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SPECIAL FEATURE

Children's Memories of a Physical Examination Involving Genital Touch: Implications for Reports of Child Sexual Abuse

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Evaluation of child sexual abuse often necessitates interviewing children about genital touch, yet little scientific research exists on how best to obtain children's reports of genital contact. To examine this issue, 72 five- and seven-year-old girls experienced a standardized medical checkup. For half of the children, the checkup included a vaginal and anal examination (genital condition); for the other half, the checkup included a scoliosis examination instead (nongenital condition). The children's memories were later solicited through free recall, anatomically detailed doll demonstration, and direct and misleading questions. The majority of children in the genital condition revealed vaginal and anal contact only when asked directly about it. Children in the nongenital condition never falsely reported genital touch in free recall or doll demonstration; when asked directly, the false report rate was low. Significant age differences in free recall and doll demonstration, found only in the nongenital condition, implicated socioemotional factors as suppressing the reports of older children who experienced genital contact.

Recent laws mandate that mental health professionals report suspicions of child abuse. Yet generally accepted, empirically based methods for assessing children's reports remain unavailable. Research on children's memory may be one important source of information relevant to this issue (Ornstein, Larus, & Clubb, in press). However, the bulk of available data on children's memory emanates from laboratory studies of word lists, stories, and pictures (see Flavell, 1985, and Kail, 1990, for reviews) that do not resemble the real-life experiences about which children actually testify, such as sexual molestation. Resultant theories do not account for many social, emotional, and contextual influences on memory that are salient in clinical and forensic interviews.

The purpose of the present study was to begin to overcome these impediments to generalizability through greater attention to ecological validity. This was accomplished by studying children's memories for a routine doctor's examination. This event resembles limited but important aspects of certain sexual abuse experiences, such as undressing and genital touch by an unfamiliar adult. The primary goals were to examine the influence of genital touch, age, type of questioning, and retention interval on children's reports, as discussed in turn below.

Little scientific research exists on children's reports of genital touch. On the one hand, genital touch by an unfamiliar adult might be a personally meaningful, salient, and novel activity for children, and therefore highly memorable (Goodman, Rudy, Bottoms, & Aman, 1990; Warren-Leubecker, Bradley, & Hinton, 1988). On the other hand, children are socialized against public discussion of genital contact (Goldman & Goldman, 1982). Resultant shame could reduce children's motivation or ability to report genital touch. Additionally, a number of other factors could undermine or enhance memory performance concerning genital contact, such as characteristics of the sociolinguistic interaction with the interviewer (e.g., intimidation, leading questions), the degree to which the event is emotionally laden (e.g., embarrassing), and the adaptiveness of strategies (e.g., withdrawal, dissociation) for coping with emotions (e.g., anxiety, guilt).

We were especially interested in the relation between age and reports of genital touch. Assuming a traditional cognitive–developmental or information-processing approach, older compared with younger children would be expected to demonstrate

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better memory performance. Similarly, studies of eyewitness memory typically report age differences in the completeness, but not necessarily the accuracy, of free recall, although age differences are inconsistently found when direct and misleading questions are posed (e.g., Leippe, Romancyzk, & Manion, in press; Marin, Holmes, Guth, & Kovacs, 1979). Younger compared with older children's ability to recall and answer questions about sexually related information may be further impeded by limited sexual knowledge (Gordon, Schroeder, & Abrams, 1990).

Alternatively, reverse developmental trends may emerge. As children develop metacognitive, self-evaluative capacities and a sense of self-consciousness (Maccoby, 1980), embarrassment associated with nudity or genital contact may increasingly interfere with reporting genital touch. This possibility is consistent with recent studies suggesting that developmental changes during the 5- to 7-year age range occur in children's understanding of embarrassment and the conditions that elicit embarrassment (Goldman & Goldman, 1982; Lentz, 1985; Seidner, Stipeck, & Feshbach, 1988; Yamamoto, Soliman, Parsons, & Davies, 1987). Taken as a whole, these studies suggest that 5- compared with 7-year-olds may be less affected by emotional or social factors that could hinder reports of genital touch.

A third goal of this study was to examine questioning techniques for obtaining information from children. In actual sexual abuse evaluations, children may first be asked a general question about what happened, then given anatomically detailed dolls and other props to act it out, and finally asked direct and sometimes inadvertently misleading questions (Boat & Everson, 1988). In response to general free-recall questions (e.g., "What happened?"), reports are typically high in accuracy but low in completeness (Dent & Stephenson, 1979; Saywitz, 1987). Some have proposed that only such open-ended, free-recall questions should be asked in child abuse investigations (e.g., see *Idaho v. Wright*, 1990). There is concern that when cuing comes in the form of direct questions, which may be construed as leading or misleading, contamination of memory may result (Loftus, 1979). However, risks and benefits of direct questions to aid reporting of sexual acts that might not otherwise be disclosed have not been previously studied. Former research indicates that direct questions typically elicit additional information, not all of which is accurate (Dent & Stephenson, 1979).

Past studies also suggest that, in general, stimulus supports (e.g., dolls, toys, pictures) aid children's recall (Piaget & Inhelder, 1973; Price & Goodman, 1990) by supplying retrieval cues, allowing reenactment, and compensating for limited language abilities. However, with regard to recall of genital activity in particular, classical psychoanalytic theory posits that children are prone to sexual fantasies. There has been speculation that anatomically detailed dolls stimulate reporting of such fantasies rather than actual memories (Yates & Terr, 1988). We thus investigated the use of free recall, anatomically detailed dolls, and direct and misleading questions to obtain from children information relevant to genital touch.

