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Variations on a Technique: Enhancing Children's Recall Using Narrative Elaboration Training

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SUMMARY

The current study examined first, whether the positive effects demonstrated by the Narrative Elaboration Technique (NET) could be further enhanced when coupled with mental reinstatement of context (MR), prior to interview, and second, compared the efficacy of the NET at a two-week delay and a nine-month delay. In Study 1, 47 children took part as a class in a staged event about safety. Two weeks later they received a single training session, and the following day were interviewed with either the NET ($n = 16$), NET + MR ($n = 17$), or in a control condition ($n = 14$). Children trained with the NET reported approximately twice as much correct information, and were more accurate, than a control group who did not receive NET training, although the combination of the NET + MR did not result in a further significant enhancement of recall. In Study 2, 22 children took part in the safety event, and nine months later received a single training session, and were interviewed the following day with either the NET ($n = 11$), or in a control condition ($n = 11$). Children who received the NET training reported more correct information than those who did not. The practical applications of the NET and its variations are discussed. Copyright © 2003 John Wiley & Sons, Ltd.

Historically, views of children as witnesses have fluctuated from their condemnation as unreliable and highly suggestible to their promotion as being as capable as adults (Lindsay, presentation at the Memory Research Theme Symposium, Dunedin, 2000). Contemporary perspectives, however, take the middle ground, acknowledging that a child's ability to provide a complete, accurate and reliable account of a past experience reflects a number of interacting factors, including the nature of the event (Brown *et al.*, 1999; Bahrick *et al.*, 1998), the type of questions asked (Dent and Stephenson, 1979; Gee *et al.*, 1999), and individual characteristics of the child (Geddie *et al.*, 2000; Greenhoot *et al.*, 1999; Quas *et al.*, 1997). There is now generally a consensus, for example, that children as young as 3 or 4 years can provide highly accurate accounts of events when prompted only minimally. Unfortunately, it is also the case that such open-ended accounts are typically very incomplete (Fivush, 1993; Goodman and Reed, 1986). In clinical, legal, and forensic settings, where often the child is the only source of information available to inform decisions regarding intervention and culpability, these open-ended accounts are unlikely to provide sufficient information for such important decisions (Saywitz and

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Snyder, 1996). Well-validated techniques that maximize both the amount and accuracy of the information that children provide are therefore needed. Appropriate interview techniques will not only help to protect children, they will also help protect innocent adults from false accusations (Saywitz and Snyder, 1996; Saywitz *et al.*, 1996).

Several interview techniques examined in laboratory-based contexts and analogue studies of children's event memory have been shown to be effective, at least over relatively short delays. One approach has been to aid recall and reporting of the specific event of interest, for example, by providing cues and props such as photographs, toys, scale models and real items from the target event (e.g. Pipe and Wilson, 1994; Priestley and Pipe, 1997; Smith, *et al.*, 1987), reinstatement of the original context (Dietze and Thomson, 1993; Price and Goodman, 1990), drawing components of the event (Butler *et al.*, 1995; Gross and Hayne, 1998, 1999), and through different forms of questioning (Dent, 1992; Dent and Stephenson, 1979; Greenstock and Pipe, 1996). These techniques generally require some knowledge of the events in question, in order that the appropriate cues and instructions can be provided. Moreover, depending on the age of the child, the specific technique, and the way in which it is used, these techniques may compromise accuracy (Salmon *et al.*, 1995; Saywitz *et al.*, 1991; see Poole and Lamb, 1998, for reviews).

A second approach has been to provide children with pre-interview training, instructions, and techniques designed to enhance their ability to talk about events in general (Saywitz and Moan-Hardie, 1994; Saywitz and Snyder, 1996; Warren *et al.*, 1991). That is, rather than providing cues derived from the event itself, this approach aims to provide general skills that can be applied to the event of interest. The Narrative Elaboration Technique (NET: Saywitz and Snyder, 1996) is an example, and uses practice and feedback to train children about the kinds of information it is important to report when talking about past events. Separate components of the NET are designed to address children's cognitive limitations which may limit their open-ended accounts, such as lack of knowledge about the expectations of the listener and ineffective use of internally driven search strategies (Saywitz and Snyder, 1996). The NET addresses these limitations by training children about the level of detail required when talking about the past, and by providing picture cards as external cues to report forensically important categories of information. Children ranging in age from 3 to 11 years have demonstrated enhanced recall without making more errors in their reports of a staged event following NET training (Camparo *et al.*, 2001; Dorado and Saywitz, 2001; Saywitz and Snyder, 1996; Saywitz *et al.*, 1996). In one study, 7- to 8-year-old children trained with the NET performed at the same level as the 10- to 11-year-old children in the control condition. The children trained with the NET also differed in the type of information reported, providing more information about the participants in the event than children from the control condition (Saywitz and Snyder, 1996).

One aim of the present study was to replicate the findings of Saywitz and colleagues with two modifications of the NET. First, we explored the possibility that the NET could be further enhanced by the addition of a second interview technique to the NET package. This second technique was mental reinstatement of context, one component of the Cognitive Interview (CI). The revised CI for adults comprises a number of techniques designed to enhance rapport, facilitate complete memory retrieval and recall, and transfer of control of the information-sharing process to the witness (Fisher and Geiselman, 1992). Although mostly used with adults, several studies have demonstrated both more complete and more accurate reports from children using this technique (Chapman and Perry, 1995; Geiselman and Padilla, 1988; Hayes and Delamothe, 1997; McAuley and Fisher, 1995;

Saywitz *et al.*, 1992). However, some of the components of the CI may not be effective with children younger than 8 years, in particular, instructions to report everything, to report from different perspectives, and from different orders (Geiselman, 1999; Geiselman and Padilla, 1988; Hayes and Delamothe, 1997; Memon *et al.*, 1993, 1995, 1997). Hayes and Delamothe (1997) demonstrated significant gains with children when using only the context-reinstatement and instructions-to-tell-everything components of the CI. They suggested that the remaining two techniques may, in fact, have reduced gains found in previous studies through interference due to children not having the cognitive skills to use the techniques effectively.

Components of the CI are highly compatible and complementary with the NET interview procedure and, indeed, the NET and CI share the common instruction to report everything, no matter how unimportant. In particular, there may be cumulative effects of mentally reinstating the event context in combination with an interview based on NET training. The advantage of mental context reinstatement from the CI is that it is a retrieval-based strategy, but one in which the child, rather than the interviewer, generates the retrieval cues. Mental reinstatement of context works on the principle that by increasing the similarity between the conditions at encoding and those at recall, more information will be able to be recalled (Smith, 1979, 1988; Tulving and Thompson, 1973). Mental reinstatement of the event context potentially makes the memory more accessible prior to reporting, with the children then being more likely to be able to use the NET cues regarding the categories of information to tell more about the event. That is, whereas the NET provides a general structure for talking about the event, MR involves generation of specific retrieval cues, making the event more accessible for children to report. Instructions to reinstate the environmental context of the event, based on those used in studies of the revised CI with children (e.g. Saywitz *et al.*, 1992), were therefore given to the children immediately prior to the interview.

