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What is This?

The Effects of Drawing on Children's Accounts of Sexual Abuse

Carmit Katz[1] and Irit Hershkowitz[2]

Abstract
This study was designed to explore the effects of event drawing during investigative interviews on the richness of the accounts made by children. The sample included 125 children aged 4 to 14 years, alleged victims of sexual abuse. The children were first interviewed with open-ended invitations before they were randomly assigned into one of two interview conditions: with ($n = 69$) or without ($n = 56$) event drawing, and then reinterviewed. Children in the drawing group disclosed more free recall information about the abusive events than children in the comparison group, including central details about people, actions, time, and location of the incidents. The effect of drawing was evident regardless of child's age, gender, type of abuse, and time delay. These findings suggest that event drawing, as used in this study, can enhance children's forensic statements in child abuse investigations.

Keywords
investigative interviews, sexual abuse, drawing, memory

During criminal investigations, young victims of sexual abuse are required to provide rich and credible testimony about the events they have experienced (Lamb, Hershkowitz, Orbach, & Esplin, 2008). Providing detailed and accurate statements are difficult for witnesses of all ages, but for children it is an especially complex task because of their limited memory and communicative skills (Lamb, Orbach, Warren, Esplin, & Hershkowitz, 2007; Orbach & Lamb, 2000; Poole & Lamb, 1998; Saywitz, 2002). Many researchers have thus attempted to identify the conditions that facilitate memory retrieval processes and have consistently shown that free recall questions are most likely to elicit accurate information about experienced events (Dent, 1982; Dent & Stephenson, 1979; Orbach & Lamb, 2000). Researchers have also reported that statements based only on open-ended questions tend to be incomplete, however, (Lamb et al., 2007) and thus have sought to identify other techniques that may enhance children's reports. The goal of this study was to determine whether drawing during an interview dominated by open-ended questions might facilitate the retrieval of information in forensic contexts.

The need to find techniques that may help children provide richer reports without compromising their accuracy have motivated many studies exploring Tulving's theory of context-dependent memory (Tulving & Thomson, 1973). The basic assumption of this theory is that, while encoding the core details of to-be-remembered (TBR) events, people normally encode the event's context as well. In this theory, "context" includes any relevant information about the environment, emotions, and objects, and Smith (1992) argued that contextual retrieval cues can stimulate memory and encourage the

retrieval of additional information about the TBR event (Smith, 1992; Smith & Vela, 2001).

Based on the previous literature, it seems that one useful distinction of various contextual cues is between external retrieval cues provided by the interviewer and techniques that encourage children to create retrieval cues themselves. Evidence suggests that external cues such as anatomically detailed dolls or interviewer-provided props may contaminate children's memory and thus have adverse effects on their testimony (Gordon et al., 1993; Goodman & Aman, 1990; Hungerford, 2005; Steward & Steward, 1996). As a result, it seems risky to employ such prompts in the forensic context. By contrast, techniques that encourage children to create their own retrieval cues empower children to direct their own memory retrieval processes (Dietze & Thomson, 1993; Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz, 2001) and have repeatedly been shown to elicit richer and more accurate reports from children (Lamb et al., 2008; Poole & Lamb, 1998).

Drawing is one medium through which to encourage the autogeneration of contextual retrieval cues. Researchers have studied drawing extensively in the last decade, showing that in some conditions drawing can help children retrieve

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information from memory about a variety of events. To model some of the features of forensic interviews, researchers have focused on studying children's memory for medical examinations (Salmon & Pipe, 2000), hospitalization (Rae, 1991), parental divorce (Weinle, 2002), and other emotionally arousing events (Gross & Hayne, 1998; Lev-Wiesel & Liraz, 2007; Salmon, Roncolato, & Gleitzman, 2003; Weinle, 2002; Wesson & Salmon, 2001). Researchers examining the accuracy of children's reports have staged events such as visiting a police station (Gross et al., 2000; Gross, Hayne, & Poole, 2006), fire station (Butler, Gross, & Hayne, 1995), magic show (Bruck, Melnyk, & Ceci, 2000), pirate show (La Rooy, Pipe, & Murray, 2005), or chocolate factory (Gross & Hayne, 1999). In most cases, the children were active participants in the TBR event, but in some cases the children were interviewed about events that they merely witnessed (Brennan & Fisher, 1998; Drucker, Greco-Vigorito, Moore-Russel, Avaltroni, & Ryan,1997). Researchers have also explored variations in the length of delay between the target events and the interviews, from 1 day to 1 year (Brennan & Fisher, 1998; Butler et al., 1995; Cain, 2004; Gross & Hayne, 1999; Gross et al., 2000, 2006; La Rooy et al., 2005; Salmon & Pipe, 2000).

