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Using Spaced Learning Principles to Translate Knowledge into Behavior: Evidence from Investigative Interviews of Alleged Child Abuse Victims

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HOW MUCH TRAINING DO INVESTIGATIVE INTERVIEWERS NEED TO FOLLOW

EVIDENCE-BASED PRACTICE IN INTERVIEWING CHILDREN?

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Abstract

The present study assessed the progress of 13 investigative interviewers (child protection workers and police officers) before, during, and after an intensive training program (n = 132 interviews). Training began with a 2-day workshop covering the principles of child development and child-friendly interviewing. Interviewers then submitted interviews on a bi-weekly basis to which they received written and verbal feedback over an 8-month period. A refresher session took place two months into training. Interestingly, improvements were observed only after the refresher session. Interviews conducted post-refresher training contained proportionally more open-ended questions, more child details in response to open-ended questions, and proportionally fewer closed questions than interviews conducted prior to training and in the first half of the training program. The need for 'spaced learning' may underlie why so many training programs have had little effect on practice.

How much training do investigative interviewers need to follow evidence-based practice in interviewing children?

Despite widespread acceptance of international guidelines on how to interview child victims and witnesses of abuse, the majority of training programs result in few differences in interviewing practices before and after training (e.g., Lamb, Sternberg, Orbach, Hershkowitz, Horowitz, & Esplin, 2002; Warren, et al.,1999). While training programs are effective in improving interviewers' knowledge of child development and the recommended techniques (e.g., a reliance on open-ended questions such as *tell me what happened*, allowing the child to lead the interview), actual practice does not mirror such knowledge (Warren et al., 1999). Typically, investigative interviews are characterised by a reliance on closed questions that elicit one-word responses from children (e.g., *Did he have his clothes on? What is his name?*), rather than open-ended questions that encourage narrative responses from children (Gilstrap, 2004; Lamb & Fauchier, 2001).

It is well-established in educational fields that concentrated instruction that takes place in a short period of time may have little effect on long-term retention (e.g., Bellezza & Young, 1989; Braun & Rubin, 1998; Challis, 1993). Students who 'cram' might do well on an exam that takes place shortly after the cramming session, but retain little of the information over long periods of time (Santrock & Halonen, 2002). A more effective studying technique is to 'space' learning so that material is reviewed at regular intervals. Such reminding of material after some forgetting can boost memory for the material and lead to long-term retention. (e.g., Roberts et al 1999; Price, Connolly, & Gordon, 2006; Read & Connolly, 2007). One possibility, then, for why investigative interviewers frequently fail to incorporate what they have learned into interviewing practice may be that the principles of learning have not been considered in investigative

interviewing training programs. Rather, training tends to be concentrated into a few days or a couple of weeks with no formal follow-up (e.g., Aldridge & Cameron, 1999; Warren et al., 1999). In this study, we tracked progress in interview quality of thirteen investigative interviewers over a period of seven months. The principles of spaced learning were incorporated into the training program and interviews were evaluated in each 2-month block. Thus, it was possible to track when evidence-based interviewing techniques were incorporated into child interviews.

Characteristics of investigative interviews of children

Child witnesses are often required, by law, to describe the alleged abuse in great detail. While once considered unreliable because of immature memory or language abilities, and susceptibility to suggestion (Bala, 1999), contemporary research shows that children are capable of providing accurate information about their experiences (see Bruck & Ceci, 1999; Lamb, Hershkowitz, Orbach, & Esplin, 2008). Importantly, children are able to describe actions, people, conversations, and other forensically-relevant details when they are given adequate opportunity to do so, that is, when they are invited using open-ended questions (e.g., *Tell me what happened, And then what happened?*; e.g., Orbach & Lamb, 2001). Even children as young as 3 or 4 can describe details of what happened in response to such questions (Goodman & Reed, 1986; Marin, Holmes, Guth, & Kovac, 1979). Responses elicited with open-ended questions are also more likely to provide an accurate representation of the event(s) in contrast to closed questions (e.g., Dent & Stephenson, 1979; Orbach & Lamb, 2001). Thus, children's ability to convey information is affected not only by the qualities of their memories, but also by the types of retrieval mechanisms employed and the quality of the communication between them and their interviewers (Bala, 1999). It is critical, then, that investigative interviewers use open-ended

questions when questioning children and that training programs are optimized to facilitate the transition from closed to open-ended interviewing.

