Journal of Applied Psychology
2003, Vol. 88, No. 2, 195–206


0021-9010/03/$12.00 DOI: 10.1037/0021-9010.88.2.195

# Individual Differences in Children's Event Memory Reports and the Narrative Elaboration Technique

Deirdre Brown and Margaret-Ellen Pipe
University of Otago

Children between 7 and 8 years old took part in a staged event at school and 1 week later were assessed using a short form of the Wechsler Intelligence scale for children (third edition) and measures of metamemory, narrative ability, and socioeconomic status. Two weeks following the event, children either received narrative elaboration training (NET; K.J. Saywitz & L. Snyder, 1996) and were prompted with the four NET cue cards at interview; received verbal prompts corresponding to the cue card categories, but without prior training; or were presented with the cards at interview without prior training. Children given verbal labels as prompts recalled as much information as children who received NET training and cue cards. Measures of intelligence were predictive of amount recalled for cards-only children but not for the other 2 groups, indicating that differences in recall between low- and high-IQ groups were attenuated when recall was supported by NET training or verbal prompting.



Several techniques have been designed to overcome children's limitations when recounting past experiences through training or preparation prior to, or instructions during, interviews (Poole & Lindsay, 2001, in press; Saywitz & Moan-Hardie, 1994; Saywitz & Snyder, 1996; Warren, Hulse-Trotter, & Tubbs, 1991). One technique that aims to provide general skills that, in turn, lead to more complete and accurate reports of past events is the narrative elaboration technique, or NET (Saywitz & Snyder, 1996). The NET involves a training session in which children are first taught about the level of detail necessary for fully describing a past event to address cognitive limitations such as lack of knowledge about the expectations of the listener and less effective use of internally driven search strategies, which may result in very brief narrative accounts by young children (Saywitz & Snyder, 1996). Children are also trained to use four cue cards as reminders of what to talk about (the participants, the setting, the actions, and the conversation and affect associated with the event) and to help them structure their reports and provide extra detail. In the present study, we addressed two questions. First, is it necessary to provide a training session, or is it sufficient to provide the structure for recall at the time of interview, for example, by providing verbal cues? Second, can we predict those children most likely to benefit from the NET or alternative techniques, and further, can we explain variability in performance following the introduction of the NET?

Initial studies with the NET demonstrated increased recall from children between the ages of 3 and 11 years without any adverse effects on the accuracy of their reports (Camparo, Wagner, & Saywitz, 2001; Dorado & Saywitz, 2001; Saywitz & Snyder, 1996; Saywitz, Snyder, & Lamphear, 1996) or with improved accuracy (Brown & Pipe, in press). Although these studies provide compelling evidence that the NET is an effective means of facilitating children's reports, techniques that require extensive training or multiple sessions are less likely to be adopted in applied settings where time and resources are under pressure. Whether there are specific components of the NET that are effective or, indeed, whether the complete package including training and instructions is necessary for enhanced recall is unclear. Eliminating components of the NET package that do not significantly contribute to increased recall and generally streamlining it would, however, enhance its applied value considerably. Although a preliminary study suggests that the initial instructions—to be complete—are not sufficient to enhance recall (Saywitz & Snyder, 1996), the importance of the prior training session, the main disadvantage of NET training from an applied perspective, has yet to be evaluated.

One purpose of the training session prior to interview is to teach the children about the cue cards, which, in turn, are intended to provide a structure for children's recall by cueing the categories of information they should talk about. The modeling, practice, and feedback in the training session also provide children with information about the kinds of information the listener needs to know and the level of detail necessary about central and peripheral aspects of the event. In the absence of specific interview techniques, children's reports of past events are often primarily made

Deirdre Brown and Margaret-Ellen Pipe, Department of Psychology, University of Otago, Dunedin, New Zealand.

Margaret-Ellen Pipe is now at the Section on Social and Emotional Development, National Institute of Child Health and Development, Bethesda, Maryland.

This research was funded by a grant from the New Zealand Foundation for Research, Science and Technology. It composed a portion of the doctoral dissertation of Deirdre Brown and was reviewed and approved by the University of Otago Human Ethics Committee, whose guidelines are consistent with American Psychological Association standards for research with human participants.

We thank all of the children and the principals and staff of the participating schools. We gratefully acknowledge Karen Saywitz and Lynn Snyder for their permission to use the narrative elaboration technique protocol and for providing us with the script; Karyn Daniels, Sasha Farry, and Rachel Sutherland for assistance with data collection and coding; Harlene Hayne for assistance with analyses; and members of the laboratory for help with staging the event.

Correspondence concerning this article should be addressed to Deirdre Brown, Department of Psychology, University of Otago, P.O. Box 56, Dunedin, New Zealand. E-mail: dbrown@psy.otago.ac.nz

up of descriptions of actions, or "what happened" (Fivush & Hamond, 1990), and are sparse in details about aspects of the event that are more peripheral in nature (Goodman, Rudy, Bottoms, & Aman, 1990; Saywitz, Goodman, Nicholas, & Moan, 1991).

The positive effects typically observed following the NET training session may, however, come from the provision of a structure for recall at the time of the interview, through cueing recall of the four categories of information, rather than from the training session. If this is the case, providing verbal cues in the interview that prompt the same categories as the cue cards should be sufficient to enhance recall without the training session typically included in the NET. To examine this possibility, we compared recall when children received the NET training session and cue cards at interview with that of (a) children who were verbally prompted for the four categories of information during the interview without prior training and (b) children who were presented with the cards at interview but not given any training in their use.

A second objective of the present study was to examine individual differences in relation to children's recall. A feature of the results of studies using the NET (e.g., Brown & Pipe, in press; Camparo et al., 2001; Saywitz et al., 1996) has been the variability in children's reports, suggesting that some children benefit from the NET more than others. The focus of existing research on individual differences has been children's suggestibility or memory for false events, rather than children's accurate recall or differences in their success at using techniques designed to facilitate recall (e.g., Bruck, Ceci, & Melnyk, 1997; Quas, Qin, Schaaf, & Goodman, 1997; for reviews, see Pipe & Salmon, 2002; Quas, Goodman, Ghetti, & Redlich, 2000). In the present study, we obtained measures relating to intelligence, metamemory, narrative ability, and socioeconomic status (SES). We were interested in whether these measures would predict children's recall and, most important, help to identify those children most likely to benefit from the NET.

