

## The Effects of Cues on Young Children's Recall of Real Events\*

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This experiment examined whether cues at the time of recall facilitate young children's recall of a real life event at different delays since the event. Two groups of five-and-a-half-year-old children participated individually in a contrived interaction with an unfamiliar adult "magician" (a confederate) and were interviewed about the interaction ten days later and then again after ten weeks. In the interviews, children were asked for their free recall of the event following which either object cues (group 1) or verbal cues (group 2) were introduced and cued recall was assessed. Results showed that the amount of information freely recalled decreased significantly between the ten day and ten week delays. However, the introduction of cues resulted in a marked increase in the amount of information recalled at the ten week delay so that overall (free and cued recall) children reported the same amount of information at the ten day and ten week delays. Finally, object cues were more effective than verbal cues in facilitating recall.

In the past two or three years interest in the credibility of children as eye witnesses has grown rapidly. This interest has been stimulated by an increasing awareness of the problem of child abuse and the need to obtain from children accurate and detailed information free from distortion. Until recently young children were thought to be unreliable and, in particular, suggestible witnesses (Ceci, Ross & Toglia, 1987; King & Yuille, 1987). However, studies supporting this assumption typically examined the accuracy of children's reports under conditions very different from the real-life situations in which children are likely to be eye witnesses (Goodman, Hirschman & Rudy, 1987). For example, most have examined children's reports and their suggestibility after children have viewed films or slides or listened to stories which last only seconds or minutes. Questioning regarding these events has typically focused on minor details or acts that are likely to be insignificant for the children (Goodman et al., 1987), and children have been observers rather than participants (Rudy & Goodman, 1987). It is not clear, therefore, how the results

of these studies relate to children's memory for events in which children are participants and the events significant, lasting minutes or hours in duration.

Some few recent studies, in particular those by Goodman and colleagues, have attempted to increase the ecological validity of research in this area by examining children's memory and testimony for real life events. For example Goodman, Aman and Hirschman (1987) questioned children a week following routine inoculations which had been videotaped. Rudy and Goodman (1987) examined children's free recall and responses to objective and suggestive questioning following an (contrived) interaction with an unfamiliar adult. These studies found that children younger than age approximately 6 years recall less in free recall compared to older children, although their recall is not less accurate than that of older groups. Further, young children are more likely to be misled into making false claims by leading, suggestive questions (Loftus & Davies, 1984), particularly if the questions relate to peripheral rather than central events (Rudy & Goodman, 1987).

The present study examined two aspects of children's memory for real events which have received extremely little attention to date, namely methods for increasing the quantity and accuracy of young children's reports, and the effect of different delays since an event on recall of the event. Given that young children freely recall less than older children, interview procedures that increase the amount of accurate

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information but which are sensitive to the potential suggestibility of young children would clearly be useful. Specific questions have been found to increase the amount of information reported (e.g., Dent & Stephenson, 1979). However, Dent and Stephenson (1979) found that specific questioning resulted in more of both accurate and inaccurate information. A more promising approach may be the use of non-verbal cues at the time of recall. In experimental studies, cues presented at the time of recall have been found to be effective in facilitating recall by children (e.g., Kobasigawa, 1974) and a recent study indicates that cues may facilitate recall of an activity, namely "making clay" (Smith, Ratner & Hobart, 1987). Smith et al. (1987) compared the effectiveness of verbal cues (the names of the utensils that had been used, read aloud), object cues (the actual utensils used were present at the time of recall), and action cues (remaking the clay). Action cues were most effective and verbal cues least effective, in facilitating recall.

The second aspect of memory for real events of interest, but little studied, is the effect of the delay between the occurrence of the event and the time of recall on amount and accuracy of recall. Delayed recall is common in legal proceedings where children may be called upon to describe events that occurred months, possibly even years earlier. In studies of children's eyewitness memory, however, children are typically questioned about an event within one or two weeks (e.g., Goodman & Reed, 1986; Saywitz, 1987; Smith et al., 1987). An exception is the study by Dent and Stephenson (1979) which examined the effect of a delay of up to two months since the event on children's recall. They found that when children were interviewed repeatedly throughout the delay interval there was little change in recall; however, without repeated interviews in the delay period the amount of information recalled and the proportion of accurate information recalled both declined. They concluded that "If delays are unavoidable, although the amount of inaccuracy does not appear to increase, the proportion of inaccurate material is considerably raised" (Dent & Stephenson, 1979, p.48). Clearly methods for increasing amount of information recalled about an event following a long delay that did not simultaneously result in an increase in the amount of inaccurate information recalled,

would be particularly useful. The present study examined the effects of verbal and object cues on recall ten days and ten weeks following a contrived event in which children participated individually in a magic show with an unfamiliar adult.