The types of questions directed to the child have been a major focus of research on drawing and children's memory. Most of the studies included open-ended or direct questions (Butler et al., 1995; Cain, 2004; Gross & Hayne, 1998, 1999), whereas others involved suggestive interviewing (Bruck et al., 2000; Gross et al., 2000, 2006; Strange, Garry, & Sutherland, 2003). In addition, drawing instructions varied across studies. In most studies, children were asked to freely draw and talk about the events (e.g.: "draw and tell me everything that happened to you when you felt sad/ on the day you visited the chocolate factory": Butler et al., 1995; Cain, 2004; Gross & Hayne, 1998, 1999; Gross et al., 2000, 2006; Salmon et al., 2003; Weinle, 2002; Wesson & Salmon, 2001), but in some studies, children were given specific instructions regarding the content of the drawing (e.g. "Draw the nurse and draw you with her" or "I heard there might have been some things like doctors use at the checkup. Draw me those things": Salmon & Pipe, 2000). Developmental differences were explored with the majority of the studies focused on 5-to 6-year-old children, but some included 3 to 4 years old (Bruck et al., 2000; Butler et al., 1995; Gross & Hayne, 1998) or 8- to 13-year-olds (Brennan & Fisher, 1998; Drucker et al., 1997; Gross et al., 2006; Lev-Wiesel & Liraz, 2007; Weinle, 2002). Other individual characteristics studied include children's gender, verbal abilities, personal characteristics such as temperament and motivation (Salmon et al., 2003), and family socioeconomic status (Cain, 2004).

Studies exploring the effects of drawing combined with open-ended questions showed that free recall had beneficial effects on the amount of information reported by children (Brennan & Fisher, 1998; Butler et al., 1995; Cain, 2004; Drucker et al., 1997; Gross & Hayne, 1998; Gross & Yong, 2001; Lev-Weisel & Liraz, 2007; Salmon et al., 2003; Weinle, 2002; Wesson & Salmon, 2001), with some researchers

reporting that the number of details doubled (Butler et al., 1995; Gross & Hayne, 1998; Weinle, 2002; Wesson & Salmon, 2001) or even tripled (Drucker et al., 1997) when children were allowed to draw. Although more information was reported when children were asked open-ended rather than closed questions (Brennan & Fisher, 1998; Cain, 2004; Gross & Yong, 2001; Rae, 1991; Salmon et al., 2003; Wesson & Salmon, 2001), sometimes direct questions were also effective (Butler et al., 1995; Gross & Hayne, 1998, 1999) in eliciting information from children. However, when drawing was combined with misinformation or suggestive questions, the accuracy of the information reported was compromised: drawing did not protect the children's retrieval (Bruck et al., 2000; Gross et al., 2000, 2006) and in one case, even intensified the adverse effects on the accuracy of the information they reported (Strange et al., 2003).

Drawing instructions seemed to affect accuracy of information as well. When children were asked to freely draw an event and later asked open-ended questions, their responses tended to be accurate, but when children were directed to draw specific parts of the event, their performance was compromised (Salmon & Pipe, 2000).

Interestingly, in these reported studies, when free drawing was combined with open-ended invitations, positive effects on the amount and accuracy of the information were evident regardless of the children's gender, verbal ability, or personal characteristics and, with a few exceptions, regardless of age. Pre-schools (Cain, 2004; Gross & Hayne, 1999; Salmon et al., 2003) and school-aged children (Brennan & Fisher, 1998; Gross & Young, 2001) benefited from drawing combined interviews and age group did not interact with interview condition (Wesson & Salmon, 2001). This strategy also minimized the differences between children from different socioeconomic backgrounds (Cain, 2004) and helped children report more details even after long delays (Gross et al., 2000, 2006).