From a cognitive perspective, *intelligence* might influence encoding, retrieval, and/or reporting. Less efficient information-processing skills lead to less information being encoded about an event (Ornstein & Haden, 2002; Ornstein, Larus, & Clubb, 1991). Further, insofar as intelligence also contributes to children's understanding of an event, in turn affecting the organization and coherence of the event representation stored in memory, it will influence recall (cf., Fivush, Kuebli, & Clubb, 1992; Murachver, Pipe, Gordon, Owens, & Fivush, 1996; Ratner, Smith, & Padgett, 1990; Wenner & Bauer, 1999). With respect to retrieval, intelligence may be associated with more effective use of retrieval strategies (Alexander, Carr, & Schwanenflugel, 1995), and higher IQ children may be better able to report what they remember, as a result of either better verbal skills or a better understanding of the amount of information the listener requires to fully understand the child's experience. The NET may, therefore, help children of lower intelligence to provide extra detail in their reports by addressing their (relative) difficulties in retrieving and reporting information. Although conceptualized here as a cognitive factor, the relation between intelligence and recall may be mediated by social factors. For example, IQ may be affected by the quality of the home environment, including access to educational and social opportunities, which may provide stimulation for cognitive development, including language abilities and the ways in which experiences are discussed and remembered (McFarlane, Powell, & Dudgeon, 2001).

Although intelligence has been shown to be negatively related to children's suggestibility in several studies (Danielsdottir, Sigurgeirsdottir, Einarsdottir, & Haraldsson, 1993; Geddie, Fradin, & Beer, 2000; McFarlane et al., 2001), to our knowledge only three recent studies have examined the relationship between intelligence and event memory. The results generally suggest a positive relationship between intelligence and event recall (Elischberger & Roebers, 2001; Geddie et al., 2000), although one study suggested the relation may be stronger with older (8–10-year-old) children (Roebers & Schneider, 2001).

Geddie et al. (2000) also reported a positive relationship between *metamemory* and event recall, at least for preschoolers. Metamemory refers to knowledge about memory, including knowledge about memory strategies, the effects of task demands on memory performance, and the ability to self-monitor memory performance (Schneider, 1999; Schneider & Bjorklund, 1998). Between ages 7 and 8 years, when metamemory skills are developing but have not yet become stable (Bjorklund & Douglas, 1997), children should demonstrate variability in knowledge about memory, which may contribute to variability in their reports. Importantly, children in the present study who were unaware of memory strategies may have benefited most from intervention, because of the provision of a strategy to aid in retrieving and reporting information about an event.

We also assessed children's *spontaneous narrative ability*, because we predicted that children with less developed narrative skill would benefit more from the modeling and practice in how to talk about the past and from the provision of a structure to use for their recall during the interview as provided in the NET. The impact of language and narrative skill on children's reports of past events has not been consistent across studies, with Gordon et al. (1993) reporting a positive relationship for 5-year-old but not 3-year-old children's recall of a pediatric exam and Greenhoot, Ornstein, Gordon, and Baker-Ward (1999) failing to find a significant relationship for either age group (but see also Salmon, Roncolato, & Gleitzman, in press).

Finally, we reasoned that training and practice in talking about the past might be particularly beneficial for children from lower SES backgrounds. In a recent review, Herrmann and Guadagno (1997) concluded that when a relationship has been demonstrated between SES and memory, it is typically positive for laboratory-based memory tasks, a pattern also observed by Geddie et al. (2000) for event memory. Children from lower SES backgrounds may be especially likely to benefit from the NET, owing to differences in experience in talking about the past, and internalization of effective means of doing so, and they may be more suggestible because of an increased likelihood of being sensitive to and influenced by the authority status of the interviewer.

In summary, in the present study we examined, first, whether the positive benefits associated with the NET are primarily due to the training and preparation for interview or to the provision of a structure for children to use for their recall of a past event. We expected that children who received the full NET training and interview package would demonstrate the most complete recall, because they had experienced both training in talking about the past and the provision of a structure for their recall during the interview, followed by children who were verbally prompted for

information and, finally, by children presented with the cue cards but without training or verbal labels. Second, we were interested in whether individual-differences measures would predict children's recall across different interview contexts and, in particular, whether these measures would predict which children were most likely to benefit from the NET. This aspect of the study was considered exploratory, and we therefore made no specific predictions as to the contributions these variables might make to children's recall.

## Method

### Participants

Children from three classrooms at two local primary schools (except for 3 children whose parents indicated they did not wish them to be present at the event) participated in a first aid and safety presentation ($N = 73$). Parental consent was obtained for 67 of the children (35 boys and 32 girls), between the ages of 6 and 8 years (mean age = 96 months, range = 82–113 months), to be interviewed about the event. The children received a small novelty gift for their participation.

### Procedure

The safety presentation was conducted in a large room or hall at school, by four research assistants. It was identical to that conducted by Brown and Pipe (in press), with the exceptions that (a) the presentation was introduced as about *safety* rather than about first aid and (b) one set of activities (the Slings Station) was omitted, in order to streamline the event. The children were assigned to one of three groups of between 6 and 8 children, each led by a research assistant. Each group began at one of the three stations positioned in corners of the room, took part in the activities of that station for approximately 10 min, and proceeded clockwise to the next station after a signal from the instructor.

At the Hazards Station, children were presented with 10 color (30 cm × 42 cm) illustrations of children in dangerous situations (e.g., playing with unmarked bottles in a shed) and were asked to identify the danger and how they could make the situation safer. At the Video Station, children watched a 30-s video of a boy rollerblading with friends, then falling over and grazing his knee. A narrator explained the basic points of taking care of a graze. Following the video, children were shown how to apply gentle pressure to a cut to stop the bleeding and how to apply pressure if there was something in the cut (e.g., a piece of glass), and then demonstrated both to the group leader. At the 111 Station children were asked a number of questions and given instructions about the use of emergency services and calling the operator to request a service. They practiced in pairs calling for an ambulance, one using the telephone to call 111, and the other acting as the operator; they then reversed roles (see Brown & Pipe, in press, for a more detailed description).

Following Saywitz and Snyder (1996), a few minutes after the children had moved to their third station, a staged interruption occurred. A research assistant (the interrupter), dressed in a uniform, burst into the room and went to each group asking for the instructor. She then loudly and angrily stated to the whole room that the first aid materials were needed at another school and that the instructor was not supposed to have them. After a brief argument, the instructor suggested that they share the equipment, the interrupter agreed, and they walked around to each group gathering up spare equipment. The interrupter then apologized for bursting in and left. The groups resumed their activities.