In many cases, applying child-friendly techniques like open-ended questioning has proven difficult to implement in the field, even when interviewers understand the necessity of interviewing in a manner that does not impair children's ability or willingness to accurately report their experiences (Warren et al., 1999). As another example, research by Cederborg and colleagues examined the quantity and quality of information provided by children in investigative interviews when interviewers relied on their own interviewing strategies (Cederborg, Orbach, Sternberg, & Lamb, 2000). Overall, 57% of the details reported by children were elicited by option-posing questions (e.g., utterances that focused the child's attention on details of the alleged incident that the child had not previously mentioned, asking the child to affirm, negate, or select an investigator-given option) and suggestive utterances (e.g., utterances that are communicated in a way that indicates the expected response; *"He forced you to do that, didn't he?"*). A mere 8% of the information obtained from child interviewees was elicited by open-ended invitations. Interviewers' reliance on option-posing and suggestive prompts reduces the completeness and, possibly, the accuracy of information obtained from children, potentially contaminating reports to such an extent that they may be inadmissible in a court of law.

Research on the effectiveness of investigative interview training courses.

The development of training programs on empirically-based recommendations was in response to the discrepancy between the clear benefit of particular questioning techniques and practice in the field. The reasoning behind many training programs is that by providing knowledge to interviewers about recommended interviewing practices will results in interviewers who are able to conduct higher quality interviewers. Despite clear evidence of the need to focus

on open-ended questions, this seemingly simple recommendation is not often followed by forensic interviewers in the field. Findings from several studies (e.g., Cederborg et al., 2000; Davies, Westcott, & Horan, 2000; Lamb, Sternberg, & Esplin, 2000; Walker & Warren, 1995) make it clear that interviewers often tend to pose closed, rather than open questions.

The literature assessing investigative interviewer performance is sparse, and that which does exists reveals that training does not always lead to change. Aldridge and Cameron (1999) compared the investigative interviewing skills over a 9-month period of British police officers and social workers who had undertaken a training course with a control group who did not receive training. Interviewers participated in an intensive research-derived training course that lasted one week, and focused on relevant matters of law, memory processes, and developmental psychology (including children's cognitive, language, and memory abilities). Interviews were video-taped and analyzed by a series of rating scales which determined the number of invitations and open-ended questions and closed questions.   No differences were found between performance of trained and untrained interviewers. In fact, closed questions and leading questions (e.g., questions that typically elicit unreliable information) were found to occupy over half the total number of questions used by both sets of interviewers. The lack of improvement indicates that the frequently adopted model of short intensive training of investigators may not be effective. Aldridge and Cameron's results are echoed by those of Warren and colleagues who analysed the pre- and post-training interviews of a group of U.S. interviewers (Warren et al., 1999). The content of the course was similar to that in Aldridge and Cameron's study, however, the course extended into a second week in which interviewers were taught interview strategies and were provided feedback on their baseline interviews. While Warren and colleagues found

that interviewer knowledge about interview content increased following the training course, overall, interview behaviour did not change.

