

**The Effects of Cross-Examination on
Children's Reports**

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Abstract

Cross-examination is a fundamental aspect of the adversarial legal system; it is meant to test the reliability of the evidence. To date, all research has examined the effect of cross-examination with children who have experienced a unique event. However, many children who testify have experienced multiple similar instances of abuse. In two experiments I investigated the effects of cross-examination on the consistency, accuracy, and perceived credibility of children's reports. In Experiment 1 ($N = 222$), younger children (kindergarten or grade 1) and older children (grade 3, grade 4, or grade 5) participated in either one (single-event; SE) or five similar (repeated-event; RE) magic shows. One-week later, children received a baseline interview which used best practice techniques. Next, half the children were cross-examined (cross) and the other half answered all cued recall questions again (direct-direct; DD). Finally, all children received a re-direct interview (Interview 3) and were encouraged to answer the questions as they remembered the details occurring during the show. In most analyses children in the cross condition were less accurate during Interview 2 than children in the DD condition. The re-direct interview helped to rehabilitate accuracy for variable details (vary in predictable ways); however, the negative effects of cross endured for accuracy of deviation details (vary in unpredictable ways) and when accuracy was defined broadly. In Experiment 2, recorded interviews of the children were randomly sampled and matched on accuracy. Undergraduate participants ($N = 532$) rated the children's perceived honesty, accuracy, credibility, and susceptibility to suggestive questions. Younger children and RE children were perceived as less honest, accurate, and credible than older children and SE children. Children who were cross-examined were rated as less susceptible to suggestive questions than children in the DD condition. These results show that cross-examination has detrimental effects on children's reports and that RE children may be disadvantaged when testifying in court.

Keywords: cross-examination; children; memory; repeated event; single event; perceived credibility

Dedication

Today, Sophia came out to the deck and said, “Mom, I’ve completed my PhD.” Sophia is 4- years old. As funny as this was, there is some truth to this. Sophia was 6- weeks old when data collection started on this project. All my children have sacrificed many homemade cookies for me to complete my graduate training. They have been very gracious, and I dedicate this to all of them.

And to my sisters, brothers, parents, and grandparents. At times this felt like a pretty challenging endeavor, especially this last month. I could not have done this without their patience, love, and support. The kids and I are just so fortunate to have such as wonderful warm family.

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List of Acronyms

CSA	Child sexual abuse
DD	Direct-direct
RE	Repeated event
SE	Single Event

Chapter 1.

Introduction

“Cross-examination is an essential aspect of the adversarial framework of our legal system and necessary to ensure the fairness of the trial” (*R. v. B.S.*, 2005). The purported purpose of cross-examination is to test the reliability of the evidence; the idea being that an honest witness will withstand the pressure of cross-examination and a dishonest witness will reveal his or her deceit (e.g., change a response). Some scholars, however, suggest that the practical purpose of cross-examination is to discredit the witness, even an honest witness. According to Brennan (1994), when a child is cross-examined, defence attorneys challenge his or her credibility using multiple approaches. This includes, but is not limited to, asking the child to confirm statements provided by other witnesses, questioning the child about statements that may have been provided months or years prior, or inquiring about details regarding a specific instance of an offence that occurred repeatedly (Brennan, 1994). Other techniques used during cross-examination to discredit the witness include: asking the questions rapidly, using ambiguous or misleading questions, and suggesting a reason for why the witness could be mistaken (e.g., the witness does not have a good memory) (Hanna, Davies, Crothers, & Henderson, 2012; Klemfuss, Quas, & Lyon 2014; Zajac, Gross, & Hayne, 2003).

Virtually all research examining the effects of cross-examination on the accuracy and consistency of children’s reports has been conducted with children who experienced a single event. However, many children who report abuse report being repeatedly victimized (Connolly & Read, 2006). In most common-law jurisdictions, children who report repeated abuse will be required to describe specific instances of the alleged abuse. This is because describing a specific instance is required to meet the legal standard for charging an offence (Woiwod & Connolly, 2017). This expectation may be unrealistic, as the task of consistently describing a specific instance of a repeated event is remarkably difficult. Children who experience repeated similar events remember details, but their memory of when each detail was experienced (i.e., source memory) fades quickly, and

reports of one instance contain many details from non-target instances (Brubacher, Roberts, & Powell, 2012; Connolly & Gordon, 2014; Connolly, Gordon, Woiwod, & Price, 2016; Woiwod, Fitzgerald, Sheahan, Price, & Connolly, 2019). This leads to descriptions that are inconsistent across reports and may appear less credible than reports of single events (Connolly & Lavoie, 2015; Connolly, Price, Lavoie, & Gordon, 2008).

The purpose of this research was to examine the effect of cross-examination on the accuracy and consistency of reports provided by children who experienced a single or repeated event (Experiment 1). This research also examined how children performed when given the opportunity to provide their initial (direct interview) responses after having been cross-examined (i.e., re-direct interview). Using recorded interviews from the first experiment, a follow-up experiment was conducted to examine the effect of cross-examination on the perceived credibility of children who had experienced a single or repeated event (Experiment 2).

1.1. Cross-examination

Most often, when a child testifies about an allegation of child abuse, he or she is called as a witness by the prosecutor and is questioned about the alleged incident at least twice: direct examination by the prosecution and cross-examination by defence¹. During direct examination the prosecutor asks the child questions to elicit the child's evidence with respect to the allegation. In some jurisdictions, a child's initial statement to the police may be recorded and submitted in lieu of direct examination in court. The child would be required to adopt the statement and would still be cross-examined about the contents of the statement. There is some flexibility when the witness is a child, but typically when a prosecutor calls a witness to the stand, he or she is not permitted to ask leading questions. Conversely, leading questions are permitted and encouraged during cross-examination. In an examination of 42 trial transcripts of cases occurring between

¹ Occasionally a defence lawyer will call a child witness, resulting in the child being cross-examined by a prosecutor, but this is unusual and did not occur in any of the research reviewed in this paper. Therefore, throughout this paper, cross-examination will be discussed and referred to as a defence technique.

1997 and 2001, Klemfuss et al. (2014) observed that defence attorneys asked child witnesses suggestive and leading questions more often than any other question type.

Given that the intended purpose of cross-examination is to test the reliability of the evidence, it makes sense that cross-examination is a key component of any trial. If the objective of cross-examination is to reveal the truth, it is essential for protecting the rights of the accused person. Cross-examination provides the defence an opportunity to challenge the evidence presented by the prosecution. To prevent injustices from occurring, we must ensure that the rights of the accused are protected.

Accused persons' rights are not absolute and must be balanced with the needs of complainants, particularly vulnerable ones such as children. Cross-examination is stressful, particularly to children (Alaggia, Lambert, & Regehr, 2009; Goodman et al., 1992; Hall & Sales, 2008), and has been described as one of the most traumatic aspects of the criminal proceedings for children alleging sexual abuse (Eastwood & Patton, 2002). For instance, children 4- to 11-years-old scored higher on a state anxiety measure when they were cross-examined compared to when they were asked direct-examination questions (Bettenay, Ridley, Henry, & Crane, 2015). Additionally, when children between 8 and 17 years of age were asked about their experience with the criminal justice system, the majority responded that given the opportunity, they would not disclose abuse again, and that the experience of going to court was not worth the outcome (Eastwood & Patton, 2002).

Two common cross-examination strategies used by defence attorneys are to *directly challenge* the child's testimony (Cashmore & Trimboli, 2005; Davies, Henderson, & Seymour, 1997) and to *incite inconsistencies* in the child's testimony (Glissan, 1991). Children's testimony may be challenged directly through explicit accusations of lying (Eastwood & Patton, 2002; Brennan, 1994; Davies et al., 1997). Not surprising, children find being accused of lying to be the most hurtful aspect of cross-examination (Eastwood & Patton, 2002). Direct strategies may also involve questioning the quality of a child's memory about the event. This could include asking a child about conversations that occurred between the initial disclosure and the trial date, asking about

specific places and times when the allegation involves repeated abuse, and quoting what other people and/or the child had said. If the child appears to be confused, this will affect his or her perceived credibility. These direct strategies are sometimes referred to as *credibility challenging* (see Zajac & Hayne, 2003). According to Black's Law Dictionary, credibility is defined as "worthiness of belief." By this definition, any technique which aims to discredit the witness could be considered credibility challenging. To maintain the distinction between the different techniques, throughout this paper credibility challenging will be referred to as *directly* challenging.

To incite inconsistencies, defence attorneys commonly subject children to a lengthy process of answering difficult questions (Brennan, 1995, Hanna et al., 2012; Zajac et al., 2003). When being cross-examined, children are asked repeated, complex, grammatically confusing, leading, and closed questions (Zajac et al., 2003). Examples of these types of questions might be, "*so neither of you never told your mother about it?*" (complex question), "*what colour did you say was the thing on the wall when you told me you were at your Grandmother's?*" (grammatically confusing), and "*then you went to the park, right?*" (leading). Closed questions require yes/ no or short word responses; "*did you go home right after?*" Hanna et al. (2012) showed that defence attorneys use double-negative (complex) questions and leading questions more frequently than prosecution attorneys. Defence attorneys may also skip around the topic rapidly asking questions about peripheral details. Difficult questions asked in rapid succession are said to confuse individuals who have rehearsed their testimony and reveal those who are being dishonest in their account. However, it is probable that these techniques, especially when used with children, will also incite confusion and inconsistencies even from honest witnesses (Hanna et al., 2012). According to Brennan (1994), when lawyers use developmentally inappropriate language, it results in a mismatch that makes it less likely the child will be able to answer the questions and places the child on a lower status. The elevated status of the defence attorney increases the likelihood that children will comply with the lawyers' suggestions due to social influence.

Children lack the sophisticated language skills necessary to navigate their way through the judicial system. When asked inappropriate questions, children will sometimes

attempt to answer them rather than reject the assertion or ask for clarification (Brennan, 1994; Markman, 1977, 1979; Waterman, Blades, & Spencer, 2000). Laboratory studies by Waterman et al. (2000) showed that using closed versus opened questions increases the likelihood that children (ages 6-8) will answer non-sensical or ambiguous questions, such as “what do bricks eat?”. This was despite being told it is okay to say, “I don’t know,” and despite the children themselves judging the questions to be non-sensical. This indicates that children will sometimes provide answers to questions even when they judge the questions as unreasonable (Waterman et al., 2000).

Recall that the purported purpose of cross-examination is to test the reliability of the evidence and the credibility of the witness, essentially to elicit the truth. However, cross-examination frequently results in children changing their responses from what they reported under direct examination (Zajac & Hayne, 2003; 2006; Zajac et al., 2003). Without knowing ground truth, when children change their responses in the courtroom one can never know whether cross-examination has served this truth-seeking purpose: did the child change from a correct to an incorrect response or from an incorrect to a correct response? What we do know is that children will look confused and inconsistent. Critically, this could impact their perceived credibility regardless of whether they are being truthful.

In summary, to raise a reasonable doubt, a defence lawyer will utilize common techniques. Directly challenging children’s testimony and inciting inconsistencies may confirm typical beliefs about children’s immature cognitive abilities. Providing an alternative explanation, such as the child is misremembering, confused, or suggestible, could challenge the perceived credibility of a child by introducing a reason why the child is incorrect. This process can be extremely lengthy and traumatic for children, and it can undermine the truth-seeking function of the courts. Therefore, research examining whether cross-examination serves a truth-seeking function is essential to protecting child witnesses and the integrity of the justice system.

1.1.1. Does Cross-examination Serve a Truth-Seeking Purpose?

Accuracy of the Report

Some studies have shown that when children are cross-examined, they are just as likely to change responses that were initially correct as those that were initially incorrect (O'Neill & Zajac, 2013b; Zajac & Hayne, 2003; but see Zajac & Hayne, 2006; Zajac, Irvine, Ingram, & Jack, 2016). For instance, Zajac and Hayne (2003) examined the effect of cross-examination on reports provided by children ages 5- to 6-years old. The children first participated in an event that involved them visiting a police station and participating in four activities: touring the jail cells, having their mug shots taken, providing a fingerprint, and viewing police cars. Half the children (*misled condition*) received incorrect information during two interviews that occurred two weeks and again four weeks after the event. Misled children were told by the same interviewer on both occasions that they had tried on handcuffs at the police station and that a woman had come to the station to report that her son's bicycle had been stolen; neither of these activities had occurred. The remaining children were in the control condition and received no misinformation at any point.² Direct examination occurred six weeks after the trip to the police station. All children were videotaped and were first asked to tell the interviewer everything they could remember about the trip to the police station. The children were then asked four "yes" or "no" questions about two activities that had actually occurred ("did you have your photo taken?" and "did you see the police car?") and two activities that had not occurred ("did you try on handcuffs?" and "did you see the lady come in and report her child's bike stolen?").