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

### Cognitive Testing Session

In the 2-week interim between the event and the training and interview sessions, a number of individual-difference measures were collected in a single session. Children were tested by a researcher who had not been part of the staged event, individually, during school time. The mean length of the sessions was 36 min (range = 20–60 min).

*Wechsler's Intelligence Scale for Children, Third Edition (WISC–III).* To gain an estimate of children's global intellectual function, we administered a five-subtest short form of the WISC–III. The five subtests administered were Information, Similarities, and Vocabulary (from the Verbal Subscale) and Picture Completion and Block Design (from the Performance Subscale). This pentad is among the 10 best short forms of the WISC–III recommended by Sattler (1998; reliability and validity coefficients associated with this short form are $r_{tt} = .947$ and r = .898). The scaled scores from these subtests were summed and estimated WISC–III Full Scale Deviation Quotients found from values provided in Sattler (1998).

*Metamemory.* A metamemory questionnaire was administered to the children to assess knowledge of memory and memory strategies. The questionnaire included seven items from those used by Belmont and Borkowski (1988) and Henry and Norman (1996) and used previously in this laboratory (Bennett, 1999), and assessed knowledge of strategies that might help children to remember something, the ability to distinguish between things that might be harder or easier to remember, the limits of the children's ability to remember a group of items, and strategies they might use for learning the items.

*Narrative ability.* To measure spontaneous narrative ability, we showed children eight pictures taken from the "Frog Where Are You?" story, which shows a boy and his dog searching for a lost frog (Berman & Slobin, 1994). The pictures were laid out in front of the children with the instruction "These pictures tell a story. I want you to look at them carefully and when you've had a good look, I want you to tell me as much as you can about the story that is in the pictures." Children were prompted to "tell more things" about the pictures until they indicated they were finished. The stories were coded for inclusion of core characters, mention of actions, location, and any elaborations. Interrater agreement for this coding was 90%.

*SES.* A measure of parental SES was derived from parents' responses to a brief demographic questionnaire that included parents' descriptions of their occupations. The Elley–Irving socioeconomic index (Elley & Irving, 1985) was used to assign SES scores to occupations, ranging from 1 (*high*) to 6 (*low*), according to 1981 New Zealand Census information. The scores are based on average yearly income and years of education or training for each occupation. The highest score of two parents was used. When there was some doubt about a score (e.g., the parental description of occupation was unclear or the occupation was not listed), two coders independently assigned a score based on estimates of an equivalent occupation, and the two scores were compared. The interrater agreement for this process (for 20 cases) was 85%. Differences were resolved by discussion.

### Training Phase

Individual training sessions took place approximately 2 weeks after the event. Children with parental consent to be interviewed were assigned to one of three conditions: the cards-only condition (CO; $n = 23$), the narrative elaboration condition (NET; $n = 22$), or the verbal labels condition (VL; $n = 22$). Children were assigned to the conditions in such a way as to ensure that the mean deviation quotient for each condition was equal, to ensure that any differences demonstrated in recall could be attributed to the manipulation of interview condition and not to a preexisting difference in IQ. All training and interview sessions were video- and audiotaped for later use.

*NET training procedure.* With the exception of the stimulus materials (the storybook and discussing what happened on the way to school), the

training followed the script created by Saywitz and Snyder (1997) and used by Brown and Pipe (in press). 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 (e.g., using a list, compared with trying to remember in their head). At 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 one to remember better (see Figure 1).

The child was then read a story ("The Time It Took Tom"; Sharratt & Tucker, 1998) and, when it was finished, was asked to recall as much of the story as possible. The cue cards were then introduced, one at a time, and the category they represented was explained and modeled (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 tell more things about the story. After the child indicated that he or she had finished using each card, feedback was given. The researcher commented on the things the child had remembered and pointed out extra details that he or she could have talked about. In this way, the level of detail that could be provided about the target event was modeled. Before moving on to the next card, the child was reminded of the category the previous card had represented.

Next, the child was asked to describe all of the things that had happened on the way to school that morning, as that was something that the researcher did not know about. After the child indicated he or she had finished the free-recall account, the cards were again introduced, one at a time. When the child indicated that there was no more to recall, the researcher gave feedback about other types of information that he or she could have talked about. The session finished with a recap of the things the child had learned during the session.

*CO and VL training procedure.* As for children in the NET training condition, we began the session by instructing children about the importance of completeness and accuracy when talking about something they remember. The child was read the story "The Time It Took Tom" and was asked to recall as much as he or she could. When the child indicated he or she had recalled as much as possible, a series of analogue tasks was introduced to keep the length of the session similar to that of the NET condition. A categorization task involved 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 he or she thought each group was. The child was then asked to tell everything that happened that morning on the way to school. He or she was given a picture of a boy running to catch the school bus to color in, and 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.

*NET condition.* The interview session began with the child being asked to recall the story from the day before. The cue cards were introduced when the child indicated being unable to recall anything further. If the child did

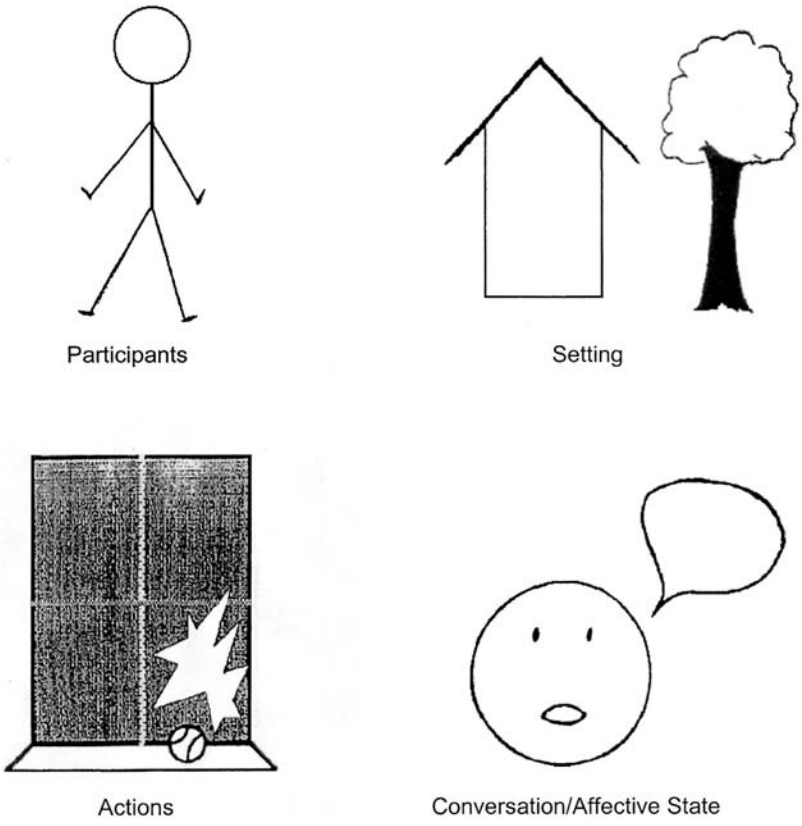


*Figure 1.* Narrative elaboration technique cue cards. From "Narrative Elaboration: Test of a New Procedure for Interviewing Children," by K. J. Saywitz and L. Snyder, 1996, *Journal of Consulting and Clinical Psychology, 3,* p. 20–21. Copyright 1996 by the American Psychological Association. Reprinted with permission of the authors.

