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The effects of cross-examination on children's reports of neutral and transgressive events

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Purpose. In many jurisdictions child witnesses who testify in court about their own sexual abuse are cross-examined by a defence attorney. Children find this process to be distressing, and despite recent child-focussed modifications to other aspects of the legal process, cross-examination has remained largely unaltered. This lack of modification is due, in part, to the assumption that cross-examination promotes truthful testimony (Wigmore, 1974 *Evidence in trials at common law*). However, little empirical research has investigated the effects of cross-examination questions on children's reports of neutral and transgressive events. To examine these effects a laboratory-based study was conducted.

Method. One hundred and twenty kindergarten (M = 6 years) and grade 2 (M = 8 years) students participated individually in a staged event. Children witnessed an adult commit a transgression and were then interviewed twice about it. Children first underwent a direct-examination interview followed by either a direct- or cross-examination interview.

Results. Children's reports of neutral events were significantly less accurate in Interview 2 cross-examination, than they were in Interview 1 direct-examination, whereas children interviewed twice with direct-examination were equally accurate in Interviews 1 and 2. Furthermore, children whose second interview involved cross-examination were less accurate in their reports of neutral events than were children whose second interview was a direct examination. Cross-examination also affected some children's disclosures of a witnessed transgression. More of the older children provided truthful disclosures of the transgression in the initial direct examination compared with the Interview 2 cross-examination.

Conclusions. Findings suggest that cross-examination as used in this study may not be the most effective procedure for eliciting truthful testimony for both neutral and transgressive events from children aged between 5 and 8 years.

Portions of this research were presented at the annual meeting of the American Psychology-Law Society, Vancouver, Canada, 2010, and the biennial meeting of the Society for Research on Child Development, Montreal, Canada, 2011.

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Prevalence rates of child sexual abuse vary throughout the world, with estimated figures as high as 60% (Pereda, Guilera, Forns, & Gomez-Benito, 2009). Despite the widespread nature of this problem the rate of convictions for alleged perpetrators is low, often due to a lack of evidence (Cross, Walsh, Simone, & Jones, 2003). Physical evidence of child sexual abuse is rare (Bussey, 1992; Saywitz, 1995) and the child's eyewitness testimony, which is usually the *only* available evidence, is often impaired by aspects of the legal process. Although modifications have been made to accommodate child witnesses, field and laboratory studies reveal that processes associated with adult criminal courts continue to distress children, particularly cross-examination (Eastwood & Patton, 2002; Goodman & Melinder, 2007; Malloy, Mitchell, Block, Quas, & Goodman, 2007; Melnyk, Crossman, & Scullin, 2007).

Cross-examination is the legal process whereby a defence lawyer questions a witness. The questions asked during cross-examination are similar to suggestive questions and are usually leading, ambiguous, complex, and irrelevant (Zajac & Cannan, 2009; Zajac, Gross, & Hayne, 2003). Although suggestive questions have been disallowed from direct examination due to their detrimental impact on children's testimony, they are still permitted for use in cross-examination (Bussey, 2009; Cossins, 2009). In fact, cross-examination is one aspect of the adversarial process that has undergone the least changes to accommodate child witnesses (Spencer, 2012) despite many advocating for extensive reforms to the process (see Spencer & Lamb, 2012). The lack of modification is in part due to the often cited, although rarely held assumption that 'cross-examination is the greatest legal engine ever invented for the discovery of the truth' (Wigmore, 1974, p. 32).

In recent years researchers have begun to assess the validity of this assumption. Zajac and Hayne conducted a landmark study in 2003 investigating the impact of cross-examination on children's reports of neutral events. Five- and six-year-old children participated in a staged event, and were then questioned about the event in two separate interviews. Children underwent direct examination in the first interview, and cross-examination in the second. Results revealed that children's reports during cross-examination differed from those they provided under direct examination. From direct- to cross-examination, 85% of children changed at least one of their original responses and 33% changed all of their original responses, regardless of whether their original responses were accurate. Furthermore, cross-examination led to an overall reduction in the accuracy of children's reports. In a further study, Zajac and Hayne (2006) used a similar procedure with 9- and 10-year-old children. Results showed that these older children made fewer changes to their responses from direct- to cross-examination. Nevertheless, 79% of older children changed at least one of their responses during cross-examination. In contrast to the 5- and 6-year-old children, however, who changed responses irrespective of their initial accuracy, older children were more likely to change initially incorrect than initially correct responses. Despite this, older children's overall accuracy was significantly reduced under cross-examination (Zajac & Hayne, 2006).

These studies provide evidence, consistent with anecdotal reports, that cross-examination undermines the accuracy of children's reports and does not, as Wigmore (1974) claimed, promote truthfulness. However, there are two significant limitations of Zajac and Hayne's (2003, 2006) research that need to be addressed before concluding that cross-examination is detrimental to children's testimony. First, children in Zajac and Hayne's (2003, 2006) studies were always interviewed with a direct examination first, and cross-examination second. Substantial research shows that children who undergo repeated interviewing often change their answers from the first to subsequent interviews (Bruck, Ceci & Hembrooke, 2002; La Rooy, Katz, Malloy, & Lamb, 2010; Melnyk & Bruck,

2004; Poole & White, 1991; Roberts & Powell, 2001). It therefore cannot be determined whether children's inconsistent responding to questions about neutral events was due to the cross-examination in particular or to repeated interviewing.

Second, Zajac and Hayne's (2003, 2006) research only assessed the impact of cross-examination on children's reports of neutral events. In the legal system, however, children are called upon to testify about alleged transgressive events such as sexual abuse. The multitude of pressures for children to either disclose, or conceal such events, makes the process of disclosure extremely complex and difficult. A number of laboratory studies have been conducted to understand the factors that may either facilitate, or impede, children's disclosure of sexual abuse (Bottoms, Goodman, Schwartz-Kenney, & Thomas, 2002; Lyon & Dorado, 2008; Lyon, Malloy, Quas, & Talwar, 2008; Talwar, Lee, Bala, & Lindsay, 2002, 2004). These studies typically include a staged event that involves a minor misdeed. Obviously, for ethical reasons, these transgressions are not as serious as episodes of sexual abuse. Following the staged event, participants are questioned about the transgression using a range of interview techniques. Taken together, results of these studies indicate that children's reports of their own and others' transgressions are impacted not just by their cognitive capacity to recall and communicate these events accurately but also by their willingness to do so.