The second modification to the NET interview was based on Poole and Lindsay's (1995) finding of enhanced recall from preschoolers who were verbally prompted for specific categories of information (everything they saw, and everything they heard). The NET involves presenting four cue cards without verbal labels, following training. In the present study, children were presented with the four cue cards from the NET first without the verbal labels as in the standard NET, and second, with verbal labels of the category of information cued by the card, to see whether the labels would prompt further recall. Dorado and Saywitz (2001) followed the cue cards with a series of questions relating to the category of information and found that the further probing added to children's recall. In the present study our verbal labels were more general and open-ended, and were intended to directly parallel the cue cards.

A second aim of the present study was to examine the effects of the NET after a long delay. A growing body of research has demonstrated a negative impact of delay on children's ability to provide complete accounts of past events. Children interviewed after a delay typically report less information than during an immediate or earlier interview, especially during free or spontaneous recall (Baker-Ward *et al.*, 1993; Flin *et al.*, 1992; Gee and Pipe, 1995; Hamond and Fivush, 1991; Howe *et al.*, 1995; Hudson and Fivush, 1991; Jones and Pipe, in press; Ornstein *et al.*, 1992; Pipe *et al.*, 1999; Pipe and Wilson, 1994; Poole and White, 1993; Salmon and Pipe, 1997), although some researchers have found no impact of delay on recall (Fivush and Shukat, 1995). Studies with younger children, especially, have demonstrated differences in the quality as well as the quantity of children's reports over a delay, with longer delays being associated with decreased

accuracy (Dent and Stephenson, 1979; Flin *et al.*, 1992; Howe *et al.*, 1995; Pipe *et al.*, 1999; Poole and White, 1993). Although evidence to date suggests that NET may be useful in applied settings for increasing the level of detail children can provide about a past event, without decreasing accuracy, the effectiveness of the NET has not been examined over very long delays. When considering any procedure that may be of relevance to professionals working with children in the field, the impact of delay must be considered. In many cases in the judicial system children wait several months before their case goes to trial, and in some cases the delay may be extended to as long as two years. For an interview technique to be of use in an applied setting, therefore, it is important to know whether positive effects extend to when the first formal interview takes place some time after the event.

In summary, the present studies aimed to replicate the positive effects of the NET demonstrated by Saywitz and colleagues when used with children aged 7 to 8 years and compared the effectiveness of the NET in enhancing children's event recall to a combination of mental reinstatement of context and NET methods. Specifically, we asked whether the positive effects elicited by the NET could be further enhanced when an instruction to mentally reinstate the context of the event was given, just prior to interview. We also asked whether a combination of the NET cue cards with verbal prompts would lead to further elaborations of the categories of information. Second, we examined whether the positive effects of the NET demonstrated after a delay of two weeks would also be evident after a delay of nine months.

STUDY 1

Method

Participants

Eighty-four children were recruited from three local primary schools to participate in a first-aid and safety presentation. Study 1 involved children from two of these schools (the data from the third school contributed to Study 2). Parental consent was obtained for 47 children (25 boys, 22 girls) between the ages of six and eight years (mean age 92 months, range 82–108 months) to be interviewed about the event. The children received a small novelty gift for their participation.

Procedure

Target event. All children from the participating classrooms took part in the event whether or not they subsequently took part in the study. The first-aid presentation was conducted by an instructor from the Order of St John's Training Service and research assistants from the laboratory, at the children's school in a large room or hall. Children were assigned to one of four groups of between six and eight children, each led by a research assistant, and began at one of the four different 'stations' positioned in the four corners of the room. They took part in the activities of that station for approximately 10 minutes, and proceeded clockwise around the room to the new station, after a signal from the instructor.

At the *Hazards Station*, children were presented with ten colour (30 cm $\times$ 42 cm) illustrations of children in dangerous situations (e.g. playing with unmarked bottles in a shed; not wearing sunscreen or protective clothing in the sun; a medicine cupboard left open). The children were asked to identify the danger and how they could make the

situation safer. At the *Video Station*, children watched a 30-second video of a boy rollerblading with his friends. The video showed the boy falling over and grazing his knee. A narrator explained the basic points of taking care of a graze. Following the video, a line was drawn on the left index finger of each child as a pretend cut. Children were shown how to apply gentle pressure to a cut to stop it bleeding, and each child demonstrated this to the group leader. The children were then shown how to apply pressure if there was something in the cut (e.g. a piece of glass), and, again, demonstrated this to the group leader. At the *Slings Station*, children watched a demonstration by the St John's instructor of how to tie a sling on the research assistant. The children then practised tying a sling with a partner, and swapped roles so that each child had an opportunity to practise. At the *111 Station* there were four (unconnected) telephones. Children were asked a number of questions about the use of emergency services, and calling the operator to request a service. They were given instruction as to the important information to give to an operator, and were cautioned never to call 111 'for fun, only for real'. Next, children were asked to pretend that their friend had fallen over while playing outside, and would not wake, so they needed to call for an ambulance. The children paired up, with one using the telephone to call 111, and the other acting as the operator. Children then reversed roles and repeated the activity.

Following Saywitz and Snyder (1996), a few minutes after the children had moved to their third station, a staged interruption occurred. At this point, a research assistant (the interrupter) dressed in a St John's uniform, burst into the room and went to each group asking for the instructor. This ensured that each group of children was aware of the interruption. The interrupter then loudly and angrily stated to the whole room that the first aid things were needed for a demonstration at another school, and the instructor was not supposed to have them. After a brief argument the instructor suggested that they share the equipment, as she had brought spare props. The interruptor agreed, and they walked around each group gathering up the spare equipment, with the exception of the 111 group. At this group the researcher stated that there were already telephones at the school, and so she did not need to take any. The researcher then apologized for bursting in and left. The groups resumed their activities.

When the children had completed the activities at the four stations they gathered in the middle of the room, where the instructor summarized what they had learned at each. The children were thanked, and returned to their classrooms.

Training phase. The training sessions took place approximately two weeks after the event and children were trained individually. Children for whom parental consent to be interviewed had been given ($n = 47$) were randomly assigned to one of three conditions: control ($n = 14$), Narrative Elaboration (NET, $n = 16$), or NET combined with mental reinstatement of context (NET + MR, $n = 17$). All training and interview sessions were video and audiotaped for later use.