A substantial amount of research over the last decade has focused on training courses that highlight the importance of extensive interviewer training, feedback, and use of the National Institute of Child Health and Development (NICHD) protocol in interviewing children (see Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007 for a review of the protocol and findings). The NICHD protocol was developed partly because of the poor uptake of open-ended interviewing (Orbach, Hershkowitz, Lamb, Esplin, & Horowitz, 2000). In brief, the NICHD protocol provides a template for all phases of the investigative interview. It incorporates open-ended questioning and is flexibly structured, emphasizing developmentally appropriate questioning without relying on suggestive questions and interviewing aids, thus enhancing open-ended retrieval during the interview. Interviewers trained in its use adhered to recommended practices (e.g., avoid leading and suggestive questioning) more so than interviewers who were not trained (e.g., Orbach, et al., 2000). Additionally, interviewers who rely on the protocol elicit more information using open-ended questions, conduct more organized interviews, and are more likely to follow closed questions with open-ended probes than interviewers who questioned alleged victims of the same age, without use of the protocol (Orbach, et al., 2000; Sternberg, Lamb, Orbach, Esplin, & Mitchell, 2001b). Consequently, children interviewed using the NICHD protocol tend to provide more details than do children interviewed without the protocol (Orbach, et al., 2000; Sternberg, et al., 2001).

The training procedure for interviewers using the NICHD protocol (outlined in Orbach, Hershkowitz, Lamb, Sternberg, Esplin, & Horowitz, 2000) begins with a 3-day seminar focused on child development principles as they relate to recommendations for developmentally-

appropriate interviewing. Following training, interviewers partake in monthly group review sessions and discuss transcribed interviews, illustrating both desirable and risky practices. Although not designed to test the use of spaced-learning principles, the encouraging results of these studies are well supported by learning principles. Rather than an intensive training session that is terminated after a relatively short time (e.g., a couple of days), the NICHD program involves continuous informal reminders of the material provided in the first training session.

In summary, it has proven surprisingly difficult to increase the use of open-ended questioning in investigative interviews with short and intensive, one-time courses, even though the interviewers can be highly knowledgeable of the material presented in the courses. Although the NICHD protocol has been very successful, the studies were not designed to specifically test the *time-line* of progress in interview quality, nor the effects of more formal follow-up sessions (in contrast to informal feedback regarding interview quality). According to the principles of spaced learning, formal instruction that takes place a while after previous instruction should have a significant impact on the learning and behaviour of interviewers. Tracking progress at systematic time points will also provide answers to the often asked question of how much training do interviewers need before behaviour modification occurs. Thus, in the current study, we delivered an investigative interviewing training program comprised two 2-day sessions spaced 2 months apart with feedback provided on a continuous basis. We compared interviewer behaviour and children's reports before training with those conducted 2, 4, and 6 months following the first training session. The data provide insight into successful models of investigative interviewing training programs.

Method

Participants

The sample consisted of 13 investigative interviewers who volunteered to participate in a joint agency training program (males n=3; police officers n=2, child protection workers n=11). The relative representation of police and child protection workers was representative of the overall pool from which interviewers were drawn. At the onset of training, both the child protection workers and police each had an average of 2 years experience interviewing children. All investigations conducted by participating child protection workers and police officers were included in the analyses, of which 11% of cases involved allegations of a sexual nature (refer to Table 1). This sample is thus likely to be representative of the range of cases investigated by interviewers questioning children who may have been, or are currently being, harmed, and probably reflects a sample that is broader in range than field studies of sexual abuse alone. The interviewers gave informed consent for the interviews to be used in research.

Sample

Each interviewer submitted between 12-32 interviews to be transcribed and coded. Pre-training (n = 33), post-training (n = 42), post-refresher (n = 33), and termination (n = 24) interviews were compared using Chi square tests of independence to confirm that there were no differences in children's age, gender, frequency of contact with the investigative agency, the relationship between the child and the alleged perpetrator, and the nature of the allegation across phases. No significant differences were found. Please refer to Table 1 for the descriptive information on these comparisons. Note that there may be small decreases in the sample size in individual analyses due to missing or incomplete data.