A child's willingness to truthfully disclose a witnessed transgression may depend on a variety of factors, including whether they expect themselves or the perpetrator to be punished following disclosure, whether they have been asked by the perpetrator to conceal the event, or whether they feel pressure to acquiesce to an interviewer's suggestions that the event has occurred. These factors are more relevant when children are questioned about transgressive rather than neutral events (Bottoms *et al.*, 2002). In their study, Bottoms *et al.* (2002) showed that although older children were more accurate than their younger counterparts when questioned about neutral events, this apparent cognitive advantage disappeared when they were questioned about a transgressive event they had been asked to conceal. It was posited that older children's heightened understanding of the potential negative consequences for disclosure may have prevented them from reporting the transgression.

It is therefore apparent that children's accuracy for neutral events should be assessed separately from their disclosures of transgressive events. Although Zajac and Hayne's (2003, 2006) research suggests that cross-examination does not promote accurate reporting of neutral events, it is possible that it does in fact serve a truth-promoting function, as Wigmore (1974) claimed, when children are questioned about transgressions. This possibility was investigated in this laboratory study.

Participants took part in a staged event, during which a researcher committed a minor transgression. The transgression was designed to emulate one aspect of child sexual abuse where an adult commits a wrongdoing that only the child witnesses. After the staged event, children's reports of both neutral and transgressive events were assessed through two interviews conducted by a second and third researcher. These interviews followed the structure used by Zajac and Hayne (2003, 2006). Children were asked open-ended questions prior to the commencement of the first interview (Interview 1), which was a direct examination. The second interview (Interview 2) was designed to unconfound the effects of cross-examination and repeated interviewing in Zajac and Hayne's (2003, 2006) research. Therefore, children were allocated to one of two interview conditions. In the direct/direct condition, children underwent a direct-examination in Interview 1, followed by a second direct examination in Interview 2. In the direct/cross condition, children

underwent a direct-examination in Interview 1, followed by a cross-examination in Interview 2.

Consistent with Zajac and Hayne's (2003, 2006) findings it was predicted that interview condition would affect children's reports of neutral events in Interview 2. Specifically, it was hypothesized that children in the direct/cross condition would be significantly less accurate in Interview 2 than children in the direct/direct condition. Furthermore, it was predicted that the accuracy of children's reports in the direct/cross condition would significantly decrease from Interview 1 to Interview 2. Lastly, it was predicted that children in the direct/cross condition would make significantly more changes in their answers to the neutral items from the first to the second interview, with a higher proportion of these changes being incorrect, compared with children in the direct/direct condition.

The effect of grade on children's reports of neutral events was also examined. Kindergarten children (6-year olds) participated in this study to enable comparison with Zajac and Hayne's (2003) research. Judicial officers typically assume children to be competent to testify at about 7 years of age (Cashmore & Bussey, 1996). Therefore, a comparison group of grade 2 (8-year olds) children was included to assess potential developmental differences. It was hypothesized that there would be no difference in the accuracy of kindergarten and grade 2 children's free recall reports, as previous research has shown that older children are as accurate as younger children in their reports of neutral events during free recall (Poole & Lindsay, 1995, 2001). In contrast, it was hypothesized that grade 2 children would provide more accurate reports during the direct examinations of Interview 1 and Interview 2 (for children who underwent a second direct examination) than would kindergarten children. This hypothesis was based on the findings that older children are more accurate in response to direct questions about neutral events than their younger counterparts (Bottoms *et al.*, 2002; Quas *et al.*, 2007; Saywitz, Goodman, Nicholas, & Moan, 1991). Furthermore, on the basis of Zajac and Hayne's (2003, 2006) findings it was predicted that younger children in the direct/cross condition would make significantly more changes in their responses to questions about the neutral events from the first to the second interview, with a higher proportion of these changes being incorrect, compared with their older counterparts.

As there is no previous research that has investigated the impact of cross-examination on children's disclosure of transgressive events, hypotheses relating to the transgression were based on Wigmore's (1974) claim that cross-examination promotes truthfulness. It was predicted that more children in the direct/cross condition would disclose the transgression in Interview 2, than children in the direct/direct condition, and that more children in the direct/cross condition would disclose the transgression in Interview 2 than in Interview 1. In addition, it was hypothesized that more children in the direct/cross condition would change their reports of the transgression from Interview 1 to Interview 2, compared with children in the direct/direct condition. Specifically, it was hypothesized that more children in the direct/cross condition would change to disclosure, rather than either changing to non-disclosure or making no change to their disclosure, compared with children in the direct/direct condition.

Although the impact of age on children's reporting of transgressive events has been investigated in previous research (Bottoms *et al.*, 2002; Pipe & Wilson, 1994; Talwar *et al.*, 2002), studies using direct examination have produced mixed findings with some finding increased disclosure with age (Pipe & Wilson, 1994), and others obtaining decreased disclosure with age (Bottoms *et al.*, 2002; Talwar *et al.*, 2002).

Furthermore, this relationship has not been investigated using cross-examination style questions. Therefore, no specific predictions about the relationship between age and reporting of transgressions under either direct examination or cross-examination were made.

Method

Participants

Participants were 120 children from middle-class schools in a large metropolitan city. There were 61 (32 boys) kindergarten (M = 6 years, SD = 5 months) and 59 (30 boys) grade 2 students (M = 8 years, SD = 5 months) who were White (72%), Asian (17%), and Middle Eastern (11%). Written parental consent and children's verbal assent were obtained for all participants.