NET/NET + MR training procedure. The training phase for the NET and NET + MR conditions was identical, and is presented in Table 1. With the exception of the stimulus materials (the storybook and discussing what happened on the way to school), the training followed the script of Saywitz and Snyder (1997). Training began with instructions to the child about the importance of being complete and accurate without guessing or making anything up, when talking about something that they remembered. Using the example of going to the supermarket for mother, it was demonstrated that there are better and worse ways to remember things (using a list, compared with trying to remember in their head). At

Table 1. Components of the training session

Treatment condition	
NET/NET + MR	Control
Instructions to be complete and accurate	Instructions to be complete and accurate
Demonstration of better and worse ways to remember	
Story read to children	Story read to children
Story recall	Story recall
Cue cards introduced, practice with cards, feedback	Categorization task
Recall of trip to school that morning	Recall of trip to school that morning
Use of cue cards for additional recall, feedback	Colouring task
Recap of session	Recap of session

this point the researcher introduced four cue cards to prompt different categories of information. These cue cards were based on those used by Saywitz and Snyder (1997) and were introduced to the children as examples of things that can help them to remember better. The cue cards are illustrated in Figure 1.

The child was then read a story ('The Time it Took Tom', Sharratt and Tucker, 1998), and when it was finished, was asked to recall as much of the story as they could. Following

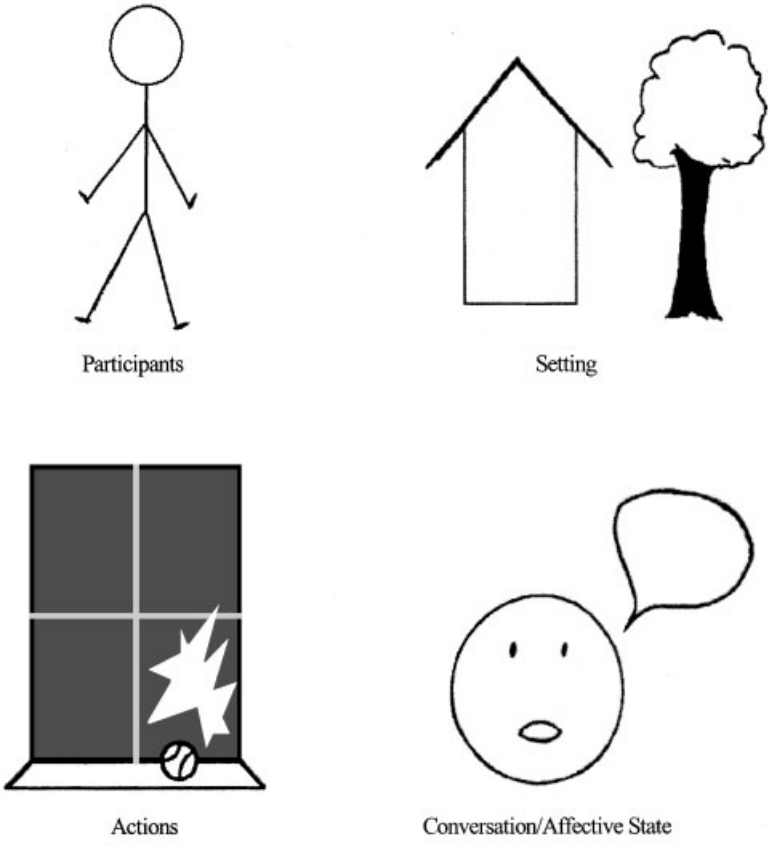

Figure 1. NET cue cards (reproduced with permission from Saywitz and Snyder, 1996)

free recall of the story, the cue cards were introduced, one at a time, and the category they represented was explained and modelled (e.g. 'This is the people card. This card helps you to tell about all the people who were there and how each person looked'). The child was prompted to use each card to help them tell more things about the story. After each card, when the child indicated that they had finished, feedback was given about what they had said. The researcher commented on the things the child had remembered, and pointed out extra details that they could also have talked about, to provide a model of the appropriate level of detail for talking about events. Before moving on to the next card, the child was reminded of the category of the card that had just been presented.

Next, the child was asked to describe an event that the researcher did not know about, namely all the things that had happened on the way to school that morning. Following free recall, the cards were again introduced, one at a time. As for story recall, the researcher gave feedback about other information that they could have talked about following children's response to each card. The session finished with a recap of the things that the child had learned about during the session.

Control training procedure. The training procedure for the children in the Control condition is presented in Table 1. As with the children in the NET training groups, the session began by instructing the child about the importance of completeness and accuracy when talking about something they remember. The child was read the story of 'The Time it Took Tom', and was asked to recall as much as they could. To ensure that any differences in the performance of the training group were not due solely to more time spent with the researcher, a series of analogue tasks were included to keep the length of the session similar to that of the NET and NET + MR groups. The child completed a categorization task, involving the presentation of a series of cards with pictures of common objects (e.g. items of clothing, items of furniture, transportation). The child was asked to sort these pictures into groups that belonged together, and to describe what they thought each group was. The child was then asked to tell everything that happened that morning on the way to school. When the child had finished telling everything they could remember, he/she was given a picture of a boy running to catch the school bus to colour in. Finally, the researcher summarized what they had done together, and the session ended.

Interview phase. All children were individually interviewed the day after their training session, by the same researcher who had conducted the training. The three groups differed only in the review of the previous day's training and pre-interview instruction. The procedure for the interview session is presented in Table 2. The general prompt for the staged event and the interview scripts were the same for all children, irrespective of their experimental condition.

NET condition. The interview session began with the children being asked to recall the story they had heard the day before. The cue cards were introduced when the child indicated that they could not recall anything further. If the children did not use the cards, they were reminded of the purpose and category of each one and encouraged to use it to tell more about the story. When all of the cards had been presented and the children had finished recalling the story the children were reminded of what had been learned the day before.

The children were then prompted to recall the staged event with a general question 'I heard that a couple of weeks ago, a lady from St John's and her helpers came to visit your class at school to talk about first aid. Tell me all about that'. The children were prompted

Table 2. Components of the interview session

Treatment condition		
NET	NET + MR	Control
Recall of story	Recall of story	Recall of story
Presentation of cue cards	Presentation of cue cards	
Reminder of training session	Reminder of training session	Reminder of training session
	Mental reinstatement of context instruction	
Free recall	Free recall	Free recall
Presentation of cards (Prompted Recall: Cards—No Labels)	Presentation of cards (Prompted Recall: Cards—No Labels)	Presentation of cards (Prompted Recall: Cards—No Labels)
Presentation of cards (Prompted Recall: Cards + Labels)	Presentation of cards (Prompted Recall: Cards + Labels)	Presentation of cards (Prompted Recall: Cards + Labels)
Specific questions	Specific questions	Specific questions

with non-directive prompts (e.g. 'Are there more things you can tell me?'), until it was clear they could not recall any more information. The cards were then presented to the children, with the prompt, 'These cards might help you to remember more, but they might not'. The category of each card was not named, but each card was presented with the general prompt, 'Does this card help you to tell something else about when the lady from St John's and her helpers came?' (cards—no labels). After all four cards had been presented, they were presented a second time, this time accompanied by the verbal category labels (e.g. 'Does this card help you to tell something else about who was there and how the people looked?') (cards + labels).