Procedure

The project was conducted over an 8-month period divided into four phases:

Phase 1: Pre-Training. Interviewers recorded and submitted interviews for transcription and coding in the month prior to commencement of formal training. Training began with two days of introduction to child-development principles and a flexible, but structured interview protocol drawing largely on the well-established NICHD protocol (Orbach, Hershkowitz, Lamb, Esplin, & Horowitz, 2000). Interviewers received considerable practice in developing and using open-ended questioning techniques and pausing (e.g., *Tell me more*; *What happened next?*), while restricting closed questions (e.g., *What was his name?*). Instructional modules included Family Ecology, Cognitive Development, Conceptual Development, and Social Development. Modules were presented with the goal of explaining the underlying motivation for the phases of the introduced protocol. Interviewers were encouraged to include, in each interview:

(i)   Formal *introduction* of the interviewer and his/her role;

(ii)   *Ground rules* (including promise to tell the truth, it's okay to say "I don't know," and correct the interviewer if he/she is wrong);

(iii)   *Practice interview* involving a structured discussion of a non-allegation-related event;

(iv)   Clear *transition* to the substantive phase (where the allegation(s) was/were discussed);

(v)   Clear *closure*.

Phase 2: Post-training. Following training, interviewers submitted interviews weekly for transcription and coding. For each interview, detailed feedback on each phase of the interview was provided in written and graphical form. Interviewers were provided with suggestions of specific strategies/techniques for future interviews. Pie charts were also provided which

depicted the overall usage of each prompt type as well as information about the success pf

specific prompts in eliciting information. Interviewers then engaged in a 20-30 minute telephone

feedback session with one of the trainers. Feedback focused heavily on interview structure and

strategies for improving prompts and interactions for each submitted interview.

Phase 3: Post-Refresher training. Two months following the first training session,

interviewers received an additional two days of training that involved review of the initial

training session and in-class practice with interview scenarios and role playing. Following the

second training session, interviewers again submitted weekly interviews and received both

written and verbal feedback on a weekly to bi-weekly basis for an additional two months.

Phase 4: Termination of training. Interviews were collected for an additional two months

after the last formal training session (i.e., Phase 3). Interviewers again submitted weekly

interviews; however, feedback from the primary investigators lessened and was only given on a

by-request basis. Interviewers were also provided with peer reviews from their colleagues.

Thus, the data in the current study came from the following time line: Month 1 (Pre-training),

Months 2-3 (first formal training session and feedback on interviews for 2 months), Months 4-6

(second formal training session and feedback on interviews for 3 months), and Month 7-8 (no

formal training, feedback provided on a request basis).

Coding

All interviews were coded for (a) adherence to components (i) to (v) outlined above, (b)

the types of interviewer utterances, and (c) the amount of details provided by children.

(a) Adherence to the components of the interview. We recorded whether each phase (e.g.,

Introduction, Ground Rules, Practice Interview) was completed by assigning a '1' when a

phase was present, and a '0' when not. Two trained Research Assistants then coded the

presence or absence of each interview component, and intercoder agreement ranged from 85-90% throughout the study. Discrepancies were resolved through discussion.

(b) Interviewer Utterances. The types of prompts used by the interviewers were coded into several categories (based on Price & Roberts, 2008).

- *Invitation* - Invites child to talk about an event with no cues from the interviewer (e.g., "Tell me more", "What else?");

- *Cued invitation* - Invites child to talk about something that s/he has already mentioned (e.g., "You said you play together. Tell me about playing together");

- *Paraphrase* - Interviewer reflects back something the child has just said (e.g., "You mentioned that you felt sad");

- *Directed narrative* - Directs the child towards a general topic but invites a narrative response (e.g., "Tell me about how things are at home"). Such prompts were present due to interviewers' mandate to explore a set of general topics in children's lives (e.g., "school", "mealtime"). [*Note*: Although some researchers consider this prompt suggestive, we argue that in the present interviews it can be a desirable prompt. When an interviewer's mandate is to explore all aspects of a child's life, s/he must ask a very general question about "home" or "school" to direct the child's attention. In such cases, a directed narrative is preferred to asking closed questions. Such questions are similar to the recommended questions in the NICHD protocol's rapport-building section (Roberts, Lamb, & Sternberg, 2004)];