not use the cards, he or she was reminded of the purpose and category of each one and was encouraged to use it to tell more about the story. When all of the cards had been presented and the child had finished recalling the story, he or she was reminded of what had been learned the day before.

Children were then prompted to recall the staged event with a general question: "I heard that a couple of weeks ago a lady and her helpers came to visit your class at school to talk about safety. Tell me all about that." The children were prompted with nondirective 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, 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 and her helpers came to talk to you about safety?" When the children had indicated they had told all they could, they were thanked and given a novelty pencil for their participation.

*CO condition.* The children in the CO condition began the session by recalling the story from the day before and were then reminded about the importance of being complete and accurate, without guessing or making anything up. The interview then proceeded as for the NET condition.

*VL condition.* The procedure for the children in the VL condition was the same as for children in the CO condition until prompted recall. During this phase of the interview, children were not presented with the cards but rather were verbally prompted for each category that the cards represented. For example, "Tell me more about the people who were there and how they looked."

### Coding

All interviews were transcribed verbatim for coding, which was based on Brown and Pipe (in press). 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). Each transcript was coded separately by two independent coders. Interrater agreement, calculated as [agreements / (agreements + disagreements)] × 100, was 89%, and any differences between coders were resolved through discussion.

In the second phase, information was first coded as either repeated (in which case no further coding was conducted) or new information, that is, information not already reported in the interview. New information was coded as from one of five categories: who was there and how the people looked (participants), where it was and how the place looked (setting), what happened and what the people did (action), what the people said and how they felt (conversation/affect), or extraneous information (e.g., clearly off task, describing the purpose of the cards, or not containing any specific information); interrater agreement was 89%. Information in each category was then coded as correct, incorrect, or unable to be verified (interrater agreement was 94%).

Finally, information was coded according to the stage of interview in which it was reported. Information provided from the first general prompt until the introduction of the cards was considered free recall, and information provided following prompting (with either the cue cards or verbal prompting) was considered prompted recall. Interrater agreement for coding information for the stage of the interview was 100%.

## Results

To examine whether the NET training and cue cards and the verbal prompts enhanced children's reports of the target event, we compared measures of the number of correct and incorrect units of information reported and the accuracy of the information reported across interview conditions. An alpha level of .05 was used for all analyses unless otherwise stated. Because of the large standard deviations, analyses were also conducted on logarithm-transformed data. The results of these analyses were very similar to those based on the raw data, and analyses reported are therefore based on the raw data.

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, $F(1, 65) = 5.48$, $\eta^2 = .08$. Children from School 1 reported more correct information across the entire interview than children from School 2 ($M = 46.80$, $SD = 23.71$, vs. $M = 33.52$, $SD = 21.67$). Children in each school were randomly assigned to interview conditions, and there were no significant School × Interview Condition interactions for correct or incorrect information reported. There were no main effects of gender or any significant Gender × Interview condition interactions for correct or incorrect information reported. Data were therefore collapsed across school and gender for further analyses.

### Amount of Correct Information Reported

To examine both the amount and the nature of the information that children reported and whether the training and instructions given prior to interview led children to report different kinds of information, we compared the amount of information reported from each of the four categories represented by the cue cards in free and cued recall (combined) across interview conditions. Numbers of correct units of information reported about each category were entered into a multivariate analysis of variance (MANOVA) with interview condition as the between-subjects factor. There was a significant overall effect of condition, $F(4, 8) = 2.44$, $\eta^2 = .13$ (Figure 2). Follow-up analyses examined, first, the total amount of information recalled; second, recall in free- and prompted-recall phases; and third, the categories of information recalled.

For total amount recalled (collapsed across categories and for free and prompted recall combined) a one-way ANOVA revealed a significant main effect of interview condition, $F(1, 64) = 3.40$, $\eta^2 = .30$. Planned comparisons revealed that children in the VL condition ($M = 47.1$, $SD = 26.0$) reported significantly more correct information than children in the CO condition ($M = 29.7$, $SD = 13.9$), although the difference between children in the NET ($M = 39.0$, $SD = 25.5$) and CO conditions ($M = 29.7$, $SD = 13.9$) did not reach significance ($p < .15$). Children in the NET and VL conditions did not differ.

We also examined the nature of information reported in free recall and prompted recall separately, reasoning as follows. If training is important in enhancing recall, we might expect to see more information reported by children in the NET condition than children in the CO or VL conditions during free recall. If the structure provided by prompting for further information is important, we would expect the children in both the NET and VL conditions to report more than children in the CO condition during prompted but not free recall. The MANOVA on category of information revealed no effect of interview condition for free recall ($\eta^2 = .05$). For prompted recall, the MANOVA revealed a significant overall effect of interview condition, $F(8, 124) = 3.09$, $p < .01$, $\eta^2 = .14$. Follow-up univariate analyses examined, first, total information reported, collapsed across categories, and, second, separate categories. For total amount recalled in prompted recall, the main effect of interview condition was significant, $F(2, 64) = 10.43$, $p < .01$, $\eta^2 = .24$. Planned comparisons revealed that