The cross-examination occurred eight months after the direct-examination interview. First, children were shown a videotape of their direct examination. Next, all children were individually interviewed by a person other than the one who had interviewed them on the previous occasions. They then answered four sets of ten questions, blocked by activity. There was one set about each of the four activities they

² The paper did not mention whether the control children were also interviewed two and four weeks following the station visit.

had discussed during the direct examination (two true and two false activities). Questions were asked in a pleasant manner. If the child did not respond to a question within a few seconds, then the interviewer moved on to the next question. If the child did respond, the interviewer moved on to the next question without providing any feedback. Within each block of questions, the first question asked the child to clarify his or her original answer- “You said in the video that you got your photo taken, didn’t you?” Most children responded “yes” to this question. Questions 2-7 were fillers, phrased in common cross-examination questioning style (e.g. complex, leading, suggestive) about things unrelated to the target activity. The purpose of Question 8 was to query the child’s certainty- “are you sure that you got your photo taken?” Question 9 expressed disbelief in the child’s original response and provided one of four plausible explanations for this disbelief. For example, “I don’t think you really got your photo taken, I think someone told you to say that. That’s what really happened, isn’t it?” Only if the child did not acquiesce by answering “yes” to Question 9 was she or he asked Question 10. This was a final leading question asking the child to consider the possibility that the alternative explanation could be true “But that might be the case, don’t you think?”

The aim of these blocks of questions was to convince the children to change their original “yes” or “no” responses about the activities (i.e., if a child had reported during direct examination that a false event did not happen, cross-examination was structured to elicit an incorrect response to that detail, and conversely, if the child had reported during direct examination that the false event did happen, the cross-examination was structured to elicit a correct response). This paradigm (the Zajac-Hayne Paradigm) has been used extensively in the field. In this paper, future reference to it will only include necessary methodological modifications. The paradigm is also described in Appendix A.

During direct examination, misled children were less accurate than control children, and this was due to errors on questions about false events. Under cross-examination, 85% of the children changed at least one of their four direct-examination responses. Importantly, under cross-examination, misled children were just as likely to change correct responses to incorrect responses as they were to change incorrect responses to correct responses. Therefore, cross-examination was not helpful in eliciting

true information from the misled children. Accuracy for control children was quite high for the direct examination. However, for this group, there was a significant decline in accuracy between direct examination and cross-examination.

In 2006, Zajac and Hayne used the same paradigm with 9- to 10-year-olds. Although these children held up slightly better than their younger counterparts, 70% of 9- and 10-year-olds still changed at least one of their original answers from direct- to cross-examination. For misled children, accuracy did not change between direct and cross-examination. However, accuracy was significantly lower in cross-examination compared to direct examination for children who were not misled. These findings raise serious concerns about the truth-seeking goal of cross-examination, particularly regarding the testimony of children who are being truthful.

Cross-examination may improve accuracy slightly for children who are initially inaccurate (Fogliati & Bussey, 2015; Righarts, Jack, Zajac, & Hayne, 2015). For example, in a study by Righarts et al. (2015), children (5- to 6-years-old) visited the police station and received a direct examination 1- to 2-days later. Either 1- to 3-days later or eight months later, a different interviewer cross-examined the children. Overall, changes children made during cross-examination were more likely to increase accuracy (51%) rather than decrease accuracy (35%), although the effect size was small. The difference was a result of children's responses to questions about false events; correct and incorrect responses about true events were equally likely to be changed (32% and 38%), while incorrect responses about false events were more likely to be changed than correct responses about false events. These results are surprising given previous research showing the adverse effects of cross-examination on children's accuracy. It is of value to note that there were few incorrect responses to begin with, and only five children (7%) improved their accuracy scores when cross-examined. These results could point to a ceiling effect possibly masking the "truth-promoting" effect of cross-examination.

Consistency of the Report

Zajac et al. (2003) examined transcripts of 21 cross-examinations and 18 direct- and re-direct examinations that included 2,935 cross-examination questions and 600

direct- and re- direct examination questions. The children (5- to 13-years-old) had all alleged incidents of child sexual abuse (CSA). The questions were coded into one of seven different categories: complex, grammatically confusing, credibility (directly) challenging, leading, closed, appropriate, and neutral (e.g., reference to prior testimony). The majority (76%) of children, when cross-examined, made at least one change to a previous portion of their testimony, and 95% of these changes followed either leading or credibility (directly) challenging questions (Zajac et al., 2003). Younger children were asked just as many questions as older children under cross-examination and all effects were observed regardless of the age of the child. Older children were more likely than younger children to ask for clarification on confusing questions, however, the actual mean difference was quite small (Zajac et al., 2003). These results are consistent with other studies showing that children commonly change their responses under cross-examination.

Recall, in Zajac and Hayne's (2003) analogue study (discussed previously), the majority (85%) of children changed at least one of their four direct-examination responses during cross-examination. Even more revealing is that one-third of the children changed all responses under cross-examination and the median number of changes was three (out of four). Critically, there was no difference in the number of response changes made under cross-examination between children in the misled group and children in the control group (Zajac et al., 2003).

These studies show that many children will change their responses under cross-examination. In a forensic setting, these inconsistencies could undermine children's credibility. Without knowing ground truth, consistency is commonly used to assess the credibility of witnesses (Myers, Redlich, Goodman, Prizmich, & Imwinkelreid, 1999). Additionally, response changes decreased accuracy for children who were initially accurate, as children often changed correct responses to incorrect ones under cross-examination (Zajac & Hayne, 2003; 2006). This research provides preliminary evidence that cross-examination does not serve a truth-seeking function with children who are accurately reporting about the events.

1.1.2. Changes under Cross- examination are Not Due to Question Repetition

When children are subjected to repeated, closed questions, that are leading, ambiguous, or complex, they may fail to understand what is being asked of them. Some children will change their responses to closed questions when they are asked the questions repeatedly (Poole & White, 1991;1993). To investigate whether response changes under cross-examination are due to question repetition only, or due to pressures inherent to cross-examination techniques, Fogliati and Bussey (2014) either cross-examined children or provided children with two direct examinations. In this study, children age 6- or 8-years-old learned about healthy eating habits. During the lesson, the administrator (Mrs. Brown) highlighted a poster with fruits and vegetables on it to emphasize to the children that the poster was special. At some point Mrs. Brown accidentally ripped the poster and said, “Oh no, I’ve ripped the special carrot poster. I hope I don’t get into trouble. Maybe nobody will notice” (Fogliati & Bussey, 2014). This activity was included to see if cross-examination encourages children to disclose a transgression.

Immediately following the lesson, all children received a direct-examination interview. The interviewer (Mrs. Jones) first asked each child an open question about what happened during the healthy eating lesson. She then asked 20 direct questions (a combination of yes/no and cued recall questions) about target details that occurred during the lesson and one question about the transgression (21 questions in total; Fogliati & Bussey, 2014).

Immediately following the direct examination, a new interviewer (Mrs. Smith) interviewed the children. Half the children (direct-direct condition) received 21 questions about the same target details asked during their direct-examination interview. The children were asked to answer the questions even if they had answered some of them previously. The remaining children (cross condition) received seven questions about each of three target details that had been asked as yes/no questions under direct examination (two neutral as well as the transgression). The cross-examination questions were similar to those used by Zajac et al. (2003, 2006): confirm their earlier response (question 1);

grammatically complex, leading, and irrelevant questions (questions 2-4); certainty about their earlier response (question 5); challenge their original response (question 6); if they did not acquiesce to the challenge, children were asked to speculate if things might have been different (question 7). If the children did acquiesce to question 6, they were not asked question 7. The cross-examination questions always challenged the child's first response—whether it was correct or incorrect. If question repetition alone accounts for children's response changes observed in previous studies, response changes should be similar in the direct-direct and cross-examination conditions (Fogliati & Bussey, 2014).

To facilitate comparisons across direct- and cross-examination conditions, the researchers only analyzed responses to questions about the three details that were common across conditions (i.e. two neutral events and the transgression). Not surprisingly, children in both conditions were similarly accurate during direct examination. Accuracy for children in the direct-direct condition did not differ between Interview 1 and Interview 2. Children who were cross-examined during Interview 2 changed more responses across the two interviews compared to children in the direct-direct condition. Cross-examination did not encourage disclosure of the transgression; children in the cross condition were no more likely to disclose the transgression compared to children in the direct-direct condition. In fact, cross-examination seemed to have a negative impact on the older children who were less likely to disclose the transgression during cross-examination than during a second direct examination (Fogliati & Bussey, 2014). These findings suggest that cross-examination does not serve a truth-seeking function; they also suggest that children's response changes are not a result of being asked the questions repeatedly. Additionally, the detrimental effects cross-examination had on the accuracy and consistency of the children's reports occurred with little delay between the event, direct- and cross-examination.

1.1.3. Changes under Cross-examination are not fully Explained by Memory Failures

Research by Jack and Zajac (2014) examined to what extent memory can explain inconsistency and inaccuracy of reports under cross-examination. They manipulated

whether participants were reminded of their initial responses directly preceding cross-examination. If memory contributes to changes that people make under cross-examination, then reminding them of their original responses should decrease the number of changes and potentially increase accuracy. Additionally, if memory for the event plays a role in performance under cross-examination, then the amount of information that individuals provide during their first interview may be related to their accuracy under cross-examination. Participants (9- to 11-year-olds, 14- to 16-year-olds, 25- to 60-year-olds), first viewed a brief video clip of a simulated non-violent crime and completed the Wechsler Abbreviated Scale of Intelligence (WASI; Jack & Zajac, 2014). Participants were interviewed, according to police protocol, 45 minutes after the video clip. Participants answered free recall questions, followed by open-ended prompts and then eight yes or no questions: four about true details and four about false details (Interview 1).

Participants were re-interviewed approximately eight months after the first interview (Interview 2). Half the participants listened to the audio recording of their original interview before the second interview. Participants answered free recall and the same eight yes/ no questions from Interview 1. On half the questions (two questions about true details and two questions about false details), participants were re-asked the same questions (control questions) and on the remaining questions (two true details and two false details), participants were cross-examined. On these cross-examination questions, the interviewer first re-stated what the original response was. “Last time you said the person that you saw in the video was a man. How did you know that?” (Jack & Zajac, 2014). This question was designed to assess participants’ ability to support their original response with contextual details. The next three questions were leading, complex, ambiguous, or irrelevant. The interviewer ended with a reason for disbelieving the participant’s initial answer (for example, “Most people who saw that clip said that it was a woman, I think they are right about that aren’t they?”; Jack & Zajac, 2014). Across all conditions, even those who heard an audio recording before being re-interviewed, were less accurate in Interview 2 than in Interview 1. This suggests that failing to remember what was reported during Interview 1 does not explain the changes that participants made under cross-examination.

The researchers also conducted regression analyses to determine if cognitive factors predicted cross-examination accuracy (Jack & Zajac, 2014). When age, the vocabulary subtest score of the WASI, and the amount of information provided during the free recall of the initial interview were included, the model predicted 8% of the variance in cross-examination accuracy. The amount of information that the participants had provided during the free recall portion only predicted 3.3% of the unique variance in cross-examination accuracy scores. The researchers suggested that providing a richer interview following the memory event may strengthen the memory representation, but that social factors rather than cognitive factors might better explain children's performance under cross-examination (Jack & Zajac, 2014).

With respect to consistency, participants made more changes in response to cross-examination questions than control questions (Jack & Zajac, 2014). When answering control questions, those participants who listened to an audio recording of Interview 1 made fewer changes than participants who did not listen to an audio recording of Interview 1. This difference was not observed for cross-examination questions, suggesting that the reminder did not prevent participants from changing their responses when cross-examined (Jack & Zajac, 2014). This further suggests that individuals will change their responses when cross-examined despite being reminded of their original responses (Jack & Zajac, 2014). However, reminding participants of their previous response under cross-examination may have also refreshed participants' memories. This could explain why the researchers did not observe the effect of audio recording for cross-examination questions.

Another way to test the memory-based explanation is with *re-direct* questioning. If a child's testimony has changed under cross-examination, the prosecution may re-direct. That is, the prosecution may question that child again in an effort to restore the child's credibility. If during re-direct children can return to their original response it would suggest that memory-based explanations cannot fully account for changes children make during cross-examination. Using Zajac and Hayne's paradigm (Appendix A), Righarts et al. (2015) provided children with an opportunity to return to their original answer in a re-direct interview after cross-examination. Children (5- to 6-years-old)

experienced the police station visit, and 1- 2 days later, received a direct examination by an interviewer who was not present at the event in question. The children were cross-examined either 1-3 days after direct examination, or eight months later by a different interviewer. Within a week of being cross-examined children were re-interviewed by a different interviewer who stated that she knew what really happened and asked the children just to tell the truth (Righarts et al., 2015). Children were then asked the same four questions as presented in the direct-examination interview. Seventy-eight percent of the children changed a response to at least one of the target questions from direct- to cross-examination. These changes did not differ as a function of delay to cross-examination. During the final re-direct interview, accuracy during the re-direct did not differ from accuracy during the direct-examination interview. That is, many of the changes that children made in cross-examination (78%) were no longer present in the final interview (Righarts et al., 2015).

These studies show that children may change their responses under cross-examination even if they have accurate memory for what occurred, and they do not fully accept their changed responses. This is evidenced by children providing their original response when given an opportunity under re-direct. Memory factors have been shown to explain a small proportion of the variance in accuracy of responses made during cross-examination (Jack & Zajac, 2014). Therefore, it's possible that social factors, such as children's tendency to comply with adults/ authority figures in ambiguous situations (e.g., testifying in court), contribute to changes made under cross-examination more than memory factors do.

1.1.4. Do Social Factors Explain Changes under Cross-examination?

According to Saywitz and Camparo (2009), researchers agree on several important guidelines to use when interviewing children in a forensic setting. For example, children assume that adults are more knowledgeable than themselves; which in most cases is a safe assumption. However, this assumption is problematic when children generalize to situations where the adult questioner was not present during the event (as in court), or if the interviewer is biased.