Also in regard to type of questioning, we were concerned with children's abilities to provide accurate descriptions of people and timing of events. Such descriptions can be of crucial importance in abuse investigations. Children may be asked about such information through questions that require knowledge of conventional systems for measuring height, age, and time. Yet children develop concepts of time and measurement gradually (Davies, Tarrant, & Flin, 1989; Friedman, 1982). We hypothesized that children may be able to provide accurate information concerning time, age, and height if asked "age appropriate" questions, that is, questions based on concepts, terms, and experiences that children understand. For example, a child might be unable to state someone's age in years but be able to state whether the person is old enough to drive.

A final issue we examined was the developmental relation between retention interval and memory. Age differences present after short retention intervals may recede over time as older children forget details and more peripheral information that constitute their initial memory advantage, whereas memory of central events may be maintained relatively well by all subjects (Goodman et al., 1990).

To examine these issues, 5- and 7-year-old girls received an identical doctor's examination, with one exception. Midway through the checkup, half the children in each age group received a routine examination of the exterior of the vagina and anus (genital condition); the others received an examination for scoliosis instead (nongenital condition). One week or one month later, memory for the checkup was tested through free recall, doll and prop demonstration, and direct and misleading questions.

Several predictions were made. First, we predicted that older compared with younger children would provide more complete and accurate information. This prediction was based on older children's more sophisticated cognitive abilities and more complete knowledge of doctor visits (Eiser, Eiser, & Lang, 1989). An important exception was expected for reports of genital contact. Older children's advanced cognitive abilities, which support more accurate memory, were also expected to support more advanced social awareness and self-consciousness, inhibiting reports of genital contact. Second, we predicted that free recall would elicit relatively brief reports unlikely to include disclosure of genital contact, whereas direct questioning would more likely result in disclosures. This pattern would be consistent with the general tendency for children to report relatively limited information in free recall (e.g., Dent & Stephenson, 1979). Third, we predicted that questions concerning time, age, and height would be answered more accurately when made more "age appropriate." Finally, we predicted that the completeness of older and younger children's memory would converge as delay increased as a result of loss of peripheral detail by older children.

Method

Subjects

Seventy-two female children participated. Half were 5-year-olds (M = 69.6 months; range = 62–77 months); half were 7-year-olds (M = 91.2 months; range = 84–102 months). Girls only were included to standardize the genital examination and because they are most frequently the reported victims of sexual assault (Finkelhor, 1984). The sample was 78% Caucasian, 10% Hispanic, 10% Asian, and 3% Black. The mean socioeconomic status of the sample, as measured with Watt's (1976) revision of the Hollingshead Scale, was 3 (range 1–7). Within

each age group, children were randomly assigned in equal numbers to experimental conditions.

The children were solicited through public elementary schools in Los Angeles County. After telephone interviews with parents regarding the study's procedure and children's medical histories, 11 families declined participation, and 36 potential subjects were excluded to restrict the sample to well, English-speaking children with no recent hospitalization or medical emergencies and no known history of sexual abuse. In addition, 8 children were replaced because they did not return for the interview.

Children who participated scored within the normal range on a parent-report measure of behavioral disturbance. Specifically, the group's mean *T* score on the Child Behavior Checklist—Revised (CBCL–R; Achenbach & Edelbrock, 1983) was 55 (*SD* = 12).

Questionnaire

The first part of the questionnaire included a free-recall question concerning the doctor's visit. The second part concerned the anatomically detailed doll and prop demonstration. The last part consisted of 70 questions, including 21 misleading questions (e.g., "The doctor had really long hair, didn't she?" when in fact she did not and "Didn't the doctor look at your feet first?" when in fact she did not) and 49 direct, but not intentionally misleading, questions (e.g., "Was there a sink in the room?" and "Did that doctor look in your ears?"). One misleading question that we were unable to score was later dropped. A subset of the questions (five direct and five misleading) could be construed as abuse-related in other contexts (e.g., "Did the doctor put something in your mouth?" "Did you take your clothes off?" "How many times did the doctor kiss you?"). We refer to these as "abuse" questions. For both direct and misleading questions, the number that could be answered correctly by saying yes or no was approximately equal. Remaining questions typically required one-word answers.[1]

In an effort to devise age-appropriate methods for eliciting information, two types of questions were included concerning the doctor's age and height and the timing of the visit: One type (original questions) required a response in terms of the conventional system for measuring age ("How old was the doctor?"), calendar time ("When did you see that doctor? What day was it?"), and height ("How tall was the doctor?"). The second type (alternate questions) requested similar information in more developmentally sensitive ways, for example, "Is the doctor old enough to be a mommy?" and "Did you see the doctor during the week or on a weekend?" The question "How tall was the doctor?" was followed by an alternate task that involved different colored bars marking off every 6 in. on the wall. This task required the child to stand next to the wall so that she could see her height marked off, followed by the child's being asked which color showed how tall the doctor was.

Procedure

An individual appointment was made for each child with a female pediatrician at a university-affiliated medical center. During recruitment, parents were told that the study concerned children's reactions to medical procedures. The child and accompanying parent were greeted at the clinic by a research assistant who obtained parental consent and children's assent and then escorted them to the examination room. A nurse was present during the examination and recorded what occurred for later comparison with the children's memories. Mothers were in the room during the examinations.