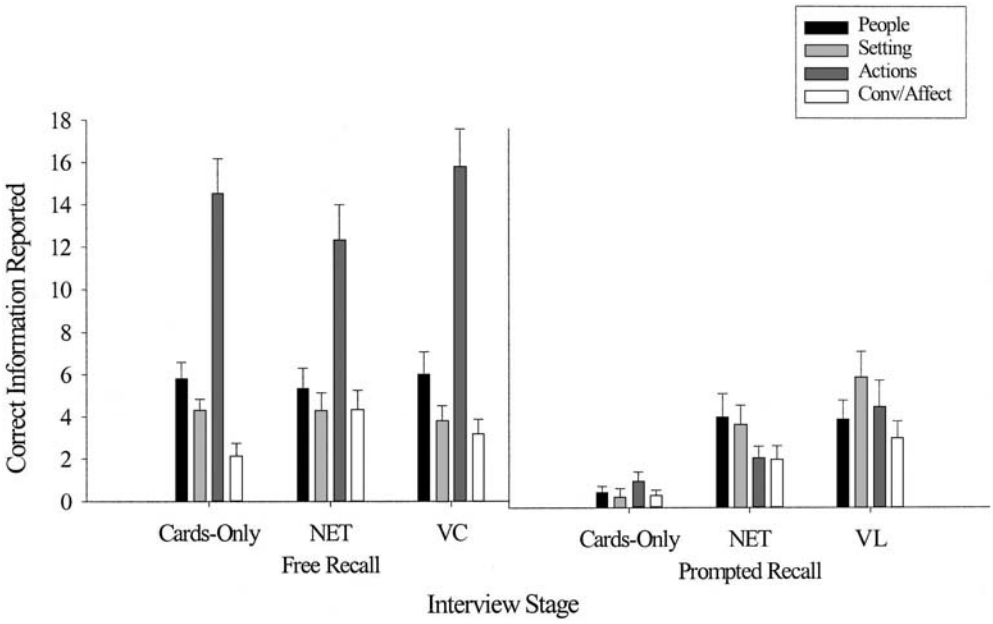


*Figure 2.* Number of correct items of information reported in each category in free and prompted recall in narrative elaboration technique (NET), verbal labels (VL), and cards-only interviews. Conv = conversation.

children in both the NET ($M$ = 12.8, $SD$ = 12.3) and VL conditions ($M$ = 18.4, $SD$ = 14.7) reported significantly more correct information following the introduction of cues (cards or verbal) than children in the CO condition ($M$ = 3.0, $SD$ = 5.6) but did not differ from each other. Children in the CO condition reported little new information during prompted recall, indicating that the cards without prior training were not effective.

Univariate analyses for each category of information in prompted recall revealed a significant main effect of interview condition for correct information reported about the people, $F(2, 64) = 6.08$, $p < .01$, $\eta^2 = .16$; about the setting, $F(2, 64) = 9.57$, $p < .01$, $\eta^2 = .23$; and about actions, $F(2, 64) = 4.83$, $\eta^2 = .13$; and for information about conversation and affect, $F(2, 64) = 5.05$, $p < .01$, $\eta^2 = .14$. Planned comparisons indicated that children from both the NET and VL conditions reported more correct information about the people, setting, and conversation/affect than children from the CO condition but did not differ from each other (see Figure 2). Children in the VL condition reported more information about actions than children in the CO condition but did not differ from children in the NET condition (Figure 2).

In summary, the introduction of cues, whether cards in the NET condition or verbal cues, led to more complete reports. We next examined whether this increase in completeness was accompanied by an increase in errors, leading to decreased accuracy.

### *Errors and Accuracy*

Numbers of errors reported in each category were entered into a MANOVA with interview condition as a between-subjects factor (Table 1). Numbers of errors were low, and there was no overall effect of condition ($\eta^2 = .03$). Total numbers of errors (collapsed across categories) reported during free and prompted recall were examined separately. There was no effect of interview condition for either free ($\eta^2 = .01$) or prompted recall ($\eta^2 = .05$). For free recall, the MANOVA on errors reported about each category of information revealed no effect of interview condition ($\eta^2 = .03$). For prompted recall, the MANOVA revealed a significant effect of interview condition, $F(8, 124) = 2.25$, $\eta^2 = .13$. Univariate analyses revealed a significant effect of interview condition for errors about actions, $F(2, 64) = 4.81$, $\eta^2 = .13$. Planned comparisons revealed that children in the CO condition reported significantly more incorrect information about actions than did children in the NET condition, although the difference between children in the CO and VL condition and between children in the NET and VL conditions did not reach significance ($p < .09$; Table 1). It should

Table 1
*Mean (SE) Number of Errors Reported by Children During Free and Prompted Recall*

| | Treatment condition | | |
|---|---|---|---|
| Type of information | Cards only | NET | VL |
| Free recall | | | |
| People | 0.78 (0.26) | 0.68 (0.28) | 0.59 (0.29) |
| Setting | 0.30 (0.12) | 0.50 (0.18) | 0.32 (0.19) |
| Actions | 1.65 (0.35) | 0.95 (0.21) | 1.59 (0.67) |
| Conversation/affect | 0.65 (0.34) | 0.32 (0.15) | 0.36 (0.20) |
| Prompted recall | | | |
| People | 0.35 (0.13) | 0.95 (0.49) | 1.41 (0.46) |
| Setting | 0.39 (0.22) | 0.05 (0.05) | 0.55 (0.18) |
| Actions | $2.35\ (0.23)_a$ | $0.14\ (0.10)_b$ | 0.77 (0.34) |
| Conversation/affect | 0.52 (0.23) | 0.23 (0.13) | 0.45 (0.36) |
| Total errors | 7.00 (1.59) | 3.82 (0.73) | 6.05 (1.49) |

*Note.* Row means with different subscripts differ significantly ($p < .01$). NET = narrative elaboration technique; VL = verbal labels.

be noted that action-related errors largely related to the cue card itself (i.e., describing information relating to playing with balls near windows), which was likely due to the semantic overlap between the theme of the event and the picture used to prompt for actions. Children who received training in how to use the cards did not incorrectly attribute the scene represented by the cue card to the event, nor did children from the VL condition (who never saw the card) incorrectly describe information relating to playing near windows as part of the event. There were no effects of interview condition for incorrect information reported about people, setting, or conversation/affect.