When the children indicated they had finished, they were asked ten specific questions about the event, including the interruption, which required a yes/no response (e.g. 'When you were learning about first aid, did you practise ringing the ambulance?'). Five of the questions required a 'Yes' response, and five required a 'No' response. Whether the children were asked a form of the question that required a 'Yes' or 'No' answer was counterbalanced. The children were then thanked, and given a novelty pencil for their participation.

NET + MR condition. The beginning of the interview session began as for the NET group. In addition and prior to the verbal prompt for the staged event, children in this group were asked to mentally reinstate the environmental context of the event with the instruction, 'Make a picture in your mind' of the event, the people who were there, the room and all of the things that were in it. They were then asked to think carefully about what happened during the event. To verify whether children were, in fact, visualising the setting of the first aid event, children were asked what it was they were picturing in their mind. If they indicated that they could not remember the event or where it was, children were prompted 'remember it was in the hall and the lady and her helpers came to talk to you about first aid and safety'. Following this prompt all children indicated that they remembered the event and were making a picture in their head of the hall and the people from the event. At this point some children began to talk about the pictures they were making. Children were asked to just think about it at that point. When the children indicated that they had finished thinking about the event, they were given the general prompt for the event. The rest of the interview then proceeded in the same way as the NET group.

Control condition. Children in the control group began the session by recalling the story from the day before. They were then reminded about the importance of being complete and accurate, without guessing or making anything up following which the interview proceeded as for the other two groups.

Coding

All interviews were transcribed verbatim for coding. The first phase of coding required parsing the transcripts into units of meaningful information by identifying and separating verbs, and any phrase that contained meaning (e.g. 'we had to guess some hazards' received one parse) (Gross and Hayne, 1998). Each transcript was coded separately by two independent coders. Inter–rater agreement, calculated as agreements divided by agreements + disagreements, × 100, was 89%. Differences between coders were resolved through discussion, before proceeding to the next phase of coding.

The second phase of coding separated information into one of five codes. Information was coded either as repeated (in which case no further coding was conducted), or new information which fell into one of five categories: information about who was there and how the people looked (participants), information about where it was and how the place looked (setting), information about what happened and what the people did (action), information about what the people said and how they felt (conversation/affect), or information that was either clearly off-task, describing the purpose of the cards, or not containing any specific information (extraneous information). Inter–rater agreement for this stage of coding was 88%. Following the coding of information into categories, information in each category was coded as correct, incorrect, or unable to be verified. Inter–rater agreement for this stage of coding was 94%.

Finally, information was coded according to the stage of interview in which it was reported. Any information that was provided from the first general prompt until the introduction of the cards was considered free recall. Information given following the initial introduction of the cards was Prompted Recall: Cards—No Labels. Information given following the second introduction of the cards with labels was Prompted Recall: Cards + Labels. Inter–rater agreement for coding information according to the stage of the interview was 100%.

No new information was generated in response to the specific questions, and the children's responses to these were simply coded as correct or incorrect.

Results

To examine whether the NET training and pre-interview instructions and MR enhanced children's reports of the target event, measures of the number of correct and incorrect units of information reported, and the accuracy of the information reported, were compared across training conditions. An alpha level of 0.05 was used for all analyses unless otherwise stated. A feature of the present results was the large standard deviations for the two training conditions (NET and NET + MR). To address the issue of variability, analyses were also conducted using non-parametric tests (Mann–Whitney *U*) and on logarithm-transformed data. The results of both sets of these analyses were very similar to those based on the raw data, and analyses reported are therefore based on the raw data with standard parametric tests.

Preliminary analyses conducted using one-way analyses of variance (ANOVAs) revealed no main effect of interviewer. A difference in the amount of correct information

reported by children from each school emerged, $F(1, 45) = 4.4$. Children from School 1 reported more correct information across the entire interview than children from School 2 ($M = 36.92$, $SD = 24.13$, versus $M = 24.70$, $SD = 14.25$). Analysis of each stage of the interview revealed children from School 1 reported more information than children from School 2 during free recall, $F(1, 45) = 4.06$ ($M = 22.33$, $SD = 17.23$, versus $M = 14.39$, $SD = 7.94$), and during Prompted: Cards + Labels, $F(1, 45) = 4.00$ ($M = 6.92$, $SD = 5.97$, versus $M = 3.87$, $SD = 4.30$). Children in each school were randomly assigned to training conditions, and there were no significant school × interview condition interactions for correct or incorrect information reported.

A main effect of gender emerged for the amount of correct information reported, $F(1, 45) = 4.5$, with girls providing more correct information ($M = 37.5$, $SD = 24.0$) than boys ($M = 25.2$, $SD = 15.5$). Gender did not emerge as a significant factor in the number of errors reported, or in the accuracy of the children's reports. There were no significant gender × interview condition interactions for correct or incorrect information reported. Data were therefore collapsed across gender for further analyses.

Correct information

The mean numbers of correctly reported units of information are shown in Figure 2. To assess the effect of training prior to the interview, the numbers of correct units of information recalled in each phase of the interview were summed and totals submitted to a one-way analysis of variance (ANOVA), with training condition as the between-subjects factor.[1] As expected, the analysis revealed a significant main effect of training condition, $F(1, 44) = 3.7$. Planned comparisons revealed that children in the NET and NET + MR overall reported significantly more correct information than children in the control condition, but did not differ significantly from each other.

One-way ANOVAs were conducted separately for each of the three stages of the interview (free recall, Prompted: Cards—No Labels, Prompted: Cards + Labels), with training condition as the between-subjects factor to determine the phase during which training was effective. The results of these analyses are presented in Figure 2. In free recall, children in the NET and NET + MR conditions reported more information than children in the control condition, although the difference was not statistically reliable, $F(1, 44) = 1.6$. As expected, a significant main effect of training condition emerged following prompting with the Cards—No Labels, $F(1, 44) = 4.5$, $p < 0.01$. Planned comparisons indicated that children in the NET and NET + MR conditions reported more items of correct information than the children in the control condition but did not differ from each other. Children provided additional (new) information during the Prompted: Cards + Labels phase of the interview, but contrary to expectations, the amount reported during this phase did not differ significantly across the training conditions.

