily with misleading questions? Are young children more easily mislead because they cannot remember what did or did not happen, or are they more easily mislead because they are more acquiescent with what adults say, independently of what

they remember? There are, of course, very different implications of these two possibilities.

We have approached this question in two different ways. First, using a signal detection analysis of children's responses to leading and misleading questions, it is possible to obtain independent measures of age differences in memory-related factors and those relating to acquiescence when children are asked leading and misleading questions (Gee & Pipe, 1995). The measure d' or discriminability in signal detection analysis provides a measure of children's ability to discriminate things that did happen (as contained in leading questions) from those that did not (as contained in misleading questions). That is, d' provides a measure of how well the child remembers what actually did happen. The measure of bias, c, on the other hand, provides a measure of the child's willingness to go along with the interviewer and say yes, independently of how well he or she remembered the answer to the question.

It appears that both memory-related factors and those relating to acquiescence, or compliance, change with age. In a study involving children aged between 5 and 6 years and 9 and 10 years, we found that whereas the measure of discriminability, d', increased with age, suggesting greater accuracy of memory for the event, bias (c) decreased, suggesting that with age children become less compliant with an interviewer's suggestions (Gee & Pipe, 1995). In other words, both memory-related and social factors contributed to children's willingness to go along with strongly misleading questions. One might also expect that increasing the delay between the event and when children are interviewed about it, should influence memorability, and, indeed, there was a decrease in the d' measure when the delay was increased from 10 days to 10 weeks (Gee & Pipe, 1995). Conversely, providing both props and questions, thus increasing the information available for children to decide whether or not what is suggested did or did not happen, lead to an increase in memorability (Gee & Pipe, 1995).

The other approach we have taken to this question is to attempt to manipulate compliance directly. If young children are less accurate in response to misleading questions due to compliance, we should be able to increase their ability to resist suggestions by manipulating factors that lead to acquiescence. The phrasing of questions may, for example, make them more or less misleading. Misleading questions can be strongly biasing, as in the directly misleading question "She touched you on the ear, didn't she?" Or they can be less biasing, but nonetheless contain the misleading information as in "Did she touch you on the ear?" The phrasing of the question can make a significant difference to young children. Greenstock and Pipe (1996), for example, found that directly misleading questions lead to age differences in accuracy. However, when the questions were not directly misleading, even though they contained the misinformation, the age difference virtually disappeared. These findings indicate that when young children are put in the position of having to disagree with an interviewer to resist a misleading suggestion, in general they don't do it. When they can answer yes or no, however, they are likely to be much more accurate. Even 3-year-old children are sensitive to the phrasing of such questions and are significantly more accurate if the questions does not require the child to disagree with the interviewer (Harris, Patterson, & Pipe, 1996).

The other issue relating to suggestibility is whether misinformation is incorporated into a child's memory and subsequent accounts, resulting in contamination of accounts. As Mark Howe has described it, suggestibility in young children has had a bit of a "now you see it, now you don't" flavour, with some studies finding it, others failing to replicate. At least one factor contributing to the apparent unpredictability of misinformation effects with children concerns the nature of the events children are asked to recall. Children can, of course, acquire information and knowledge about events from a variety of sources — their own experience, watching others, conversations, even books and television. And the nature of the events themselves may differ, they may be traumatic, painful, distressing, or emotionally neutral, as in most of the studies to date, or at the other end of the continuum they may be highly salient, enjoyable experiences. What sorts of effects do these variables have?

There is a native American saying "Tell me, and I'll forget. Show me, and I may not remember. Involve me, and I'll understand" (quoted in Steinem, 1992). In many respects, that there will be differences in memories acquired from different sources of information is so obvious that it hardly warrants demonstration. Nonetheless, there may be implications of these differences that do warrant further examination, for example, whether memories based on stories or films, as used in many studies of the suggestibility of memory during childhood, are more easily modified than those based on experience. In a series of studies, therefore, we have begun to explore differences due to information source. For example, Murachver, Pipe, Gordon, Fivush, and Owens (1997) compared event memories based on experience, observation, and stories about the same event. Experience lead to superior verbal recall compared to both observing another child experience the event, or reading a story about it. When children

were asked to re-enact the event, however, now children who had observed performed significantly better, although the children who had read the story still recalled and re-enacted less information. These differences in the way events are represented have implications relating to the modifiability of the memories also. In a subsequent study, children who directly experienced the event, and then read a story about it were not very likely to change their account of the experience (Little, 1994). If asked what happened in the story, however, children were much more likely to assume that whatever they had experienced was also in the story. When children both experienced the event and observed another child experiencing a similar event, the influence of what was experienced on what was remembered as having been observed and of observation on what was remembered as having been experienced were much less asymmetrical. The strength of the initial memory — strongest for experience, weakest for the story — determined the extent to which children modified the memory of information from that source. The event itself, and whether there are strong causal connections between the component actions may also be an important factor in determining not only how well an event is remembered but also how modifiable that memory is (cf. Owens, 1996; Owens, Murachver & Pipe, 1996).

Conclusions

Our research highlights the difficulty of drawing simple conclusions about the reliability of children's testimony. The ability of children to remember and accurately recount past events is determined not only by the age of the child, but by a number of other factors including the context in which remembering takes place, and the time periods over which children must remember. As Gee (1994) has put it, children's ability to provide accurate accounts of their past experiences depends critically on the support or obstacles that are provided in the interview context. It depends not only on the child, but also on the adults who question the child and ask them to recount their experiences. Young children's accounts can be enhanced by providing appropriate support without compromising accuracy, at least when children are interviewed soon after the event. But the kind of support provided — the kinds of questions that are asked, the props that are provided — are also critical. There is a risk that in providing some kinds of support, such as toys and dolls, or asking questions that require children to agree or disagree with the interviewer, young children's accounts may become less accurate. Such risks are of course of considerable significance when children are interviewed in clinical and legal contexts. Several other researchers are currently exploring techniques that help children to recount their experiences but do not compromise the accuracy of their accounts and the results of these studies are also promising (Saywitz & Snyder, in press; Saywitz, Snyder & Lamphear, 1996). Techniques that may helpful will not always be able to be directly applied in the real life contexts in which children are interviewed. Practical, legal and clinical considerations may well constrain the techniques available to an interviewer in any particular case. Nonetheless, a sound base of knowledge concerning the developing abilities of young children, and how these may be optimised, will allow informed decisions within those constraints.

Acknowledgements

The research studies described here were supported in part by grants from the Child Health Research Foundation, the Health Research Council, and the Foundation for Research, Science, and Technology.

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