Accuracy was calculated as the proportion of correct information [correct/(correct + incorrect)] reported about each category (Table 2). The MANOVA on proportion correct revealed a significant effect of interview condition on the accuracy of information reported, $F(4, 108) = 12.39$, $p < .01$, $\eta^2 = .32$. Accuracy across all categories of information (total accuracy) was submitted to a one-way ANOVA; the effect of interview condition was not significant ($\eta^2 = .05$). Separate MANOVAs for free and prompted recall revealed a significant effect of interview condition for information reported during prompted recall, $F(8, 38) = 4.06$, $p < .01$, $\eta^2 = .52$, but not during free recall ($\eta^2 = .05$). Follow-up univariate analyses or prompted recall followed by planned comparisons showed that for setting information, children in the NET condition were more accurate than those in either the CO or VL conditions (Table 2). Further, children in the VL condition were more accurate than children in the CO condition, $F(2, 21) = 21.99$, $p < .01$ (Table 2). For actions, children in the NET and VL conditions were more accurate than children in the CO condition but did not differ from each other, $F(2, 21) = 6.28$, $p < .01$ (Table 2). Accuracy for each category in general was much lower for children from the CO condition, suggesting that without training, any information generated in response to the cards may be unreliable. It is important to note, however, that there was very little new information reported by the children during prompted recall, and the lower level of accuracy of the information that was reported is not indicative of a high level of erroneous information per se.

Table 2
*Mean (SE) Proportions of Items Recalled Correctly (Accuracy)*

| | Treatment condition | | |
|---|---|---|---|
| Type of information | Cards only | NET | VL |
| Free recall | | | |
| People | .90 (.03) | .93 (.03) | .95 (.02) |
| Setting | .95 (.02) | .86 (.06) | .95 (.03) |
| Actions | .89 (.03) | .88 (.05) | .91 (.03) |
| Conversation/affect | .73 (.10) | .93 (.04) | .94 (.03) |
| Prompted recall | | | |
| People | .55 (.15) | .87 (.05) | .75 (.08) |
| Setting | $.34\ (.21)_a$ | $1.00\ (.05)_b$ | $.93\ (.02)_c$ |
| Actions | $.36\ (.10)_a$ | $.92\ (.07)_b$ | $.92\ (.03)_b$ |
| Conversation/affect | .42 (.15) | .94 (.03) | .91 (.05) |
| Overall accuracy | .82 (.03) | .87 (.04) | .91 (.01) |

*Note.* Row means with different subscripts differ significantly ($p < .01$). NET = narrative elaboration technique; VL = verbal labels.

### *Age*

Pearson's product–moment correlations conducted between age and the total number of correct units of information, the total number of incorrect units of information, and the total accuracy of information reported indicated there were no significant correlations (all $r_{xy} < .23$).

### *Individual Differences*

To explore the contributions of individual-differences measures to children's recall, we conducted forced-entry regression analyses on total amount of correct information reported, total numbers of errors, and the measure of overall accuracy [total correct/(total correct + total incorrect)], using interview condition and measures of intelligence (deviation quotient), metamemory, narrative ability, and SES as independent variables. The correlation matrix for this analysis is presented in Table 3. One participant from the CO condition was excluded from the individual-difference analyses because English was not his native language.

Initially, the regression analyses were conducted across the three interview conditions. The only significant predictor of correct and incorrect information and accuracy was interview condition. None of the individual-difference measures accounted for additional variance in any dependent variable when the groups were considered together. Prior research has shown that the effects of individual-difference factors may be mediated by the way in which children are interviewed (Salmon et al., in press). We therefore conducted the analyses separately for each interview condition to examine whether the contribution of individual-difference factors was mediated by the interview context.

*Correct recall.* For children in the CO condition, intelligence was the only variable that significantly predicted the amount of correct information reported, accounting for 20% of the variance ($\beta = .45$, $p < .05$). For children in the NET and VL conditions, none of the variables predicted correct recall.

*Incorrect recall.* For children in the CO condition, intelligence was, again, the only variable that significantly predicted the amount of incorrect information reported, accounting for 22% of the variance ($\beta = .46$, $p < .05$). For children in the NET and VL conditions, none of the variables predicted incorrect recall.

*Accuracy.* For children in the CO and VL conditions, none of the variables significantly predicted accuracy of recall. For children in the NET condition, none of the variables predicted accuracy at the .05 level of significance, although metamemory approached significance, accounting for 17% of the variance ($\beta = .40$, $p = .06$).

### *Subgroup Analyses*

To explore the direction of the effects of intelligence on correct and incorrect recall more thoroughly, we formed two subgroups within each condition on the basis of intelligence measures, using the mean deviation quotient of 100. Figure 3 shows the mean number of correct items of information reported by children as a function of intelligence group and interview condition. One-way ANOVAs with intelligence group as the between-subjects factor were conducted separately for each interview condition on mean numbers of correct and incorrect items of information reported.

Table 3
*Pearson Product–Moment Correlation Matrix for Correct Information Reported and Individual-Difference Measures*

| Individual-difference measure | Treatment condition | | | |
|---|---|---|---|---|
| | Cards only | NET | VL | Total (collapsed across condition) |
| IQ | .45* | .09 | .01 | .13 |
| Picture completion | .52* | .18 | .37 | .28* |
| Information | .51* | −.06 | −.17 | .01 |
| Similarities | .29 | .19 | −.29 | .01 |
| Block design | .18 | −.03 | .39 | .17 |
| Vocabulary | .57** | .10 | −.09 | .13 |
| Narrative ability | .35 | .19 | .03 | .18 |
| Metamemory | .10 | .29 | −.11 | −.11 |
| Socioeconomic status | −.31 | .19 | −.22 | −.04 |

*Note.* NET = narrative elaboration technique; VL = verbal labels.
* $p < .05$. ** $p < .01$.

*Correct information.* In the CO condition, children from the low-IQ group reported less correct information than children from the high-IQ group, $F(1, 20) = 12.21$, $p < .01$, $\eta^2 = .34$. High- and low-IQ groups did not differ for children in the NET and VL conditions. The effects of intelligence on the amount of information children were able to report were, therefore, attenuated by the interview context.

The cutoff point used to define the subgroups of children as either "low IQ" or "high IQ" was based on the mean score of 100. However, average intelligence is defined by the WISC–III scale as being represented by scores of 90–109, and so children included in the "low IQ" group may not actually have been of low intelligence according to this definition. New subgroups were therefore formed, using 90 as the cutoff score for the high-IQ group. With this criterion, for children in the CO condition, the difference in amount recalled only approached significance, $F(1, 20) = 3.77$, $p = .06$, with children from the low-IQ group reporting less than children from the high-IQ group. There were no main effects of IQ group for children in the NET and VL conditions.