Category of information reported. To examine whether the training and instructions given prior to interview led children to report different kinds of information, the amount of information reported from each of the four categories represented by the cue cards was compared across training conditions. Numbers of correct and incorrect units of information are shown in Figure 3. A MANOVA with training condition as the between-subjects factor failed to reveal a significant overall effect of condition on the amount of correct information reported, $F(4, 8) = 1.66$. However, given that Saywtiz and colleagues found an

[1]Given that we expected the level of recall to vary during each stage of interview according to condition, MANOVA was not considered appropriate.

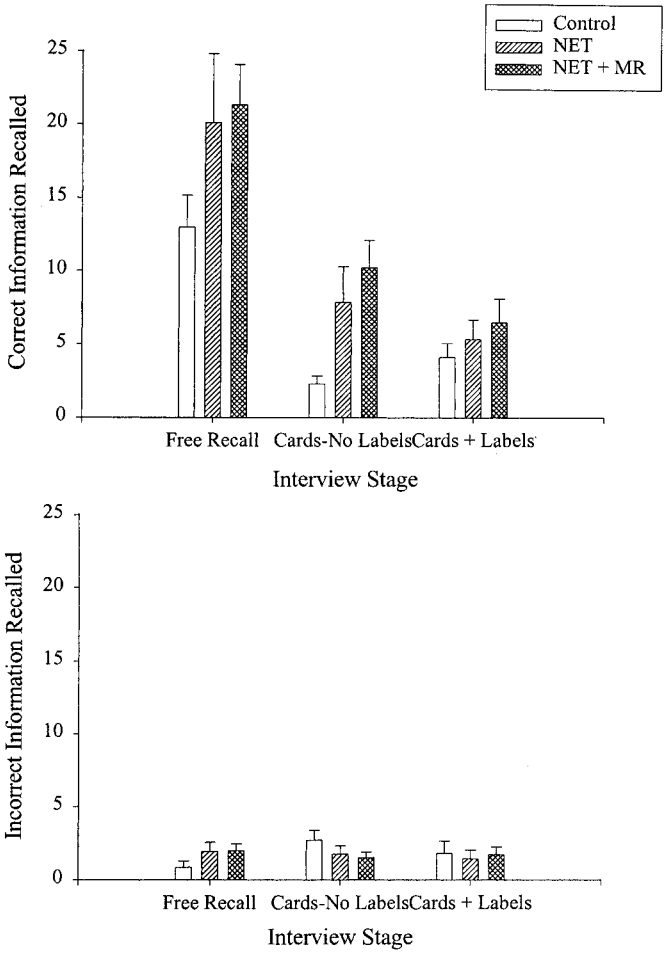

Figure 2. Correct and incorrect information reported at each stage of interview after a 2-week delay (Study 1)

increased number of details reported about the people from the event (Camparo *et al.*, 2001; Saywitz and Snyder, 1996; Saywitz *et al.*, 1996), univariate analyses for each category of information were conducted. There was a significant main effect of training condition for correct information about people $F(1, 44) = 4.6$, and for information about the setting $F(1, 44) = 4.1$. Consistent with Saywitz and colleagues, planned comparisons indicated that children from the two training conditions reported more correct information about both people and the setting than children from the control condition, but did not differ from each other. Contrary to expectations, for action and conversation/affect the amount of information reported did not differ significantly across training condition.

Errors and accuracy

A MANOVA with training condition as the between-subjects factor revealed no overall effect of training condition for incorrect information reported (see Figure 2).

Accuracy of recall was calculated as total correct items of information/(total correct + total incorrect), that is, proportion correct (Table 3). A MANOVA revealed a significant

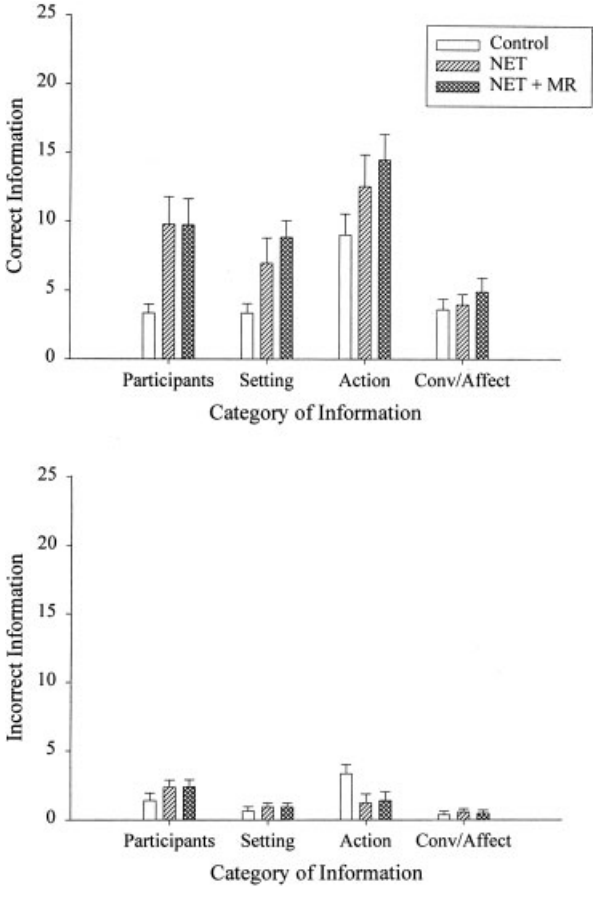

Figure 3. Correct and incorrect information reported in each category of information after a 2-week delay (Study 1)

overall effect of condition on accuracy, $F(6, 64) = 2.4$. When accuracy was examined separately at each phase of the interview, following prompting with Cards—No Labels there was a significant main effect of training condition, $F(2, 33) = 5.3$; planned comparisons indicated that children in the NET and NET + MR conditions were more accurate than the children in the control condition, but did not differ significantly from each other. Interestingly, the accuracy of information reported by children in the control condition

Table 3. Study 1: Mean (SE) accuracy of information reported in each stage of the interview

	Treatment condition		
Interview stage	Control	NET	NET + MR
Free recall	0.93 (0.03)	0.91 (0.02)	0.92 (0.02)
Prompted: cards—no labels	$0.54\ (0.10)_a$	$0.79\ (0.08)_b$	$0.88\ (0.03)_b$
Prompted: cards + labels	0.74 (0.09)	0.85 (0.05)	0.82 (0.04)
Total accuracy	$0.78\ (0.05)_a$	$0.87\ (0.02)_b$	$0.89\ (0.02)_b$

Note: Row means with different subscripts differ significantly ($p < 0.05$).