## Method

### *Subjects*

Eleven male and thirteen female children aged 5 years 6 months (5-6) to 5-11 (mean = 5-8) from two primary schools in Dunedin (New Zealand) took part in the study. All children had parental consent to participate.

### *Materials*

Materials comprised an adult's and a child's magician's costume (black top hat, black cape, and white gloves), wand, pen filled with evaporating blue ink, pair of white gloves stained with blue ink. Materials for the four tricks comprised two cups with lids, two small balls that fitted inside the cups, a large handkerchief with an extra seam in which a match could be placed, a matchbox and matches. The tricks were chosen to be interesting for five- to six-year-old children. A cassette recorder was used to record interviews.

### *Procedure*

Children participated in the contrived interaction individually in a small room located in the school. The experimenter explained to the child that her friend, a magician, was learning to teach people to become magicians and wanted to practice with some tricks. The experimenter then introduced the child to the magician in the room where the magic show was to take place, and left. The magician followed a predetermined script. She helped the child put on a hat, cloak and pair of white gloves which were described as special gloves, necessary to perform the experiments. The magician then demonstrated four tricks. The first involved the disappearance and reappearance of one of the balls in the cups, the second involved inverting the cup and the ball remaining inside it. In the third trick a matchstick was wrapped in the handkerchief, broken into small pieces, and appeared whole when the handkerchief was reopened, and in the final trick, a box of matches remained in place despite the box being inverted. Prior to the fourth trick, the magician picked up a pen and "accidentally" spilt ink onto the child's white gloves. The magician helped the child to take the gloves off, saying that they had been "ruined" and would no longer work as "magic" gloves. She put the gloves under the table saying if they were discovered she (the magician) would be reprimanded and that therefore they should not tell anyone about

the inkspill. The interaction lasted approximately eight minutes on average.

All children were interviewed first ten days following the interaction (short delay) and second, ten weeks following the interaction (long delay). Interviews were conducted by the experimenter and comprized two sections. In the first section, free recall was assessed. The experimenter told the child that she did not know what the magician had done and that she wanted to know everything that had happened. No further prompts were given. In the second section of the interview, cued recall was assessed. For cued recall, children were randomly assigned to either verbal-cues group or object-cues group. The experimenter explained that the magician had left town, leaving the magicians outfit and tricks. For the verbal-cues group, the experimenter read a list of the items of clothing involved in the tricks. The list was read slowly, several times. For the object-cues group, the experimenter placed the items used in the interaction on a table in front of the child. Following the presentation of the cues (verbal or object), the child was asked to describe what had happened in the interaction. No further prompts were given. Finally, when children had completed their descriptions under cued recall, the experimenter asked the child if they knew anything about a pair of white gloves with an ink stain that she had found.

Ten weeks after the first interview children were interviewed a second time. The experimenter began the interview by explaining that she wanted to find out how much the children remembered about the interaction. With respect to the final question concerning the ink-stained gloves, the experimenter said that she had forgotten whether she had asked the child about the gloves. All other aspects of the second interview were identical to the first interview.

Both interviews were recorded on cassette tape. Transcripts were made from the audiotapes, and from the transcripts a list of items of information reported was made. An item of information was defined as either a single action or "act" (e.g., she tipped the cup with the ball upside down) or a description of an object (e.g., there was a match in the seam of

the hankercchief). A total of 21 items of information were reported.