Children likely do not understand that cross-examination is an acceptable way to propose alternative explanations and raise a reasonable doubt. Children assume adults are genuine in what they are saying and will not question the sincerity of adults in the courtroom (Brennan, 1994; Grice, 1975; Zajac et al., 2003). They may not be prepared for, or do not consider, the motivations of the defence attorneys and may be unaware of how the techniques and question styles chosen by defence attorneys are intentionally meant to discredit the witness. The experience is in general confusing, as the apparent motives of the defence attorney shifts back and forth (Zajac et al., 2003).

Children tend to trust and comply with adults, particularly those of elevated status (e.g., Ceci, Ross, & Toglia, 1987). When a child is greeted by a defence attorney in a courtroom, it seems likely that the attorney will be perceived by most young children as an authority figure. Children provide more correct information and make fewer errors when they are interviewed by a supportive interviewer compared to an unsupportive, distant interviewer (Carter, Bottoms, & Levine, 1996; Davis & Bottoms, 2002). Children may be more likely to comply with suggestive and misleading questions when asked by an unsupportive interviewer than when asked by a supportive interviewer, simply to seek the approval of the interviewer (Davis & Bottoms, 2002).

Overall, children tend to trust the motives of adults who are questioning them. Children typically view adults as authority figures with more knowledge than themselves. The perceived status of an interviewer (or lawyer), could result in children answering questions in a way they believe will please the interviewer, rather than in a way the children remember the information. Because of the potential for an interviewer to influence children's responses, common approaches to interviewing children involve ground rules, such as, telling children that the interviewer was not there and does not know what took place, telling them it is okay to say "I don't know", and telling them to correct the interviewer if he or she says something that is incorrect (Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007). Although there is mixed evidence on the efficacy of these ground rules, the rules may be most effective when combined (Mulder & Vrij, 1996), and when children receive training on providing substantive responses (Saywitz & Moan-Hardie, 1994). None of the aforementioned guidelines are

implemented during cross-examination, and this raises the risk that children, not fully aware of the defence attorney's motive to discredit him or her, will acquiesce to challenges put forth.

1.1.5. Cross-examination of Children Who Have Experienced a Repeated Event

At least half of children who have been abused have been subjected to repeated incidents (Connolly & Read, 2006). In most jurisdictions, the expectation is that children will be able to describe at least one specific instance of abuse (Woiwod & Connolly, 2017). To date, no research has compared the effects of cross-examination on children's reports of a single event and their reports of an instance of a repeated event.

Evidence suggests that memory for single events and memory for repeated events are organized differently (Fivush, 1984; Hudson & Mayew, 2009). Instance-based theories posit memory for each instance is represented in memory as a separate memory trace. Alternatively, schema-based theories posit repeated experiences lead to general knowledge structures that represent what typically happens during familiar or repeated events (Hudson & Mayew, 2009). The current research relies on schema-based theory.

One schema-based theory, script theory, posits that experiencing similar instances results in the formation of general event representations (i.e., a script) that contain the sequence of activities as well as the actors, and objects typically present during instances. The development of a script begins after a single experience, and becomes stronger with each repeated experience (Fivush, 1984). For a brief period, memory for a single instance of a repeated event will be available, but due to decay or interference, the instance quickly becomes difficult to retrieve (Slackman & Nelson, 1984). Therefore, after a short delay, when asked about a single instance of a repeated event, an individual will be more likely to retrieve the script than the specific instance. The individual will then rely on the script to construct a report, based on what the individual "knows" typically occurs, as well as memory for experienced details that are not strongly associated with instances (Connolly et al., 2016).

When people experience repeated events, some of the details may remain consistent across instances. For example, each time a child goes to the beach, she takes her special beach towel. This is a *fixed detail*. Fixed details are represented at a specific level (e.g., special beach towel) in script memory. Therefore, when memory for either the instance or the script is retrieved, so is the correct fixed detail.

Repeated events may include two types of variation. *Predictable variation* refers to details which come to be expected to change across instances (*variable details*). For example, sometimes when a child goes to the beach, she takes her large green bucket; other times she takes her small pink bucket, and still on other occasions she takes her brother's orange bucket that has sea creatures on it. These variable details are represented in script memory at the general level (e.g., a bucket) with an associated list of *variable options* that are ways they have been experienced in the past (e.g., green, pink, orange). These options appear to be linked to the general script rather than the instance.

It may be that memory for repeated events is organized as follows: a script contains sequentially ordered fixed and variable actions, actors, and objects that are typically present when an instance is experienced. Variable options may be organized as lists of experienced options that are linked to the relevant variable details in script memory.

Children make errors attributing variable options to a specific instance. Variable options are not useful in cueing an instance of a repeated event, but they are needed for researchers to know which instance the child is reporting (Connolly et al., 2016; Fivush, 1984). Intrusions from general event knowledge may also result in the report of an *external intrusion*; a detail that didn't occur in any instance. However, there is some evidence that RE children may be less likely than SE children to report an external intrusion (Woiwod et al., 2019). Repeated-event (RE) children will be more accurate in their reports of fixed details than variable details and more confident about their memory for fixed details compared to single-event (SE) children, (Roberts & Powell, 2005). Repeated-event children are less confident than SE children in their reports of variable options that occurred during a specific instance (Roberts & Powell, 2005). Overall, when

asked to recall variable options, RE children are less confident, less accurate, and less consistent than SE children.

Instances of repeated events may contain unpredictable variation, which is referred to as a *deviation*. For example, one time when the child goes to the beach, her grandmother comes along, and they have a picnic near the water. Because they are distinct, deviation details are recalled more accurately than variable options. For this reason, interviewers may use deviation details to cue children to the specific deviation instance (Connolly et al., 2016). Children are good at explaining how this instance deviated from the others (Farrar & Goodman, 1992). However, experiencing a deviation does not appear to have a targeted positive effect on memory for variable details of the deviation instance; a deviation facilitates recall for all instances (Connolly et al., 2016). Importantly, for the purposes of the current research, even when a deviation is present, RE children answer many of the questions about variable details incorrectly (Connolly et al., 2016).

Children as young as three years old show evidence of general event knowledge, develop scripts, and rely on these scripts during recall. However, scripting involves the pre-frontal cortex and therefore older children likely script faster than younger children (Hudson & Mayew, 2009). Notwithstanding less developed scripting skills, once a script is developed, younger children are more script dependent than older children. That is, when trying to remember a familiar event, younger children may rely more on script memory than older children, and therefore may be more inclined to make script-consistent errors (Farrar & Goodman, 1992). This suggests that older children will be more likely to attribute details to the correct instance of a repeated event. As a result, older children will be more accurate and consistent than younger children when reporting a specific instance of a repeated event.

Children who have experienced multiple similar instances of abuse may remember what they experienced but might not be able to confidently state during which instance they experienced the details. Lack of confidence could result in the child being more likely to be successfully challenged, especially if the challenge involves something

that seems plausible (i.e., script consistent). This could result in greater detriments for RE children than SE children under cross-examination and could have important implications for the perceived credibility of children reporting on variable options of a repeated event.

1.2. Children's Perceived Credibility

Perceived credibility is particularly relevant in a forensic setting where ground truth is unknown. In this situation, children's perceived credibility can be a determining factor in decisions made at many stages of the legal process. For example, a child's perceived credibility could influence whether a parent decides to report the allegation to authorities, or whether the prosecution decides to recommend the case proceed to court. This is particularly evident in cases such as CSA; because these cases commonly lack corroborative and physical evidence, the only evidence may be the child's report (Connolly & Read, 2003; Myers, 1992). Moreover, a child's perceived credibility is influenced by factors other than actual accuracy. Although perceived credibility has received considerable research attention, there has been surprisingly little research on how cross-examination affects perceived credibility.

Witness credibility, according to the two-factor theory proposed by Goodman, Bottoms, Herscovici, and Shaver (1989), is assessed on the basis of two components: perceived cognitive competence and perceived honesty (e.g., Ross, Jurden, Lindsay, & Keeney, 2003; Bottoms, 1993; Goodman et al., 1989). Generally, younger children are perceived to be less cognitively competent and more honest than older children and adults (Bottoms & Goodman, 1994). How this affects overall perceptions of credibility depends on the nature of the event to be remembered. Accurate reporting of an event necessarily requires the pertinent information to be encoded, stored, and retrieved. In a situation that involves complex and novel stimuli, perceived cognitive competence will carry more weight than perceived honesty in an overall assessment of credibility (Bottoms 1993; Leippe & Romanczyk, 1989). This is because developed cognitive skills are required to encode, store, and retrieve accurate details. An adult or older child is perceived as more cognitively competent than a younger child and therefore more credible in these circumstances. However, in a scenario that involves a familiar

environment, a known perpetrator, and/or a repeated event, advanced cognitive skills are not needed to encode, store, and retrieve this information and so even young children will be judged competent. Perceived honesty will be more relevant in the overall analysis of credibility. Because younger children are perceived to be more honest than older children and adults, they will be judged to be more credible, overall (Bottoms & Goodman, 1994). Research by Nunez, Kehn, and Wright (2011) showed that children's credibility, in the context of a familiar event, peaked at the age of eight. In summary, it is likely that younger children will have a credibility advantage in a familiar situation and a disadvantage in an unfamiliar situation.

Cross-examination aims to challenge overall credibility by discrediting the child's perceived honesty and cognitive competency. The child's honesty may be questioned directly either through accusations of lying or presenting other motives for why the child may be untruthful. For instance, when a lawyer suggests that the child has been coached by her mother, it could be viewed that the child had a reason to be dishonest about the allegation and that the mother provided sufficient sexual knowledge for the child to fabricate the allegation. This approach could challenge the underlying belief that *this child* is inherently honest and too naïve to fabricate, particularly details of CSA.

To challenge a child's perceived cognitive competency, cross-examining lawyers will often attempt to elicit inconsistencies. Report consistency is an important influence in the assessment of perceived credibility, and may be the strongest predictor (Brewer, Potter, Fisher, Bond, & Luszcz, 1999). Mock jurors convict an accused person more often when the witness provides consistent testimony about central details compared to when the witness provides inconsistent testimony about central details (Berman, Narby, & Cutler, 1995). These differences are seen when the inconsistencies occur between a pre-trial interview and direct testimony, between preliminary testimony and direct testimony, as well as between cross-examination and direct testimony (Berman & Cutler, 1996). Regarding perceptions of the child witness, a child that provides inconsistent testimony will be viewed as less credible than a child that provides consistent testimony (Connolly et al., 2008; Lieppe & Romanczyk, 1989). These findings mirror those observed in real-life settings. Child witnesses who appear consistent are perceived by jurors as more

credible than child witnesses who are less consistent (Cashmore & Trimboli, 2006), and cases with consistent witnesses are more likely to result in guilty verdicts (Myers et al., 1999).

Confidence is another factor that may influence witness credibility. Children who are less confident about their memory may be more likely to change their responses when they are challenged, such as when they are being cross-examined. Recall that children who report on variable details of a repeated event will be less confident than children who report on a single event. This undoubtedly could affect the child's perceived credibility, putting RE children at a greater disadvantage than SE children under cross-examination. Cashmore and Trimboli (2006) showed that jurors rated children as being more confident and less stressed when answering questions posed by prosecutors than questions posed by defence attorneys. Juror ratings of children's confidence also correlated with juror ratings of how well the children understood the questions, suggesting that confidence plays a role in perceptions of cognitive competence and therefore also contributes to perceptions of overall credibility (Cashmore & Trimboli, 2006). Confidence may predict children's accuracy for episodic information, but the reliability of the relationship is inconsistent and increases with age (Ackerman & Koriat, 2011; Roebbers, 2002). Therefore, a child that appears unconfident is not necessarily inaccurate.

1.2.1. Credibility of Single Event versus Repeated Event Children

There is only a small body of literature that examines the credibility of children who have reported on repeated events. Some research shows that children who have experienced a repeated event are perceived as more credible than children who have only experienced an event once. To investigate the effect of familiarity on the perceived credibility of children's reports, Pezdek et al. (2004) compared Criteria-based Content Analysis (CBCA) ratings of children's reports of an intrusive medical procedure (voiding cystourethrogram fluoroscopy). Some children experienced the procedure more than once (familiar condition) and others experienced the procedure only once (unfamiliar condition). CBCA uses several criteria (e.g., logical structure, quantity of details) to rate

credibility, with higher CBCA scores reflecting higher credibility than lower CBCA scores. Children who experienced the procedure more than once received higher CBCA scores than those who experienced the procedure once. In contrast, Connolly and Lavoie (2015) compared CBCA ratings of children who had experienced a single event to children who experienced four similar instances, and children who were instructed to fabricate an event. CBCA scores discriminated between reports about the single event and reports about the fabricated event, but there were no differences in scores between reports when four similar instances were experienced and reports for those who had fabricated the events. Therefore, CBCA may discriminate fabricated events and true single events, but not fabricated events and true repeated events.

To test the effect of frequency on perceived credibility, researchers asked children to describe their experience with sewing a button on a shirt (Blandon-Gitlin et al., 2005). Half the children were familiar with the event (researchers first described the steps involved in sewing the button) and half the children were unfamiliar with the event (children heard nothing about the steps involved). From each of these conditions, half the children sewed a button onto a shirt as part of a series of activities (true account), and the other half were told they were meant to sew a button onto a shirt as part of their series of activities but that the researcher forgot to get them to do it (false account). All children were asked to describe the sewing as if they participated in the activity, regardless of whether they sewed a button on the shirt. Children's reports in the familiar condition received higher CBCA ratings than children's reports in the unfamiliar condition, and this did not differ depending on whether the children were telling the truth or lying about having sewn on the button.