- *Directed specific* – Directs the child towards a particular topic and invites a brief response (e.g., "What was he wearing?");

- *Option-posing* - Question provides child with two or more options (e.g., "Were you inside or outside?");

- *Yes/No* - Question requires a "yes" or "no" response (e.g., "Did you go home right away?"). These questions were strictly coded such that if the appropriate grammatical response to a question was "yes" or "no", the question was considered a yes/no question (e.g., "Can you tell me more about that?");

- *Suggestive* - When utterance contains information not mentioned by the child; or when interviewer leads child into a particular response (e.g., "You walked away immediately, didn't you?");

- *Facilitator* - Responsive device (e.g., "okay", "hmm hmm"). Although initially coded as an interviewer prompt, child responses to facilitators were subsequently incorporated into the prompt asked immediately prior to the facilitator as in previous research (e.g., Lamb et al., 2002a, 2002b). As a result, facilitators will not be discussed further.

Intercoder agreement for the interviewer utterances was 90% (interim agreement checks throughout the study ranged from 85-94% and were conducted to ensure that coders remained in agreement).

(c) Child Details. These details referred to a word or words that were a complete subject ("I", "you", "she"), object ("ball", "shirt"), preposition ("put on" is one detail), adjective ("white", "hard"), other grammatical structure that provided information (e.g., "my"), or any other information-containing words. Words used only as a speech style (e.g., "like", "umm") were excluded from word counts and duplicate details were not included. Intercoder agreement for the child details was 90% (interim agreement ranged from 89-96%).

Results

(a) Adherence to interview components

Separate Chi-squared tests were conducted for each component of the interview to assess whether their frequency increased over the four time points (see Table 2). Three of the components increased over time: More interviews contained *Ground Rules* , χ^2 *(3, N = 132) =* 10.45*, p < .02*, and a *Transition to the Substantive Phase*, χ^2 (3, N = 132) = 10.29, *p < .02*, in Phase 3 (post-refresher) and Phase 4 (termination) compared to Phase 1 (pre-training) and Phase 2 (post-training); and more interviews contained formal *Closure*, χ^2 (3, N = 132) = 10.44, *p <* .02, at Phases 2, 3, and 4 compared to Phase 1. Interviewers included *Rapport Building* more often at Phases 3 and 4 than at Phase 1 but this did not quite reach significance, χ^2 (3, N = 132) = 6.85, *p* = .08. There was no improvement from Phase 1 to Phase 2 and no significant improvements were made in the proportion of interviews which contained an *Introduction* or *Practice Interview, p > .20.*

Interviewer Utterances

In order to determine whether and when interviewers improved in the quality of prompts employed throughout the 8 months, proportional scores were calculated. First, a sum was calculated of open-ended prompts (i.e., invitations, cued invitations and invitation occurrences) and proportions were calculated for each Time Phase by dividing the number of open-ended prompts by the total number of prompts in that time phase. Proportional scores must be used to control for the overall number of prompts used. Proportional scores were also created separately for directed narrative prompts, and closed questions (i.e., directed specific, yes/no, option-posing, and suggestive). The proportional scores for each type of utterance were then entered separately into a 4(Time Phase:Sept/Oct, Nov/Dec, Jan/Feb, mar/Apr) one-way repeated

measures analysis of variance (ANOVA). Bonferroni tests were used to follow up main effects. The full set of means is displayed in Table 3. As will be seen in the following analyses, there was no improvement in the quality of interviewing between the pre- and first post-training data; improvements occurred only after the refresher training session.