## Results

Mean number of items of information reported under free and cued recall at each delay (ten days and ten weeks) are shown in Table 1. The number of items correctly recalled were submitted to a 2 (sex)  $\times$  2 (cue condition)  $\times$  2 (recall condition)  $\times$  2 (delay) mixed anova, with repeated measures on the last two factors. There were no significant main effects. Three interactions were significant. First, there was a significant interaction between recall condition (free vs cued) and delay (short vs long),  $F(1,20) = 51.35, p < .0001$ . Figure 1 shows that whereas there was a marked decrease in number of items recalled from first to second interview under free recall, there was a marked increase under cued recall. Second, there was a significant interaction between recall condition and cue condition (verbal versus object),  $F(1,20) = 7.40, p < .01$ . Figure 2 shows that the verbal-cues and object-cues groups did not differ in number of items recalled under free recall but did differ for the cued-recall condition. Post hoc t-tests confirmed that only the latter difference was significant,  $t(20) = 3.58, p < .001$ . Third, there was a significant interaction between delay and cue type,  $F(1,20) = 4.31, p < .05$ . Figure 3 shows that the total number of items correctly recalled did not differ for the two groups at first delay, but at the long delay children in the object-cues group recalled more items than children in the verbal-cues group,  $t(20) = 3.57, p < .001$ . This third interaction is likely to be an artifact of the previous two interactions which showed that there was a significant difference in the amount recalled under object

Table 1: Mean number of items of information recalled by Object-cue and Verbal-cue groups as a function of recall condition (free vs cued) and delay (10-day vs 10-week).

Group	Delay			
	10-day		10-week	
	<i>free recall</i>	<i>cued recall</i>	<i>free recall</i>	<i>cued recall</i>
Object cue	7.08	3.00	3.66	10.00
Verbal cue	7.83	1.75	4.25	4.92

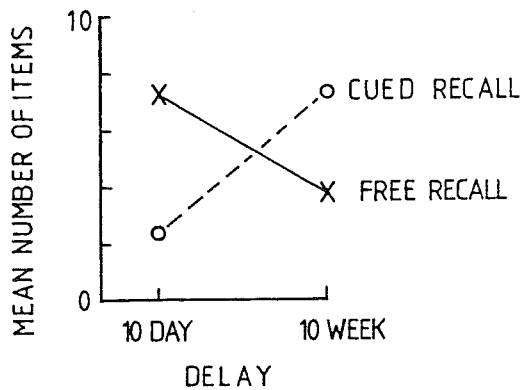


Figure 1. Mean number of items of information recalled at each delay for free and cued recall by verbal- and-object-cues group (combined).

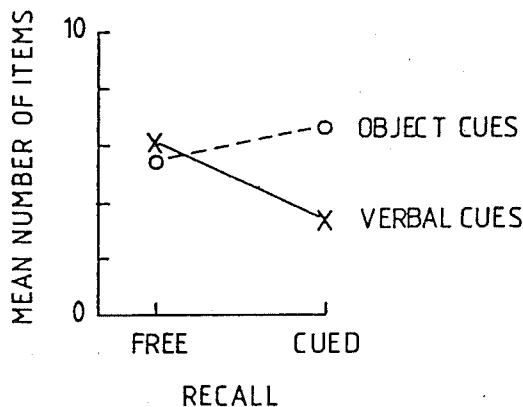


Figure 2. Mean number of items of information recalled by object-cues and verbal-cues groups for free and cued recall.

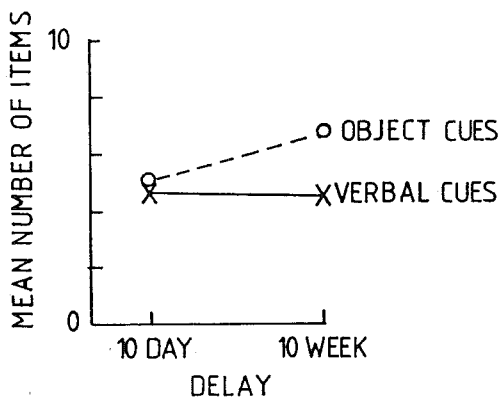


Figure 3. Mean number of items of information recalled by object-cues and verbal-cues groups at each delay.

versus verbal cues and that cued recall contributed significantly more to the total numbers of items recalled at the second interview. The three-way interaction between cues, type of recall and delay was not significant,  $F(1,20) = 1.84, p > .05$ .

No child spontaneously reported the inkspill incident (in free or cued recall) in the first interview, but six spontaneously reported it during the second interview. In response to the specific question relating to the inkspill, in the first interview ten subjects maintained that they knew nothing about the ink on the gloves, but four of these children accurately described the incident in the second interview. Further, four children who in the first interview described the incident, did not in the second interview. The total number of items recalled by children reporting the inkspill on both occasions and those failing to report it on at least one occasion did not differ,  $F(1,22) = < 1$ , indicating that the recall of those children failing to report the inkspill was not generally impaired.