Overall, when drawing was free rather than focused on specific aspects of the event and when questions following the drawing were open-ended, drawing was reported as a beneficial tool. However, the relevant studies were mostly conducted in the laboratory, rather than in the field and none of them involved real-life investigations of alleged abuse victims.

In the current field study, several steps were taken to ensure that the investigative process was not adversely affected by including the drawing component. First, all interviews were conducted using the National Institute of Child Health and Human Development (NICHD) Protocol (Lamb et al., 2008), which has been repeatedly shown to increase the number of open-ended questions asked while reducing the number of potentially contaminating suggestive questions. Second, all investigative interviewers were intensively trained by the researchers and were given continuous feedback on each of their interviews. This process was implemented to ensure that all interviewers used the protocol appropriately and gave priority to open-ended invitations. Third, to ensure that the children's testimony would not be contaminated, the instruction to draw was given only after the children had described the

abusive events in response to open-ended questions. Thus, the drawing prompted a second retrieval rather than the first retrieval studied by most researchers. Only one study has examined drawing during a second retrieval, but this study included no comparison group (La Rooy et al., 2005). Fourth, only after the abusive events had been described in response to open-ended questions were the children assigned to one of two research conditions: with and without drawing. This ensured that the interviewers' awareness of the children's experimental condition did not affect their initial effort to elicit retrieval.

The primary goal of the current study was to determine whether free drawing of an abusive event in association with open-ended questioning helped children retrieve additional information about the event. Informed by previous literature, we expected that children in the drawing condition provide larger amounts of forensic information about sexual abuse events, especially in response to open-ended invitations. We expected that drawing will be beneficial to children regardless of their age or gender, the alleged abuse, and the time delay between the alleged abuse and interview.

Method

Sample

The sample comprised 125 children, aged 4 to 14 years ($M = 9.9$, $SD = 2.41$), who were referred for investigative interviews because they were believed to have been abused sexually on a single occasion by a perpetrator who was not a family member. All children, whose allegations matched these study criteria and were interviewed between November 2005 and July 2007 by the participating interviewers, were included in the sample. The children, 31 boys and 94 girls, were randomly assigned to one of two research conditions: interview with drawing or interview without drawing. Alleged abuse included: exposure ($n = 29$) defined so when the alleged suspect revealed his private body parts to the victim; touching private body parts over clothes ($n = 35$); skin-to-skin touching of private body parts ($n = 36$); and penetration ($n = 25$), including vaginal, anal or oral penetration. The time delay between the alleged incidents and the investigative interviews ranged from 1 to 730 days ($M = 37.63$, $SD = 79.84$).

The interviews were conducted in Israel by nine trained investigative interviewers. The interviewers all had similar professional backgrounds: Bachelor's degree in Social-Work or Criminology and about 7 years experience conducting investigative interviews with children.

The NICHD Investigative Interview Protocol

The NICHD Investigative Interview Protocol was developed by a group of researchers attempting to incorporate what was known about developmentally appropriate interviewing with children into forensic interviews (Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007; Lamb et al., 2008).

The Protocol includes three main phases: in the first (introductory) stage, the child is introduced to the interviewer, the importance of telling the truth is emphasized and the ground rules are explained, with children being encouraged to say "I don't know" when appropriate. During the second stage, the focus is on building rapport and establishing a supportive relationship with the child, while introducing the preferred interviewing techniques. When the child appears comfortable, the interviewer "trains" the child episodic memory using a neutral experience so that the child becomes familiar with the interviewer's questioning style, emphasizing open-ended questions. In the third and substantive stage, the focus moves to the abusive target event. Interviewers are instructed to use open-ended questions as much as possible: main invitations (e.g., tell me everything that happened to you from the beginning to the end as best as you can), follow-up invitations (e.g., and then what happened?), and cued-invitations (e.g., you mentioned a cream, tell me everything about it). Interviewers proceed with direct questions (e.g., when did it happen?) only after open-ended questions appear to have exhausted the child's memory. Option-posing questions (e.g., did he touch you under the clothes?) are to be asked only when essential forensic information is missing and only at the end of the interview. Suggestive questions (e.g., he stuck his fingers in, right?) are to be avoided completely. At the end of the interview, in an attempt to help the children relax again, the interviewers are instructed to move the focus of the conversations to neutral topics (e.g., what are you going to do after the interview?).