Open-ended prompts. A 4(Time Phase) ANOVA showed a main effect, $F(3, 124) = 7.91$, $p < .001$ (see Table 3). Bonferroni tests showed that the proportion of open-ended prompts used at Time Phase 3 and Time Phase 4 was significantly greater than at Time Phase 1. Additionally, the proportion of open-ended prompts at Time Phase 3 was greater than at Time Phase 2 (Post-training).

Directed narratives. A 4 (Time Phase) ANOVA was significant, $F(3, 124) = 6.86$, $p < .001$. Specifically, the proportion of directed narratives at Time Phase 3 was significantly greater than at Time Phase 1, and significantly greater at Time Phase 3 and Time Phase 4 than Time Phase 1 and Time Phase 2.

Closed-ended prompts. A 4 (Time Phase) ANOVA indicated, as expected, interviewer use of undesirable closed questions decreased over the course of the program, $F (3,124) = 5.32$, $p = .002$. Specifically, the proportion of closed questions at Time Phase 4 was significantly lower than at Time Phase 1 and Time Phase 2.

Paraphrases. Finally, there was no change in the proportion of paraphrases used by interviewers at any point in training, $F(3, 124) = 0.82$, $p > .05$.

Facilitators. Responses after facilitative devices (e.g., Mmm-hmm) were included with the previous prompt, however, a 4(Time Phase) ANOVA on these data showed an increase in facilitators from Time Phase 2 to Time Phase 4, $F(3, 124) = 4.10$, $p < .01$. This probably reflects the improved listening skills of the interviewers.

Child Details

The final set of analyses were conducted to see whether there was any increase in the amount and quality of information provided by children over the course of the spaced training. We compared the proportion of details elicited from open questions, directed narratives, closed questions, and paraphrases in separate 4(Time Phase) ANOVAs.

Although the proportion of information elicited by open-ended questions increased from .08 at Time 1 to .12 at Time 4, this difference was not statistically significant, $F(3, 121) = 1.75$, $p = .161$, Similar nonsignificant increases were observed for directed narratives, $F(3,121) = 0.67$, $p = .58$, and paraphrases, $F(3,121) = 1.63$, $p = .19$. There was, however, a significant decrease over Time of the proportion of information elicited by closed questions, $F(3, 121) = 9.53$, $p < .001$. Means decreased from .39 in Time Phase 1, to .37 in Time Phase 2, to .26 in Time Phase 3, and .21 in Time Phase 4 (see Table 4).

Discussion

Training programs in investigative interviewing that include a single, though intense, learning session have not generally resulted in beneficial changes in interviewer behavior (e.g., Aldridge & Cameron, 1999; Warren et al., 1999). While training and research has focused extensively on the use of certain interviewing procedures, for the most part, interviewers do not adopt these suggested strategies (e.g., Cederborg et al., 2000; Lamb et al., 2000; Walker & Warren, 1995). Professional educators would not be surprised at this, however, because adult learning research shows clearly that information is retained for longer when the learning is 'spaced' (Schmidt & Bjork, 1992). In the current study, we used the concept of spaced learning to design an investigative interviewing training program. Because we included a formal follow-up training session that took place two months after the initial training session, and because we

had a record of the investigators' interviews before and following each training session, we were able to track the temporal trajectory of changes in their interviewing behavior across a wide variety of interviews with a large sample of children over an 8-month period.

One of the most striking findings was that, although interviewers made an effort to employ some of the techniques immediately after training, changes in interviewer behavior were not observed until after a subsequent refresher training session. In general, compared to interviews done pre-training (Time Phase 1) and after the first training session (Time Phase 2), interviews at Time Phase 3 and especially Time Phase 4 (i.e., after the refresher training) contained significantly more open-ended prompts, more narrative questions about general topics (e.g., school, home), fewer closed-ended prompts, and more utterances that contained facilitative support without asking a question. Perhaps more importantly, the proportion of information in children's reports that was elicited by risky, closed-ended questions (i.e., questions more likely to result in short and inaccurate responses; Goodman & Aman, 1990, O'Callaghan & D'Arcy. 1989; Peterson & Biggs, 1997; Price & Goodman, 1990; Saywitz, Goodman, Nicholas, & Moan, 1991) decreased significantly. These findings demonstrate that when forensic investigators use recommended interview procedures, they enhance the quality and quantity of the information elicited from alleged child victims. While this latter finding is not surprising, what the current study does reveal is that it is not only desirable but *essential* that training programs include a formal refresher training session for *interviewer behavior* to change.

