

How Do Body Diagrams Affect the Accuracy and Consistency of Children's Reports of Bodily Touch Across Repeated Interviews?

DEIRDRE BROWN¹, MARGARET-ELLEN PIPE², CHARLIE LEWIS³, MICHAEL E. LAMB^{4*} and YAEL ORBACH⁵

¹University of Victoria, Wellington, New Zealand

²Brooklyn College, New York, USA

³University of Lancaster, Lancaster, UK

⁴University of Cambridge, Cambridge, UK

⁵National Institute of Child Health and Human Development, Bethesda, USA

Summary: We examined the amount, accuracy, and consistency of information reported by 58 5- to 7-year-old children about a staged event that included physical contact/touching. Both 1 and 7 months following the event, children were asked both open and yes/no questions about touch [i] when provided with human body diagrams (HBDs), [ii] following instruction and practice using the HBDs, or [iii] without HBDs. Children interviewed with HBDs reported more information at 7 months, but a high proportion of inaccurate touches. Children seldom repeated touch-related information across the two interviews and did not incorporate errors made in the 1-month interview into their open-ended accounts 6 months later. Asking children to talk about innocuous touch may lead them to report unreliable information, especially when HBDs are used as aids and repeated interviews are conducted across delays that resemble those typical of forensic contexts. Copyright © 2011 John Wiley & Sons, Ltd.

Conducting forensic interviews with children can be challenging. Although children's free recall reports are usually highly accurate (see Lamb, Orbach, Sternberg, Esplin & Hershkowitz, 2002, for a review) they also tend to be brief, often providing limited information to those investigating possible offenses (e.g., Poole & Lamb, 1998). Attempts to elicit more detailed information by asking more direct questions tend to reduce the reliability of the elicited information (e.g., Bjorklund, Bjorklund, Brown, & Cassel, 1998; Fivush, Peterson, & Schwarzmueller 2002; Greenstock & Pipe, 1996). Because forensic interviewers often need to elicit specific information, for example relating to bodily touch, some professionals have suggested that non-verbal techniques may facilitate detailed reporting without affecting the quality or accuracy of children's accounts.

Props such as toys, scale models and anatomically detailed dolls have considerable intuitive appeal as means of helping young children to express themselves (see Pipe & Salmon, 2009). Anatomically detailed dolls are problematic for a variety of reasons, however, and considerable criticism has been leveled against their use in forensic interviews (see Bruck, Ceci, & Principe, 2006 for a review). Human body diagrams (HBDs) may constitute an alternative means of helping children to recount abusive experiences because they too address linguistic (e.g., limited vocabulary), cognitive (e.g., limited knowledge or understanding), or motivational (e.g., because of the nature of the event) constraints on communication by allowing children to respond nonverbally.

Human body diagrams may have an advantage over dolls because they invite less exploration that may be misinterpreted as attempts to communicate experienced events, but only four studies have examined the effectiveness of interviewer-provided HBDs (Aldridge et al., 2004; Brown, Pipe,

Lewis, Lamb, & Orbach, 2007; Willcock, Morgan, & Hayne, 2006). Steward et al. (1996) found that 3- to 6-year-old children's free recall reports of bodily touches during a pediatric examination were very accurate but incomplete. When the children were questioned with dolls and HBDs in conjunction with yes/no and direct questions, they still omitted many experienced touches and reported more contact that had not occurred. Following longer delays accuracy decreased, and there were some spontaneous but inaccurate reports of genital touches.

In a field study, Aldridge et al. (2004) found that HBDs appeared to enhance 4- to 13-year-olds' reports of touch experienced during alleged incidents of abuse. Alleged victims were asked to show on a body diagram where previously reported touches had occurred and to indicate whether various body regions had been touched. Many new forensically relevant details were reported during the HBD phase of the interviews, especially by the youngest (4- to 7-year-old) children but the accuracy of the children's accounts could not be established.

Willcock et al. (2006) found that when five- to six-year-old children were shown (clothed) body diagrams and questioned about touch, they failed to mention many of the innocuous touches that had occurred during a scripted event 1 month earlier, and reported many inaccurate touch details, including touches of the genital and breast/chest areas. In a second experiment, children were questioned using the HBD in one of three delay conditions, that is, immediately, 24 hours, or 1 month after the event. Reports of touch were again incomplete and inaccurate, although children interviewed immediately reported twice as many touches as those interviewed after delays.

Brown et al. (2007) showed that HBDs did not yield better recall of touches experienced by 5- to 7-year-olds during a staged event than did verbal questioning alone when children's recall was assessed after a 4- to 6-week delay using (i) an HBD, (ii) an HBD accompanied by practice and feedback, or (iii) open and yes/no questions but no diagram (verbal

*Correspondence to: Michael E. Lamb, Social and Developmental Psychology, University of Cambridge, Free School Lane, Cambridge CB2 3RQ, UK.
E-mail: mel37@cam.ac.uk

questions). Most children were responsive to open-ended questions about touch but reported very little new information (about touch or any other aspect of the event), and the accuracy of this additional information was generally low (33%). Responses to yes/no questions about touch to different body regions differed by condition. Children provided with HBDs without instruction and feedback were less accurate than children in the other two groups. Brown et al. concluded that, even when they are introduced at the end of an exhaustive verbal interview, body diagrams may compromise the reliability of the information children report.