Omissions were frequent and recall of the tricks was incomplete under both free recall and cued recall. The information reported under both free and cued recall always related to the magic tricks; no child mentioned getting dressed up in the magicians cape, hat or gloves, reported that each trick had been demonstrated twice, or referred to the time, day or location of the event. Nor was any description of the magician ever freely offered.

Errors were rare and were therefore not analysed. There were no errors of commission, that is, no child reported an act or described an object that was not part of the interaction. However, three children in the first interview and five children in the second, made errors in describing an aspect of one of the tricks.

#### Discussion

In the present study, young children participated in an event and were interviewed about it ten days and then again ten weeks later. Consistent with the findings of Dent and Stephenson (1979) the amount of information recalled about the event, assessed in free recall, had decreased significantly following the long delay. However, the results of the present study indicate that this decrease in free recall is not the result of memory decay. The introduction of cues following free recall resulted in a marked

increase in the number of items of information recalled in the ten-week delayed interview. Cues therefore served to "restore" recall, so that the children recalled the same number of items of information overall (free and cued recall combined) on the two occasions. The effectiveness of cues in restoring recall suggests that children may have a retrieval difficulty following long delays (c.f., Kobisagawa, 1974). It should be noted, however, that in the present study children were interviewed twice and the delayed interview was therefore also a repeated interview. It is possible that cues may not be as effective in restoring recall when presented following a long delay only (cf., McDaniel, Kowitz, & Dunay, 1989).

It is tempting to speculate on the basis of the results reported here that cues may be useful in real-life situations in which children are interviewed, for example, in evidential interviews. The present results indicate that cues relevant to an event may indeed facilitate recall of the event. In real-life situations, however, it is unlikely that an interviewer will be able to distinguish cues that are relevant from those that are irrelevant to an event of interest. It is therefore important to know the effects of irrelevant cues, and in particular whether irrelevant cues introduce errors into children's reports. We are currently examining this.

In the present study, object cues were more effective than verbal cues in facilitating recall, although this was found only at the ten week delay. Smith et al. (1987) found object and action cues to be more effective than verbal cues in facilitating recall when they interviewed children approximately a week after an event. Smith et al. did not, however, assess free recall prior to cued recall. It is probable that the failure of the present study to find an advantage for object cues at the short delay is the result of a ceiling effect since cued recall followed free recall. In particular, cues were generally ineffective in prompting recall of additional information at the short delay. The results of the present study, together with those of Smith et al. (1987) suggest that object cues are more useful in facilitating recall of real events by young children. Objects may be more effective as cues than verbal labels because, for instance, children may have encoded specific details such as colour or size of an object which would not be represented by the verbal cues. It should be noted, however, that in both the present study

and that of Smith et al. (1987), the method of presentation of cues differed for object and verbal cues respectively. Whereas object cues were available throughout the period of cued recall, verbal cues comprised lists of words read aloud on successive occasions and individual cues were not, therefore, continuously available to subjects. More strictly comparable procedures for cue presentation (such as having printed verbal cues on cue cards available to subjects during cued recall) would determine whether the type of cue or different presentation procedure was important.

In the present study, no child spontaneously disclosed an incident, namely, the "accidental" ink-spill, that they had been asked not to when first interviewed about their interaction, and only 25% spontaneously mentioned it at the second interview. In response to direct questioning about the incident, 25% of the children maintained ignorance of it through both interviews, while a further 33% of the children maintained ignorance in one or other of the interviews. The possibility that children who did not disclose the inkspill had poorer memories than the remaining children was ruled out by their comparable performance in recalling information overall. It remains possible, nonetheless, that children did not report the inkspill either because they forgot it or they considered it insignificant. This explanation would seem unlikely, however, given that children were specifically questioned about the inkspill and further that several children who did not report the inkspill in the first interview did so in the second interview. The apparent willingness of children to conceal information about the inkspill is perhaps surprising given that it was described to them as an accident, and the culpability of the magician was emphasized, and there was no implication of consequences of the inkspill or of its disclosure for the child. The conditions under which children conceal information have received little attention to date, but clearly have significant implications for studies of children's eyewitness memory.

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