Design

The study was conducted in two stages. First, each child participated individually in a healthy eating lesson conducted by 'Mrs Brown', during which she committed a minor transgression. Second, the child was questioned about the healthy eating lesson by 'Mrs Jones' in Interview 1 and 'Mrs Smith' in Interview 2. This sequence of events was designed to follow the order of events in forensic contexts, where a child witnesses an event and is later questioned about the event in court. Mrs Jones asked open-ended questions followed by Interview 1 direct-examination questions. Interview 2 was conducted by Mrs Smith and each child was randomly allocated to one of two interview conditions: the direct/direct condition or the direct/cross condition. The direct/direct condition involved a second set of direct-examination questions, and the direct/cross condition involved cross-examination questions. Both interviewers (Mrs Jones and Mrs Smith) were present for the duration of the interviews as they would be in court. Each child was tested individually in a room on the school premises, with the entire procedure taking approximately 30 min.

Procedure

Staged event

The 'Healthy Eating Lesson' was conducted by Mrs Brown. During the lesson the child played games and answered questions. Mrs Brown showed the child the 'Fruit and Veggie Poster', emphasizing that it was special and important. The poster consisted of nine pictures, each 21 cm × 29 cm, of fruits and vegetables, (e.g., apple, strawberries, carrot) glued onto one piece of cardboard. The poster hung on the wall and a 'Do Not Touch' sign was placed above it.

In the first game, the child was shown a tray with plastic fruits and vegetables on it. As Mrs Brown named each fruit and vegetable, the child's task was to pick up the appropriate fruit or vegetable and state its colour. Next Mrs Brown told the child that her favourite vegetable was a carrot. She then walked to the Fruit and Veggie Poster to show the child a picture of a carrot. When trying to remove it, she 'accidentally' ripped it. She reacted by saying 'Oh no, oh no, I've ripped the special carrot poster, I hope I don't get into trouble. Maybe nobody will notice'. Following this, Mrs Brown sat down with the child and played a game with a 'Fruit and Veggie Rainbow' without any further talk of the transgression. At the end of the healthy eating lesson Mrs Brown offered the child a sticker for 'doing a good

job'. The child was then asked to help pack up the healthy eating lesson and wait for Mrs Jones and Mrs Smith to come in and assess what s/he had learned.

Open-ended questions

Mrs Jones told the child that she was from the 'Fruit and Vegetable Organisation' and that her job was to ask questions to assess how well children had been taught about fruit and vegetables during the healthy eating lesson. She emphasized the importance of the child's responses, and requested permission to audio-record the interview. All children consented to this request. In both interview conditions, the child was asked an open-ended question, 'Tell me everything that happened during the healthy eating lesson' followed by a single prompt, 'Tell me more about what happened'. The open-ended questions were modelled after those used by Zajac and Hayne (2003, 2006). Once the child indicated that no further information could be provided, Mrs Jones began the direct examination.

Interview 1

This interview consisted of 21 direct questions. Each question was related to a different aspect of the healthy eating lesson and concerned either Mrs Brown, Mrs Brown's actions, the child's actions, or the objects in the healthy eating lesson. Twenty questions assessed the child's accuracy to report neutral events that happened during the healthy eating lesson, and one question provided an opportunity to disclose the transgression. The questions were comprised of a combination of yes/no questions (e.g., 'Did you sit down during the healthy eating lesson?') and specific questions (e.g., 'Which pieces of fruit did you touch during the healthy eating lesson?'). The direct-examination questions were modelled after the non-misleading specific questions used by Rudy and Goodman (1991). Although Zajac and Hayne's (2003, 2006) direct interview included misleading questions, these questions were not included here as many jurisdictions do not permit their use in direct examination (Bussey, 2009).

Interview 2

The second interview was conducted immediately after the first. Mrs Smith told the child that she was from the 'Potato Chip Factory' and that her job was to ask questions to find out why everyone likes the healthy eating lesson so much.

Direct/direct condition. In the direct/direct condition the child was asked a different set of 21 questions by Mrs Smith about the same 21 events that Mrs Jones enquired about in the first interview. Mrs Smith instructed the child to answer her questions, even if some of the questions had been answered previously.

Direct/cross condition. In the direct/cross condition the child was asked a series of cross-examination questions. These were based on the questions used by Zajac and Hayne (2003, 2006), which were derived from actual court cases. Questions concerned three target events selected from the 21 events that provided the basis for the direct-examination questions. Following Zajac and Hayne (2003, 2006), target events were

selected from those events which were assessed by yes/no questions in Interview 1. The target events consisted of two neutral events and the transgression. The child was always questioned about the two neutral events first, and the transgression last. This was in accordance with the principles of cognitive interviewing in which emotionally laden questions are asked towards the end of the interview (Saywitz, Geiselman, & Bornstein, 1992). For each of the three target events the child was asked one of two sets of questions (depending on their response in the initial direct examination), as outlined in the Appendix. These questions were leading, ambiguous, complex, and irrelevant, as they would be in court and were aimed at persuading children to change their initial responses. For example, a child who answered 'Yes' to a target question in the first direct examination was asked a set of questions designed to change his/her response from a 'Yes' to a 'No'.

The first question of each set clarified the child's response in the initial direct examination, for example, 'When Mrs Jones asked you some questions about the healthy eating lesson, you said that you did sit down, didn't you?' Questions 2, 3, and 4 were complex, irrelevant, ambiguous, and leading, for example, 'Do you have pets at home?' Question 5 assessed the child's certainty that his/her original claim was accurate, for example, 'Are you sure you sat down?' Question 6 challenged the child's response with a leading question, for example, 'But if Mrs Brown told me that you didn't sit down, she'd be right about that wouldn't she?' If the child said 'No' to Question 6 another leading question was asked, Question 7 'But she might be right about that, don't you think?' If the child answered 'Yes' to Question 6, Question 7 became redundant and was consequently not asked. Therefore, each child answered between 18 and 21 questions during the cross-examination depending on the answer provided in response to Question 6.