In the above studies, children's recall of touch was assessed over relatively short delays of up to a month (e.g., Brown et al., 2007; Willcock et al., 2006), with only one study examining touch reports after a much longer (6 months) delay (Steward et al., 1996). Most case evaluations in forensic contexts are delayed for weeks or even months (Hershkowitz, Horowitz, & Lamb, 2005) and several additional months may pass before investigations reach court (Plotnikoff & Woolfson, 1995; Pipe et al., 2008). Delays are typically associated with less information, especially during free or spontaneous recall (Hudson & Fivush, 1991; Pipe, Gee, Wilson, & Egerton, 1999), and decreased accuracy as well, especially if additional prompts are required (Dent & Stephenson, 1979; Pipe et al., 1999).

In the current study, we examined changes in children's reports of touch across a forensically relevant delay (7 months) and asked whether changes in accuracy were due to the HBDs, or whether even verbal enquiries about touch lead to decreased accuracy over long delays. We also examined the *consistency* of children's responses to questions about touch in the interviews conducted 1 and 7 months after the event, as a function of the use of HBDs. In forensic contexts, children are often interviewed on more than one occasion and by more than one person (e.g., police officers, lawyers, social workers, psychologists, family members), and consistency is sometimes viewed as a marker of credibility or reliability (LaRooy, Lamb, & Pipe, 2009). Laboratory-based research indicates that repeated interviewing may have both facilitative and detrimental effects on children's later accounts of personal experiences depending on the nature of the interviews and their timing (see Goodman & Quas, 2008; LaRooy et al., 2009, for reviews). However, surprisingly few researchers have examined the consistency of children's reports across interviews, although this is the only way to determine whether information is consolidated as a function of earlier interviews (Brainerd & Ornstein, 1991; Gee & Pipe, 1995; Warren & Lane, 1995) and whether errors reflect changes in memory or in reporting biases (LaRooy et al., 2009). For example, do children incorporate erroneous information introduced in earlier interviews into subsequent reports? If such information becomes part of the memory representation, it should be as consistently reported as correct reports of touch. Errors may also be incorporated into recall because children rely on gist (a general sense of what occurred) rather than verbatim (an exact recall of what occurred) memory in later interviews (Brainerd & Reyna, 1990; Fivush et al., 2002; Gee & Pipe, 1995). A greater reliance on gist recall may lead to memory reconstruction, increasing the number of new, previously unreported errors.

In this study, 5- to 7-year-old children were interviewed 7 months after they had participated in a staged event involving

touch. The children had previously been interviewed between 4 and 6 weeks after the event (Brown et al., 2007). Children were asked to recall touch under one of three conditions: In two conditions, HBDs were introduced as part of the touch enquiry, either with or without practice and feedback regarding use of the diagrams (see Brown et al., 2007). In the third (verbal questions only control) condition, children were asked questions about possible touches without the HBDs. We predicted that children in the verbal questions (control) condition would report less touch-related information but be more accurate than children in the other two conditions. Based on prior research (see LaRooy et al., 2009), we also predicted that new information introduced in the second interview would be less accurate than information repeated from the previous interview.

METHOD

Participants

All children who had participated in the earlier study (Brown et al., 2007) were invited to attend a second interview. Several could not be contacted or were unable to attend, and the final sample thus included 58 of the original 79 children (36 boys, 22 girls; $n(\text{Body diagrams only}) = 19$, $n(\text{Body diagrams-with-instruction}) = 21$, $n(\text{Verbal questions}) = 18$). They were between the ages of 5 and 7 years at the first interview (mean age 74 months, range 61–85 months, $SD = 7.0$). Verbal assent was obtained from each child before the event and each of the interviews. Each child received small novelty gifts in thanks for participation following each interview and photographs from the event after the second interview.

Procedure

Target event

Each child participated individually in the staged event, which lasted approximately 15 minutes. A research assistant took children to 'meet the photographer' (a researcher) who invited the children to look at a book about pirates before dressing them in a pirate costume on top of their school clothes. Once the children were in costume, they sat on a small stepladder and were photographed. The photographer then dressed herself in a cowboy costume and two photographs were taken of the child with the photographer. A third research assistant entered the room and briefly argued with the photographer about access to some equipment. Once costumes had been removed, the children were allowed to use the camera to take a picture of the photographer and then returned to class.

During the event, the photographer touched the children seven times. She (i) tickled their feet before putting the boots on, (ii) wiggled their right ear before putting the earring on, (iii) squeezed their wrist to check that the wristband was on correctly, (iv) patted them on the left side of their waist to indicate what side to hang the sword on, (v) put her arm around their shoulder for the first photo together, (vi) put her arm around their waist for the second photo together, and finally (vii) patted them on the shoulder at the end of the event.