In a similar study, children either experienced or imagined a mock doctor exam, one time or four nearly identical times (Strömwall, Bengtsson, Leander, & Granhag, 2004). One week later, RE children were interviewed about the final instance they experienced or imagined, and the SE children were interviewed about the only instance they experienced or imagined. CBCA and reality monitoring were used to study the effect of event frequency on credibility ratings of the children's reports. Reality monitoring is based on the rationale that experienced events will contain more perceptual, emotional,

and contextual information than imagined events, and that imagined events will contain more elements of thought and reasoning than experienced events (Strömwall, et al., 2004). Children who experienced or imagined an event four times received higher CBCA ratings and higher reality monitoring scores than children who only experienced or imagined the single event. Together, these studies suggest that children who have experienced a repeated event will be perceived as more credible than children who experienced a single event, when evaluated using the CBCA or reality monitoring criteria.

These results are contrary to what might be expected given the research discussed above on repeated events and the ability to remember a specific instance. Because events become scripted with repetition and the memory for a specific instance quickly becomes difficult to retrieve, it could be expected that a report of an instance of a repeated event is less accurate and consistent than that of a unique event, and therefore perceived to be less credible. However, the perceived credibility of a child who has experienced a repeated event may depend on the nature of the repeated event and the way the child is asked to describe it (see Roberts & Powell, 2005). If the repeated event is largely fixed or if a child is asked to describe only fixed details, children will likely be consistent throughout the report and will likely report with high confidence. But, if the event contains many variable details or if the child is asked to report variable details about a specific instance, this will likely result in inconsistent reporting and lower confidence. In the studies that have been described thus far the repeated events consisted of largely fixed details.

Connolly et al. (2008) examined the perceived credibility of children (aged 4-5 or 6-7) who had experienced either a single event (one play session, SE) or repeated event (4 play sessions, RE). In each play session there were 16 variable details: details that had associated options which varied in a predictable way with each show in the RE condition. The children were later interviewed about the last session for the RE children and the only session for the SE children. The children first provided free recall of their experience and then answered cued recall questions; one about each of the 16 variable details. Accuracy was determined by calculating the number of details reported that had been experienced in any of the sessions (Connolly et al., 2008). Incorrect responses were

reported details that did not occur during any of the sessions. Actual accuracy was matched across frequency conditions. There were 16 videos of reports from RE children and 15 videos of reports from SE children. Undergraduate participants viewed one videotape and rated on a scale of 1-7 how honest, cognitively competent, credible, consistent, and confident they thought the child was (Connolly et al.).

Individuals rated SE children as more honest, more cognitively competent, and more credible than RE children (Experiment 1). Older children were also judged to be more cognitively competent, more credible, and more confident than younger children. Content of the videos was analyzed to study differences in syntax, powerfulness, and internal consistency (across free and cued recall) as possible mediators of the relationship between event frequency and credibility. Reports provided by SE children were found to be more internally consistent than those provided by RE children. Older children's reports contained fewer contradictions than younger children's reports. Consistency partially mediated the relationship between event frequency and credibility ratings (Connolly et al.). In Experiment 2, Connolly et al. replicated the procedures with a community sample. The findings were similar with the exception that differences between SE and RE children were only observed for perceived accuracy and credibility, and not for perceived honesty. As well, consistency fully mediated the relationship between frequency and credibility in the community sample.

The differences between Connolly et al. (2008) on the one hand and Pezdek et al. (2004), Blandon-Gitlin et al. (2005), and Stromwell et al. (2004) on the other hand, are likely due to the type of details that were asked about. In Connolly et al., the repeated events were predominately variable; in Pezdek et al., Blandon-Giltin et al., and Sromwell et al., the repeated events were predominately fixed.

Overall, some researchers have shown that children who have experienced a repeated event are perceived as more credible than children who have experienced a single event when using CBCA and reality monitoring to evaluate the reports. Other researchers have found that children reporting on a repeated event are perceived as less credible than children reporting on a single event. The type of detail that children report

likely influences how they are perceived. When an event is largely fixed and children report fixed details, children who have experienced the event multiple times will be perceived as more credible than children who experienced the event only once. However, if the event is largely variable and children report many variable details, then RE children will be less consistent, confident, and credible than SE children.

1.3. Summary

Contrary to the intended purpose of cross-examination, research shows that this process has negative effects on the accuracy and consistency of children's reports. Many children change their responses under cross-examination, regardless of whether their initial responses were correct. This deleterious effect exists over and above that of repeated questioning, suggesting that something inherent to the technique of cross-examination is driving the changes. Repeated questioning and memory-based explanations cannot fully account for the effect that cross-examination has on children's reports. This effect has only been studied with SE children and to date no research has examined the effects of cross-examination on children who have experienced a repeated event. Given that children who have experienced a repeated event have difficulty remembering which instance to ascribe variable options to, it is possible that memory plays a larger role in performance under cross-examination for RE children than SE children. It is therefore also possible that RE children will be more likely to change their responses under cross-examination than SE children and less likely than SE children to report their initial response under re-direct.

I know of no existing research exploring the effect of cross-examination on the perceived credibility of children's reports. When ground truth is unknown, such as in a legal case, perceived credibility is as important as actual accuracy (Connolly & Read, 2003; Myers, 1992). Previous research shows children who are familiar with an event (i.e., experienced it repeatedly) are perceived as more credible than children who are unfamiliar with an event when they report fixed details. Other studies show RE children to be perceived as less credible than SE children when reporting variable details. If there are differences in the perceived credibility of children who have experienced either a

single or a repeated event, these differences could be emphasized when the child is cross-examined. If cross-examination does not affect perceived credibility (because evaluators see through the tactics and focus just on the initial responses of children) it is an unfortunate experience for the child but may not affect justice.

1.4. The Current Research

Based on the research presented in this paper, it seems possible that RE children may change their responses under cross-examination at least to the same degree as SE children. When provided with the opportunity to recall their initial (direct interview) responses under re-direct examination, RE children may not provide the same responses, perhaps resulting in even greater inconsistency, lower accuracy, and lower perceived credibility than SE children. This research investigated how interviewing with techniques commonly used by defence attorneys affects the accuracy and consistency of children's reports (Experiment 1) and judgments of credibility (Experiment 2) of children who experience either a single or a repeated event.

Chapter 2.

Experiment 1

The purpose of Experiment 1 was to examine the ability of children (kindergarten / grade 1, grades 3- 5) who experienced a single event or a repeated event to remain accurate and consistent across interviews, especially when their original responses were challenged. Children participated in either one or five magic shows and were interviewed about one of the shows exactly one week later. The direct interview (Interview 1) consisted of free and cued recall and included best practice techniques. Afterwards, children were greeted by a different interviewer (Interview 2) and were either asked each of the cued-recall questions again (direct-direct; DD) or were cross-examined (cross). Finally, the original interviewer returned (Interview 3) and provided all children with an opportunity to answer the cued-recall questions based on their memory for the show (re-direct). Analogous to what occurs in some actual trials involving child witnesses, these interview components were completed within the same interviewing session.

2.1. Hypotheses

Subsequent to this project commencing, research emerged suggesting that RE children and SE children are similarly accurate when reporting deviation details (Connolly et al., 2016). I therefore analyzed variable (event) and deviation details separately. The following hypotheses are relevant only for performance on variable details (accuracy narrowly defined):

1. SE children will be more accurate than RE children across all interviews.
2. Older children will be more accurate than younger children across all interviews
3. In the cross condition, children will be less accurate on Interview 2 than Interview 1. This effect will be greater for RE children than SE children.

4. In the cross condition, RE children will be less accurate on Interview 3 than Interview 1. There will be no difference in accuracy between Interview 3 and Interview 1 for SE children.
5. Children in the cross condition will be less consistent than children in the direct-direct condition between Interview 1 and Interview 2. This effect will be greater for RE children than SE children.
6. RE children will be less consistent between Interview 1 and Interview 3 than SE children. This effect will be greater in the cross than the direct-direct condition.

Analyses examining accuracy and consistency of the deviation details, as well as accuracy broadly defined, were also conducted. As I had no a priori hypotheses with respect to these, the analyses were exploratory.

2.2. Method

2.2.1. Design

Experiment 1 was a 2 (question type: direct-direct (DD) , cross) X 2 (event frequency: single (SE) , repeated (RE)) X 2 (age: K/ gr. 1 , gr 3 - 5) X 3 (interview: Interview 1, Interview 2, Interview 3) mixed design. Interview was the within-subjects variable.

2.2.2. Participants

An a priori power analysis was conducted using G* Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) to determine the appropriate sample size to test a possible three-way interaction among the between-subjects conditions. With alpha set at .05 and power set at .90 a sample size of 240 participants is required to detect a medium effect size ($f = .21$). In groups of up to 30, children (K/gr. 1 or gr. 3-5) participated in either one (SE) or five (RE) different magic shows, occurring on five consecutive days (see Connolly et al., 2016). These age groups were chosen because in theory the younger age group should have higher perceived honesty and lower perceived cognitive competency than the older age group. Parents provided consent for children to participate in the magic shows as well

as the memory interviews. Parents were also asked whether they consented to their child's recorded interview to be used in a follow-up experiment (Experiment 2).

2.2.3. Materials and Procedure (see Appendix B)

Magic shows

Children participated in either one (SE) or five shows (RE) on five consecutive days. Each show was approximately 15 minutes long and included 12 critical details. Each critical detail had six variable options which varied across shows (e.g., at the beginning of each show children did a different warm-up exercise; one day the exercise was sit-ups, the next day it was push-up, etc.; see Table 1 for a list of critical details and associated variable options). For RE children, there were two presentation orders so that approximately half the children experienced the variable options in one order (i.e., ABCDE) and the remaining children experienced the variable options in a different order (i.e., FCDEB) (see Table 1). In each of the two presentation orders, RE children experienced five of these variable options (i.e., ABCDE), while the sixth was the variable option used to challenge the children during cross-examination (i.e., F). Therefore, across the two presentation orders, all variable options were experienced by approximately half the children (i.e., details used to challenge these children were experienced by the remaining children). Single-event children experienced the variable options selected for presentation on day 3 (i.e., C for half the children and D for the other children).

Children experienced the critical details in the same order in each of the shows. The children began by receiving a *ticket to the show*. The magician (Dazzling Dylan) prepared by removing an *item from her costume*, before the children participated in a *warm-up exercise*. Next, the magician drank a *special juice*. The children put on a *hat*, received a *magic item* and a *stage nametag*. Next, the magician introduced her *stuffed assistant* and played *special music* to prepare for the trick. The magician taught the children to say the *magic words* before performing the trick. After the trick, the magician placed a sticker on a part of each child's *body*. Finally, the magician told the children a *secret* and said *good-bye* in a special way. During each show the children learned a different magic trick (A – Disappearing Ball, B – Mystery Box, C – Egg Pouch, D –

Appearing Flower, E – Color Blendo, F – Change Bag). The trick name was not a critical detail; it was used to direct children to the target instance during the interviews.

Deviation

The target show, for both SE (only show) and RE children (third show) included an interruption that was a deviation for RE children. The interruption included seven critical details that are presented here in italics. A different magician (*Clever Chloe*) interrupted the show and asked for Dazzling Dylan’s help. Clever Chloe carried a magic *skipping rope* in her hand and claimed to have casted a *disappearing spell* on herself. Dazzling Dylan placed a *red magic necklace* on Clever Chloe and spun her around *three times*. This antidote was successful and as a sign of her appreciation, she invited Dazzling Dylan to a *costume party*.

Interview 1

One week after the third show for RE children or the only show for SE children, children were interviewed and recorded individually with free- and cued-recall questions (see Appendix C for the Interview 1 protocol). In addition to best practice techniques, children engaged in mental context reinstatement (a prompt from the cognitive interview). The purpose of this was to provide children with the ideal conditions to do well in the first interview, before undergoing cross-examination. Children were asked 12 cued-recall questions in a fixed order (the same order as they were experienced in the show) about the target instance, one about each of the critical details. All children were also asked seven cued-recall questions about the deviation, one about each of the deviation details. There was a total of 19 questions. Interviewers were blind to the variable options children experienced in the shows. Recall that there were two presentation orders, so children would be reporting on the middle instance C- Egg pouch if they were in presentation order 1 or D – Appearing Flower if they were in presentation order 2.

Interview 2

Within three minutes after the direct examination, children were greeted by a different interviewer who either challenged the children (*cross* condition) or simply asked

them about each of the 19 details again (*direct-direct* (DD) condition) (see Appendix D). The reason for asking these children about *each* of the details in the DD condition was to equate interview time between the cross children and the DD children. The children in the cross condition were cross-examined on four event details and two deviation details, using eight questions (question set) per detail. Cross-examination questions were similar as those used in previous cross-examination studies (see Zajac & Hayne, 2003, 2006; Fogliati & Bussey, 2014) and were developed from questioning styles used during cross-examination in court (see Zajac et al., 2003). The interviewer asked the questions without providing any feedback and if the child did not respond within a few seconds, the interviewer proceeded to the next question in the set. The first time a child acquiesced, the interviewer proceeded to the next detail. Only if the child did not acquiesce to any of the previous questions, was she or he asked question eight; the final leading question. There was no rapport or review of the ground rules and interviewers were instructed to ask questions at a steady pace, in a neutral manner.