Table 4. Study 1: Mean (SE) accuracy of information reported in each category

	Treatment condition		
Information category	Control	NET	NET + MR
Participants	0.73 (0.08)	0.79 (0.07)	0.83 (0.03)
Setting	0.77 (0.10)	0.83 (0.07)	0.92 (0.02)
Actions	$0.74\ (0.06)_a$	$0.91\ (0.03)_b$	$0.92\ (0.02)_b$
Conv/affect	0.88 (0.08)	0.92 (0.03)	0.93 (0.03)

Note: Row means with different subscripts differ significantly ($p < 0.05$).

during this phase (Prompted: Cards—No Labels) was very low; when the verbal labels for the cards were provided, however, the accuracy of information reported increased by 20% (see Table 3). The accuracy of information reported during free recall or following prompting with the Cards + Labels did not differ across the three training conditions.

Accuracy measures for each category were submitted to a MANOVA. There was no significant effect of training condition.

Specific questions. Children were asked ten specific questions concerning details of the event. There was no significant difference in the number of correctly answered questions across control (6.7), NET (6.4), or NET + MR (6.4) conditions.

Age. To assess whether age was associated with the amount of information reported, Pearson's Product–Moment correlations were conducted between age and total number of correct units of information, total number of incorrect units of information, and total accuracy of information reported. Age was not significantly correlated with any of these variables (all $r_{xy} < 0.28$).

Summary and discussion

Children who received NET training, with or without the addition of MR, reported more correct information and were more accurate in their reports of the event than children who did not receive training. In particular, children who received training reported more details about the people and the setting of the event. Although there were indications that children's free recall benefited from the training, the increased amount of information reported during this stage of the interview was not statistically significant and the increase in information occurred primarily following the introduction of the picture cue cards. These results replicate those found by Saywitz and colleagues (Camparo *et al.*, 2001; Dorado and Saywitz, 2001; Saywitz and Snyder, 1996; Saywitz *et al.*, 1996), and provide further support for the NET as a reliable interview technique for enhancing children's event reports following short delays. Further, although there were indications that children benefited from the instructions to mentally reinstate the environmental context of the event before reporting what they remembered, the increase in information reported, although large, was not statistically significant. A conservative conclusion is, therefore, that the positive effects of mental reinstatement of context observed in previous studies (Dietze and Thomson 1993; Hershkowitz *et al.*, 2001), did not add to the beneficial effects of the NET.

That the strongest effects of the NET were evident during the prompted recall stage of the interview following the introduction of the cue cards points to the importance of the

instructions and practice provided during the training session. For children who had received narrative elaboration training, the cards acted as effective prompts for additional recall even without the labels. In contrast, for control children who had not received training in their use, the cards alone were not effective. This is, perhaps, not surprising, given the cards are generic and not specific to the event. When ambiguity as to the purpose or meaning of the cards was removed by presenting them together with their verbal labels, however, all children reported additional information, including those in the control condition.

STUDY 2

In Study 2 we asked whether the effects of the NET that we observed at the two-week delay would extend to a longer delay of nine months. Study 2 compared the reports of children who received NET training with those who did not and all children were interviewed about the event for the first time at the nine-month delay so that any effects could not be attributed to a prior interview about the event. The NET + MR condition was not included in Study 2, given that it had not significantly added to the effects of the NET in Study 1.

Method

Participants

Parental consent was obtained for 22 children (12 boys, 10 girls) between the ages of six and eight years (mean age 105 months, range 100–113 months) to be interviewed about the event nine months later. Half of these children were drawn from one of the schools used for Study 1, the remaining children were drawn from a third school.

Training and interview sessions. The training session and interview took place approximately nine months after the event, and children were trained and interviewed individually by two new interviewers who had been trained by the first author to ensure consistency with the first study. Children were randomly assigned to one of two conditions: control ($n = 11$), or the NET ($n = 11$). Numbers for the delay sample were lower than in Study 1, due to low parent response rates and several children having left the schools where the event took place by the time of the interview. All training and interview sessions were video- and audiotaped for later use. The procedure for the training and interview sessions was identical to that described for the children interviewed two weeks after the event (Study 1). Coding followed the same procedure and was conducted by the same principal coder (the first author) as in Study 1. Inter–rater agreement for the parsing of information into units of meaningful information was 89%, for coding of information as new or repeated, and into categories of information was 87%, for coding of information as correct or incorrect, 86%, and for the stage of interview in which information was reported, 100%. No new information was generated in response to the specific questions, and the children's responses to these were simply coded as correct or incorrect, as in Study 1.

Results

Is the NET effective after a 9-month delay?

Study 2 examined whether the positive effects of the NET demonstrated after a short delay would also be found after a much longer delay of 9 months. To determine whether the NET

was effective, we compared amount recalled, errors, and accuracy at the 9-month delay, across interview condition (between subjects). An alpha level of 0.05 was used for all analyses unless otherwise stated. As in Study 1, there was considerable variability in the data. To address this issue, analyses were conducted on both logarithm-transformed data and raw data. In a few instances, the analyses based on the transformed data revealed significant differences that failed to reach conventional levels of significance when based on the raw data. In these instances, results of analyses based on both transformed and raw data are presented. All other reported analyses are based on raw data. Preliminary analyses conducted using one-way analyses of variance (ANOVAs) revealed no main effect of interviewer, school or gender.

Correct information. The mean numbers of correctly and incorrectly reported units of information and measures of accuracy (proportions correct) are shown in Table 5.

To assess the effect of training prior to the interview, as in Study 1 the numbers of correct units of information recalled in each phase of the interview were examined separately and also were summed and totals submitted to a one-way analysis of variance (ANOVA), with training condition as the between-subjects factor. For total amount recalled across all phases of the interview, children in the NET condition reported more correct information than children who did not receive training, although this effect did not reach statistical significance $F = 3.72$, $p = 0.07$. Univariate analyses for each interview stage, with training condition as the between-subjects factor revealed that children who received NET training reported more correct information during both the Prompted: Cards—No Labels stage of the interview, based on the transformed data, $F(1, 20) = 4.7$, ($F = 3.84$, $p = 0.07$ for raw data) and the Prompted: Cards + Labels stage, $F(1, 20) = 5.2$, ($F = 2.98$, $p = 0.10$ for raw data), but not during Free Recall.