At the end of the cross-examination, Mrs Smith thanked the child and said that although the questions were pretty tricky, s/he did really well answering them. This procedure was used by Zajac and Hayne (2003, 2006). Mrs Smith told the child that she now understood why everyone liked the healthy eating lesson. The child was asked not to tell his/her friends about the healthy eating lesson or the questions they answered. Mrs Smith also asked the child if what Mrs Brown did with the carrot poster was good or bad. The vast majority (approximately 98%) of children said that it was bad, confirming that ripping the carrot poster was a valid transgression. The child was then informed that Mrs Brown would not get into trouble for ripping the carrot poster because it was probably an accident and the poster could be repaired.

Coding

Open-ended narratives

Two measures were derived from children's open-ended narratives, one measuring their accuracy for neutral events, and the other measuring their disclosure of the transgression.

Neutral events. Children's accuracy score for neutral events was computed by using a procedure similar to that employed by Quas *et al.* (2007). The total numbers of correct and incorrect units of information were calculated for each child. Units of information were defined as 'any piece of syntactic information corresponding to agents (who), actions (verb), objects (recipient of action), or descriptors (adjective)' (Quas *et al.*, 2007, p. 828). If the child provided redundant information, that

information was not given an additional score. If the child provided irrelevant information, or responded that s/he did not know the answer, s/he received a score of zero for both the correct and incorrect units of information. The accuracy score, which was expressed as a percentage, was computed by dividing the total number of correct units of information by the total number of units of information (i.e., the total number of correct and incorrect units) and multiplying this number by 100.

Transgressive event. Children's open-ended narratives were categorized according to whether they spontaneously disclosed the transgression. If the child did not mention the transgression during their open-ended narrative, their report was categorized as a non-disclosure. It is not possible to determine, however, whether an omission was intentional, and could thus be considered a lie, or whether the child simply did not remember, or did not think it important to relay information about the transgression. If the child mentioned the transgression, by reporting that Mrs Brown ripped the carrot poster, by referring to someone doing something wrong with the carrot poster, or by referring to Mrs Brown doing something wrong without specifying what she did, their report was categorized as a disclosure.

Interviews

On the basis of reporting differences in Bottoms *et al.* (2002) study between neutral and transgressive events, responses to the two neutral items were assessed separately from responses to the transgressive item. This separation also enabled comparison with Zajac and Hayne's (2003, 2006) research which only assessed reports for neutral events.

Neutral events. Three categories of scores were created to examine children's responses to the neutral items in Interview 1 and Interview 2: children's overall accuracy, the number of changes made to the neutral items from Interview 1 to Interview 2, and the proportion of these changes that were incorrect.

Overall accuracy. Two overall accuracy scores were calculated for each child: one score for Interview 1 and the other for Interview 2. These scores represented the percentage of neutral items responded to correctly in each interview. To enable comparison between children's accuracy during the direct- and cross-examinations, accuracy scores were calculated on the basis of children's responses to the two neutral target items. These two target items were assessed by single questions in the direct examinations, and multiple questions in the cross-examination (see Appendix).

Each of the target items concerned events that had taken place and a response was therefore considered to be correct if it affirmed that the event had occurred during the healthy eating lesson. For example, in the direct examinations a 'Yes' response to the target item, 'Did you sit down during the healthy eating lesson?' was considered correct, as all children did sit down during the lesson. During cross-examination, however, correctness was determined by the child's answer to the final leading question. This question encouraged children to report that their initial response had been, or may have been, incorrect. A 'Yes' response to the final question indicated a change to the child's initial response, whereas a 'No' response indicated the maintenance of the child's initial

response. Correctness was therefore determined by considering whether the child's initial response had been correct, and whether s/he changed or maintained this response. Accuracy scores, expressed as percentages, were computed separately for Interview 1 and Interview 2 by dividing the number of neutral items answered correctly in each interview by two (the total number of target neutral items), and multiplying this number by 100.

Number of changes between Interview 1 and Interview 2. A score representing the number of changes that children made to the two neutral items from Interview 1 direct examination to Interview 2 was computed. A score of 0 was assigned if no changes had been made to either of the items, a score of 1 was assigned if one of the responses was changed, and a score of 2 was assigned if both responses were changed.

Proportion of incorrect changes between Interview 1 and Interview 2. First, the number of incorrect changes made to the two neutral items was computed. For each item a child answered correctly in the initial direct examination but then answered incorrectly in Interview 2, a score of 1 was added to the number of incorrect changes. The minimum score was 0 and the maximum score was 2. Second, the number of correct changes made to the two neutral items was also computed. For each item a child answered incorrectly in the initial direct examination but answered correctly in Interview 2, a score of 1 was added to the number of correct changes. The minimum score was 0 and the maximum score was 2. The proportion of incorrect changes was computed by dividing the number of incorrect changes by the total number of changes made (i.e., the number of incorrect changes plus the number of correct changes).

Transgressive event. Two scores were created to examine children's reports of the transgressive event across Interviews 1 and 2. These scores represented children's transgression disclosure in each interview, and the disclosure changes from Interview 1 to Interview 2.

Transgression disclosure. Unlike children's reports of neutral events, children's reports of the transgression were assessed by a single item, necessitating the use of categorical scores. Children's Interview 1 and Interview 2 responses were categorized according to whether they disclosed the transgression. Reports in Interview 1 were categorized on the basis of the child's response to the transgression item, 'Did Mrs Brown do anything with the carrot poster?' If the child answered 'No' to this question, his/her response was categorized as a non-disclosure. If the child answered 'Yes' to this question, his/her response was categorized as a disclosure.