*Subtests of the WISC–III.* Examination of the correlation matrix for performance on subtests of the WISC–III and correct recall revealed that three of the five subtests (Vocabulary, Picture Completion, and Information) were independently correlated with total recall. A stepwise regression analysis was conducted on total amount of correct information reported, with performance on individual subtests of the WISC–III as independent variables. The analyses were conducted separately for each interview condition. For children in the CO condition, Vocabulary significantly predicted correct recall, accounting for 32% of the variance ($p < .01$). No other subtest entered the regression as a unique predictor over

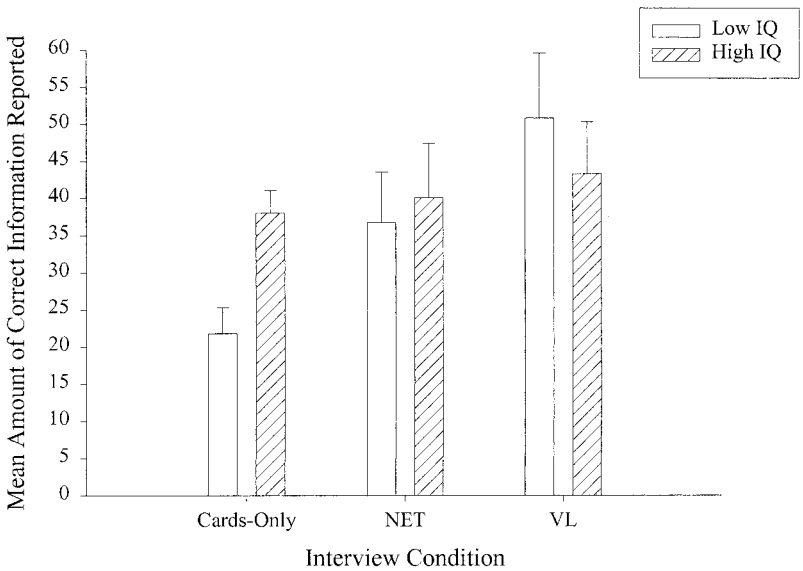


*Figure 3.* Number of correct items of information reported by children from each interview condition (narrative elaboration technique [NET], verbal labels [VL], or cards only) for low (0–100) and high (101–150) IQ children.

and above the variance that was accounted for by Vocabulary. As with intelligence, subgroups of children were formed within each condition, on the basis of their scores on the Vocabulary subtest. The mean score of 10 was used to form two groups with low and high Vocabulary scores. In the CO condition, children with low scores reported less information than children with high scores, $F(1, 20) = 11.05$, $p < .01$, $\eta^2 = .36$. For children in the NET and VL interview conditions, there were no significant differences in amount recalled, as a function of Vocabulary scores. The result paralleled that for IQ—that is, without intervention, children with lower vocabulary scores reported less information, but in a supportive interview context there was no difference in the amount reported by children with low and high scores. For children in the NET and VL conditions, none of the subtests significantly predicted recall.

To examine whether verbal skills (as indicated by Vocabulary score) or intelligence (deviation quotient) was more predictive of recall, we analyzed the difference between the correlation coefficients using Cohen's (1988) effect size *q*. The difference between the coefficients yielded $q = .20$, which is indicative of a small effect size. Thus, it is not possible to conclude that verbal skill is more predictive than IQ per se when considering correct recall.

For incorrect information, the ANOVAs failed to reveal a difference as a function of intelligence for children in any interview condition. This was presumably because overall amounts of incorrect information were low, making it difficult to detect differences in amount reported by each group. No subgroup analyses were performed for accuracy of information reported, as no variables emerged as significant predictors from the regression analyses.

## Discussion

The current study examined two issues. First, we compared the recall of children who received Saywitz and Snyder's (1996) NET package, including cue cards to prompt four forensically relevant categories of information, with that of children who were provided with a structure for recall by verbal cues relating to the same categories. Contrary to our expectations, the children who received verbal labels recalled as much information as children who received the NET training and cue cards during interview and significantly more than children interviewed in the cards-only condition. The positive effects of the NET cue cards replicate previous studies (Brown & Pipe, in press; Camparo et al., 2001; Dorado & Saywitz, 2001; Saywitz & Snyder, 1996; Saywitz et al., 1996) and attest to the reliability of NET as a means of enhancing recall. However, providing verbal prompts for the same categories of information, even without any training in how to talk about the past, was just as effective. Importantly, the increased level of detail reported by children interviewed following NET training and with verbal cues did not come at the cost of decreased accuracy. To the contrary, children interviewed with the verbal cues were more accurate when reporting actions from the event, and children who had the NET were more accurate when reporting information about conversation/affect, compared with children interviewed with the cards but without training.

In addition to reporting more information, children in the NET and verbal labels conditions differed in the content of their reports of the event compared with children interviewed without either form of support. Previous studies using the NET have demonstrated increased levels of detail reported by children about participants (Brown & Pipe, in press; Saywitz & Snyder, 1996; Saywitz et al., 1996) and the setting of the event (Brown & Pipe, in press). The current study demonstrated that training with the NET can also enhance children's ability to report information about conversations and emotions that were part of the experience, an effect also found with verbal labels as cues. The specific effects of NET training are, however, likely to depend on the event content. The increased level of detail reported by children interviewed with verbal cues indicates that simply asking children to talk about different categories of information can help them to provide information that they may not otherwise include in their reports. Providing the categories of information, either through verbal prompting or training with the cue cards, potentially gives children a structure for their reports and conveys information about what it is important to talk about.

We had expected that children who received both training and prompting from the NET protocol would show the highest level of recall. With laboratory-based memory tasks, research has shown that although children can demonstrate appropriate use of a newly learned strategy during training, they often fail to generalize this training to a new task (Borkowski, Milstead, & Hale, 1988; Kurtz & Borkowski, 1984). Pressley, Forrest-Pressley, and Elliott-Faust (1985) advocated practice sessions over different sessions, settings, and tasks to facilitate generalization of strategy use and to ensure that the child does not view the strategy as being linked to a particular task or situation. It is possible that some children in the present study had difficulty transferring what they had learned during the NET training session to talking about the staged event. All of the children were able to use the cards to provide more information about the story that was used as a stimulus during training. However, some children did not use the cards to talk about the event at all in the event interview. It is possible, for example, that presenting the cards following training, but with their verbal labels to facilitate the transfer of learning, might prime children to use what they have learned during the training session and lead to even greater enhancements in recall.