The nurse instructed each parent to help the child undress and left the room. She returned with the doctor who greeted the child and pointed out large, inflated toy crayons hanging from the ceiling above the examination table, placed there as a distinctive cue for later reference to the event. She asked the parent a few standardized questions about the child's medical history. The study was conducted at a medical center where the routine physical checkup included genital and anal examination by both visually inspecting and touching the exterior of these areas to look for rashes, infections, tears, and other evidence of trauma. All children participated in a standardized physical checkup, starting with the head and proceeding to the toes, with the exception that for half of the children the genital inspection was withheld; instead, at the same point in the examination, their backs were tapped along the spine to check for scoliosis (nongenital condition). The doctor and nurse left the room while the child re-dressed.[2]

For the second session, the child and parent returned one week or one month later, depending on delay condition, to a different building in the medical complex. At the return visit, the parent was informed of the full nature of the study and was shown the questionnaire and anatomically detailed dolls. Parents were allowed to strike any questions they did not want asked. (In all, two parents struck two questions from the interview. No parent objected to the dolls.) At this visit, parents completed the CBCL–R.

Children were interviewed individually by a female interviewer, blind to examination condition. All children received the same interview, which was videotaped. To prompt free recall, each child was asked to "Think about your visit to the doctor who had the big crayons in the office. Tell me everything you can remember about what happened, from beginning to end." After free recall, each child was shown a set of anatomically detailed dolls and told, "These are special dolls that have all the same parts that real people have." A male and female doll dressed like the nurse and a male and female doll dressed like the doctor were available, as was an assortment of child and adult dolls of both sexes dressed in street clothes. One doll was undressed by the interviewer to show the child that the dolls had the same parts as real people. Then the child was told to pick a doll to show each person who was at the doctor visit and was prompted once with "Anyone else?" There also were doctor toys to use as props, only half of which were actually used in the examination. The child was then asked to use the dolls and toys to show and tell what happened when at the doctor's office, from beginning to end. Children were prompted once with "Tell me while you show me," if necessary.

After the child demonstrated what happened, the direct and misleading questions were asked. For several of the questions, including the ones concerning vaginal and anal touch, the interviewer held up an undressed anatomically detailed doll and pointed to the relevant body part while asking the question (e.g., "Did that doctor touch you there?" pointing to the doll's vagina). At the end of Session 2, parents were paid and children received a sticker.

Results

In the following sections, analyses are presented concerning the completeness and accuracy of the children's free recall and doll demonstrations overall. We then describe analyses examining children's free recall and demonstration of body parts

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[1] Copies of the questionnaire and scoring checklist can be obtained from Karen J. Saywitz. Our questions were chosen to be as ecologically valid as possible. In actual practice, wide variability exists in questions asked. Some of our questions were specific to the checkup. Nevertheless, many questions were comparable to those asked in abuse investigations in their form, specificity, and concern with bodily touch.

[2] The doctor failed to check one part of a child's body in 6 cases (because of physician error) and checked an extra part in 3 cases (because of parental request). In no case were errors or additional checks made concerning the spinal or genital part of the examination.

touched by the doctor. Next, analyses are presented for direct questions overall, followed by analyses for direct questions concerning bodily touch. As part of the latter analyses, important comparisons are included of the children's reports of vaginal and anal touch across the free-recall, demonstration, and direct question tasks. Separate analyses of answers to misleading, abuse, and age-appropriate questions are presented next. Finally, analyses concerning age differences in memory for central versus peripheral information are described.

Unless otherwise specified, results are reported on the basis of a series of 2 (age) × 2 (delay) × 2 (examination) analyses of variance, with all factors varied between subjects. All significant effects are reported.

Free Recall and Demonstration

Coding. Children's responses to free-recall and demonstration tasks were scored as correct or incorrect units of information. For example, the statement "The doctor listened to my heart" obtained one correct point for "doctor," one for "listened," one for "heart," and one for "my." "The doctor checked my blood pressure" was scored as four errors because the children's blood pressure was never checked. Free recall was composed of verbal reports. Demonstration data combined verbal and nonverbal information. For qualitative analyses, responses were compared with a 52-item checklist regarding participants, objects, and actions (e.g., nurse, thermometer, and getting undressed, respectively).

Two coders, blind to children's group assignment, scored 18 protocols (25%), equally representing the experimental conditions but otherwise chosen randomly. Reliability of coding as measured by kappa was .87 for units of information in free recall and .72 for units of information in demonstration, indicating acceptable reliability.

Overall analyses. The number of correct units of information reported by each child in free recall and demonstration were entered as dependent measures in a 2 (age) × 2 (delay) × 2 (examination) multivariate analysis of variance (MANOVA). A significant Age × Examination interaction emerged, $F(2, 63) = 4.45$, $p < .025$ (see Table 1). Univariate tests of the free-recall scores revealed a significant Age × Examination interaction, $F(1, 64) = 5.70$, $p < .025$. Simple effects analyses indicated that 7-year-olds in the genital condition recalled less correct information than did 7-year-olds in the nongenital condition, $F(1, 64) = 7.33$, $p < .01$, whereas examination condition did not significantly affect 5-year-olds' performance. In addition, 7-year-olds in the nongenital condition recalled more correct information than did 5-year-olds in the nongenital condition, $F(1, 64) = 8.20$, $p < .01$. A significant age difference failed to emerge for children in the genital condition.

Univariate tests for the demonstration scores uncovered a similar significant Age × Examination interaction, $F(1, 64) = 6.32$, $p < .01$. Simple effects analyses again revealed that 7-year-olds in the nongenital condition reported (through word and action combined) significantly more information than did 7-year-olds in the genital condition, $F(1, 64) = 8.10$, $p < .01$, or 5-year-olds in the nongenital condition, $F(1, 64) = 10.16$, $p < .01$. Performance of 5-year-olds in the genital condition did not differ significantly from that of 5-year-olds in the nongenital condition or 7-year-olds in the genital condition. Thus, in both free recall and demonstration, 7-year-olds in the genital condition performed at the level of 5-year-olds instead of at the level of 7-year-olds in the nongenital condition.