The same procedure was used to categorize reports in Interview 2 for children in the direct/direct condition. For children in the direct/cross condition, however, Interview 2 responses were categorized as disclosures if children maintained their initial allegation (i.e., they said 'Yes' in Interview 1 and did not change their response in Interview 2) or changed their initial denial to an allegation (i.e., they said 'No' in Interview 1 and changed their response towards 'Yes' in Interview 2). Responses were categorized as non-disclosures if children maintained their initial denial (i.e., they said 'No' in Interview 1 and did not change

their response in Interview 2) or changed their initial allegation to a denial (i.e., they said 'Yes' in Interview 1 and changed their response towards 'No' in Interview 2).

Disclosure changes between Interview 1 and Interview 2. The scoring of disclosure changes from Interview 1 to Interview 2 for the transgression item differed from the scoring used for the two neutral items. As there was only one transgression item, it was possible to capture information relating to both the number and direction of changes in a single analysis, rather than the two separate analyses that were required for examining changes to the neutral items. Responses were categorized as either a change to non-disclosure (i.e., the transgression was disclosed in Interview 1 and it was not disclosed in Interview 2), a change to disclosure (i.e., the transgression was not disclosed in Interview 1 and it was disclosed in Interview 2), or no disclosure change (a child maintained either their initial disclosure, or initial non-disclosure, across Interviews 1 and 2).

Reliability

Twenty-six per cent (32) of the interviews were double coded. There was an acceptable level of agreement across all scores with Cronbach Alpha's ranging from 0.85 to 1.00. Any differences were resolved through discussion and one rater scored the remaining interviews.

Results

Results from the open-ended narratives are presented first, followed by results from Interview 1 and Interview 2. Results from Interviews 1 and 2 encompass children's reports in each of these interviews, as well as the changes to their reports from Interview 1 to Interview 2. Analyses were conducted on 119 participants; one participant's data were excluded due to extreme scores on a number of the dependent measures. Different analyses were employed to analyse the neutral events, for which scores were numeric, compared with the transgressive event, for which scores were categorical. Preliminary analyses did not reveal any significant gender effects, and therefore all further analyses were collapsed across this variable.

Open-ended narratives

Neutral events

An independent samples *t*-test was conducted to examine the effect of grade on children's accuracy for neutral events. Results revealed a significant effect for grade, $t(49) = -2.62$, $p = .01$. Grade 2 children ($M = 97.74\%$, $SD = 7.96$) were significantly more accurate in their responses than were kindergarten children ($M = 86.76\%$, $SD = 26.90$).

Transgressive event

Only 10 of the 119 participants (8.40%) spontaneously reported the transgression during their open-ended narratives. A chi-squared test revealed that children's reports of the transgression were not affected by grade, $\chi^2(1, N = 119) = 0.07$, $p = .79$.

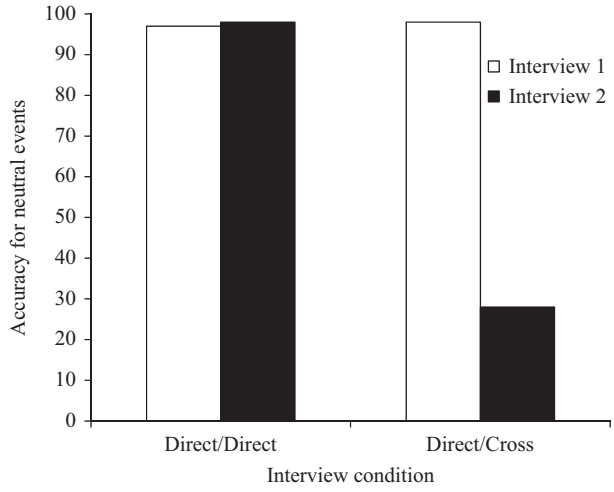

Figure 1. Children's accuracy for neutral events in Interview 1 and Interview 2, as a function of interview condition.

Interviews

Neutral events

Overall accuracy. Children's overall accuracy scores for the neutral events in Interview 1 and Interview 2 were analysed using a 2 (Grade) × 2 (Interview condition: direct/direct, direct/cross) × 2 (Interview phase: Interview 1, Interview 2) ANOVA. The first two factors were between subjects and the last factor was within subjects. The main effect of grade did not attain significance, $F(1, 230) = 0.01$, $p = .94$. However, results did reveal a significant two-way interaction involving interview condition and interview phase, $F(1, 230) = 209.33$, $p < .001$, $\eta^2 = .48$. This interaction is depicted in Figure 1. Accuracy did not differ between children in the direct/direct condition and those in the direct/cross condition for Interview 1 direct examination, $t(230) = 0.43$, $p = .66$. This is as expected as there had been no manipulation of interview condition at
this point. However, in Interview 2, children in the direct/cross condition were significantly less accurate than those in the direct/direct condition, $t(230) = 19.86$, $p < .001$. Furthermore, accuracy did not differ from Interview 1 to Interview 2, for children in the direct/direct condition, $t(230) = 0.23$, $p = .81$. However, children in the direct/cross condition became significantly less accurate from Interview 1 to Interview 2, $t(230) = 20.06$, $p < .001$.

Number of changes between Interview 1 and Interview 2. A 2 (Grade) × 2 (Interview condition) ANOVA was conducted on the number of changes children made to the neutral items from Interview 1 to Interview 2. A significant main effect of interview condition, $F(1, 115) = 217.11$, $p < .001$, $\eta^2 = .65$, emerged. Children in the direct/cross condition ($M = 1.44$, $SD = 0.65$) changed more of their responses from Interview 1 to Interview 2 than did children in the direct/direct condition ($M = 0.08$, $SD = 0.28$).