Field studies in the United States, Israel, Canada, and the United Kingdom (Cyr, Lamb, Pelletier, Leduc, & Perron, 2006; Lamb et al., 2008; Orbach et al., 2000; Sternberg et al., 2001) have shown that use of the NICHD protocol has positive effects on the quality of interviewing, with more open-ended questions and fewer option-posing or suggestive questions asked by forensic interviewers. In addition, children's free narratives were richer in protocol interviews, with more information elicited using open-ended questions. These findings are important because details elicited using open-ended questions are more likely to be accurate than those elicited using option-posing and suggestive questions (Dent, 1982, 1986; Poole & Lamb, 1998).

Interview With or Without Drawing

All children were interviewed using the NICHD protocol until the interviewers had exhaustively probed the children's memory of the alleged event using open-ended questions. The interviewer then opened an envelope revealing to which condition the child had been randomly assigned.

In the *drawing group*, interviewers gave the children a blank sheet of paper, a pencil, and a rubber (eraser) and said, "You've told me what happened to you. Now I would like you to draw what happened, and then we will continue". Seven to 10 min were allowed for drawing. During the drawing, interviewers limited their interventions to facilitators like "hmm" or repeating the children's words. After the children finished drawing, the interviewers said, "You told me earlier what happened to you and now you've drawn it. The drawing is right here in front

of you. Now please tell me again everything that happened to you from the beginning to the end as best as you can. You can also look at the drawing if you want''. After the children's first postdrawing narratives, the interviewers continued the interviews in accordance with the protocol, moving from open-ended question to more focused questions. Interviewers were instructed to ignore the drawing completely, to avoid offering any interpretations of it, and to focus only on the verbal information that the children provided. Any deviations from these instructions were coded as suggestive utterances.

In the *comparison group*, the children took a break of 7 to 10 minutes, during which time they could choose to play or rest. This break was designed to equal the drawing time allowed to children in the research group, as well as the total duration of the interview. No drawing was allowed during the break. After the break, the interviewers said: ''You've told me what happened to you and then you've played/taken a rest. Now please tell me again everything that happened to you from the beginning to the end as best as you can''. After the children's first narratives, the interviewers continued the interviews in accordance with the Protocol.

By law, all interviews were video recorded and transcribed by experienced professional transcribers. Transcripts were sent to the researchers only after details potentially identifying those involved in the incidents had been removed.

Ethical Approval

The research was approved by the manager of the investigative interview unit in Israel, the head of the youth department of the Israeli police, the vice president of the Israeli juvenile court, and the chairman of the University of Haifa's ethics board.

Data Coding

After being checked to ensure that they were performed in accordance with the protocol, the interviews were coded to quantify the interviewers' interventions as well as the richness of the children's responses.

The interviewer's utterances were coded as main invitations, follow-up invitations, cued invitations, directive questions, option-posing questions, and suggestive questions, as detailed by Lamb and his colleagues (Lamb et al., 1996, 2008). For the purpose of some analyses, the various types of invitations have been collapsed into a broad category of open-ended invitations whereas the other types of questions formed another category of specific questions.

Details reported by the children were defined as informative words or phrases identifying or describing the components of the abusive event. In this study, we focused on the proportion of new details reported after the manipulation (with or without drawing). By new details, we refer to substantive details that the children produced in the second retrieval, which were not reported during the first retrieval. All new details were coded as either central when they addressed the core of the sexual

events or peripheral when they addressed the context of the events. In addition, the content of the details was classified into one of the following categories: people, actions, location, time, and objects.

Intercoder agreement was checked by having 15% of the transcripts independently recoded by two experienced coders. Agreement was higher than 90% for both the classification of interviewer utterances and the identification and classification of details reported by the children.