Table 1
Mean Number of Units of Information Recalled Correctly and Incorrectly as a Function of Age and Examination Condition

	Questioning technique			
	Free recall		Demonstration	
Condition	5 years	7 years	5 years	7 years
Genital examination ($n = 36$)				
Correct				
M	23.50	20.58	49.08	46.22
SD	21.94	16.55	14.84	15.45
Incorrect				
M	2.22	1.61	4.94	7.89
SD	2.73	2.48	4.70	6.54
Nongenital examination ($n = 36$)				
Correct				
M	19.69	35.94	43.56	68.36
SD	14.48	12.81	25.06	32.54
Incorrect				
M	1.72	3.25	9.47	8.50
SD	2.89	4.42	7.48	7.21

A second MANOVA identical to that described above was conducted entering the number of units of information recalled or demonstrated in error. There were no significant main effects or interactions (see Table 1).

Further examination of the data uncovered several omissions evidenced by older children in the genital condition. Fisher's exact tests (two-tailed) conducted on free recall of checklist items revealed that 7-year-olds in the genital condition reported undressing ($p < .05$) and what took place immediately before the genital examination ($p < .01$) significantly less often than agemates in the nongenital condition reported undressing and what occurred immediately before the scoliosis examination. However, a similar pattern was not evident in the demonstration task, in which responses were predominantly determined by the props.

Interestingly, when asked to demonstrate as well as tell what happened, children reported approximately twice as much correct information ($M = 52$) as in free recall ($M = 25$). Although accuracy rates (ratio of correct to total information reported) were respectably high on both tasks (free recall, $M = .93$, $SD = .08$, and demonstration, $M = .87$, $SD = .09$), the error rate rose from a mean of 2.2 errors (8.09%) in free recall ($SD = 3.2$) to 7.7 errors (12.89%) in demonstration ($SD = 6.6$). Further examination to determine the seriousness of errors ($n = 95$) made in the demonstration task revealed 57% involved toy instruments alone (e.g., using a distractor prop), 15% involved dolls alone (e.g., inaccurately reporting a sibling in the room), 16% involved combining dolls with props incorrectly, and 13% involved "other" errors (e.g., verbal error). None of the errors involved demonstration of sexually explicit behaviors. Approxi-

mately half the errors (45/95) were due to children's use of the tongue depressor, which, although not used in Session 1, is common to doctor visits in general.

Reports of bodily touch. The majority of body touch that occurred was not reported in free recall. The mean ratio of number of body parts reported in free recall and demonstration to number of body parts touched in the examination was .10 (SD = .12) and .29 (SD = .14), respectively. As seen in Table 2, the proportion of children reporting various types of bodily touch in free recall and demonstration varied across body parts.

One of our main concerns was to determine the types of questions needed to elicit reports of vaginal and anal touch. In free recall and demonstration, 8 (22%) and 6 (17%) children in the genital condition correctly reported vaginal touch, respectively, whereas 28 (78%) and 30 (83%) failed to report it, respectively. Only 4 children correctly reported anal touch in free recall, and 4 correctly reported it in demonstration. Thus, 32 (89%) failed to mention anal touch in free recall, and the same number failed to demonstrate anal touch with the dolls.[3] There were no commission errors on these tasks. That is, no child in the nongenital condition recalled or demonstrated that vaginal or anal touch occurred when it had not. Similarly, all errors regarding the scoliosis examination were omission errors (97% and 100% omission error rate in free recall and demonstration, respectively). There were no commission errors reporting the scoliosis examination when it had not occurred.

Interestingly, there was a reverse developmental trend for reporting vaginal and anal touch in free recall. Of the 8 children who reported vaginal touch in free recall, 5 were 5-year-olds and 3 were 7-year-olds. Of the 4 children who reported anal touch in free recall, 3 were 5-year-olds and only one was a 7-year-old. Reverse developmental trends such as these were noted on only 10 other items of the 52-item checklist. On the demonstration task, a reverse developmental trend was noted on demonstration of anal touch; however, age groups did not differ on demonstration of vaginal touch. Sixteen items of the 52-item checklist showed reverse developmental trends on the demonstration task, most of which were associated with the use of toy instruments.

In summary, analyses of free recall and demonstration data revealed differential age effects across examination conditions, with children in the genital condition failing to show age differences, indicating suppressed memory performance by older children. Also, vaginal and anal touch was infrequently reported in free recall and demonstration tasks, which were characterized by high omission rates but no false reports of sexual contact.

Table 2
Proportion of Children Reporting Body Parts Touched

Type of body touch	Free recall[a]	Demonstration[a]
Wrist	.03	.03
Head	.00	.03
Neck	.01	.01
Eyes	.18	.47
Ears	.19	.57
Mouth	.11	.54
Chest	.03	.15
Heart	.21	.72
Abdomen	.04	.04
Reflexes	.22	.81
Knees	.24	.76
Ankles	.06	.11
Elbows	.07	.25
Vagina[b]	.22	.17
Anus[b]	.11	.11
Spinal touch[b]	.03	.00

[a] n = 72. [b] n = 36.

Direct Questions

Overall analyses. Analysis of variance was conducted on the proportion of direct questions answered correctly. There was a significant Age × Delay interaction, $F(1, 64) = 9.04$, $p < .01$ (see Table 3). Simple effects analyses revealed that after 1 week, older children responded to more questions correctly, M = .80, SD = .06, than did younger children, M = .67, SD = .08, $F(1, 64)$ = 33.19, $p < .01$. After 1 month, age differences were minimal and failed to reach significance (7-year-olds, M = .74; SD = .06; 5-year-olds, M = .71, SD = .06). However, older children responded to more questions correctly after one week than after one month, $F(1, 64) = 7.24$, $p < .01$. This was not true for younger children. The main effect of examination was not significant ($F < 1.00$), and there were no significant interactions.