Six details were challenged under cross-examination, four event details and two deviation details. Children were randomly assigned to a set of details to be challenged on. This assignment was not determined by how children responded during Interview 1. Details selected for cross-examination were counterbalanced. From the 12 event details and seven deviation details three question sets were used. Each of these question sets included four event details and two deviation details. There was no overlap in details; event and deviation details in each question set were different from the event and deviation details in the other question sets. Children were never cross-examined on the question “*What was the name of the other magician that interrupted Dazzling Dylan?*”

In an actual trial, the defence will challenge the children in multiple ways. In the current research, I used four plausible alternatives as to why the child may have reported the detail incorrectly: a) “*I think that it might have been a pom pom and I think that you might have remembered it incorrectly didn’t you?* b) *If the person that remembered the show the best said that it was a chef’s hat, they might be right about that don’t you think?* c) *Most people who saw the show said you used open sesame. I think that they might be right about that don’t you?* d) *If your teacher told me that you listened to a flute, she*

would probably be right don't you think?" (see Zajac & Hayne 2003, 2006). For each child, two challenge methods were presented once, and two challenge methods were presented twice. The challenge methods were partially counterbalanced so that children did not experience them in the same order across question sets. Each detail was challenged with each method (e.g., the magic show ticket was challenged in four different ways across children) and each detail was challenged in the same way for approximately an equal number of children.

Interview 3

Finally, the original interviewer returned to provide all children with the *re-direct interview* (Appendix E), by asking them about the four event details and two deviation details that had been the subject of cross-examination. The original interviewer explained that the second interviewer may have been confused about some aspects of the magic show and children should answer the questions exactly how they remember them happening (see Righarts et al., 2015, for a similar approach). This explanation was used for both DD and cross children. For children in the DD condition, the six questions they were asked during re-direct were also counterbalanced, so that there were approximately the same number of children asked about the same six details in the DD condition as there was in the cross condition (see Appendix G for counterbalancing diagram).

2.2.4. Coding

There were four questions about the event details in the target instance and two questions about the deviation. Responses to the event and deviation details were coded similarly. Children's responses were considered accurate if they reported the experienced detail to the target instance. For example, when asked about what was on the magic show ticket, children in presentation order 1 would be correct when they reported sandpaper. If a child reported something that could be inferred from the coders that the child meant sandpaper (small rough piece of paper) then that would also be considered correct. If a child said they did not know, reported something that they did not experience, or that they experienced in a different instance, then it was coded as incorrect.

Accuracy

Only the six critical details (four event and two deviation) that were used for cross-examination were analysed. I used a scoring scheme similar to that used in previous cross-examination studies (see Fogliati & Bussey, 2014; Zajac & Hayne, 2003). Free recall was collected to mimic what occurs in an actual trial, but because children were only challenged on their responses to the cued recall questions, the free recall portion of the interview was not analysed for this experiment. To calculate accuracy for cued recall responses in each interview, children received two points for each correct cued recall response they provided, for a maximum of eight points for responses to the questions about the event details and four points for questions about the deviation. This was the same for each interview (i.e., 12 points maximum for each of the three Interviews). A response was scored as correct when the child provided the specific variable option relevant to the instance he or she had been asked about. During Interview 2, children in the cross-examination condition who were originally correct during Interview 1 and resisted being challenged on questions 3, 6, 7, and 8 were coded as correct and received two points for that detail. Children who acquiesced to question 3, 6, or 7 were coded as incorrect and received zero points. Children who acquiesced to question 8 “but that might have been the case?” received one point for that detail (see Zajac & Hayne, 2003, 2006). This question could indicate that although she or he did not accept the suggestion, she or he was open to the possibility that the alternative explanation provided by the interviewer might be correct (see Zajac & Hayne, 2003; 2006).

Consistency

Children received a score for consistency between Interview 1 and Interview 2, as well as between Interview 1 and Interview 3. I did not examine consistency between Interview 2 and Interview 3 because I was interested in whether children change their responses under cross and whether children would report the same detail during re-direct as their direct examination. These questions did not require analyses involving consistency between Interview 2 and Interview 3.

Children received two points each time they were consistent on a detail between two interviews for a maximum of 12 points (8 points for event details and 4 points for deviation details) for each interview pair. For Interview 2, children in the cross condition who resisted acquiescing for questions 1 – 8 on a single detail retained the responses provided during the first interview and therefore received two consistency points for that detail. As with accuracy, if children in the cross-examination condition resisted changing their response for questions 3, 6, and 7, yet acquiesced to question 8, one point for consistency was awarded. Children in the DD condition had to report the same option for each interview to receive two consistency points for that detail. Only the six details used for the cross-examination children were coded, calculated, and analysed for children in the DD and cross conditions. For Interview 3, all children had to report the same detail as Interview 1 to receive two points for that detail.

2.3. Results

Two-hundred and twenty-two children participated in the study. The mean age of children in the kindergarten – grade 1 condition was 5.83 years ($SD = .64$; $N = 108$), and the mean age of children in the grade 3-5 condition was 9.19 years ($SD = .83$; $N = 114$). Interview 1 data for 56 of the RE children is also reported in Woiwod's (2018) doctoral dissertation. That research examined the effects of mental context reinstatement on children's memory for a repeated event.

2.3.1. Variable details

Accuracy Narrowly Defined

Interrater agreement was calculated on 18% of the data (41 interviews). For Interview 1 (correct/incorrect coding) $Kappa = .99$, $p < .001$, for Interview 2 (points awarded) $Kappa = .94$ $p < .001$, and for Interview 3 (correct/incorrect coding) $Kappa = .93$ $p < .001$.

Accuracy was computed as a score out of eight for the four event details of interest during Interview 1, Interview 2, and Interview 3. A 2 (question type: DD, cross)

X 2 (event frequency: SE, RE) X 2 (age: K/ gr. 1, gr. 3-5) X 3 (interview: Interview 1, Interview 2, Interview 3) mixed model Analysis of Variance with Interview as the within-subjects variable was conducted for exploratory reasons. Planned comparisons were conducted to test a priori hypotheses. When the assumption of sphericity was violated the Greenhouse-Geisser degrees of freedom and values are reported (see Table 2 for means).

There was a main effect of question type, $F(1, 214) = 11.69, p = .001, \eta_p^2 = .05$. There was a main effect of interview, $F(1.89, 403.34) = 50.80, p < .001, \eta_p^2 = .19$. These were qualified by a Question Type X Interview Interaction, $F(1.89, 403.34) = 26.96, p < .001, \eta_p^2 = .11$. As shown in Figure 1, for children in the DD condition the difference between Interview 1 ($M = 3.16, SD = 2.52$) and Interview 2 ($M = 3.07, SD = 2.48$) was not significant $t(106) = .71, p = .48$. DD children were more accurate during Interview 3 ($M = 3.44, SD = 2.41$) than Interview 2, $t(106) = 2.60, p = .01$. They were also more accurate during Interview 3 than during Interview 1 $t(106) = 2.93, p = .004$. Children in the cross condition were more accurate on Interview 1 ($M = 3.10, SD = 2.50$) than Interview 2 ($M = 1.68, SD = 2.14$), $t(114) = 9.13, p < .001$. They were more accurate during Interview 3 ($M = 2.99, SD = 2.55$) than Interview 2, $t(114) = 8.10, p < .001$. There was no difference in accuracy between Interview 1 and Interview 3, $t(114) = .87, p = .39$. This shows that accuracy decreased during Interview 2 for children who were cross-examined and not for children in the DD conditions; cross-examination affected children's accuracy. It also shows that accuracy during Interview 3 was equal to or greater than accuracy during Interview 1 for all conditions; the re-direct interview rehabilitated accuracy for variable details.

Hypothesis 1 stated that SE children would be more accurate across all interviews than RE children. This was supported by a main effect of frequency, $F(1, 214) = 222.04, p < .001, \eta_p^2 = .51$, whereby SE children ($M = 4.56, SD = 1.51$) were more accurate than RE children ($M = 1.41, SD = 1.69$). Hypothesis 2 stated that older children would be more accurate than younger children across all interviews. This was partially supported. There was a main effect of age, $F(1, 214) = 11.82, p = .001, \eta_p^2 = .05$ that was qualified by a Frequency X Age interaction, $F(1, 214) = 8.87, p < .001, \eta_p^2 = .04$. In the SE

condition, older children ($M = 5.32, SD = 1.99$) were more accurate than younger children ($M = 3.80, SD = 2.16$); however, in the RE condition there were no differences between older ($M = 1.38, SD = 1.92$) and younger children ($M = 1.44, SD = 1.96$). Thus, Hypothesis 1 was supported, and Hypothesis 2 was partially supported.

There was also a Frequency X Age X Interview interaction $F(1.89, 403.34) = 4.52, p = .01, \eta_p^2 = .02$ (see Figure 2). Follow-up analyses showed that for SE children, there was a main effect of interview. However, the Age X Interview interaction was not significant. Paired-samples t-tests showed SE children were more accurate during Interview 1 ($M = 4.98, SD = 1.97$) than Interview 2 ($M = 3.80, SD = 2.44$), $t(103) = 7.17, p < .001$. SE children were more accurate during Interview 3 ($M = 4.98, SD = 2.01$) than Interview 2, $t(103) = 7.48, p < .001$, and there was no difference in accuracy between Interview 1 and Interview 3, $t(103) = .01, p = 1.00$. The pattern was similar for older RE children. Paired-samples t-tests showed older RE children were more accurate during Interview 1 ($M = 1.46, SD = 1.74$) than Interview 2 ($M = 1.00, SD = 1.49$), $t(58) = 2.18, p = .03$. They were more accurate during Interview 3 ($M = 1.73, SD = 1.80$) than Interview 2, $t(58) = 3.66, p = .001$. There was no difference in accuracy between Interview 1 and Interview 3, $t(58) = 1.31, p = .20$. For younger RE children, the difference between Interview 1 ($M = 1.53, SD = 1.54$) and Interview 2 ($M = 1.14, SD = 1.48$), approached significance $t(58) = 1.97, p = .05$. Children were more accurate during Interview 3 ($M = 1.56, SD = 1.58$) than Interview 2, $t(58) = 2.01, p = .049$. There was no difference in accuracy between Interview 1 and Interview 3, $t(58) = .19, p = .85$. Therefore, accuracy during Interview 1 was greater than accuracy during Interview 2. Accuracy was greater during Interview 3 than Interview 2 and there were no differences in accuracy between Interview 1 and 3. However, for young RE children only, the difference between Interview 1 and Interview 2 neared significance.

Hypothesis 3 stated that for children in the cross condition, accuracy would be lower in Interview 2 than Interview 1 and that this difference would be greater for RE children than SE children. This hypothesis was partially supported. The Question Type X Frequency X Interview interaction was not significant $F(1.89, 403.34) = 2.63, p = .077, \eta_p^2 = .01$. As this was an a priori hypothesis, planned comparisons were conducted. In the

cross conditions, children were less accurate during Interview 2 than Interview 1. However, an independent samples t-test showed that the difference was greater for SE ($M_{\text{diff}} = 1.91, SD = 1.72$) than for RE children ($M_{\text{diff}} = .97, SD = 1.48$), $t(113) = 3.15, p = .002$. Thus, Hypothesis 3 was partially supported.

Hypothesis 4 stated that when RE children were cross-examined there would be a significant difference between Interview 1 and Interview 3, while there would be no difference between Interview 1 and Interview 3 for SE children who were cross-examined. This hypothesis was not supported. Paired-samples t-tests indicated that the difference between Interview 1 and Interview 3 was not significant for RE children who were cross-examined $t(60) = .66, p = .51$ nor SE children who were cross-examined $t(54) = .57, p = .57$. Thus, Hypothesis 4 was not supported.

2.3.2. Deviation details

Accuracy

Accuracy was computed as a score out of four for the two deviation details of interest during Interview 1, Interview 2, and Interview 3. A 2 (question style: DD , cross) X 2 (event frequency: SE , RE) X 2 (age: K/ gr. 1 , gr. 3 - 5) X 3 (interview: Interview 1, Interview 2, Interview 3) mixed model Analysis of Variance was conducted with Interview as the within-subjects variable (see Table 3 for means).

There was a main effect of age, $F(1, 214) = 15.00, p < .001, \eta_p^2 = .07$, and a main effect of frequency, $F(1, 214) = 4.67, p = .03, \eta_p^2 = .02$, that were qualified by a Frequency X Age interaction, $F(1, 214) = 7.718, p = .006, \eta_p^2 = .04$ (see Figure 3). In the SE condition, older children ($M = 2.58, SD = 1.57$) were more accurate than younger children ($M = 1.40, SD = 1.10$); however, in the RE condition there were no differences between older ($M = 1.71, SD = 1.53$) and younger children ($M = 1.51, SD = 1.61$).