Protocol interview

All children were initially interviewed after a delay of between 4 and 6 weeks by one of four research assistants who had been trained to use the National Institute of Child Health and Human Development (NICHD) interview protocol. A different research assistant conducted the second interview, approximately 6 months after the first interview. This second interview using the NICHD interview protocol took place in the same room and followed exactly the same format as the first interview (for additional detail, see Brown *et al.*, 2007). The children's reports of the event form the basis for a separate study; only information reported about touch is discussed here.

Touch inquiry

Immediately after the NICHD *protocol interview*, the interviewers asked specifically about touches that had occurred (the *touch inquiry* interview), in one of three conditions. Children were interviewed in exactly the same way after a 7-month delay as they had been earlier.

Body diagram only

Children in this condition were shown an HBD and asked, 'Did any part of the photographer's body touch any part of your body?' Children who responded affirmatively were asked to mark the place on the HBD and were then asked *open-ended questions* (e.g., 'tell me about that touching') to elicit episodic recall of the touch. When children indicated that they could recall no more information, they were asked six *yes/no questions* about touch to different parts of their bodies (face, chest, arms/hands, front genital region, bottom, legs/feet). Three of these areas had been touched (i.e., 'yes' responses were correct) and three had not been touched (i.e., 'no' responses were correct). If children indicated that any of these regions had been touched, they were asked to mark the HBD and were prompted in an open-ended manner to elaborate on their response. The procedure was then repeated using a new HBD, with the children asked if they had touched any part of the photographer's body. 'No' responses to all questions were correct, because the children never touched the photographer.

Body diagrams-with-instruction

Children in this condition were given the two HBDs (the same diagrams as children in the body diagram-only condition)—one representing them, and one representing the interviewer—and were trained in their use. The interviewer touched the children on the elbow and then asked them to show on the HBD of themselves where the interviewer had touched them. If the children indicated incorrectly, the interviewer corrected them and demonstrated the correct response. The children were then asked to indicate on the HBD of the interviewer which part of her body had touched them. Feedback was again given. Just over half of the children (54%) required correction and additional explanation to complete the first trial successfully. After responding correctly on two trials (all children successfully completed the second trial), two blank HBDs were presented to represent the child and the photographer. The interview regarding touch to the child was identical to that in the body diagram-only condition. Two more blank HBDs

were then presented for the children to practice reporting touch that they initiated between themselves and the interviewer and following two successful trials children were asked whether they had touched the photographer during the event. If the response was affirmative, they were asked to indicate on HBDs where they had touched the photographer and to provide an account of this touch. Finally, they were asked yes/no questions regarding touch to unmentioned body parts as in condition 1.

Verbal questions

Children in this condition were not shown any HBDs. As in the other two conditions, participants were first asked an introductory question about being touched by the photographer and were encouraged to elaborate on any reports of touch in response to *open questions*. They were then asked six *yes/no questions* that paralleled those asked of children in the other conditions. Each question named the location of possible touch (e.g., 'did the photographer touch your feet?'); if children answered affirmatively, they were asked follow-up questions to elicit further details (e.g., 'tell me about that touching'). Children who responded negatively to the first question were asked a second more specific question referring to the action associated with the touching (e.g., 'did the photographer tickle your feet?'), in case they interpreted the word 'touch' narrowly or had encoded the contact more specifically as a 'tickle' (for example) rather than as a 'touch'.

Coding

Following transcription of all interviews, unique information (relating to touch and other information) reported verbally or nonverbally (e.g., by demonstration or pointing at the body or diagram) during the *touch inquiry* and not previously mentioned in the *Protocol interview* was coded. Units of meaningful information were categorized as correct, incorrect, forensically relevant (information that might appear 'significant' or worthy of follow-up in a forensic or court context, for example, 'she pulled my trousers up', 'we just cuddled and had fun'); touch to genital, chest or buttock areas was coded separately. Subjective (e.g., opinions such as 'it was fun'), ambiguous (insufficient information to code for accuracy, for example, 'it went in a round thing') and unverifiable (e.g., reference to actions or material that occurred off video or was inaudible) information was coded but not included in analyses (see Brown *et al.*, 2007 for further details).

Information reported during the second interview was also coded as either *repeated* from the touch inquiry phase of the 1-month interview or as *new*, reported for the first time or in a different way (e.g., a correct yes response to a direct question at Time 1 and an incorrect no response at Time 2).

Reliability

A second coder, unaware of the research hypotheses, coded 20% of the transcripts. Inter-rater reliability for the *touch inquiry*, calculated using Kappa, was .86.

RESULTS

Spontaneous reports of touch were rare. Only three (of the 58) children did so during the 7-month delay *Protocol interview* prior to the touch inquiry. All three children had been

interviewed with HBDs at the 1-month delay and the spontaneous reports included a combination of correct touches disclosed in the 1-month touch inquiry and incorrect touches (both new and repeated).