Responses to direct questions about bodily touch. Answers to direct questions were analyzed to determine the accuracy of memories of body touch. Again, accuracy varied across body parts (see Table 4). Because the questions were the yes–no type, chance was calculated at 50%. Children showed significantly less than chance reporting of some body parts (e.g., neck) in response to a direct question. Children showed dramatically high rates of correct responses to direct questions regarding other body parts (e.g., ears, vagina, anus). Answers to direct questions about some body parts (e.g., tapping along the spine, wrist) did not differ significantly from chance, and therefore guessing cannot be ruled out.

Of central concern was whether direct questions were needed to elicit reports of vaginal and anal touch in the genital condition and whether direct questions would elicit false reports of such touch in the nongenital condition. Although the majority of children who experienced vaginal touch failed to report it in free recall and demonstration, they disclosed the experience when asked directly. As mentioned earlier, only 8 (22%) of 36 girls reported vaginal touch in free recall, and only 6 (17%) reported it in demonstration; however, 31 (86%) disclosed vaginal touch in response to the interviewer's direct question (accompanied by pointing to the doll's vaginal area). The same pattern held for anal touch. Only 4 (11%) girls reported anal

[3] Of the 8 children who reported vaginal touch in free recall, 4 continued to demonstrate vaginal touch in demonstration, and 4 failed to do so. Two additional children reported vaginal touch in demonstration who had not previously done so. Of the 4 children who reported anal touch in free recall, only 1 also demonstrated anal touch in demonstration. Three additional children reported anal touch in the demonstration task who had not previously done so in free recall.

Table 3
Mean Proportion Correct on Direct and Misleading Questions as a Function of Age, Examination Condition, and Delay

Delay and question type	5 years		7 years	
	Genital	Nongenital	Genital	Nongenital
Week				
Direct questions				
M	0.66	0.69	0.81	0.79
SD	0.09	0.08	0.06	0.07
Misleading questions				
M	0.83	0.80	0.88	0.91
SD	0.12	0.08	0.11	0.07
Month				
Direct questions				
M	0.72	0.69	0.76	0.72
SD	0.06	0.05	0.07	0.03
Misleading questions				
M	0.81	0.72	0.87	0.83
SD	0.08	0.14	0.09	0.14

touch in free recall or in demonstration; yet when asked a doll-aided direct question, 25 (69%) of 36 girls disclosed that anal touch occurred. The proportion of the sample disclosing genital touch when it occurred differed across type of interview technique. Tests of differences among multiple proportions yielded $\chi^2(2, N = 36) = 42.88$, $p < .001$ for vaginal touch and $\chi^2(2, N = 35) = 33.28$, $p < .001$ for anal touch.

Accurate reporting of vaginal and anal touch in response to direct questions was by far the rule (see Table 4). Percentage correct answers to these yes–no questions were significantly higher than chance expectation. Therefore, children's failure to report vaginal and anal touch in free recall and demonstration was not due to storage failure.

The majority of errors to direct questions regarding vaginal and anal touch were omission errors. Commission errors were rare. However, one child in the nongenital condition falsely affirmed vaginal touch; two children in the nongenital condition falsely affirmed anal touch. This constitutes a 2.86% rate of false reports of vaginal touch and a 5.56% rate of false reports of anal touch. (The 2.86% rate is based on 35 children because one parent crossed out the vaginal touch question.) In all cases, the commission errors occurred in response to direct questions. There was a 21.74% rate of false reports of tapping the spine (scoliosis examination) by children in the genital examination condition.

When any child, regardless of examination condition, reported genital or anal touch, the child was asked, "How did the doctor do that? What was it like? What did the doctor touch you with? How did it feel? Did it hurt?" These follow-up questions were primarily included to see if detail could be provided when a false report was made. Of the children in the nongenital condition who made the three commission errors, two were unable to provide any detail. However, one child in the nongenital condition who said yes to the anal touch question described in further questioning that "it tickled" and "the doctor used a long stick."

In summary, in response to direct questions, older children performed better than did younger ones after one week, but this age-related advantage disappeared after a month. Also, for children in the genital condition, direct questions elicited a dramatic increase in accurate reports of vaginal and anal touch over reporting rates in free recall or demonstration. Errors regarding vaginal and anal touch in response to direct questions were due predominantly to omissions. Commission errors were rare and occurred only in response to direct questions.

Misleading Questions

To examine children's suggestibility in response to misleading questions, analysis of variance was conducted on the proportion of misleading questions answered correctly by each child (see Table 3). A significant main effect of age emerged, $F(1, 64) = 9.97$, $p < .01$, with 7-year-olds, $M = .87$, $SD = .10$, answering a higher proportion of misleading questions correctly than did 5-year-olds, $M = .79$, $SD = .11$. There was

Table 4
Proportion of Children Responding Correctly or Incorrectly to the Question, "Did the Doctor Touch You Here?"

Body part	Correct	Incorrect		
		Omission error	Commission error	Don't know
Ears	.92*	.08	—	.00
Vagina	.92*	.07	.01	.00
Anus	.82*	.14	.03	.01
Spine (tapping)	.60	.21	.09	.09
Wrist (pulse)	.50	.46	—	.04
Neck (glands)	.31*	.65	—	.04

Note. Answers to these yes–no questions were scored as correct or incorrect and compared with chance expectation of 50%, but a further breakdown of type of errors is provided for the reader's interest. Proportions are based on the total number of children who responded to the question. Question was asked while pointing to the appropriate body part on an anatomically detailed doll. Dash indicates commission error was not possible.