For the purpose of the current study, the gain of information was computed as the proportion of new details provided after the manipulation out of the total amount of details children provided before the manipulation. The gain of new details in each category (people, action, location, time, and object), the subtotal gain of new central and peripheral details, and the total gain of all combined new details provided, following the manipulation were systematically computed as percentages out of the total amount of details children provided before the manipulation.

Results

Analyses were designed to determine whether drawing helped children of a wide age range (4-14 years) report larger proportions of information, and specifically free recall information, about sexual abuse incidents in their second interview following the manipulation. Further analyses explored the nature of the information obtained, both in terms of its forensic relevance (central or peripheral details) and content categories (i.e., people, actions, location, time, and objects).

Manipulation Check

The quality of interview. A preliminary analysis was designed to ensure that there were no differences between the interviewing strategies used in the two research conditions. A 2 (interview condition: drawing or nondrawing-between-subject) × 2 (interview stage: before or after the manipulation-within-subject) × 5 (prompt type: invitations, cued invitations, direct questions, option-posing questions, suggestive questions-within-subject) multivariate analysis of variance (MANOVA) revealed no condition differences in the number and proportion of question types. Thus, interviews in the two research condition groups were equivalent with respect to the strategies used by interviewers before and after the manipulation.

The quality of the interviews was remarkably good in both groups, with more than 87% open-ended invitations posed to the children in the first retrieval and over 50% open-ended invitations in the second retrieval. The percentage of directive questions was 10% in the first retrieval and 42% in second retrieval. In both retrievals, the percentage of option-posing and suggestive questions was impressively low (less than 7% option-posing and less than 0.30% suggestive questions).

Children's reports of neutral events. To test the effect of the drawing manipulation, it was important to confirm that there were

no differences between the two groups with respect to the children's abilities and cooperativeness. Comparing the amount of details children provided in the presubstantive part of the interviews, a t test analysis revealed that children in the drawing group were as verbal and cooperative ($M = 108.81$, $SD = 78.47$) as children in the comparison group ($M = 102.94$, $SD = 55.88$) when describing a neutral event.

The Effect of Drawing on Children's Reports

To explore the effects of drawing on children's report, the proportion of the new additional information provided by children following the manipulation was examined (see Method section). The amount of the details obtained before the manipulation was tested as a covariate in the following analyses and had no effects. Therefore, the following analyses ignore the amount of the details obtained before the manipulation.

A linear regression model predicting the proportion of new details children produced in the second interview, based on the interview condition (drawing or non drawing) and children's age was tested. The regression analysis was conducted after it was ensured that the continuous variables entered into the equation were normally distributed and the association between the predicting and dependent variable was linear. The interview condition significantly predicted the proportion of new details children produced ($F(1,122) = 18.45$, $p < .000$), accounting for 12% of the variance ($R^2 = .13$, R^2 adj $= .12$, F change $= 18.45$, p [F change] $< .001$). No predicting effect was evident for child's age or for the age-condition interaction, however. Similarly, regression analyses combining gender, abuse type, and time delay between the incident and the interview showed no predictive effects on the proportion of new details children produced following the manipulation and those variables did not interact with the interview condition.

The relative effectiveness of drawing eliciting new details when open-ended versus specific prompts were posed was then tested using an ANOVA, after it was ensured that a normal distribution was evident and that the basic assumptions for this analysis were kept. A 2 (interview condition: drawing, non-drawing; between-subject) × 2 (prompt type: open-ended, specific; within-subject) ANOVA revealed main effects for the interview condition ($F(1,116) = 13.98$, $p < .000$, $\eta_p^2 = .11$) and prompt type ($F(1,116) = 9.19$, $p < .003$, $\eta_p^2 = .07$) as well as an interaction between the two ($F(1,116) = 12.83$, $p < .000$, $\eta_p^2 = .10$). Children in the drawing condition provided a larger proportion of additional new details ($M = 96.41\%$, $SD = 55.90\%$) than their counterparts ($M = 58.51\%$, $SD = 38.66\%$) and all children provided larger proportions of information in response to specific prompts ($M = 47.79\%$, $SD = 18.68\%$) than in response to open-ended prompts ($M = 38.60\%$, $SD = 22.72\%$). The interaction between the interview condition and prompt type suggests that the effect of drawing was evident in children responses to open-ended questions but not in response to focused questions. Following open-ended invitations, children in the drawing condition added a higher proportion of new information ($M = 48.08\%$, $SD = 30.92\%$) than children in the nondrawing condition ($M = 26.98\%$, $SD = 17.41\%$). In response to closed questions, however, children in both conditions added similar proportions of new information (*drawing*: $M = 46.18\%$, $SD = 19.38\%$; *nondrawing*: $M = 49.76\%$, $SD = 17.76\%$).