Proportion of incorrect changes between Interview 1 and Interview 2. A further analysis was conducted on the proportion of these changes that were incorrect. A 2 (Grade) × 2 (Interview condition) ANOVA revealed a significant two-way interaction involving grade and interview condition, $F(1, 55) = 18.03$, $p < .001$, $\eta^2 = .25$. The interaction revealed that children in both grades made a higher proportion of incorrect changes if they were in the direct/cross condition compared with the direct/direct condition. Furthermore, children in the direct/direct condition made a significantly higher proportion of incorrect changes if they were in kindergarten ($M = .67$, $SD = .58$), than in grade 2 ($M = .00$, $SD = .00$), $t(55) = 4.51$, $p < .001$, whereas children in the direct/cross condition made an equal proportion of incorrect changes if they were in kindergarten ($M = 1.00$, $SD = .00$) and grade 2 ($M = .98$, $SD = .10$), $t(55) = 0.57$, $p = .57$.

Transgressive event

Transgression disclosure. Children's disclosure of the transgression in Interview 1 was compared with their disclosure of the transgression in Interview 2 using a categorical analysis. This data analytic strategy was used as there was only one transgression item. A 2 (Grade) × 2 (Interview condition) × 2 (Interview phase) generalized linear mixed model was conducted, with the first two factors being between subjects and the last factor being within subjects. There was a significant two-way interaction between grade and interview phase, $F(1, 230) = 5.38$, $p = .02$, which was qualified by a three-way

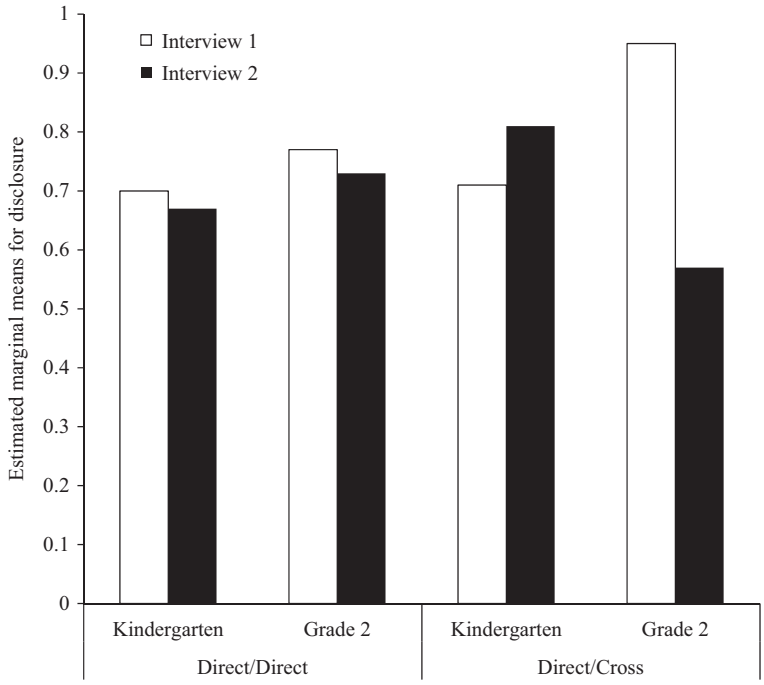

Figure 2. Estimated marginal means for children's disclosure of the transgressive event in Interview 1 and Interview 2, as a function of interview condition.

interaction involving grade, interview phase, and interview condition, $F(1, 230) = 5.21$, $p = .02$ (see Figure 2 for estimated marginal means).

For the direct/direct condition, the number of children who disclosed the transgression did not differ between Interview 1 and Interview 2, for either kindergarten $t(230) = 0.28$, $p = 0.78$, or grade 2 children $t(230) = 0.30$, $p = 0.77$. Furthermore, there was no difference between the number of kindergarten and grade 2 children who disclosed the transgression, during either Interview 1 $t(230) = 0.59$, $p = .56$, or Interview 2 $t(230) = 0.56$, $p = .57$.

For the direct/cross condition, the number of kindergarten children who disclosed the transgression did not differ between Interview 1 and Interview 2, $t(230) = 0.90$, $p = .37$. However, fewer grade 2 children disclosed the transgression in Interview 2 compared with Interview 1, $t(230) = 3.71$, $p < .001$. In addition, although the number of grade 2 children who disclosed the transgression in Interview 1 was higher than the number of kindergarten children who did so, $t(230) = 2.64$, $p = .009$, fewer grade 2 children disclosed the transgression in Interview 2 when compared with their kindergarten counterparts, $t(230) = 2.00$, $p = .05$.

Comparisons were also made between the direct/direct and the direct/cross conditions, with regards to the number of children who disclosed the transgression. For Interview 1, there was no difference between the direct/direct and the direct/cross conditions in the number of kindergarten children who disclosed the transgression, $t(230) = 0.08$, $p = .93$. However, fewer grade 2 children disclosed the transgression in the direct/direct condition compared with the direct/cross condition, $t(230) = 2.10$, $p = .04$. For Interview 2, there was no difference between the direct/direct and the direct/cross conditions in the number of kindergarten $t(230) = 1.26$, $p = .21$, or grade 2 children $t(230) = 1.30$, $p = .19$, who disclosed the transgression.

Disclosure changes between Interview 1 and Interview 2. A 2 (Grade) × 2 (Interview condition) main-effects multinomial logistic regression was conducted to investigate children's disclosure changes from Interview 1 to Interview 2. The dependent variable consisted of three categories: change to non-disclosure, change to disclosure, and no change to disclosure. The overall model was significant, $\chi^2(4, N = 119) = 28.54$, $p < .001$. There was a significant main effect of grade, $\chi^2(2, N = 119) = 9.59$, $p = .01$. *Post-hoc* tests revealed that the odds of students making no change to their disclosure rather than changing to a disclosure were 7.31 times greater for grade 2 compared with kindergarten students, *Wald* $(1, N = 119) = 6.19$, $p = .01$. Furthermore, the odds of students changing to a non-disclosure, rather than to a disclosure, were 8.68 times greater for grade 2 compared with kindergarten students, *Wald* $(1, N = 119) = 6.01$, $p = .01$.