* $p < .01$ (significantly different from chance).

also a significant main effect of delay, $F(1, 64) = 3.87$, $p < .05$. Children who returned in one week, $M = .86$, $SD = .10$, were more resistant to misleading questions than were children who returned in a month, $M = .81$, $SD = .12$, although the mean difference was small.

Because commission errors to misleading questions are of much interest in the child testimony literature, errors to misleading questions were further characterized as omissions or commissions (see Table 5). When the proportion of omission errors made by each child was analyzed, a significant main effect of age emerged, $F(1, 64) = 5.13$, $p < .05$.[4] Five-year-olds, $M = .24$, $SD = .16$, made more omission errors to misleading questions than did 7-year-olds, $M = .16$, $SD = .11$.

When the proportion of commission errors was analyzed, the Age × Delay × Examination interaction was significant, $F(1, 64) = 5.14$, $p < .05$. Simple effects analyses revealed that, at the one-week delay, 5-year-olds in the nongenital condition made more commission errors than did 7-year-olds in the nongenital condition, $F(1, 64) = 9.22$, $p < .01$, and more than did 5-year-olds in the genital condition, $F(1, 64) = 6.29$, $p < .025$. One would expect 5-year-olds, regardless of examination condition, to produce more commission errors than 7-year-olds; thus, it is of interest that significant age differences occurred only for nongenital condition children. At one month, there were no significant main effects or interactions.

In summary, children were highly resistant to misleading questions, and younger children omitted more in response to misleading questions than did older children. Over time, resistance to misleading questions decreased. Additionally, younger children in the nongenital condition made more commission errors than did other groups. Significant age differences in commission errors did not appear in the genital condition.

Abuse Questions

We were also interested in children's answers to abuse questions. The children's answers to the five direct and five misleading abuse questions were analyzed separately. When the proportion of correct answers made by each child to the direct abuse questions was analyzed, significant main effects of delay, $F(1, 64) = 5.29$, $p < .025$, and examination, $F(1, 64) = 4.10$, $p < .05$, emerged. Surprisingly, children answered fewer of these questions correctly after one week, $M = .77$ ($SD = .22$) than after one month, $M = .87$ ($SD = .13$). Children in the genital condition, $M = .78$, $SD = .21$, answered fewer of these questions correctly than did children in the nongenital condition, $M = .86$, $SD = .13$.

This pattern was primarily a function of omissions errors. The overall mean proportion of omission and commission errors on direct abuse questions was .25 ($SD = .24$) and .06 ($SD = .19$), respectively. There were no significant main effects or interactions when proportions of omission or commission errors to direct abuse questions were analyzed.[5] The vast majority of omission errors to direct abuse questions were made in response to the question, "Did that doctor put something into your mouth?" Approximately half the children answered no, even though most had earlier reported their temperatures being taken by mouth or had demonstrated (incorrectly) that the doctor used a tongue depressor. This question may have been too general to cue retrieval of these previously reported specifics. The majority of commission errors were made to the question, "Did that doctor ever touch you before that day?" All six errors were made by 5-year-olds, many of whom indicated they did not understand the linguistic construction using "ever" and "before." Thus, less advanced cognitive and language skills of younger children may have contributed to these errors.

When the proportion of misleading abuse questions answered correctly by each child was considered, a significant main effect of age emerged, $F(1, 64) = 5.16$, $p < .05$. Seven-year-olds, $M = .99$, $SD = .03$, answered a higher proportion of misleading abuse questions accurately compared with 5-year-olds, $M = .96$, $SD = .10$. However, regardless of age, children demonstrated nearly perfect performance. When proportion omission errors were analyzed, no significant differences emerged. The overall mean proportion of omission and commission errors on misleading abuse questions was .01 ($SD = .05$) for both types of errors. When proportion commission errors were analyzed, a significant main effect of age emerged, $F(1, 64) = 4.27$, $p < .05$, with 7-year-olds making no commission errors and 5-year-olds making four commission errors, a mean proportion of .02. Consistent with findings from other studies (Goodman et al., 1990), three of the four errors were to the question, "How many times did the doctor kiss you?"

In summary, children showed high resistance to misleading

Table 5
Mean Proportion of Omission and Commission Errors on Misleading Questions

	Omissions		Commissions	
Condition	5 years	7 years	5 years	7 years
Genital examination				
Week				
M	.25	.13	.07	.06
SD	.23	.11	.08	.08
Month				
M	.21	.19	.15	.06
SD	.09	.09	.14	.07
Nongenital examination				
Week				
M	.18	.15	.21	.05
SD	.16	.08	.11	.07
Month				
M	.31	.18	.13	.14
SD	.13	.16	.11	.18

[4] Of the 20 misleading questions, 12 could be answered incorrectly by making a commission error; 8 could be answered incorrectly by making an omission error. For these and all other question types, proportion of omission errors was calculated using the total number of questions of that type (e.g., misleading) on which an omission error was possible as the denominator. Proportion of commission errors was calculated similarly.

[5] With regard to direct abuse questions, children in the genital condition had four chances to make an omission error, and children in the nongenital condition had only two chances to do. This was so because questions about genital touch were considered abuse-related, whereas questions about the scoliosis examination were not.

abuse questions. Errors tended to be made by younger children. Answers to direct questions about abuse were influenced by delay and examination condition, but not age. This pattern was primarily due to omissions, not commissions.