As the effects of drawing were selectively evident in the free recall information children provided in response to open-ended prompts, a further analysis was designed to explore the nature of the new free recall information obtained.

The Effect of Drawing on the Nature of New Free Recall Information

A 2 (interview condition: drawing, nondrawing) × 2 (detail type: central, peripheral) × 5 (detail content: people, action, location, time, object) ANOVA with research condition varied between-subject and detail type and detail content varied within-subject confirmed the main effect for the interview condition ($F(1,123) = 12.86$, $p < .000$, $\eta_p^2 = .095$) and revealed a main effect for the type of detail ($F(1,122) = 81.99$, $p < .000$, $\eta_p^2 = .402$) and for the content of the detail ($F(4,119) = 55.81$, $p < .000$, $\eta_p^2 = .625$) as well as two-way interactions of interview condition with detail type ($F(1,122) = 9.41$, $p < .003$, $\eta_p^2 = .072$), and with detail content ($F(4,119) = 8.33$, $p < .000$, $\eta_p^2 = .219$) and a three-way interaction ($F(4,119) = 2.82$, $p < .028$, $\eta_p^2 = .087$; see Table 1).

Larger proportions of central ($M = 27.27\%$, $SD = 22.61\%$) than peripheral ($M = 11.23\%$, $SD = 9.91\%$) free recall details were obtained regardless of interview condition. Similarly, larger proportions of details describing actions ($M = 18.29\%$, $SD = 15.05\%$) and locations ($M = 18.29\%$, $SD = 15.05\%$) in comparison to details describing people ($M = 10.99\%$, $SD = 8.16\%$) were obtained, but smaller proportions of details describing time ($M = 3.05\%$, $SD = 2.91\%$) and objects ($M = 2.55\%$, $SD = 2.31\%$) in all comparisons.

The interaction between the interview condition and detail type suggests that children in the drawing group produced remarkably higher proportions of new central details ($M = 34.35\%$, $SD = 25.48\%$) than children in the comparison group ($M = 18.68\%$, $SD = 14.67\%$), but slightly higher proportions of new peripheral detail (*drawing*: $M = 13.74\%$, $SD = 11.08\%$; *nondrawing*: $M = 8.17\%$, $SD = 7.27\%$).

Subsequent contrast tests explain the interaction between the interview condition and detail content, with children in the drawing group produced higher proportions of details relating to people ($M = 11.02\%$, $SD = 8.27\%$), actions ($M = 15.78\%$, $SD = 13.80\%$), and location ($M = 4.61\%$, $SD = 3.96\%$) than children in the comparison group (*people*: $M = 5.69\%$, $SD = 4.29$; *action*: $M = 9.46$, $SD = 8.34\%$; *location*: $M = 1.60\%$, $SD = 1.34\%$), whereas no group differences were evident in details describing objects and time. Note that using a univariate analysis a significant difference was also found in details describing time (see Table 1).

Finally, contrast tests exploring the three-way interaction suggest that children in the drawing group produced higher

Table 1. The Proportion of the New Information Children Provided in Response to Open-Ended Prompts After the Manipulation by Detail Type and Contents

Detail Type and Content	Drawing (n = 69)		Non Drawing (n = 56)		
	M (%)	SD	M (%)	SD	p
Central					
People	11.02	8.27	5.69	4.29	<.001
Actions	15.78	13.80	9.46	8.34	.002
Location	4.61	3.96	1.60	1.34	<.001
Time	3.49	2.86	2.26	1.54	.013
Objects	0.78	0.38	0.45	0.09	ns
Total central	34.35	25.48	18.68	14.67	<.001
Peripheral					
People	2.84	1.61	1.82	1.41	.019
Actions	6.12	5.44	4.46	3.89	ns
Location	2.26	1.39	0.33	0.06	.005
Time	0.13	0.04	0.11	0.03	ns
Objects	2.06	1.94	1.74	1.46	ns
Total peripheral	13.74	11.08	8.17	8.17	<.001
Total	48.08	30.92	26.98	17.41	<.001

Note. All group comparisons displayed in this table were explored using independent *t* tests. Multivariate analyses resulting with interactive effects are mentioned in the text.

proportions of central details relating to a wider range of contents: people, actions, and location, while they produced higher proportions of peripheral details only in relating to the location category.