Reports of touch during the touch inquiry. We examined the numbers of children reporting touch-related information (both touches by the photographer and touches of the photographer), the amount of information reported, and its accuracy as a function of interview condition and delay (1 month vs 7 months). Of particular interest are changes in the children's responses to the open and yes/no questions, respectively, over the long delay. *Total information* included information reported verbally and nonverbally in response to open questions and elaborations in response to yes/no questions. *Accuracy* was calculated as total correct information/total information reported (Table 1).

Where measures were proportions, they were subjected to arcsine transformations. Effect sizes (η_p^2 for ANOVA; v and ϕ for chi square analyses) are reported when tests were significant, and a measure of observed power is reported when tests were not significant.

Children's responsiveness to open questions about touch

There was a slight increase in the number of children who reported information about touch (of or by themselves) in response to *open questions* in the *touch inquiry* that had not been reported in the Protocol interview, from 60% in the 1-month interview to 69% in the 7-month interview. However, this overall increase in the proportion of children reporting touch-related information was not consistent across interview conditions. More children in the HBD-only group provided touch-related information following the longer delay (32% vs 63% in the 1- and 7-month interviews, respectively) and McNemar tests confirmed that this change was significant, $\chi^2(1, N=19)=4.17, p<.05$. There was also a non-significant tendency for more children in the HBD-with-instructions group to provide touch-related information after the longer delay (71% vs 90%). For children interviewed with verbal questions only, however, the trend was in the opposite direction, with fewer children providing touch-related information after the longer delay (78% vs 50%) as one might expect.

Touches of the child: Open-ended reports

The amount and accuracy of information provided in open-ended responses by the 48 children (body diagram only $n=13$; body diagram-with instruction $n=20$; verbal questions $n=15$) who reported any information in response to open-ended questions about touches by the photographer during either the 1-month or 7-month interviews were then examined. The analysis revealed a subtle relationship between the length of delay and condition. Analysis of the total amount of information reported using a mixed-design ANOVA with delay (1 month vs 7 month) as the repeated measure and interview condition (body diagram only versus body diagram-with-instruction versus verbal questions) as the between-participants factor, revealed a significant interaction between the two factors ($F(2, 45)=6.71, p<.01, \eta_p^2=0.23$). Simple-effects analyses showed that children in the body diagram-only condition reported more information after 7 months than after 1 month, ($M=6.54$ vs 4.31: $t(12)=2.66, p<.05$), whereas children in the verbal questions group reported less information at 7 months than at 1 month ($M=3.73$ vs 7.93: $t(14)=2.2, p<.05$). The amount of information reported by children in the body diagram-with-instructions group at the two time points did not differ ($M=10.65$ vs 8.85: $t(19)=1.5, NS$).

Accuracy of information reported (for those children who reported any correct information during *both* interviews, $n=29$) revealed that children interviewed with verbal questions were more accurate ($M=0.65$) than children in the body diagram-with-instructions group ($M=0.25$); the mean for children in the body diagram-only group fell between the other two ($M=0.40$). The ANOVA showed a main effect of interview condition ($F(2, 26)=7.85, p<.01, \eta_p^2=0.38$; group differences confirmed by Tukey tests, $p<.01$) but no main effect of delay and no interaction. It should be noted that these comparisons were based on very small group sizes (<10 per group), however.

Touches of the photographer: Open-ended reports

Analysis of the total amount of information reported about touching the photographer in response to open-ended prompts revealed no significant effects of delay, interview condition or interaction (in each case, power < 0.3). The

Table 1. Mean (*SD*) numbers of details and accuracy of information reported during questioning about touch

	Treatment condition					
	Body diagram only		Body diagram + instruction		Verbal questions	
	1 month	7 months	1 month	7 months	1 month	7 months
<i>Touch to child</i>						
Total information ($n=48$)	4.31 (5.68)	6.54 (3.64)	8.85 (8.24)	10.65 (7.73)	7.93 (6.35)	3.73 (4.51)
Total accuracy ($n=29$)	0.59 (0.28)	0.22 (0.18)	0.27 (0.31)	0.23 (0.24)	0.59 (0.33)	0.70 (0.28)
Specific question accuracy ($n=58$)	0.50 (0.06)	0.49 (0.04)	0.57 (0.14)	0.54 (0.17)	0.62 (0.11)	0.59 (0.16)
<i>Touch to Photographer</i>						
Total information ($n=48$)	5.08 (12.61)	3.85 (7.02)	3.15 (5.66)	3.65 (4.92)	2.07 (3.45)	1.00 (1.85)
Total accuracy ($n=13$)	0.26 (0.49)	0.05 (0.10)	0.08 (0.12)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Specific question accuracy ($n=57$)	0.94 (0.13)	0.89 (0.30)	0.90 (0.14)	0.88 (0.22)	0.95 (0.15)	0.98 (0.06)

accuracy of information about touches of the photographer was not analyzed because only 13 children reported any correct information in both interviews.