Questions concerning timing, age, and height. In this study, we explored whether children's reports of timing, age, and height could be improved by asking age-appropriate questions. To determine the effectiveness of the alternate forms of questioning a 2 (age) × 2 (delay) × 2 (examination) × 2 (form of question: original vs. alternates) × 3 (content: timing, age, height) repeated measures analysis of variance was conducted, with the latter two factors varied within subjects. A significant effect of form of question emerged, $F(1, 64) = 331.42$, $p < .001$. Children performed significantly better on the alternate questions, $M = .58$, $SD = .43$, than on the original questions, $M = .09$, $SD = .29$.

The Age × Form of Question interaction was also significant, $F(1, 64) = 4.33$, $p < .05$. Simple effects analyses revealed that 7-year-olds performed significantly better than did 5-year-olds on both the original, $M = .14$, $SD = .35$, and $M = .05$, $SD = .21$, respectively, and alternate forms, $M = .68$, $SD = .42$, and $M = .48$, $SD = .41$, respectively. In addition, responses to the alternate forms were significantly more accurate than responses to the original forms for both 5- and 7-year-olds, although the alternate form may have helped 7-year-olds somewhat more.

The analysis also showed a significant effect of question content, $F(2, 128) = 90.38$, $p < .001$. When responses were collapsed across form of question, children reported more accurately about the doctor's age, $M = .48$, $SD = .47$, and timing of the event, $M = .43$, $SD = .43$, than about the doctor's height, $M = .09$, $SD = .29$. Bonferroni post hoc analyses revealed that these two comparisons were significant at the .01 level. The alternate questions aided the children report age and timing, but not height. (Some of the children's responses to the original question about height could not be scored because the children gestured or otherwise responded in ways that could not be adequately coded.)

Central Versus Peripheral Information

Several researchers report better memory for central events than for peripheral details (Goodman et al., 1990; Tucker, Mertin, & Luszcz, 1990). In the present study we predicted that memory for central and peripheral information would vary as a function of age and delay. To investigate these possibilities, five adults rated each question on a 4-point scale as to whether it measured central or peripheral information (1 = *very central–core* to 4 = *very peripheral–not important*). Mean ratings below 3.0 were used to characterize questions as central and those above 2.9 to classify questions as peripheral. This resulted in 43 central questions and 26 peripheral questions.

When a 2 (age) × 2 (examination) × 2 (delay) × 2 (type of information: central vs. peripheral) analysis of variance was conducted, with the latter factor varied within subjects, on each child's proportion correct score, a significant main effect of type of information emerged, $F(1, 64) = 38.45$, $p < .001$. Children responded more accurately to questions about central information, $M = .79$, $SD = .08$, than about peripheral information, $M = .71$, $SD = .11$. In contrast to our predictions, there were no other significant main effects or interactions. In summary, central information was recalled better than was peripheral information, and this pattern did not vary with age or delay.

Discussion

A major finding of this study concerns the differential age effects evidenced across examination conditions. In free recall and demonstration, an age advantage was found only for children in the nongenital condition. Seven-year-olds in the genital condition performed at the level of 5-year-olds. In fact, examination of the few reports of vaginal and anal touch in free recall revealed reverse developmental trends, with 5-year-olds more readily revealing these experiences. It is unlikely that less complete reports of older children in the genital condition resulted from a general memory failure; when asked direct questions about the examination, older children showed no evidence of impaired memory. Although the findings imply that a memory deficiency, as proposed by traditional cognitive development theories, may explain age differences evident in the nongenital condition, this type of deficiency alone provides an inadequate explanation for the results overall.

Instead, a social-motivational model of remembering may best explain our findings (Paris, 1988). Within this framework, two related processes suggest themselves. First, for older children in the genital condition, information may have been potentially available but edited out of their reports deliberately. The interaction of emotions, socialization experiences, and metacognitive capacities could differentially affect reports by older children for an event that includes genital touch. Older compared with younger children's larger store of past experiences, greater knowledge of social conventions, and better metacognitive and perspective-taking abilities (Flavell, 1985; Maccoby, 1980), attributes that usually support more accurate, detailed, and coherent reports, may lead to heightened awareness of others' reactions to nudity and genital touch, an awareness that can reduce motivation to report genital contact to unfamiliar adults.

A second possibility is that the information may have been stored but was less accessible for purposes of free recall and demonstration. The fact that, for older children, the information was inhibited only in the genital condition suggests the possibility of emotional blocking that may have rendered some information temporarily inaccessible. According to this explanation, emotions such as embarrassment, anxiety, or self-consciousness may interfere directly with access to stored information, as when one's mind goes blank. For the reasons stated above, these feelings could have been more prevalent or intense among the older children.

The second major result of our study is that the vast majority of vaginal and anal touch went unreported in free recall and demonstration, but was disclosed when children were asked doll-aided direct questions, perhaps because direct questions about genital touch not only provide memory cues, but also social cues. In important ways, recounting one's memories constitutes a social process of communication (Rogoff & Lave, 1984). By the very nature of the questions, the interviewer implicitly gave permission to talk about something that children may have been socialized not to discuss with strangers. The use

of dolls to point to the genital area eliminated potential confusion regarding children's idiosyncratic names for vagina and anus. It also eliminated the need to say the names of these body parts aloud, a potentially emotional (embarrassing, guilt-provoking) or value-laden (taboo) activity. In addition to memory cues, these facilitating social cues may have enhanced the child's ability or willingness to respond to questions, whereas these cues were not available during free recall.

The relative success of direct questions at eliciting additional information could have also been due to priming effects because task order was not varied. The fact that other studies find similar effects when free recall and direct questions are studied independently makes this notion less likely (e.g., Dent & Stephenson, 1979). However, recent evidence suggests that later recovery of items previously not remembered could be due to initial, unsuccessful retrieval attempts (Brainerd, Reyna, Howe, & Kingma, 1990). Regardless of the exact mechanism involved, the experimental interview was modeled after forensic investigations to recreate aspects of the recall context experienced by child victim-witnesses.