Discussion

This field study is the first one designed to explore the effects of drawing on the richness of forensic accounts made by alleged victims of child sexual abuse. Prior research on the role of drawing has involved nonabused children tested in the laboratory (Bruck et al., 2000; Butler et al., 1995; Gross & Hayne, 1999; Gross et al., 2000; Gross et al., in press; Gross & Yong, 2001; La Rooy et al., 2005). Besides exploring memories for alleged sexual abuse in the field, this study benefited from random assignment of children into the different research conditions and from systematic use of the NICHD Protocol.

Another strength of the current study is the fact that all alleged victims who met the inclusion criteria during the data collection period were included in the study, thereby ensuring that the sample was representative. The wide range of ages (4-14 years) and the large sample (*n* = 125) allowed the effects of drawing to be explored more fully than in previous studies.

In addition, the quality of interviews in this study was remarkably high, presumably because the interviewers had all been using the NICHD Protocol for several years and also benefited from additional guidance in the use of open-ended questions during the period of data collection.

The results of this study clearly show positive effects of drawing in investigative interviews of children: a remarkable increase in the richness of statements is evident in the drawing condition. The advantage of drawing is especially impressive because it was introduced after the interviewers have exhausted the child's memory using open-ended questions, but it has still

been very effective and elicited large amounts of new information. Because this was a field study in the forensic context, we could not jeopardize the forensic aspects of the interviews, and thus drawing was introduced only after the children had produced as much relevant information as possible in response to open-ended questions. The drawing in this study thus prompted a second retrieval from memory.

Both cognitive and emotional processes may have been involved in the children's enhanced performance in the drawing condition. From a cognitive perspective, the drawing may have served as an aid that stimulated the children's memories. Because drawing presents visual cues, it may provide an especially powerful prompt to memory, given that visual features are dominant in the encoding process (Butler et al., 1995; Burgess & Hartman, 1993; Cutler, Penrod, & Martens, 1987). In addition, drawing may have helped organize children's retrieval efforts, keeping them focused on the memory retrieval goal of the interview (Brennan & Fisher, 1998). Most children enjoyed drawing, and for this reason, the integration of drawing into the investigative interview may have maintained the children's attention (Faller, 1988; Poole & Lamb, 1998). As far as emotions were concerned, drawing may have helped reduce anxiety and empower children, allowing them to perform better when interviewed (Butler et al., 1995; Gross & Hayne, 1998). Empowering children seems to motivate them to become more active in the retrieval process (Dewey, 1963, 1980) and may be especially important when children have been disempowered by abuse.

In line with the expectations, the positive effects of drawing were selectively expressed in the open-ended questioning but not in the focused questioning. This selective effect is extremely important in the forensic context because information elicited using open-ended questions is more likely to be accurate than that elicited using riskier focused prompts (Dent,

1982, 1986; Poole & Lamb, 1998) and is easier to judge for credibility (Hershkowitz, Fisher, Lamb, & Horowitz, 2007; Lamb et al., 2007, 2008; Poole & Lamb, 1998). Thus, drawing seems to have a positive effect in open-ended questioning but no corresponding negative effect in focused questioning.

Although all types of detail were enhanced, drawing had an especially strong impact on the number of central details, which are the ones that specify the core of the sexual incidents and indicate the seriousness of the offence. Specifically, more new central details about people, actions, and locations were retrieved when children used drawings, suggesting that the descriptions of the suspects or witnesses and their actions were more elaborated and that the information regarding the scene of the crime was more detailed. The fact that those central details were elicited using open-ended invitations increases the likelihood that those details were accurate.