Table 5. Study 2: Mean (SE) number of correct and incorrect items and accuracy for each stage of the interview

Interview stage	Treatment condition			
	Control		NET	
	2 weeks	9 months	2 weeks	9 months
Correct				
Free recall	13.00 (2.19)	6.82 (1.88)	20.13 (4.74)	10.27 (2.75)
Prompted: Cards—No Labels	2.29 (0.54)	4.27 (2.30)	7.88 (2.43)	17.82 (6.52)
Prompted: Cards + Labels	4.14 (0.95)	2.64 (1.39)	5.38 (1.33)	11.64 (5.03)
Total correct	19.43 (2.95)	13.73 (4.44)	33.38 (5.87)	39.73 (12.72)
Incorrect				
Free recall	0.86 (0.43)	1.73 (0.60)	1.94 (0.62)	4.09 (1.16)
Prompted: Cards—No Labels	2.71 (0.68)	3.00 (1.23)	1.75 (0.57)	7.27 (2.80)
Prompted: Cards + Labels	1.79 (0.86)	1.64 (0.86)	1.44 (0.59)	3.09 (1.00)
Total incorrect	5.36 (1.39)	6.70 (2.30)	5.13 (1.05)	14.46 (4.51)
Accuracy				
Free recall	0.93 (0.03)	0.78 (0.04)	0.91 (0.02)	0.72 (0.06)
Prompted: Cards—No Labels	0.54 (0.10)	0.37 (0.14)	0.79 (0.08)	0.65 (0.09)
Prompted: Cards + Labels	0.74 (0.08)	0.59 (0.16)	0.85 (0.05)	0.67 (0.10)
Total accuracy	0.78 (0.04)	0.60 (0.11)	0.87 (0.02)	0.70 (0.06)

Table 6. Study 2: Mean (SE) number of correct and incorrect items and accuracy reported in each category

	Treatment condition	
Information category	Control	NET
Correct		
People	2.36 (0.87)	10.27 (3.80)
Setting	1.55 (0.62)	8.27 (2.77)
Actions	7.55 (2.49)	14.45 (4.42)
Conv/affect	2.27 (0.97)	6.73 (2.64)
Incorrect		
People	0.73 (0.47)	6.00 (2.54)
Setting	0.60 (0.40)	2.18 (1.13)
Actions	4.27 (1.52)	3.45 (1.24)
Conv/affect	0.55 (0.31)	2.82 (1.01)
Accuracy		
People	0.84 (0.09)	0.65 (0.06)
Setting	0.68 (0.17)	0.85 (0.06)
Actions	0.58 (0.11)	0.81 (0.02)
Conv/affect	0.67 (0.17)	0.63 (0.11)

Correct information reported about each category. As in Study 1, children trained with the NET reported more correct information about people from the event based on the transformed data, $F(1, 20) = 5.5$, ($F = 4.12$, $p = 0.056$ for raw data), and the setting of the event, $F(1, 20) = 8.6$, $p < 0.01$ ($F = 5.63$, $p = 0.03$ for raw data) (Table 6). More correct information was reported about the remaining two categories by children in the NET condition, but the difference did not reach significance for either ($p > 0.10$).

Incorrect information. At the 9-month delay, there were no effects of condition on the amount of incorrect information reported during any stage of the interview, or total incorrect (Table 5). For each category examined separately (Table 6) univariate analyses revealed that children trained with the NET reported more incorrect information about the people from the event, based on the transformed data, $F(1, 20) = 8.4$, $p < 0.01$ ($F = 4.15$, $p = 0.06$ for raw data) and conversation/affect associated with the event, $F(1, 20) = 4.6$, than children who did not receive training.

Accuracy. The MANOVA for accuracy of information (proportion correct, as in Study 1) revealed no overall effect of condition on accuracy overall or for any stage of the interview examined separately (Table 5).

Analyses of accuracy of information from each category showed that children trained with the NET were less accurate for information reported about people from the event, based on transformed data, $F(1, 13) = 5.2$ ($F = 3.3$, $p = 0.09$ for raw data) (Table 6), but not for any other information category.

Specific questions. Children were asked ten specific questions concerning details of the event, as in Study 1. There was no effect of condition on the number of correctly answered questions (Control = 6.9, NET = 6.5).

Age. Pearson's Product–Moment correlations failed to reveal any significant relation between age and the total number of correct units of information, the total number of incorrect units of information, or the total accuracy of information reported, as in Study 1 (all $r_{xy} < 0.16$).

Summary and discussion

A similar pattern of results emerged when the NET was introduced after a delay of 9 months to that observed following the two-week delay (Study 1). Children interviewed with the NET reported more correct information in response to the cue cards, and included more correct details in their reports about the people and the setting of the event, than children who did not receive training (Camparo *et al.*, 2001; Saywitz and Snyder, 1996; Saywitz *et al.*, 1996). After the long delay, however, children interviewed with the NET also reported more incorrect information about people and conversation/affect, and were less accurate when reporting information about people than children who had not received the NET training. Examination of the kinds of errors children made revealed that when prompted to talk about people almost half of the children trained with the NET attempted to provide descriptions of clothing, and the overwhelming majority of the errors made related to these descriptions. It is not surprising from a memory perspective that children had difficulty in accurately describing such peripheral details after such a long delay. What this does illustrate, however, is the difficulty associated with specifically prompting children to talk about this kind of detail. When presented with the cue cards, children attempted to provide descriptions in the manner in which they had been trained, even though they may not have had a memory for that level of detail. That is, prompting children for this type of information resulted in attempts to report information they could not remember accurately. Although children did make errors when describing information relating to people, it is encouraging to see that these errors were largely confined to descriptions of attire rather than incorrectly reporting that certain people were present or absent for activities. None of the errors made would lead to the incorrect assumption that any of the people from the event did things that did not actually happen.

The present findings demonstrate that although some of the benefits associated with using the NET following short delays extend to situations in which some time has elapsed between the event and the memory interview, caution must nonetheless be exercised. The NET training is specifically designed to facilitate reporting of details which children may not otherwise spontaneously report (such as descriptions of people, the setting, conversations and emotion). If the risk of errors when reporting information of this kind is increased with the use of the NET, at least after a delay, then the decision as to whether to use it or not and potentially increase unreliable information reported about people (information which might be critical in a forensic setting) must be weighed against the benefits that may be gained.

GENERAL DISCUSSION

The present findings replicate the positive effects on children's recall of the NET after a short delay, as demonstrated by Saywitz and colleagues. Consistent with previous studies, we found increased recall from children trained with the NET (Camparo *et al.*, 2001; Dorado and Saywitz, 2001; Saywitz and Snyder, 1996; Saywitz *et al.*, 1996), in particular,

an increase in details reported about the people from the event. We also found in the present studies that children trained with the NET provided more detail about the setting of the event. Information of this kind is likely to be extremely useful in eyewitness contexts. At the short delay, the increase in the amount reported was associated with an increase in the accuracy of information reported as a result of NET training, although this was not the case at the longer delay. A common problem associated with interviewing children in real-world settings is that the reports provided by children with minimal prompting, although highly accurate, are typically very brief. An advantage of the NET, therefore, is that the prompting provided by the cue cards is general and not potentially leading with respect to details from the event, and yet yields a large increase in the amount of information reported without compromising accuracy.