There was a main effect of interview, $F(1.97, 420.64) = 34.57, p < .001, \eta_p^2 = .14$. This was qualified by a Question Type X Interview interaction, $F(1.97, 420.64) = 16.65, p < .001, \eta_p^2 = .07$. There was also a Question Type X Frequency X Interview interaction, $F(1.97, 420.64) = 3.82, p = .02, \eta_p^2 = .01$. As shown in Figure 4, for SE children in the

cross condition, accuracy was greater for Interview 1 ($M = 2.29$, $SD = 1.51$) than Interview 2 ($M = 1.64$, $SD = 1.48$), $t(54) = 4.51$, $p < .001$, and Interview 3 ($M = 2.07$, $SD = 1.49$), $t(54) = 2.19$, $p = .03$. Accuracy was also greater for Interview 3 than for Interview 2, $t(54) = 2.89$, $p = .005$. However, for SE children in the DD condition, accuracy was greater during Interview 1 ($M = 2.20$, $SD = 1.17$) than Interview 2 ($M = 1.96$, $SD = 1.38$), $t(48) = 2.59$, $p = .01$, but there was no difference between Interview 1 and Interview 3 ($M = 2.00$, $SD = 1.41$), $t(48) = 2.94$, $p = .06$, or Interview 2 and 3, $t(54) = .33$, $p = .74$. For RE children in the cross conditions, accuracy was greater for Interview 1 ($M = 2.20$, $SD = 1.50$) than Interview 2 ($M = 1.12$, $SD = 1.29$), $t(59) = 7.27$, $p < .001$, and Interview 3 ($M = 1.53$, $SD = 1.62$), $t(59) = 4.51$, $p < .001$. It was also greater for Interview 3 than for Interview 2, $t(59) = 2.55$, $p = .013$. For RE children in the DD conditions there were no differences in accuracy between Interview 1 ($M = 1.65$, $SD = 1.50$) and Interview 2 ($M = 1.59$, $SD = 1.53$), $t(57) = .81$, $p = .42$, and Interview 3 ($M = 1.55$, $SD = 1.55$), $t(57) = 1.14$, $p = .26$. There was also no difference between Interview 3 and Interview 2, $t(57) = 1.00$, $p = .32$. Therefore, accuracy was lower during Interview 2 than Interview 1 except for RE children in the DD conditions. Accuracy was lower during Interview 2 than Interview 3 for children in the cross conditions but not children in the DD conditions. Accuracy was lower during Interview 3 than Interview 1 for children in the cross condition but not children in the DD conditions. This shows that the re-direct interview (Interview 3) did not fully rehabilitate accuracy for deviation details when children were cross-examined.

2.3.3. Accuracy Defined Broadly

Recently, there has been some move to conceptualize accuracy as the number of correctly reported experienced details rather than details attributed to the correct instance. Therefore, I also examined the effect of cross-examination on children's accuracy, defined broadly. For this measure children received 2 points for each response where they accurately reported a detail that was experienced across any of the instances. Occasionally children provided a detail they experienced within an instance but ascribed that detail to the incorrect target detail. For example, when asked what the magic prop was the child responded with sandpaper. The child did see sandpaper during the show,

but it was on the ticket and was not the magic prop. When defined narrowly these were coded as inaccurate; when defined broadly these were coded as accurate. This applies to both SE and RE children.

I conducted a 2 (question type: DD, cross) X 2 (event frequency: SE, RE) X 2 (age: K/ gr. 1, gr. 3 - 5) X 3 (interview: Interview 1, Interview 2, Interview 3) mixed model Analysis of Variance with Interview as the within subjects variable. There was a main effect of interview, $F(1.84, 390.44) = 90.98, p < .001, \eta_p^2 = .30$. There was also a Frequency X Interview interaction, $F(1.84, 390.44) = 12.52, p < .001, \eta_p^2 = .06$, and a Question Type X Frequency X Interview interaction, $F(1.84, 390.44) = 13.67, p < .001, \eta_p^2 = .06$ (see Figure 5). For SE children in the DD condition there were no differences in accuracy between Interview 1 and Interview 2, $t(48) = .72, p = .47$, Interview 2 and Interview 3, $t(48) = 1.55, p = .13$, or Interview 1 and Interview 3, $t(56) = 1.43, p = .16$. When SE children were cross-examined accuracy was higher for Interview 1 than Interview 2, $t(54) = 8.76, p < .001$, and Interview 3 than Interview 2, $t(54) = 7.91, p < .001$, but there was no difference in accuracy between Interview 1 and Interview 3, $t(54) = 1.00, p = .32$. For RE children in the DD condition there were no differences in accuracy between Interview 1 and Interview 2, $t(55) = .13, p = .90$, Interview 2 and Interview 3 $t(55) = .54, p = .59$, or Interview 1 and Interview 3, $t(55) = .39, p = .70$. When RE children were cross-examined, accuracy was higher for Interview 1 than Interview 2, $t(59) = 15.94, p < .001$, and Interview 3 than Interview 2, $t(59) = 5.74, p < .001$. Accuracy was also higher for Interview 1 than Interview 3, $t(59) = 6.35, p < .001$. This shows that the re-direct did not fully rehabilitate RE children's accuracy broadly defined, when they were cross-examined.

There was a main effect of age, $F(1, 212) = 14.92, p < .001, \eta_p^2 = .07$, and a Frequency X Age interaction, $F(1, 212) = 4.89, p = .03, \eta_p^2 = .02$. In the SE condition, older children ($M = 5.38, SD = 1.98$) were more accurate than younger children ($M = 3.99, SD = 2.16$); however, in the RE condition there were no differences between older ($M = 5.28, SD = 2.41$) and younger children ($M = 4.77, SD = 2.66$). There was also a Frequency X Age X Interview interaction, $F(1.84, 390.44) = 5.73, p = .004, \eta_p^2 = .03$ (see Figure 6). Paired-samples t-tests showed older SE children were more accurate during

Interview 1 ($M = 5.75$, $SD = 1.64$) than Interview 2 ($M = 4.73$, $SD = 2.32$), $t(54) = 4.52$, $p < .001$, they were more accurate during Interview 3 ($M = 5.67$, $SD = 1.99$) than Interview 2, $t(54) = 4.20$, $p < .001$, and there was no difference in accuracy between Interview 1 and Interview 3, $t(54) = .54$, $p = .57$. The pattern was the same for younger SE children: they were more accurate during Interview 1 ($M = 4.49$, $SD = 2.02$) than Interview 2 ($M = 2.94$, $SD = 2.42$), $t(48) = 4.92$, $p < .001$, they were more accurate during Interview 3 ($M = 4.53$, $SD = 2.03$) than Interview 2, $t(48) = 4.20$, $p < .001$, and there was no difference in accuracy between Interview 1 and Interview 3, $t(48) = .22$, $p = .83$. Paired-samples t-tests showed older RE children were more accurate during Interview 1 ($M = 6.55$, $SD = 1.79$) than Interview 2 ($M = 3.62$, $SD = 2.98$), $t(57) = 6.53$, $p < .001$. They were more accurate during Interview 3 ($M = 5.66$, $SD = 2.46$) than Interview 2, $t(57) = 4.89$, $p < .001$. They were also more accurate during Interview 1 than Interview 3, $t(57) = 2.60$, $p = .01$. The pattern was the same for younger RE children; they were more accurate during Interview 1 ($M = 6.07$, $SD = 1.87$) than Interview 2 ($M = 3.62$, $SD = 3.12$), $t(57) = 5.34$, $p < .001$. They were more accurate during Interview 3 ($M = 4.62$, $SD = 3.00$) than Interview 2, $t(57) = 2.24$, $p = .03$. They were also more accurate during Interview 1 than Interview 3, $t(57) = 3.72$, $p < .001$. This shows that the re-direct rehabilitated accuracy for SE children; there were no differences in accuracy between Interview 1 and Interview 3. However, the re-direct did not fully rehabilitate accuracy for RE children; accuracy was lower on Interview 3 than Interview 1.

2.3.4. Variable details

Consistency

I computed two consistency scores a) consistency between Interview 1 and Interview 2 and b) consistency between Interview 1 and Interview 3. Each of these was based on the four variable details of interest for a maximum score of 8. Interrater agreement was calculated on 18% of the data (41 interviews) based on the points awarded for consistency between Interviews 1 and 2 Kappa = .82, $p < .001$, based on the points awarded for consistency between Interviews 1 and 3 Kappa = .87 $p < .001$.

To compute the consistency score it necessarily requires two interviews and therefore the Interview variable is no longer available to be analyzed. I conducted a 2 (question type: direct-direct, cross) X 2 (event frequency: single, repeat) X 2 (age: K/ gr. 1, gr. 3-5) Analysis of Variance on the consistency score between Interview 1 and Interview 2, as well as Interview 1 and Interview 3 (see Table 4 for means).

For Interview 1 and Interview 2 consistency, there was a main effect of frequency, $F(1, 214) = 32.23, p < .001, \eta_p^2 = .13$ and a main effect of age $F(1, 214) = 9.80, p = .002, \eta_p^2 = .04$. Both were qualified by a Frequency X Age interaction, $F(1, 214) = 8.75, p = .003, \eta_p^2 = .04$. As shown in Figure 7, in the SE condition, older children ($M = 5.95, SD = 2.44$) were more consistent than younger children ($M = 4.12, SD = 2.73$), $t(112) = 5.21, p < .001$; however, in the RE condition there were no differences between older ($M = 3.42, SD = 2.71$) and younger children ($M = 3.24, SD = 2.79$), $t(106) = 1.66, p = .101$.

Hypothesis 5 stated that children who were cross-examined would be less consistent between Interview 1 and Interview 2 than children in the DD condition, and this effect would be greater for RE children than SE children. This hypothesis was partially supported. There was a main effect of question type, $F(1, 214) = 66.94, p < .001, \eta_p^2 = .24$, where children in the cross conditions ($M = 2.93, SD = 2.61$) were less consistent than children in the DD conditions ($M = 5.44, SD = 2.56$). However, the effect was not larger for RE than SE children: the Question Type X Frequency interaction was not significant, $F(1, 214) = 2.09, p = .15, \eta_p^2 = .01$. Thus, Hypothesis 5 was partially supported.

For consistency between Interview 1 and Interview 3 there was a main effect of question type, $F(1, 214) = 12.20, p = .001, \eta_p^2 = .05$; children in the DD condition were more consistent ($M = 5.68, SD = 2.44$) than children in the cross condition ($M = 4.71, SD = 2.73$). There was a main effect of frequency, $F(1, 214) = 79.71, p < .001, \eta_p^2 = .27$; SE children were more consistent ($M = 6.59, SD = 2.52$) than RE children ($M = 4.31, SD = 2.51$). There was also a main effect of age, $F(1, 214) = 9.57, p = .002, \eta_p^2 = .04$; younger

children were less consistent ($M = 4.67$, $SD = 2.66$) than older children ($M = 5.67$, $SD = 2.52$).

Hypothesis 6 stated that RE children would be less consistent between Interview 1 and Interview 3 than SE children and this effect would be greater in the cross than the DD condition. This hypothesis was partially supported. As reported above, there was a main effect of question type and a main effect of event frequency. However, the Question Type X Frequency interaction was not significant $F(1, 214) = .203$, $p = .65$, $\eta_p^2 = .001$. Therefore, SE children were more consistent than RE children and DD children were more consistent than cross children, but the effect of frequency was no greater in the cross condition than the DD condition. Thus, Hypothesis 6 was partially supported.

2.3.5. Deviation details

Consistency

For deviation details, I computed two consistency scores: a) consistency between Interview 1 and Interview 2, and b) consistency between Interview 1 and Interview 3. Each of these was based on the two deviation details of interest for a maximum score of 4. I conducted 2 (question type: direct-direct, cross) X 2 (event frequency: SE, RE) X 2 (age: K/ gr. 1, gr. 3-5) Analysis of Variance on the consistency score between Interview 1 and Interview 2, as well as Interview 1 and Interview 3.

For Interview 1 and Interview 2 consistency there was a main effect of question type, $F(1, 214) = 65.99$, $p < .001$, $\eta_p^2 = .24$; children in the DD conditions ($M = 3.16$, $SD = 1.29$) were more consistent than children in the cross conditions ($M = 1.70$, $SD = 1.53$). There was also a main effect of age, $F(1, 214) = 20.98$, $p < .001$, $\eta_p^2 = .09$; younger children ($M = 1.96$, $SD = 1.58$) were less consistent than older children ($M = 2.82$, $SD = 1.51$).

There was also a Question Type X Frequency X Age interaction, $F(1, 214) = 4.13$, $p = .043$, $\eta_p^2 = .02$. As shown in Figure 8, for younger children only the effect of question type was significant $F(1, 104) = 23.40$, $p < .001$, $\eta_p^2 = .18$; children in the DD condition were more consistent than children in the cross condition. This was true for

both SE and RE children. For older children, the Question Type X Frequency interaction was significant $F(1, 110) = 5.37, p = .02, \eta_p^2 = .05$. For older children in the cross conditions, SE children were more consistent ($M = 2.63, SD = 1.55$) than RE children ($M = 1.43, SD = 1.42$) $t(56) = 3.08, p = .003$; however, for older children in the DD condition, there were no differences in consistency between SE ($M = 3.68, SD = .75$) and RE children ($M = 3.54, SD = .99$), $t(54) = .55, p = .59$. Therefore, frequency only mattered for older children who were cross-examined.

For Interview 1 and Interview 3 consistency, there was a main effect of question type, $F(1, 214) = 8.63, p = .004, \eta_p^2 = .04$; children in the DD condition ($M = 3.27, SD = 1.11$) were more consistent than children in the cross condition ($M = 2.73, SD = 1.53$). There was also a main effect of age, $F(1, 214) = 6.31, p = .01, \eta_p^2 = .03$; younger children were less consistent ($M = 2.76, SD = 1.44$) than older children ($M = 3.21, SD = 1.27$).