Why exactly is the spacing of training sessions such an effective teaching technique? First, research on cognition and learning shows that memories and knowledge need to be 'consolidated' before they are stable enough to be retained for long periods of time (e.g., Litman & Davachi, 2008). Complimentary research on neuropsychological development, particularly the

hippocampal area that is involved in memory formation (see Litman & Davachim 2008) shows that there is a neural basis for such consolidation. While psychologists have always speculated that memories need to move to a hypothetical 'long-term memory space' to be retained, spacing and subsequent consolidation provides such an opportunity. Knowledge does not equal behavior change, however, as has been found in some previous training studies. Thus, a second reason why the spaced training may have aided improvements in interviewing is that the consolidation period allowed the information to be retained and retrieved without effort such that resources were freed up to consider the relevance of the knowledge for behavior as well as to provide time to 'try out' the techniques. Many of the trainees commented at the refresher training session (when they were hearing about child development principles in interviewing for a second time) that now 'it clicked' (Price & Roberts, 2008).

While increasing the use of open-ended and narrative prompts and decreasing the use of closed prompts took some time to develop, the interviewers incorporated key elements of an interview almost immediately. The inclusion of the Ground Rules, Rapport Building, and a Closure section increased at each time phase, although a clear Transition to the Substantive Phase did not improve until after the refresher session. These improvements are encouraging. The difference in the trajectory of change for the type of prompts employed and inclusion of key interview elements could suggest that some behavior changes are easier than others. The key elements listed above are fairly scripted interchanges and interviewers merely need a reminder (e.g., a cue card) to administer. Forming questions in an open-ended fashion and avoiding closed-ended questions, on the other hand, requires more thought and preparation and so, in this study, required more time and more practice to achieve. This pattern of results underlines that investigative interviewing of children is a complex and expert skill.

It was disappointing that the use of a Practice Interview did not increase, even after the second, refresher session. The Practice Interview appears to be one of the most important parts of an investigative interview when children are able to practice recalling information and interviewers are able to practice crafting open-ended questions (Roberts, Brubacher, Powell, & Price, in press). Past research has clearly indicated that when children practice answering open-ended questions before the Substantive phase, they go on to subsequently report more information than children who have not had such practice (e.g., Sternberg et al, 1997; Roberts et al., 2004). The apparent (but not statistically significant) decrease in the use of the Practice Interview at Time Phase 4 may be attributed to the fact that during this phase interviewers were no longer getting the rigorous feedback they had come to except by the researchers, but were receiving casual feedback from their peers. Other desirable practices (e.g., using facilitators) continued to increase at this time, however. Another explanation may be that interviewers became more efficient at eliciting the needed information from children in a shorter period of time, and therefore did not feel that they needed to continue using practice interviews.

In summary, while interviewers made a strong effort to include key elements in their interviews following the initial training session, improvements in the largest, most significant, yet most difficult portion of the interview (i.e., relying on open-ended questions in the substantive phase) were not observed until after a second training session conducted two months after the first. Principles of adult learning, specifically spaced learning theory, predicted and explained the results. The formal, follow-up sessions probably consolidated knowledge to the point when the training material 'clicked'. If interviewers understand why certain techniques and practices are recommended, it will undoubtedly result in better adherence to internationally-recognized guidelines on interviewing children.