Accuracy of responses to yes/no questions

After the open-ended questions, all children were asked specifically (yes/no) whether different areas of their bodies were touched, and whether they had touched the photographer in various places. Analyses of the accuracy of children's responses to these questions therefore included the entire sample ($n=58$). Children in the body diagram-only condition were less accurate ($M=0.50$) when reporting touches by the photographer than children in the verbal-question condition ($M=0.61$); children in the body diagram-with-instruction condition were not significantly different from either ($M=0.56$). A mixed-model ANOVA confirmed a main effect of interview condition on accuracy ($F(2, 55)=5.03$, $p < .01$, $\eta_p^2=0.16$, Tukey tests, $p < .05$). With respect to the accuracy of children's responses to questions about touches of the photographer, there were no significant main effects or interactions ($F(2, 53)=0.82$, power=0.08). (Note that one child reported touching all areas of the photographer's body during open questions and so was not asked any yes/no questions.)

Reports of forensically relevant information

Few children reported forensically relevant information (excluding reports of genital, breast or buttock touches, discussed separately in the succeeding text) that might have aroused suspicions. During the 1-month interview, two children reported forensically relevant information regarding touch to their own bodies (one each from the body diagram-with-instructions and verbal-question groups). Both of these children provided this information when elaborating on their responses to the yes/no questions. During the 7-month interview, four children reported forensically relevant information (one from the body diagram-only group, two from the body diagram-with-instructions group, and one from the verbal-question group). One child spontaneously reported this information during the open-ended questions about touch and the other three children provided the information when elaborating on (incorrect) yes responses to specific questions. There were no reports of forensically relevant information regarding touches of photographer in either interview.

Reports of touch to the genital, buttocks, and breast areas

We examined the frequency with which children specifically indicated on the body diagrams that they had been touched or had touched the photographer on the genital, breast/chest, and buttocks areas. The extent of such misremembered touching differed depending on whether the child or photographer was touched. Of the 40 children interviewed with body diagrams after the 7-month delay, 1 reported being touched in the genital area, 5 on the breast/chest, and 4 on the bottom area. Eight of these 10 reported touches were elaborated upon and seven were described innocuously (e.g. clarification that the touch was actually on the shoulder). That is, elaboration confirmed forensic relevance in only one of the

10 cases. Remarkably, seven of the 10 reported touches were repeated from the 1-month interview, despite the absence of feedback in the first interview that might have helped consolidate the false memories.

There were eight reported instances of touching *the photographer's* breast/chest, genital area or bottom, 7 of which had not been reported in the earlier (1-month) interview. Seven of these eight touches were elaborated on; of these, three were described innocuously, with four remaining forensically relevant.

Information repeated across interviews versus reported for the first time

How consistent were children's reports of touch-related information over the two interviews, and did body diagrams influence the probability that touch information was introduced for the first time in the 7-month interview? Children in the body diagram-with-verbal-instruction group provided more information about touch than children in the verbal-only condition (children in the diagram-only condition were intermediate). Analyses revealed a significant interaction between interview condition and the amount of new as opposed to repeated information about reported touches of the child ($F(2, 45)=4.54$, $p < .05$, $\eta_p^2=0.17$). Simple-effects analyses for each type of information showed no difference between groups concerning repeated information provided ($F(2,45)=0.26$, ns, power=0.09) but a significant group difference in new information ($F(2, 45)=8.6$, $p < .01$, $\eta_p^2=0.28$. Tukey tests between the two groups $p < .05$)

We also examined whether the accuracy of the information differed depending on whether it was new or repeated. A series of paired comparisons showed that children in all conditions were more accurate when reporting new rather than repeated information, M (drawing-only)=0.34 vs .01: $t(10)=2.96$, $p < .05$; M (drawing-with-instruction)=0.26 vs .02: $t(18)=2.91$, $p < .01$; M (verbal questions)=0.72 vs .25: $t(7)=4.27$, $p < .01$. A significant interaction between information type (new vs repeated) and interview condition ($F(2, 35)=6.79$, $p < .01$, $\eta_p^2=0.28$) largely reflected the difference between conditions (Table 2).

An analysis of the total amount of repeated as opposed to new information revealed no significant group differences but showed that more new than repeated information was reported. A repeated-measures ANOVA produced a main effect for information type, $F(1, 45)=14.96$, $p < .001$, $\eta_p^2=0.25$ and no interaction regarding touches of the photographer, $F(2, 45)=1.37$, $p > .05$, power=0.28. The accuracy of new and repeated information about touching the photographer could not be analyzed further because cell sizes were too small.