2.4. Discussion

To help us investigate the effects of cross-examination on the accuracy and consistency of reports, children participated in either a single (SE) or five similar (RE) magic shows. Children in the RE condition participated in one show a day for five consecutive days. RE children experienced 12 variable details that changed in predictable ways across the shows. RE children also experienced an unpredictable change (deviation) during the target instance. SE children experienced the same details as the target instance for RE children but given it was the only show for SE children, they would not have experienced the details as changing in either predictable or unpredictable ways.

One week following the target show all children were interviewed three times in the same session. During Interview 1, all children were interviewed in a supportive manner, using MCR and an interview adapted from the NICHD protocol (Lamb et al., 2007). Presumably many of these techniques are implemented when a child provides direct testimony in court or video-taped evidence, given that the objective is to obtain an accurate report. Following Interview 1, all children were greeted by a new interviewer who did not review the ground rules. Children in the cross-examination condition were

asked complex, confusing, and suggestive questions about four of the variable details in the show. Children in the DD condition were simply asked all cued recall questions again. A few minutes after this, the initial interviewer returned and provided children with a re-direct interview which allowed children the opportunity to answer the questions one final time.

2.4.1. Cross-examination affects accuracy of children's reports when defined narrowly.

Accuracy for Interview 2 was lower than accuracy for Interview 1 for children in the cross condition but not for children in the DD condition. Therefore, cross-examination had a negative effect on accuracy which cannot be accounted for by being asked the same questions repeatedly. I predicted that SE children would be more accurate than RE children across interviews. This hypothesis was supported when accuracy was defined narrowly (children ascribed the variable detail to the specific instance they were questioned about). Children who participated in one magic show were more accurate than children who participated in five similar magic shows, across all interviews. This finding is consistent with previous research showing children who experience similar instances of a repeated event are less accurate than children who experience a unique event, when asked about the variable details of a specific instance (Connolly et al., 2016).

I also predicted that in the cross-examination condition the difference in accuracy between Interview 1 and Interview 2 would be greater for RE children than SE children. This hypothesis was not supported. In fact, when accuracy was narrowly defined, I observed the opposite; in the cross condition there was a larger difference in accuracy between Interviews 1 and 2 for SE children than RE children. This finding is surprising given that our cross-examination manipulation included misleading and suggestive questions and previous research shows that SE and RE children are similarly susceptible to suggestive cued recall questions (Powell & Roberts, 2002). Connolly and Price (2006) showed that high similarity between the suggested and variable details increased the likelihood that RE children would be more vulnerable to suggestion than SE children.

There are two possible explanations for this unexpected effect: delay from event to interview and floor effects. In a recent meta-analysis, delay from the event to interview was found to moderate the number of suggested details reported by RE and SE children (Woiwod et al., 2019). In delays of up to one week, RE children reported more suggested details than SE children and in delays of one week or more SE children reported more suggested details than RE children. The authors noted that there were few studies that examined delay and cautioned about drawing firm conclusions. Nevertheless, the findings are consistent with the current research where the delay from the magic show to interview was one week.

Another potential explanation for cross-examination having a larger effect on SE than RE children could be the low performance of RE children during the baseline interview, when accuracy was narrowly defined. In the cross condition, the mean correct score for RE children during Interview 1 was 1.48 (fewer than one out of four details), while for SE children during Interview 1 the mean correct score was 4.52 (more than two out of four details). It could be that simply having higher accuracy during Interview 1 provided more opportunity for SE children to demonstrate the effect of cross-examination. It is also important to note that in the current research, even under cross-examination, SE children were more accurate (narrowly defined) than RE children.

I predicted that older children would be more accurate than younger children. When accuracy was narrowly defined, this hypothesis was supported only in the SE condition. Older SE children were more accurate than younger SE children. In the RE condition, there were no differences in accuracy between older and younger children. This finding was consistent across all interviews and is interesting given that previous research shows older children remember more than younger children. For example, when children either 6- to 8-years-old or 9- to 11-years-old participated in four similar magic shows and were interviewed about all instances, older children provided more correct responses than younger children (Experiment 3; Connolly et al., 2016). In the current research, children were only questioned about the 3rd instance. It is possible that in the current research, RE children's ability to attribute the correct details to the 3rd instance

was low across conditions ($M = 1.38$, RE older, $M = 1.44$, RE younger). If children had been questioned on a different instance (first), age effects may have emerged.

2.4.2. Cross-examination affects accuracy of children's reports when defined broadly.

When accuracy is defined broadly (children report a detail which was experienced during any of the instances), RE children may be as accurate as SE children (see Woiwod et al., 2019). In the current research when accuracy was defined broadly, RE children were as accurate as SE children. Cross-examination affected accuracy broadly defined for both SE and RE children. For SE and RE children who were cross-examined, accuracy was lower during Interview 2 than Interview 1; however, for SE and RE children in the DD conditions there were no differences in accuracy between Interview 1 and Interview 2. This shows that cross-examination affected children's accuracy broadly defined in a way which cannot be explained by repeated questioning.

Taken together these results show that cross-examination affected accuracy of reports provided by SE and RE children when accuracy was defined narrowly and broadly. In all but one analysis, accuracy was lower during Interview 2 than Interview 1 for children in the cross conditions but not for children in the DD conditions. These results show the suggestive, confusing, and ambiguous questions used during cross-examination resulted in decreased accuracy which cannot be explained by repeated questioning.

2.4.3. Cross-examination affects accuracy of deviation details.

With respect to deviation details, accuracy was lower during Interview 2 than Interview 1 for SE children in both the cross and DD conditions as well as RE children in the cross condition, while there was no difference for RE children in the DD condition. This shows that cross-examination and repeated questioning for SE children affected accuracy. I also observed the same effect of age as with variable details; in the SE condition older children were more accurate than younger children but in the RE condition there were no differences between older and younger children. This is

surprising given that we would expect memory for the deviation details to be good, and older children to have better memory than younger children. It could be that the effect of repeated interviews impacted RE children's performance even for details that were distinct, and this prevented age effects from emerging.

2.4.4. Re-direct rehabilitates accuracy for variable details.

To observe whether a re-direct interview rehabilitated children's reports after cross-examination, I compared accuracy during Interview 3 to Interview 1. Previous research shows that a re-direct interview provided after cross-examination encourages many children to report the response given in their initial interview (Righarts et al., 2015). Generally, the re-direct interview results in children's reports becoming more accurate than their cross reports, suggesting that the changes children make under cross-examination are not entirely due to memory errors. I predicted that accuracy during Interview 3 would be significantly lower than accuracy during Interview 1 when RE children were cross-examined but not when SE children were cross-examined. My hypothesis was not supported when accuracy was narrowly defined. For SE and RE children who were cross-examined there were no differences in accuracy for variable details between Interview 3 and Interview 1, suggesting that a re-direct interview rehabilitated all children's reports following the deleterious effects seen during cross-examination. These results suggest that by providing children an additional opportunity to answer the questions about variable details, those children who changed their responses under cross-examination are likely to be as accurate during the re-direct as during "direct examination". The results also suggest that when children acquiesce to a detail suggested under cross-examination, it does not interfere with their memory to the point where they will report the suggested detail once released from a coercive interview. Memory impairment may be more likely during an actual trial however, where the delay between direct- and cross-examination is longer than the delay between interviews in the current experiment. It should also be noted that accuracy during Interview 1 was low, especially for RE children ($M = 1.49$, $SD = 1.64$). If accuracy had been higher during Interview 1, differences between Interview 1 and Interview 3 may have emerged.

There could be different explanations for why RE and SE children were as accurate during Interview 3 as Interview 1. Accuracy for RE children during Interview 1 was low and during Interview 2 was nearly at floor. Improvement from Interview 2 to 3 during the re-direct interview for RE children was small but significant. RE children may not have remembered the variable details of each specific show well but had good memory for what they reported during Interview 1. SE children were more accurate than RE children during Interview 1 ($M = 4.98$, $SD = 1.97$), evidence of better memory for the details of the show. SE children's accuracy also decreased during Interview 2 and recovered during Interview 3. Although it is possible that SE children were remembering what they reported during Interview 1, it could be that they had good memory for the details of the show. It is possible that because RE were less accurate than SE children during Interview 1, when accuracy was narrowly defined, there simply was not the same opportunity for RE children to be affected by cross-examination as there was for SE children. Future research looking at the effect of cross on RE children could try cross-examining on the first instance, because this instance has been shown to be the most accurate for RE children when accuracy is narrowly defined.

2.4.5. Re-direct rehabilitates accuracy (defined broadly) for SE but not for RE children.

When accuracy was defined broadly, for RE children who were cross-examined, Interview 2 was less accurate than Interview 1; although Interview 3 was more accurate than Interview 2, it was less accurate than Interview 1. For SE children who were cross-examined, Interview 2 was less accurate than Interview 1, Interview 3 was more accurate than Interview 2 but there was no difference in accuracy between Interview 1 and 3. For both RE and SE children in the DD conditions there were no differences between the three interviews. These results suggest that when accuracy is defined broadly cross-examination is more detrimental to RE than SE children. Decreases in accuracy also indicates that RE children reported suggestions of non-experienced details rather than experienced details from non-target instances. If RE children were changing their responses to a different experienced variable detail, then their broadly-defined accuracy would have remained the same.

In a study by Righarts et al. (2015) children who had experienced a single visit to the police station received a re-direct interview within one week of being cross-examined. Many of the changes that children had made under cross-examination were no longer present after the re-direct interview, resulting in accuracy between the direct and the re-direct interview being the same (Righarts et al., 2015). I replicated this finding in the current research when children reported on variable details and extended the findings by showing that a re-direct may not always rehabilitate. When SE and RE children recalled variable details, there were no differences in accuracy between Interview 1 and Interview 3. However, when accuracy was defined broadly, reports provided by RE children who were cross-examined were not fully rehabilitated by a re-direct interview. This points to lasting detrimental effects of cross-examination, which may be specific to RE children.

2.4.6. Re-direct does not completely rehabilitate accuracy for deviation details.

When examining the effects of cross-examination on accuracy for deviation details, a slightly different pattern emerged: frequency interacted with interview and question type. This interaction points to a negative effect of cross-examination which was not fully rehabilitated with the re-direct interview. For SE and RE children in the cross conditions, accuracy during Interview 2 and Interview 3 was lower than accuracy during Interview 1. Although accuracy was higher for Interview 3 than Interview 2, indicating some recovery through re-direct, these results suggest that the re-direct did not fully rehabilitate children's reports of deviation details after being cross-examined. For SE children in the DD condition there was a decrease in accuracy from Interview 1 to Interview 2; however, there was no difference in accuracy between Interview 1 and Interview 3, suggesting that the re-direct rehabilitated accuracy. For RE children in the DD condition there were no differences in accuracy across any of the interviews. Overall, these results indicate that cross-examination had an effect on deviation details that was not fully rehabilitated through a re-direct interview.

These findings were exploratory but point to the risk of children adopting the response about deviation details they are provided under cross-examination. During the supportive re-direct interview, some children reported the detail that was suggested during the cross interview. Importantly, these results show that children may provide an incorrect detail when they are re-directed, even if their initial response was correct. In the current study, children were re-directed by their original interviewer, with best practice techniques, and were encouraged to answer the questions as they remembered them occurring during the show. In spite of this, children who were cross-examined during Interview 2, were less accurate in Interview 3 than Interview 1 when answering questions about the deviation. This finding is surprising in part because the difference in accuracy between Interview 1 and 3 emerged for deviation details but not for variable details. Children typically remember deviation details better than variable details and therefore should also be less likely to change their responses to details they remember well. These findings, however, are consistent with studies showing that memory for the details does not fully explain changes children make under cross-examination (Righarts et al., 2015). Understanding how memory for deviation details is impacted by repeated interviewing and cross-examination would be a worthwhile area for future research.

Overall, a re-direct interview helped to rehabilitate children's reports about variable details. Accuracy for Interview 2 was lower than accuracy for Interview 1 as a result of cross-examination, but accuracy was restored through the re-direct interview; accuracy for Interview 3 was the same as accuracy for Interview 1 when children were reporting about variable details. Conversely, the re-direct did not fully rehabilitate accuracy for deviation details. There were no differences in accuracy between Interview 3 and Interview 2, but accuracy during Interview 3 was lower than accuracy during Interview 1 for children who were cross-examined. As well, the re-direct did not fully rehabilitate accuracy broadly-defined for RE children who were cross-examined: accuracy for Interview 3 was lower than accuracy for Interview 1.

2.4.7. Cross-examination affects consistency of children's reports.

Children who were cross-examined were less consistent than children who were in the DD condition when reporting on variable details between Interview 1 and Interview 2. However, contrary to my hypothesis, the difference in consistency was no greater for RE children than for SE children. These results in the SE condition are consistent with previous findings by Fogliati and Bussey (2014) who had children participate in a healthy eating lesson and then were either cross-examined or asked the cued recall questions again. In that study, children who were cross-examined during Interview 2 changed more responses across the two interviews compared to children who were asked all the cued recall questions again. The current research is the first study to report the same pattern in RE children.

When asked the same questions repeatedly, some children will change their responses (Poole & White, 1991;1993). This could be because they assume that their first response was incorrect. Some children will change their response and provide one they believe the interviewer must be seeking. The results of the current research show that the suggestive, unsupportive questioning style characteristic of cross-examination led to more frequent changes than repeated questioning for both SE and RE children.