Examination of recall at different stages of the interview provides some clues as to the mechanisms through which the NET procedure is effective. During the free recall stage of the interview, children trained with the NET reported more information than children in the control condition, although the difference was not statistically reliable. There was, however, considerable variability in children's recall following NET training, raising the possibility that some children drew on knowledge gained from the training session to provide more complete reports in this phase, whereas others did not. Research on the use of memory strategies suggests that children in the age-range of the children in our study (7 to 8 years) can use strategies to help retrieve information, but often need specific instruction to do so effectively. That is, they may not spontaneously use a new strategy (Kobasigawa, 1974, 1977; Paris *et al.*, 1982; Ritter, 1978; Ritter *et al.*, 1973; Whittaker *et al.*, 1985) as in the free-recall section of the interview.

With the introduction of the cue cards, when children were effectively instructed to use the new strategy, children from the training conditions reported between 65% and 85% more information compared to that already recalled in free recall. Clearly, when presented with the cards, children who had been trained with them knew how to use them, and did so. In contrast, the cards provided very little benefit for children who had not received training. Moreover, although children in all three groups were very accurate in the free-recall stage of the interview, the accuracy of the reports of children who had not received training decreased markedly when the cue cards were introduced, suggesting that the cards may have been more confusing than helpful. These findings indicate the need for some caution in the use of the cards as cues for recall, and that training with the cards prior to the interview is essential if they are to be used in the NET format. Consistent with this, Sattar and Bull (presentation at the 6th European Conference on Law and Psychology, Sienna, 1996) found that simply presenting children with the four NET cue cards did not produce increased recall, even following a brief practice with the cards immediately prior to the interview. Together, these findings suggest that the benefits of the NET rely on the training session, rather than simply reflecting the more structured NET interview alone. The training session teaches the children not only the type of information required, but also the level of detail required when talking about the past, and both components may be important.

It is perhaps not surprising that the control children were unable to use the cue cards effectively when they were first introduced. But even when verbal prompts were associated with each cue card, control group children did not differentially benefit compared to the other two groups in terms of the amount of information reported, although their accuracy increased considerably. Given that control group children had reported the least information up to that point of the interview, and the possibility that children in the training conditions might have exhausted the information available for reporting, the control group

might have been expected to benefit most from the verbal prompts. However, all children benefited from the verbal prompts in association with the cue cards. Two recent studies have demonstrated increased recall from children verbally prompted to recall everything they heard, and everything they saw and the present findings confirm the value of these general open-ended prompts (Elischberger and Roebers, 2001; Poole and Lindsay, 1995).

Contrary to our predictions, adding mental reinstatement of the event context to the NET interview did not significantly enhance recall over and above the NET alone. The strong positive effects of the NET alone may have meant that any further improvement was difficult to detect, especially in combination with the variability in performance following NET training. Although not examined in these studies, the benefits of mental reinstatement of environmental context may have been more evident after a delay, when the children's memory for the event may have been less accessible. The effectiveness of mental reinstatement across delay intervals and in combination with other techniques is a promising area for future research. Variability following NET training is consistent with results reported by Saywitz and colleagues (Camparo *et al.*, 2001; Saywitz and Snyder, 1996; Saywitz *et al.*, 1996), and suggests that the NET training and preparation prior to an interview benefits some children more than others. It is possible that some children were less effective at mentally reinstating the context of the event than others, and this may have contributed to the large variance observed, making significant effects more difficult to detect. It would clearly be useful, from both practical and theoretical perspectives, to be able to predict those children most likely to benefit from particular interview and training procedures, such as the NET, and this is a promising direction for future research.

The difference in amount recalled by children from each school in Study 1 is interesting, and may reflect differences associated with the socioeconomic status of the children at each school. Children from School 1 in the present study were from a school which was assigned a decile rating of 9 by the New Zealand Ministry of Education, whilst School 2 was assigned a decile rating of 4. Decile ratings reflect the socioeconomic status of the households in the area surrounding the school, as indicated by national census data. Schools with decile ratings of 4–6 are classified as average, with 1 being the lowest rating, and 10 being the highest. Thus, there was a marked difference in the socioeconomic status of the two schools, which may have contributed to the higher level of recall demonstrated by children from School 1. A positive relationship has been demonstrated between SES and recall, with children from higher SES backgrounds recalling more correct information (Geddie *et al.*, 2000), although further research is needed to more directly examine the contribution of SES to individual differences in recall. Similarly, Dorado and Saywitz (2001) found differences in errors made by preschool children as a function of SES, with children from lower SES backgrounds reporting more errors than their counterparts from middle SES backgrounds, although no differences were found in correct recall. The difference in recall as a function of gender is also interesting, and may reflect a difference in language ability between the boys and girls in this study. Although gender differences are not commonly reported (or perhaps even examined), some studies have reported gender effects on the amount of information recalled (Rudy and Goodman, 1991; Salmon *et al.*, 1995; Salmon and Pipe, 1997; Tobey and Goodman, 1992), with girls typically recalling more than boys. Differences in the amount of information reported as a function of gender in this study may have reflected the girls' better language skills, differences in communication styles, or differences in willingness to talk about the type of detail that was prompted (e.g. how people looked, and what the room looked like).

The NET was effective in helping children to tell more about a past event, not only when interviewed soon after the event, but also for those children interviewed for the first time following a 9-month delay. The increased amount of information reported was not at the expense of overall accuracy, which is important given the negative impact of delay often found with accuracy. That is, children were able to provide more complete accounts of an event that had occurred some time earlier, without the overall reliability of their accounts being compromised. However, this conclusion needs to be qualified by the finding that accuracy of information relating specifically to people and, in particular, their clothing, did decline. The decreased accuracy of children's descriptions of people's clothing highlights the risk of cueing children to report information they have forgotten following a delay, even when the cues presented are very general.

The large variation associated with the use of the training procedure after a short delay was also a feature at the nine-month delay. Indeed, at the long delay there were some children who did not respond to the cards at all during the memory interview, even though they were able to use them during the training session. Again, this suggests that this technique may be more helpful for some children than for others, and research to determine which children may benefit most from its use will be important in validating the procedure as a useful tool in applied settings.

In summary, together with studies by Saywitz and her colleagues (Camparo *et al.*, 2001; Dorado and Saywitz, 2001; Saywitz and Snyder, 1996; Saywitz *et al.*, 1996), these findings support the use of the NET as an effective technique in helping children provide both a more complete and accurate report of a past event, with minimal, non-leading prompting, at least after a short delay. Even following the long delay the NET enhanced recall with no overall decrease in the accuracy of the information recalled, although there was an increase in errors relating to peripheral details. In the present study, children interviewed following NET training reported between 40% and 55% more information overall than those interviewed without such training, over both short and long delays. Given that children are increasingly called upon to provide crucial information in court cases, this research has important applications for obtaining a reliable and detailed account from children without exposing them to influences which may compromise the accuracy of their testimony. Future research will need to address the effectiveness of the NET in contexts which more closely resemble those in which children are likely to be interviewed in real life contexts, for example across repeated interviews, longer delays, and for stressful events. All these factors may have an impact on children's reports of past experiences.

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