From an applied perspective, that verbal cues without prior training were effective is very promising. The benefits of the verbal prompts may be derived from the provision of a structure for children to use when talking about a past event. Many studies have demonstrated the benefits of providing an external structure for children's recall in the form of cues, props, and specific questioning (Dent & Stephenson, 1979; Gee, Gregory, & Pipe, 1999; Goodman & Aman, 1990; Price & Goodman, 1990; Priestley & Pipe, 1997; Salmon, Bidrose, & Pipe, 1995; Smith, Ratner, & Hobart, 1987). Previous studies have also demonstrated increased recall from children following general open-ended prompting (Elischberger & Roebers, 2001; Poole & Lindsay, 1995) and open-ended invitations based on information already reported (Orbach et al., 2000; Sternberg, Lamb, Orbach, Esplin, & Mitchell, 2001). The results of the present study add further support to the value of general open-ended prompts in facilitating children's recall. An increase in correct information reported as the result of the introduction of such simple and general prompts suggests that providing a structure for children's recall at the time of interview can be extremely beneficial. The advantage of such prompts is that they can be implemented at very little cost in terms of training, preparation, or extending the length of the interview.

One concern often expressed about prompting children for further information, however, is that it exacerbates the risk that children will provide unreliable information (for a review, see Ceci & Bruck, 1993). Camparo et al. (2001) investigated whether narrative elaboration training and interview techniques would increase the likelihood of children providing an account of a fictitious event. They found that some children did attempt to provide a description during prompted recall or specific questioning after their initial denials of the event were ignored. However, children trained and interviewed with the NET were not more likely to talk about the fictitious event than children interviewed with a standard interview format. Their study highlights the importance of caution in proceeding with prompts to enhance children's recall, especially if the child has repeatedly asserted that he or she has no knowledge of the event.

A second question examined in the present study was the role of specific individual differences in explaining variability in children's performance following the use of the NET and predictions as to whether they would be likely to benefit from it. Over all interview conditions there was no relation between any of the measures and children's recall. IQ was associated with recall when children were interviewed without training or structure (cards only), but there was no association in either the NET or verbal labels condition. Further, whereas high- and low-IQ subgroups in the cards-only condition differed in the amount recalled, this was not the case for the NET or verbal labels interview condition. Providing a facilitative interview context therefore eliminated the contribution of IQ to the amount of information reported. That is, lower IQ children benefited from a supportive interview context, either through training and interviewing with the NET or when a structure for recall was provided via verbal prompting. The significant relationship demonstrated between IQ and recall for children in the cards-only condition is consistent with past studies of intelligence and recall (e.g., Elischberger & Roebers, 2001; Geddie et al., 2000; Gordon et al., 1993), although Elischberger and Roebers (2001) found that the effects of IQ were not mediated by providing verbal prompting for further information, as found in the present study. The association between IQ and recall may be due to children of lower IQ generating fewer internal retrieval cues when interviewed without external support.

The NET interview and the verbal labels in the interview appeared to be especially effective for children of lower IQ. That is, for higher IQ children, those who received NET training or verbal labels in the interview did not differ in amount recalled compared with children in the cards-only condition. For the low-IQ group, however, following the NET training or verbal labels in the interview, children reported much more information compared with children in the cards-only condition. The finding that performance on a measure of vocabulary provides the same pattern of results as a measure of intelligence suggests that verbal or language skills may make an important contribution to children's ability to talk about a past event.

Children's vocabulary scores from the WISC–III were significantly related to their event recall, but their performance on the narrative ability task was not, suggesting that verbal or language skills, like memory, may be made up of domain-specific abilities rather than a set of general abilities. Several studies have reported a positive relationship between varbal ability and recall (Gordon et al., 1993; Salmon et al., in press; but see also Greenhoot et al., 1999). In contrast, in the present study, children's narrative ability, as assessed by their descriptions of the picture stimuli, was not. Kleinknecht (2001) found that children's narrative skill predicted event memory to the extent that the level of narrative structure imposed onto reports of an experienced event predicted reports of that event, although general narrative skill did not. Our measure of narrative ability was potentially an index of general narrative ability, and, as such, our findings are consistent with Kleinknecht (2001).

None of the other individual measures we examined were significantly related to children's recall for the sample as a whole or for each condition. Previous research has found a significant relation between SES and children's recall (cf. Geddie et al., 2000), and that we did not also find such a relation may reflect the restricted range of SES scores for the sample of children in the present study. This might reflect, in turn, both the sample and the index we used. An index with a larger range of scores (e.g., the Hollingshead Four Factor Index) might be more sensitive. Further, although past research has demonstrated a relationship between metamemory and memory in children, these studies have used metamemory and memory tasks that are very different from those in the present study. In particular, although metamemory has been consistently associated with memory performance for item recall, the association with event memory may be less robust (but see Geddie et al., 2000). It is also possible, however, that at least for event recall, metamemory may be less important for older children, as in the present study (for a review, see Schneider, 1999).

Of particular significance to the aims of our study, none of the individual-difference measures significantly explained variability in recall for children in the NET or verbal label conditions, and even within the cards-only condition, a large proportion of the variance was not explained by the regression analyses (approximately 80%). Several researchers have commented on the potential importance of social and motivational factors as well as those relating to personality and temperament in understanding children's recall (Greenhoot et al., 1999; Roebers & Schneider, 2001; Salmon et al., in press). Research that incorporates a fuller understanding of the characteristics of the child that may interact with the situational context and impact on recall is clearly a next step (Paris, 1988; Roebers & Schneider, 2001; Saywitz, 2001).

Our conclusions must, of course, be considered within the constraints of the present study. As already noted, the individual measures selected may not have been sensitive to the processes we predicted might contribute to children's ability to recount the event or benefit from NET training. Moreover, our conclusions regarding the effects of verbal labels in structuring and enhancing children's recall as effectively as the NET are limited to the specific age group of children in the present study. It is unclear whether these findings would extend to younger children who might benefit from the opportunity to practice, as well as from more concrete retrieval cues.

The above limitations notwithstanding, from an applied perspective the present findings provide support for both the NET and the use of verbal prompting about categories of information as techniques that may help children to provide more complete accounts of a past event, without compromising the accuracy of their reports. It is possible that whereas some children may benefit from the instruction and practice provided in the training session of the NET, other children may simply require verbal prompting for

further information. In the absence of information to help specifically predict which children will benefit from which aspects of these techniques, using an interview strategy that includes both of these elements increases the likelihood that something will be effective for everyone (Pressley et al., 1985). Where time is limited, however, the success of the verbal labels provided during the interview indicates that a training session is not necessarily needed, and introducing general prompts for categories of information can lead to increased recall without a concomitant increase in errors.

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Received November 28, 2001
Revision received April 16, 2002
Accepted April 18, 2002 ■