It is important to note that a spaced training program may not necessarily be more costly than an intensive 'one-shot' program. Many programs are a week long (e.g., Aldridge & Cameron, 1999) and so the spaced training program we devised was not any longer: Two days of training were conducted at each of the first and the second (refresher) sessions. What differs from other training programs, is the *spacing* of the training. Other programs need not include exactly the same spacing as the current one, but psychologists recommend that subsequent training takes place long enough after the first so that some forgetting has occurred but memory is still quite good. This is known as the 'time window' and is a fundamental aspect of learning across the lifespan from infants to seniors (e.g., Rovee-Collier, Evancio, & Earley, 1995). A clear conclusion emerges from this research: It is recommended that training programs space learning to encourage maximum retention and behavior change so that child witnesses can be interviewed in the most developmentally-appropriate fashion possible thereby allowing them to disclose their experiences.

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Table 1.*Case information for interviews from each Time Phase.*

Time Phase	Frequencies			
	1 Pre-training	2 Post-training	3 Post-refresher	4 Termination
Child age (in years)	9.56	10.42	9.98	11.43
Child Gender (male%)	45%	61%	43%	58%
New (vs. ongoing) case	91%	78%	84%	81%
Single (vs. repeated) instance	44%	52%	24%	31%
Perpetrator				
Father	33%	30%	29%	25%
Mother and Father	16%	17%	24%	0%
Mother	0%	13%	35%	38%
Sibling	11%	4%	0%	0%
Acquaintance - Adult	0%	0%	0.04%	0%
Acquaintance - Child	0.05%	0.13%	0%	0.125%
Stranger	0.05%	0.09%	0%	0%
Relative	0.11%	0%	0.06%	0%
Step-father	0%	0%	0%	0.125%
Mother's boyfriend	0%	0.04%	0%	0%
Teacher	0.05%	0%	0%	0%
Allegation present	61%	62%	62%	64%
Allegation				
Hitting	56%	30%	47%	50%

Sexual assault/touch	11%	26%	12%	6%
Fighting observed	11%	17%	18%	19%

Table 2.

The percentage of interviews containing each component by time phase.

	Time Phase			
Interview Component	Phase 1 Pre-training	Phase 2 Post-training	Phase 3 Post-refresher	Phase 4 Post-Study
Introduction	58% (66%)	62% (66 %)	73% (66%)	75% (66%)
Ground Rules*	61% (77%)	74% (77%)	88% (77%)	92% (77%)
Rapport Building*	70% (82%)	81% (82%)	92% (82%)	92% (82%)
Practice Interview	30% (39%)	38% (39%)	49% (39%)	38% (39%)
Transition to Substantive*	47% (53%)	41% (53%)	64% (53%)	75% (53%)
Substantive Phase	100% (97%)	95% (97%)	94% (97%)	100% (97%)
Closure	24% (48%)	57% (48%)	55% (48%)	58% (48%)

Notes. * = $p < .05$
      Expected percentages in parentheses.

Table 3.

The proportions of each interviewer utterance type at each Time Phase.

Utterance Type	Phase 1 Pre-training		Phase 2 Post-training		Phase 3 Post-refresher		Phase 4 Termination	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Open-ended	.07	.06	.09	.09	.16	.12	.15	.10
Directed Narrative	.13	.10	.15	.08	.21	.08	.22	.10
Paraphrase	.05	.06	.05	.05	.04	.04	.07	.10
Closed-ended	.58	.12	.55	.14	.46	.16	.46	.18
Facilitators	.30	.15	.29	.14	.39	.20	.42	.19

Table 4.

The proportion of details reported by children at each Time Phase as a function of interviewer utterance type

Utterance Type	Time Phase							
	Time Phase 1		Time Phase 2		Time Phase 3		Time Phase 4	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Open-ended	.08	.10	.11	.11	.14	.10	.12	.11
Directed Narrative	.13	.18	.17	.11	.16	.09	.17	.11
Paraphrase	.03	.04	.02	.03	.02	.02	.01	.01
Close-ended	.40	.16	.37	.15	.26	.20	.21	.14