DISCUSSION

As in previous research, children rarely reported spontaneously any of the several instances of bodily contact that had occurred when asked for open-ended accounts of the event (Brown *et al.*, 2007; Saywitz, Goodman, Nicholas & Moan 1991), and this was true following a longer (7-month) delay than previously investigated. By contrast, when specifically questioned, the majority of children reported

Table 2. Mean (*SD*) amount and accuracy of repeated and new information reported in the second (7-month) interview

	Treatment condition		
	Body diagram only (<i>n</i> = 13)	Body diagram-with instruction (<i>n</i> = 20)	Verbal questions (<i>n</i> = 15)
<i>Touch of child</i>			
Total repeated	1.46 (2.22)	1.55 (2.26)	1.00 (1.56)
Total new	4.92 (3.59)	9.35 (7.07)	2.80 (3.51)
Accuracy (repeated)	0.01 (0.03)	0.01 (0.04)	0.01 (0.04)
Accuracy (new)	0.34 (0.29)	0.26 (0.32)	0.72 (0.32)
<i>Touch of photographer by child</i>			
Total repeated	0.07 (0.28)	0.30 (0.98)	0.07 (0.26)
Total new	3.23 (5.60)	3.35 (4.63)	1.00 (1.85)

information at both time points but, unfortunately, they reported touches that had occurred as well as touches they had not experienced. The effects of delay on both the amount of touch-related information reported and its accuracy depended on how children were questioned about touch, and whether and how body diagrams were introduced. Following verbal questions without HBDs to aid their reports, both the number of children reporting touch-related information and the amount of information they reported declined significantly over time, as one might expect. By contrast, nearly twice as many of the children interviewed with HBDs (with or without instruction) reported at least *some* inaccurate information after 7 months, more than after 1 month and, on average, they reported *more* information following the longer delay. Interestingly, 7 of 40 children interviewed with HBDs incorrectly reported being touched in the chest/buttocks/genital areas in both interviews, despite the absence of interviewer responses that might have reinforced those false memories. This suggests that mere reporting consolidated those false memories in the presence of HBDs. Indeed, HBDs combined with open-ended questions about touch had a particularly deleterious effect following the longer delay. Over time, and possibly as a function of the repeated interviews, it appears that children in the verbal condition became much more constrained in their reporting of touch-related information, whereas those in the body diagrams conditions became less so.

Does the innocuous nature of the touches experienced explain why the bodily contact was not encoded or well remembered (Quas et al., 2007)? The touches were designed to be distinctive and unusual, but children may not have attended to them in the context of more exciting aspects of dressing up for a photograph. It is also possible that these children did not encode the contacts as 'touches' as opposed to the associated actions (e.g., 'tickling') (Bruck, 2008; Hashima, Barton, & Stewart, 1988; Quas & Schaaf, 2002). The children in the verbal questions condition were, however, asked an additional question about each assessed touch, which specifically named the action associated with the touch (e.g., 'Did the photographer *tickle* your feet') and still responded inaccurately, tending to deny true touches rather than affirm false touches (i.e., a 'no' bias). This suggests that the touches were not salient enough to have been recognized or encoded.

Independent of the amount of information reported, the quality of information elicited was especially poor when

children were presented with HBDs. Although errors of omission may suggest that HBDs do not adequately facilitate recall and reporting, the errors of commission arouse concerns that the children's reports were being contaminated. For children asked verbal questions only, accuracy remained relatively high across interviews (70% at 7 months vs 59% at 1 month), despite declines in the total number of details reported, whereas accuracy remained low when body diagrams were used without instruction. Further, the benefits of instruction after a 1-month delay (Brown et al., 2007) were lost over the subsequent 6 months, with accuracy declining from 59% to 22%. Thus, although body diagrams helped children report information relating to the bodily contact, more than 75% of the details they elicited were inaccurate, perhaps because the diagrams suggested that more information was expected and provided accessible response alternatives.

When children in all three groups were asked direct yes/no questions about whether they had been touched in particular areas, accuracy was also low and close to chance for those interviewed with body diagrams. This had also been the case in the initial interview, and reflected a tendency for children to deny being touched by the photographer. When asked about touches they had made *to* the photographer, children correctly denied almost all touches, so accuracy levels in all three groups were around 90%. Because the event did not include scripted touches of the photographer by the child, however, the high accuracy levels could simply reflect a bias to deny touching or being touched. Indeed, a bias to deny that touch had occurred probably accounts for both the very high levels of accuracy in response to yes/no questions about touching the photographer (a 'no' response was always accurate) and the near-chance levels for reports of touches by the photographer (a 'no' response was accurate for half of the questions).

Overall, our findings, like those of Steward et al. (1996), show that, after a longer delay, forensically relevant misreports of touches to the genital, buttock, and chest areas are rare but are more frequent after 7 months than after 1 month. In the present study, such erroneous reports were only elicited by probing questions, particularly in association with the HBDs. Other errors typically involved information that was consistent with a script of dressing up (e.g., touch in the context of doing up a shirt) and with meeting and greeting a new person (e.g., shaking hands) and were highly credible in that context. Such findings underscore the extent to

which forensic investigators must be careful not to elicit scripted information when pursuing detailed accounts of touching, especially those involving repeated abusive events, and to ask that children elaborate on reported touches. As Brown *et al.* (2007) noted, such elaboration typically makes clear that the touches were innocuous.