The third major finding is that false reports of vaginal and anal touch from children in the nongenital condition were nonexistent in free recall and demonstration with anatomically detailed dolls; they were rare in response to direct questions. A cost-benefit analysis of the use of direct questions about vaginal and anal touch must consider the fact that when direct questions were employed, one child made a false report of vaginal touch, although she could provide no details in further questioning. Also, two children falsely reported anal touch, one of whom provided two details. Interestingly, the rates of false reports in this study are comparable to those found in clinical samples of children referred to agencies for evaluations of child abuse (2–8%; Gomes-Schwartz, Horowitz, & Cardarelli, 1990; Jones & McGraw, 1987; Theonnes, Cosby, & Pearson, 1988). Our results suggest that although there is a risk of increased error with doll-aided direct questions, there is an even greater risk that not asking about vaginal and anal touch leaves the majority of such touch unreported.

The results of this study are also relevant to determining the utility of anatomically detailed dolls to aid disclosure of genital contact. Counter to clinical experience, doll use did not often elicit additional reports of vaginal or anal touch. Children's use of the dolls for purposes of demonstration also did not stimulate false reports of genital contact, consistent with other studies of nonreferred samples (Boat & Everson, 1988; Goodman et al., 1990; Sivan, Schor, Koeppl, & Noble, 1988). Generalization from this study regarding the value of dolls in sexual abuse evaluations is limited because anatomically detailed dolls may possess different stimulus characteristics for genuine victims of abuse (e.g., preoccupied with sexual issues, forbidden to tell). Steward and Steward (1989) reported different patterns of recall for painful versus nonpainful body touch; our results may not generalize to genital contact that is painful. However, responses to direct questions accompanied by dolls to point to a body part suggest a valuable if limited role for anatomically detailed dolls in forensic or clinical interviews.

In the demonstration task, anatomically detailed dolls and props elicited twice as much accurate information as did initial free recall. Although improvement was dramatic, the dolls and props also stimulated a small increase in errors; however, the majority of errors involved props, not dolls. Interestingly, over half the errors were due to intrusions of features common in doctor scripts. Similar to results reported by Steward and Steward (1989), the majority of errors attributable solely to the dolls involved a sibling's presence or absence during the examination. None involved demonstrations of sexually explicit activities.

The fourth major finding concerns the significant interaction between age and delay in response to direct questions. There were significant age differences one week but not one month after the examination. This pattern could be due to older children having forgotten some of the details they initially reported, whereas younger children's memory, less detailed from the start, remained constant over time. However, the prediction that older compared with younger children would forget relatively more peripheral information was not confirmed. Children evidenced more accurate memory of central information than peripheral detail regardless of age or delay, strengthening the notion that children are more capable of reporting central events than peripheral detail (Goodman et al., 1990; Tucker et al., 1990). Perhaps the type of detail lost over time by the older children was not captured by our central versus peripheral distinction.

In regard to the misleading questions overall, age differences in suggestibility were apparent, as were effects of delay. Some of the younger children's suggestibility seemed to be a function of the mismatch between the question and their level of linguistic and cognitive functioning. However, younger children were not uniformly suggestible; for example, their resistance to abuse-related suggestions was substantial.

Consistent with results of other studies (Goodman et al., 1990; Tucker et al., 1990), resistance to suggestion lessened over time. As memory fades, children may become more vulnerable to accepting information implied in suggestive questions, a phenomenon true of adults, at least in laboratory studies (Loftus, 1979). However, although delay and age effects on misleading questions were present, they were primarily a function of incompleteness, not confabulation. Commission errors were relatively infrequent. They were most likely to be made by 5-year-olds in the nongenital condition.

Finally, we explored whether children's reports of timing, age, and height could be improved on the basis of age-appropriate questioning. Although children were unable to state accurately the doctor's age or the date or day when the doctor visit occurred, they could provide accurate information about the doctor's age and the timing of the event when asked more age-appropriate questions. Children also had difficulty stating the doctor's height, but the task we devised was unsuccessful in eliciting more accurate height information. These data illustrate that obtaining accurate information from children depends to some degree on matching the task to the child's developmental level. The results also suggest that this is not necessarily a simple undertaking. Future research should continue to elucidate the most developmentally appropriate ways to elicit information from children.

Although we attempted to attain greater ecological validity than heretofore achieved in research on children's testimony as it relates to sexual abuse evaluations, the situation studied lacked the urgency of a clinical evaluation or courtroom proceeding. Questioning did not involve the repeated interviews

and cross-examinations that real witnesses undergo. Moreover, the genital touch did not resemble coercive, repeated abuse that can instill high levels of fear, shame, and mistrust. Although reported abuse typically involves male perpetrators (Finkelhor, 1984), the doctor in our study was a woman; a nurse and the child's mother were in the room, which is also unlike many abuse situations. Children in the nongenital condition had no motive to distort their reports. Moreover, children were aware that the doctor's intent was to heal, not to harm. Thus, generalization to clinical and legal cases must be carefully considered. Nevertheless, the data may be useful to clinicians weighing the costs and benefits of different interview techniques and to legal professionals weighing what action to take to protect a child or the accused.

The results of the present study strengthen the need for replication of previous research on children's memory and testimony with more ecologically valid paradigms before generalizing to cases of sexual molestation; challenge the wish that spontaneous recall can abolish direct questioning; and call for new methodologies to disentwine the relative contributions of situational, emotional, and social variables to memory performance. We hope that such research will further scientific knowledge about children's testimony and at the same time aid those who face the difficult task of interviewing children about sexual abuse.

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