The main effect of interview condition also attained significance, $\chi^2(2, N = 119) = 18.87$, $p < .001$. *Post-hoc* contrasts revealed that the odds of students making no change to their disclosure rather than changing to a disclosure were 3.34 times greater for students in the direct/direct condition compared with students in the direct/cross condition, *Wald* $(1, N = 119) = 3.85$, $p = .05$. Furthermore, the odds of students making no change to their disclosure rather than changing to a non-disclosure were 10.07 times greater for students in the direct/direct condition compared with students in the direct/cross condition, *Wald* $(1, N = 119) = 12.10$, $p = .001$.

The interaction between grade and interview condition could not be tested as so few children in the direct/direct condition made any disclosure changes. Therefore, only children in the direct/cross condition were included in a multinomial logistic regression

with grade as the independent variable. Results revealed a significant effect of grade, $\chi^2(2, N = 59) = 9.28, p = .01$. *Post-hoc* contrasts revealed that the odds of students changing to a non-disclosure, rather than to a disclosure, were 18.00 times greater for grade 2 compared with kindergarten students, *Wald* $(1, N = 59) = 6.14, p = .01$.

Discussion

This study examined the claim that cross-examination promotes true reporting of neutral and transgressive events. The results revealed, consistent with predictions and with the findings of Zajac and Hayne (2003, 2006) that cross-examination negatively influences children's accurate reporting of neutral events. It was further shown that cross-examination impacts some children's disclosure of a witnessed transgressive event. In particular and counter to Wigmore's (1974) assertion, cross-examination did not promote truthful disclosure for kindergarten children, and actually reduced the number of older children who provided truthful disclosures.

Children's accuracy for reporting neutral events was significantly impacted by interview condition. Children's accuracy in Interview 2 was significantly lower if they underwent cross-examination compared with a second direct examination. Furthermore, children who were cross-examined provided significantly less accurate responses during their cross-examination than they did during their initial direct examination. These results extend Zajac and Hayne's (2003, 2006) findings by showing that the detrimental effect of cross-examination was due to the types of questions asked during cross-examination, not to the effects of a repeated interview.

In addition to reducing children's reporting accuracy, cross-examination also led children to make a considerable number of changes to their reports of neutral events. In support of the hypotheses, children interviewed with cross-examination in the second interview made more changes to the neutral items from Interview 1 to Interview 2, than those interviewed with direct examination in the second interview. Furthermore, children interviewed with cross-examination in the second interview made a higher proportion of incorrect changes from Interview 1 to Interview 2 than children interviewed with a second direct examination. These results are also consistent with Zajac and Hayne's (2003, 2006) findings in showing that the changes produced through cross-examination do not necessarily result in increased accuracy.

The current study also examined developmental differences in children's reports of neutral events. Older children were significantly more accurate in their open-ended narratives than were younger children. Although this was in contrast to our prediction, and the findings of Poole and Lindsay (1995, 2001), it is consistent with Beuscher and Roebers' (2005) finding that 8- and 10-year-old children were more accurate in their free recall compared with 6-year-old children. For the direct examination, counter to predictions, older children were no more accurate than their younger counterparts in the direct examinations of either Interview 1 or Interview 2. Children from both age groups performed near ceiling on the neutral items in both the first and second direct examinations. This reveals that younger children were as accurate in their reports as older children, when asked non-misleading direct questions.

For children who underwent cross-examination, there were no age differences in either the number of changes they made in response to neutral items, or in the proportion of these changes that were incorrect. These findings do not support the hypotheses that, under cross-examination, younger children would make more changes, and a higher

proportion of incorrect changes, than older children, nor were they consistent with Zajac and Hayne's (2003, 2006) research. This could be due to the smaller gap between age groups in this study ($M = 6.00$ years vs. $M = 8.00$ years) compared with that in Zajac and Hayne's research ($M = 6.30$ years vs. $M = 9.97$ years) (2003, 2006). Interestingly though, younger children did make a higher proportion of incorrect changes from Interview 1 to Interview 2, compared with their older counterparts, if their second interview was a direct examination. This is consistent with findings by Howie, Sheehan, Mojarrad and Wrzesinska (2004), who demonstrated that younger children had a greater tendency than their older counterparts to change their initial accurate response towards an inaccurate one across repeated interviews.

In addition to examining the effects of cross-examination on children's reports of neutral events, this study also investigated the impact of cross-examination on children's disclosure of a witnessed transgression. In contrast to predictions, an equal number of children disclosed the transgression during the cross-examination as during a second direct examination. This suggests that cross-examination is no more effective than a second direct examination at eliciting a truthful disclosure of a witnessed transgression. On the contrary, cross-examination negatively impacted older children's disclosures of the transgression. For those children interviewed with direct- and then cross-examination, there was no difference in the number of younger children who provided disclosures in the direct- versus the cross-examination; however, fewer older children disclosed the transgression in the cross-examination than in the initial direct examination. Although it is important to consider that an unusually high number of children in this group disclosed the transgression in Interview 1, their disclosure was nevertheless undermined by cross-examination. This is contrary to the hypothesis, and Wigmore's (1974) assertion, that cross-examination promotes truthful testimony.

The present study also investigated the impact of cross-examination on the consistency of children's transgression disclosures from Interview 1 to Interview 2. The likelihood of children making a change to a non-disclosure, a change to a disclosure, or no disclosure change was compared for children whose second interview was a direct- versus a cross-examination. As predicted, the likelihood of children making a disclosure change, rather than no disclosure change, was greater for children who underwent cross-examination in Interview 2 than it was for children who underwent a second direct examination. This pattern is consistent with that found for neutral events, where children interviewed with cross-examination changed more of their responses compared with children interviewed twice with direct examination. Counter to the effect for neutral events, however, where changes were predominantly incorrect, cross-examination promoted some children's disclosure yet undermined others. In support of Wigmore's (1974) assumption and the hypothesis, children interviewed with cross-examination were more likely than those interviewed with direct examination to change from an initial non-disclosure to a truthful disclosure, rather than to make no disclosure change. In contrast, they were also more likely to change from a truthful disclosure to a non-disclosure than they were to make no disclosure change. That is, cross-examination facilitated truthful disclosure for some children, while leading others to recant their truthful reports of the witnessed transgression.