Relatively little information about touching reported in the initial interview was reported again 6 months later. Rather, children in all three interview conditions reported more *new* (mean = 5 items) than *repeated* (mean = 1 item) information in the second interview, and this pattern was particularly marked for the children who had been instructed in the use of the HBDs. By contrast, most research on the consistency of children's accounts across repeated interviews (LaRooy *et al.*, 2009) shows that new information constitutes a smaller (but significant) proportion of the information reported over repeated interviews. New information is typically less accurate than information repeated across interviews, furthermore, and this too was not found here; interestingly, when children were only questioned verbally (i.e., no body diagrams) the repeated and new information was similarly accurate (72% and 73%). When body diagrams were used, repeated information was less accurate than new, although overall low levels of accuracy and floor effects preclude meaningful comparisons. Our divergent results may be attributable to the fact that information was elicited here using direct rather than open-ended questions, and the focus was very narrow (i.e. about touch). As noted earlier, information about innocuous touches appears not to be well encoded even at short delays. Researchers have not yet examined consistency of children's accounts as a function of encoding and the salience or 'memorability' of the events, but it seems likely that information not well remembered following a short delay will be less well remembered following an even longer delay. In the future, researchers should also tease apart the effects of delay and repeated interviewing, which were confounded here because all children were interviewed at both 1 and 7 months.

Although the majority of children had reported information about touch during the 1-month interview, over half of it was inaccurate, and those erroneous reports of touch were not incorporated into children's spontaneous accounts during the open-ended Protocol interview at 7 months, as might have been anticipated (Berkowitz, 2000). Indeed, very few children spontaneously reported *any* information about touch during the 7-month Protocol interviews and any such information was new. These findings underscore the likelihood that the touches (real or imagined) were not very salient and suggest that the children's erroneous reports involved acquiescence to please the interviewers rather than effortful memory retrieval processes that might have been more prone to contamination.

As in previous studies, body diagrams were used here to explore previously unreported instances of touch rather than to encourage elaboration regarding reported touches. Indeed, because children so rarely recalled touches spontaneously, diagrams could not be used to elicit *additional* information! Studies exploring the use of non-verbal techniques to elicit elaboration and additional detail are clearly needed.

In all, the findings reported here suggest both that the introduction of body diagrams did not help elicit accurate information about touching and that the bodily contact was

poorly encoded. Despite relatively neutral questioning in association with the body diagrams, accuracy also declined, suggesting that the risks associated with HBD outweigh the advantages, and that alternative ways of eliciting information about touch need to be explored. Our findings also suggest that information about touching elicited using HBDs about events that occurred sometime before may be highly unreliable, even when it sounds quite credible. Whether similar findings would be obtained if more salient or perhaps traumatic touches were involved is unknown, but our results make clear that any technique developed for use in the forensic context must be rigorously examined in experimental studies exploring the range of factors that may affect the accuracy of children's reporting ability, such as salience, delay, and repeated interviewing, and above all the accompanying verbal instructions and prompts.

REFERENCES

- Aldridge, J., Lamb, M. E., Sternberg, K. J., Orbach, Y., Esplin, P. W., & Bowler, L. (2004). Using a human figure drawing to elicit information from alleged victims of child sexual abuse. *Journal of Consulting and Clinical Psychology, 72*, 304–316.
- Berkowitz, S. (2000). *Children's susceptibility to interviewers' suggestions in investigations of sexual abuse events*. Unpublished Master Thesis submitted to the University of Haifa, Faculty of Social Welfare and Health Studies, School of Social Work.
- Bjorklund, D., Bjorklund, B., Brown, R., & Cassel, W. (1998). Children's susceptibility to repeated questions: How misinformation changes children's answers and their minds. *Applied Developmental Science, 2*, 99–111.
- Brainerd, C., & Ornstein, P. (1991). Children's memory for witnessed events: The developmental backdrop. In J. Doris (Ed.), *The suggestibility of children's recollections* (pp. 10–20). Washington, DC: American Psychological Association.
- Brainerd, C. J., & Reyna, V. F. (1990). Gist is the grist: Fuzzy-trace theory and the new intuitionism. *Developmental Review, 10*, 3–47.
- Brown, D. A., Pipe, M. E., Lewis, C., Lamb, M. E., & Orbach, Y. (2007). Supportive or suggestive: Do human figure drawings help 5–7 year old children to report touch? *Journal of Consulting and Clinical Psychology, 75*, 33–42.
- Bruck, M. (2008). *Children's memory and understanding of being touched*. Paper presented at the meeting of the American Psychology-Law Society, Bridging the Discipline, Jacksonville, FL (March).
- Bruck, M., Ceci, S. J., & Principe, G. F. (2006). The child and the law. In K. A. Renninger, I. Sigel, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology* (Sixth Ed., Vol. 4), Child Psychology in practice (pp. 776–816). Hoboken, NJ: Wiley.
- Dent, H. R., & Stephenson, G. M. (1979). An experimental study of the effectiveness of different techniques of questioning child witnesses. *The British Journal of Social and Clinical Psychology, 18*, 41–51.
- Fivush, R., Peterson, C., & Schwarzmuller (2002). Questions and answers: The credibility of child witnesses in the context of specific questioning techniques. In M. L. Eisen, J. A. Quas, & G. S. Goodman (Eds.), *Memory and suggestibility in the forensic interview* (pp. 331–354). Mahwah, NJ: Lawrence Erlbaum Associates.
- Gee, S., & Pipe, M.-E. (1995). Helping children to remember: The influence of object cues on children's accounts of a real event. *Developmental Psychology, 31*, 746–758.
- Goodman, G. S., & Quas, J. A. (2008). Repeated interviews and children's memory: It's more than just how many. *Current Directions in Psychological Science, 386–390*.
- Greenstock, J., & Pipe, M.-E. (1996). Interviewing children about past events: The influence of peer support and misleading questions. *Child Abuse & Neglect, 20*, 69–80.
- Hashima, P. Y., Barton, K., & Stewart, M. S. (1988). What does "touch" mean to young children? An empirical study. *Perceptual and Motor Skills, 67*, 683–690.