Use of drawing was helpful regardless the children's age. This finding is consistent with previous reports, suggesting that preschools (Cain, 2004; Gross & Hayne, 1999; Salmon et al., 2003) and school-aged children (Brennan & Fisher, 1998; Gross & Young, 2001) benefited from drawing and that age group did not interact with interview condition (Wesson & Salmon, 2001). Interestingly, the inclusion of children aged up to 14 years for the first time in drawing studies permitted us to extend the effect of drawing and to conclude that drawing can be helpful for older children and even for young adolescents who are developmentally capable of independent retrieval (Lamb et al., 2008; Poole & Lamb, 1998). However, this gain is especially important for young children who have limited memory skills and more difficulty responding to open-ended prompts. The ability of the youngest children to benefit from drawing challenges the claims that their limited drawing skills (Veltman & Browne, 2002) also limits drawing effects on memory as better drawings provide more effective contextual cues. The absence of age effects rather supports the claim made by other researchers (Brennan & Fisher, 1998) that the graphic features of the drawing do not necessarily define the strength of the cues it provides and that even simple drawings or scribbles made by young children can help reconstruct the context of the event. This assumption should be further explored to establish the relationships between the graphic complexity of the drawing and the effectiveness of retrieval.

In addition, drawing had positive effects regardless of the delay between the abusive events and the interviews, suggesting that the cues assisted retrieval even when the memory traces weakened. This finding has important implications in the forensic context, because victims often postpone disclosures, with investigations taking place weeks, months, or even years after the incidents (Hershkowitz et al., 2006). Beyond the loss of memory traces, long delays between abusive events and investigative interviews increase the risk that victims will accept suggestions because their memories are partial (Flin, Boon, Knox, & Bull, 1992; Roediger & Thorpe, 1978). The combination of free drawing for the stimulation of memory after long delays with open-ended invitations might not only help children retrieve more information from memory by also reducing the risk of memory contamination. This hypothesis was not tested in the current study, however.

Because drawing was also found effective for both boys and girls, and regardless of the abuse they described, its effects can be considered rather robust. As an investigative tool, drawings can form a standard aid in the interview with no need to adjust it to specific populations or in specific situations.

Although this research yielded important findings, there are some limitations that need to be acknowledged. First, in the current study, children in the comparison group experienced a 7-min break designed to match the delay between first and second retrieval in the drawing condition, and consequently they were not focused on the TBR during this time or even possibly distracted. An additional comparison group controlling for this factor, in which the children are asked to focus on the TBR event for 7 min using a technique other than drawing might have somewhat assisted the isolation of the drawing effects. However, such a design moves the focus to a different research question, that is, the relative effectiveness of various retrieval tools while the perfect comparison group for exploring the question under investigation in the current study (i.e., is the incorporation of drawing in an investigative protocol likely to result with more informative forensic statements?) is hard to design, if not impossible.

Second, because this was a field study involving reports of undocumented events, accuracy could not be determined. Accuracy is a key measure in laboratory analogue studies but not employed in such field studies. Despite the lack of accuracy measures, ecologically valid field studies in forensic contexts such as the current one are absolutely necessary. Note that in this study the reported information was elicited primarily using open-ended invitations and thus was likely to be accurate.

However, although accuracy measures are difficult to apply in field studies, the consistency of the details children provided before and after drawing can be determined (Orbach & Lamb, 2000) and may form a substantial contribution in a follow-up study.

Third, all investigated incidents involved only single occurrences of sexual abuse by nonfamily members. The selection of single incidents was designed to avoid memory scripts associated with frequent and enduring abuse, and the selection of nonfamily suspects was designed to control for motivational issues involved when the suspects are parents or family members. Previous research has shown that multiple events and incidents including family members are reported differently (Lamb et al., 2008; Poole & Lamb, 1998), and further research is needed to explore the effectiveness of drawing in such contexts.

Nevertheless, the theoretical and practical implications of this study are meaningful. The results support the positive role of drawings in forensic investigations with alleged victims of child sexual abuse. Note that the findings speak for the specific use of drawing employed in the current study, as some other procedures using drawings differently might compromise the quality of the information obtained from children.

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