Although results revealed that older children interviewed with cross-examination were more likely to change to a non-disclosure than to a disclosure, compared with the younger age group, more of the older children provided a disclosure in Interview 1, than did their younger counterparts. Hence, more children in the older age group had the opportunity to change to a non-disclosure from the first to the second interview. As these children were not expected to provide a higher number of disclosures in the first

interview, future research investigating how cross-examination impacts the disclosure of transgressive events by children across different age groups is required.

This study has significant implications for research and the legal system, however, there are some limitations. The sample was presumably non-maltreated, yet in forensic cases, children who testify typically have been maltreated. As other research has shown that maltreated children display cognitive delays in comparison with their non-maltreated counterparts (Lyon & Saywitz, 1999), the capacity for maltreated children to provide accurate testimony under cross-examination may differ from that of the present sample. Future research on the influence of cross-examination on children's reports should therefore include a comparison group of maltreated children.

Furthermore, the delay between an episode of child sexual abuse and testifying about the event can be well over a year (Eastwood & Patton, 2002). Although the cross-examination in this study took place immediately, its impact was comparable to that found by Zajac and Hayne (2003, 2006) following a delay. Furthermore, previous research showed that the length of delay between the direct- and cross-examination (8 months vs. 1–3 days) did not have a significant effect on children's reporting accuracy when they were cross-examined (Righarts, 2007). Although it is important for future research to establish the impact of cross-examination after a delay, on children's transgression disclosure, this is a challenge. In this study, the inclusion of a delay was precluded by institutional ethical guidelines. Requirements necessitated that the child be debriefed about the transgression immediately after the testing session to alleviate any discomfort they may have experienced about witnessing the transgression. Most studies involving deception with children do not involve delays for similar ethical reasons (Lyon *et al.*, 2008; Lyon & Dorado, 2008; Talwar *et al.*, 2002, 2004).

A further limitation of this research is the mild severity of the transgression used. Despite its low personal relevance, the vast majority of children stated that the transgression was bad, and failed to disclose the presumably salient event during open-ended questioning. These findings suggest that children were motivated to omit the transgression from their reports. Therefore, the transgression provided an appropriate context in which to assess the impact of cross-examination on children's reports of transgressive events. A final limitation is that all children in this study witnessed the transgression. This allowed for an assessment of how cross-examination impacts children's true disclosures. However, it is often argued in legal settings that children disclose non-witnessed events in response to parental coaching (see Poole & Lindsay, 1995). Therefore, it is important for future research to examine how cross-examination impacts children's false disclosures of events they have not witnessed but have been coached to allege.

In summary, results from this study indicate that cross-examination is detrimental to the accuracy of children's reports of neutral events. They suggest that leading, ambiguous, complex, and irrelevant questions are just as problematic when used in cross-examination as they are when used in direct examination (Ceci & Bruck, 1995; Goodman & Melinder, 2007; Melnyk *et al.*, 2007; Sternberg, Lamb, Orbach, Esplin & Mitchell, 2001). The findings also indicate that cross-examination does not promote truthful disclosure of transgressive events, and may even jeopardize older children's reports of witnessed transgressions. In combination with previous research showing that cross-examination is highly distressing for child witnesses (Eastwood & Patton, 2002), these findings suggest that cross-examination as currently employed by the legal system may not be the best method for promoting truthful testimony from children aged 5 to 8

years. Strategies that adequately test children's evidence, without compromising their accuracy and truthfulness, need to be identified to increase opportunities for justice in child sexual abuse cases.

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Appendix

Sample cross-examination questions

Target event (Neutral): Sitting down during the healthy eating lesson (initial 'No' response).

1. When Mrs Jones asked you some questions about the healthy eating lesson, you said that you did not sit down, didn't you?
2. Can you tell me why you think that?
3. Did you do sport yesterday at school?
4. You had to tell Mrs Brown what your favourite fruit was, didn't you?
5. Are you sure you didn't sit down?
6. But if Mrs Brown told me that you did sit down, she'd be right about that, wouldn't she?
7. But she might be right about that, don't you think?

Target event (Neutral): Sitting down during the healthy eating lesson (initial 'Yes' response).

1. When Mrs Jones asked you some questions about the healthy eating lesson, you said that you did sit down, didn't you?
2. Can you tell me why you think that?
3. Did you do sport yesterday at school?
4. You had to tell Mrs Brown what your favourite fruit was, didn't you?

5. Are you sure you sat down?
6. But if Mrs Brown told me that you didn't sit down, she'd be right about that, wouldn't she?
7. But she might be right about that, don't you think?

Target event (Transgression): Mrs Brown ripping the carrot poster (initial non-disclosure).

1. When Mrs Jones asked you some questions about the healthy eating lesson, you said that Mrs Brown didn't do anything with the carrot poster, didn't you?
2. Can you tell me why you think that?
3. Mrs Brown gave you a sticker didn't she?
4. Did you do arts and crafts yesterday at school?
5. Are you sure Mrs Brown didn't do anything with the carrot poster?
6. I think Mrs Brown did do something with the carrot poster, but you just don't remember. That's what happened, isn't it?
7. But that might be what happened, don't you think?

Target event (Transgression): Mrs Brown ripping the carrot poster (initial disclosure).

1. When Mrs Jones asked you some questions about the healthy eating lesson, you said that Mrs Brown did do something with the carrot poster, didn't you?
2. Can you tell me why you think that?
3. Mrs Brown gave you a sticker, didn't she?
4. Did you do arts and crafts yesterday at school?
5. Are you sure Mrs Brown did something with the carrot poster?
6. I don't think that's what happened, I think your friends saw Mrs Brown do something with the carrot poster, but you didn't. That's what happened, isn't it?
7. But that might be what happened, don't you think?