- Hershkowitz, I., Horowitz, D., & Lamb, M. E. (2005). Trends in children's disclosure of abuse in Israel: A national study. *Child Abuse & Neglect*, 29, 1203–1214.
- Hudson, J. A., & Fivush, R. (1991). As time goes by: Sixth graders remember a kindergarten experience. *Applied Cognitive Psychology*, 5, 347–360.
- Lamb, M. E., Orbach, Y., Sternberg, K. J., Esplin, P. W., & Hershkowitz, I. (2002). The effects of forensic interview practices on the quality of information provided by alleged victims of child abuse. In H. L. Westcott, G. M. Davies, & R. Bull (Eds.), *Children's testimony: Psychological research and forensic practice* (pp. 131–146). New York: Wiley.
- LaRooy, D., Lamb, M. E., & Pipe, M.-E. (2009). Repeated interviewing: A critical evaluation of the risks and potential benefits. In K. Kuehnle, & M. Connell (Eds.), *The evaluation of child sexual abuse allegations: A comprehensive guide to assessment and testimony* (pp. 327 – 364). Hoboken NJ: Wiley.
- Pipe, M.-E., & Salmon, K. (2009). Dolls, drawing, body diagrams and other props: A role in investigative interviews? In K. Kuehnle, & M. Connell (Eds.), *The evaluation of child sexual abuse allegations: A comprehensive guide to assessment and testimony* (pp. 365–396). Hoboken NJ: Wiley.
- Pipe, M.-E., Gee, S., Wilson, J. C., & Egerton, J. M. (1999). Children's recall one and two years after the event. *Developmental Psychology*, 35, 781–789.
- Pipe, M.-E., Orbach, Y., Lamb, M., Stewart, H., & Abbott, C. (2008). *Do best practice interviews with child sexual abuse victims influence case outcomes?* Final Technical Report to the National Institute of Justice, Grant Number 2006-IJ-CX-0019.
- Plotnikoff, J., & Woolfson, R. (1995). *Prosecuting child abuse: An evaluation of the government's speedy progress policy*. London: Blackstone Press.
- Poole, D. A., & Lamb, M. E. (1998). *Investigative interviews of children: A guide for helping professionals*. Washington, DC: American Psychological Association.
- Quas, J. A., & Schaaf, J. M. (2002). Children's memories of experienced and nonexperienced events following repeated interviews. *Journal of Experimental Child Psychology*, 83, 304 – 378.
- Quas, J. A., Davis, E. L., Goodman, G. S., & Myers, J. E. B. (2007). Repeated questions, deception and children's true and false reports of body touch. *Child Maltreatment*, 12, 60 – 67.
- Saywitz, K. J., Goodman, G. S., Nicholas, E., & Moan, S. F. (1991). Children's memories of a physical examination involving genital touch: Implications for reports of child sexual abuse. *Journal of Consulting and Clinical Psychology*, 59, 682–291.
- Steward, M. S., Steward, D. S., Farquar, L., Myers, J. E. B., Reinhart, M., Welker, J., . . . Morgan, J. (1996). Interviewing young children about body touch and handling. *Monographs of the Society for Research in Child Development*, 61, (4–5, Serial No. 248).
- Warren, A., & Lane, P. (1995). Effects of timing and type of questioning on eyewitness accuracy and suggestibility. In M. S. Zaragoza, J. R. Graham, G. C. N. Hall, R. Hirschman, & Y. S. Ben-Porath (Eds.), *Memory and testimony in the child witness* (pp. 44–60). Thousand Oaks CA: Sage.
- Willcock, E., Morgan, K., & Hayne, H. (2006). Body maps do not facilitate children's reports of touch. *Applied Cognitive Psychology*, 20, 607–615.