For Interview 1 and Interview 2 consistency I also observed an effect of age on consistency; younger children were less consistent than older children. As with accuracy this was only true for SE children; there were no differences between older and younger RE children on Interview 1 and Interview 2 consistency. This may be because RE children were particularly vulnerable to changing their responses that when exposed to repeated interviews even older children were inclined to provide a different response.

Recall that Connolly et al. (2016) found that memory for deviation details was the same for RE and SE children; therefore, it is possible that reports about deviation details may be similar between the two groups. For consistency of deviation details between Interview 1 and Interview 2, children in the DD conditions were more consistent than children in the cross conditions. Older RE children were less consistent on deviation details than older SE children but only when they were cross-examined. For younger

children and children in the DD conditions, there was no difference in consistency between RE and SE children. Interestingly, older RE children who were cross-examined were more adversely affected than SE children, for consistency of details between Interview 1 and Interview 2. Future research could continue to investigate potential differences between SE and RE children when reporting on deviation details under cross-examination.

2.4.8. Do memory errors explain changes made under cross-examination?

During trial if a child changes their response under cross there may be an opportunity for the prosecutor to re-direct the child to try and rehabilitate the child's credibility. Previous research has shown that when SE children are provided with a re-direct interview after cross-examination, they will often report the same response they had reported during the baseline interview (Righarts et al., 2015). The authors argued that social factors best explain changes children make under cross because the suggestion presented during cross-examination does not overwrite the original memory trace; rather it likely results in two competing traces (the child's original response and the suggestion; Righarts et al., 2015).

I was interested in whether the same pattern would emerge for RE children. Given that RE children have difficulty attributing a detail to the correct instance, I predicted that RE children would be less likely than SE children to report their original response during re-direct and that this effect would be greater in the cross than the DD condition. For variable details this hypothesis was partially supported. Children in the RE condition were less consistent between Interview 1 and Interview 3 than children in the SE condition, and children in the cross condition were less consistent between Interview 1 and Interview 3 than children in DD condition but the two factors did not interact. That is, cross-examination affected consistency between Interview 1 and 3 for all children. Although question type did not interact with event frequency, examination of the mean consistency scores illustrate the impact of the combined main effects of question type and event frequency. For example, when examining consistency for variable details between Interview 1 and Interview 3 the mean consistency score for SE DD children was 7.03 out

of 8; the mean for RE cross children was only 3.5 out of 8. Thus, RE children who were cross-examined reported the same response during Interview 3 as they had for Interview 1 for fewer than half of the variable details.

For consistency of deviation details between Interview 1 and Interview 3, children in the cross conditions were less consistent than children in the DD conditions. The current results suggest that even for deviation details, children who are questioned in an unsupportive, suggestive manner will be less likely to return to their initial responses than children who are simply questioned repeatedly. Given the brief time between the interviews one might expect children to remember the answers they provided during Interview 1, especially deviation details. The results could mean that the challenges used during cross-examination created confusion or memory issues over-and-above being questioned repeatedly. Older children were also more consistent in their reports of deviation details between Interview 1 and Interview 3 than younger children.

Recall that children were interviewed three times within approximately 45 minutes. Even within this brief time interval, RE children were less likely than SE children to report the same detail for Interview 3 as they had for Interview 1. In fact, some RE children were very inconsistent in their reporting of details across all three Interviews. For example, young RE children who were cross-examined provided consistent responses for Interview 1 and Interview 3 for fewer than half the details ($M = 3.06$ out of 8). Interview 3 was conducted with the same interviewer as Interview 1 and used appropriate questions, much like what would be done in court when a prosecutor must try to rehabilitate a child's testimony after cross-examination. The purpose of this was to encourage children to report the details as they remembered them occurring during the show, even if they had acquiesced during cross-examination. Given that the techniques used during re-direct were highly similar as those used during Interview 1, failure to provide the same details during Interviews 1 and 3 was not likely due to poor interviewing. Perhaps one reason RE children were more likely to change their responses to details than SE children is because they were less confident in their responses to Interview 1 than SE children (Roberts & Powell, 2005). If a child can remember their initial response to a question but is not confident in the accuracy of that initial response,

they may be more likely to change their response when faced with a suggestion compared to children who are confident about their initial response.

Cross-examination negatively affected accuracy of reports provided by SE and RE children when accuracy was narrowly and broadly defined. Although a re-direct interview restored accuracy, narrowly defined, for variable details reported by SE and RE children, it failed to fully rehabilitate accuracy for deviation details. When accuracy was broadly defined the re-direct rehabilitated accuracy for SE children but not fully for RE children. RE children were also less consistent than SE children, and children who were cross-examined were less consistent than children in the DD conditions.

RE children were asked to report the variable details that occurred during a specific magic show. Across five different shows, the children experienced these details five different ways (variable options). When asked about the variable options associated with a specific instance, RE children often misattribute options to an incorrect instance (Connolly et al., 2008; Connolly et al., 2016; Woiwod et al., 2019). As shown in Experiment 1, this can result in RE children being more likely to change their responses than SE children. Cross-examination has been shown to have negative effects on the consistency of children's reports. Consistency has been shown to be an important predictor of perceived credibility (Brewer et al., 1999). Given this, it seems likely that cross-examination will have a negative impact on children's perceived credibility. In court, when ground truth is unknown, perceived credibility of the witnesses is one of the biggest determining factors of the case (Connolly & Read, 2003; Myers, 1992). Whether cross-examination influences the perceived credibility of children is a question that has yet to be examined. Experiment 2 examined the effect of cross-examination and event frequency on the perceived credibility of children's reports.

Chapter 3.

Experiment 2

Undergraduate participants watched a recorded interview of a child who had experienced either a single or a repeated event. In the second portion of the interview the child was either challenged with cross-examination style questions (cross) or asked all cued recall questions again (DD). After watching the interview, participants rated the perceived honesty, accuracy, credibility, consistency, suggestibility, and confidence of the child.

3.1. Hypotheses

1. Children who are cross-examined will be perceived as less honest, accurate, and credible, as well as more susceptible to suggestive questioning than children in the DD condition.
2. SE children will be perceived as more accurate, and credible than RE children.
3. Older children will be perceived as more accurate and credible than younger children, and younger children will be perceived as more honest than older children.
4. The relationship between event frequency and perceived credibility will be mediated through perceived consistency and perceived confidence.
5. The relationship between question style and perceived credibility will be mediated through perceived consistency and perceived confidence.

3.2. Method

3.2.1. Design

Experiment 2 was a 2(question style: DD, cross) X 2(event frequency: SE, RE) X 2(age: K/ gr. 1, gr. 3 - 5) between-subjects nested design.

3.2.2. Participants

Each video was rated by 12-15³ undergraduate participants ($N= 532$) on accuracy, honesty, credibility, consistency, confidence, and suggestibility of the child. Participants were recruited using the Simon Fraser University Psychology Research Pool. The mean age of participants was 19.31 years ($SD = 1.87$). Seventy percent were female and 60% reported that English was their first language. Of participants reporting a language other than English as their first, the mean number of years participants reported speaking English was 11.52 ($SD = 5.13$) years.

3.2.3. Materials

Interviews

In Experiment 1, I asked parents for consent to use the children's recorded interviews in a follow-up experiment. Multiple recorded interviews were used in each condition to minimize the possible effect of characteristics (e.g., attractiveness, verbal ability etc.) of individual children, on perceptions of credibility. Five interviews from each condition of the eight between-subjects conditions in Experiment 1 were selected and matched on accuracy during the initial direct examination (Interview 1) (40 videotapes in total). The number of interviews was chosen based on previous studies on witness credibility (Leippe, Manion, & Romanczyk, 1992 used three videos in each condition; Connolly et al., 2008 used four videos in each condition). Accuracy was computed as experienced variable options (i.e., the child reported a detail that was experienced during any of the magic shows he or she participated in). Recorded interviews included closed captioning of the child's responses to ensure that all participants were fully aware of the child's answers to the questions.

Credibility questionnaire

The credibility questionnaire was adapted from Connolly et al. (2008) which examined perceived credibility of children who experienced either one or four similar

³ One interview was inadvertently shown to 17 participants.

magic shows. The questionnaire used multiple items (Appendix F). These items were averaged to create the relevant composite measures: honesty (#1, #2 reversed, and #11; Cronbach's alpha = .76), accuracy (#3, #6, and #9; Cronbach's alpha = .78), credibility (#5 and #12; Cronbach's alpha = .81), and confidence (#8 and #13 reversed; Cronbach's alpha = .54). Perceived consistency (#4) and perceived suggestibility (#7) were also measured.

3.2.4. Procedure

Before beginning, all participants in a session (up to 12 participants) received a brief general description of the experiment and provided written consent. Each recorded interview was approximately 30 minutes in length and completion of the questionnaire took up to 30 minutes, resulting in the entire session being approximately one hour long. Participants were asked to watch one interview carefully (i.e., free recall and cued recall in Interview 1, as well as cued recall in Interviews 2, and 3) and were told that they would later be asked questions regarding the credibility of the child. Before the interview commenced, participants saw a still shot of the child interviewee and were asked if any of them knew the child in any capacity. If a participant reported knowing a child, a new interview would have been chosen, but this did not occur. After participants finished viewing the interview, they completed the credibility questionnaire. Following the questionnaire, participants were asked to complete a brief demographic questionnaire and were provided with a written debriefing script.

3.3. Results

Participant responses ($N = 532$) were averaged across interviews such that each interview ($N = 40$) had a mean response. The nested dataset was used to conduct a 2(question style: direct-direct, cross) X 2(event frequency: SE, RE) X 2(age: K/ gr. 1, gr. 3 - 5) Analysis of Variance on the dependent variables: perceived accuracy, perceived honesty, perceived overall credibility, and perceived susceptibility to suggestive questioning.

3.3.1. Question type

Hypothesis 1 stated that children in the DD conditions would be perceived as more honest, accurate, and more credible than children in the cross conditions. This hypothesis was not supported. There were no interactions and no main effects of question type on perceived accuracy, $F(1, 32) = .78$ $p = .38$, $\eta_p^2 = .02$, credibility, $F(1, 32) = .47$ $p = .50$, $\eta_p^2 = .01$, or honesty $F(1, 32) = .53$ $p = .47$, $\eta_p^2 = .02$. There was a main effect of question type on perceived susceptibility to suggestive questioning, $F(1, 32) = 5.65$ $p = .02$, $\eta_p^2 = .16$; participants provided higher ratings of susceptibility to suggestibility for interviews of children in the DD condition ($M = 4.75$, $SD = .40$) than interviews of children in the cross condition ($M = 4.18$, $SD = .98$). This finding was unexpected because I had hypothesized that children in the cross conditions would be rated as more susceptible to suggestive questioning than children in the DD conditions.

3.3.2. Frequency

Hypothesis 2 stated that SE children would be perceived as more accurate and more credible than RE children. This hypothesis was supported. There was a main effect of frequency on perceived accuracy, $F(1, 32) = 10.13$, $p = .003$, $\eta_p^2 = .24$; participants provided higher ratings of accuracy for interviews of SE children ($M = 4.82$, $SD = .70$) than interviews of RE children ($M = 4.23$, $SD = .63$). There was a main effect of frequency on perceived credibility, $F(1, 32) = 12.56$, $p = .001$, $\eta_p^2 = .28$; participants provided higher ratings of credibility for interviews of SE children ($M = 4.85$, $SD = .82$) than interviews of RE children ($M = 4.04$, $SD = .73$). There was also a main effect of frequency on perceived honesty, $F(1, 32) = 6.19$, $p = .02$, $\eta_p^2 = .16$; participants provided higher ratings of honesty for interviews of SE children ($M = 5.18$, $SD = .62$) than interviews of RE children ($M = 4.74$, $SD = .58$). This finding was unexpected but is consistent with that observed in Connolly et al. (2008).

3.3.3. Age

Hypothesis 3 stated that older children would be perceived as more accurate and credible than younger children. This hypothesis was supported. There was a main effect

of age on perceived accuracy, $F(1, 32) = 10.28$ $p = .003$, $\eta_p^2 = .24$; participants provided higher ratings of accuracy for interviews of older children ($M = 4.82$, $SD = .73$) than interviews of younger children ($M = 4.23$, $SD = .59$). There was a main effect of age on perceived credibility, $F(1, 32) = 8.17$, $p = .007$, $\eta_p^2 = .20$; participants provided higher ratings of credibility for interviews of older children ($M = 4.78$, $SD = .76$) than interviews of younger children ($M = 4.12$, $SD = .87$). There was also a main effect of age on perceived honesty, $F(1, 32) = 7.02$ $p = .01$, $\eta_p^2 = .18$; participants provided higher ratings of honesty for interviews of older children ($M = 5.20$, $SD = .58$) than interviews of younger children ($M = 4.72$, $SD = .61$). This finding was unexpected, because I had hypothesized that younger children would be perceived as more honest than older children.

3.3.4. Mediation analyses

I hypothesized that the relationship between frequency and perceived credibility would be mediated through perceived consistency and perceived confidence. To reduce the number of analyses conducted, honesty, accuracy, and credibility ratings were summed for each participant to create an overall credibility score (Cronbach's alpha = .96; see Connolly et al., 2008 for a similar approach). Frequency was dummy coded as 1 and 2. The assumption that there is a linear relationship between the independent and dependent variable was met; event frequency correlated with consistency and confidence. The **total effect** of event frequency on perceived credibility explained 19% of the variance in the model (adjusted R^2), $F(1, 38) = 8.67$, $p = .006$. RE speakers were associated with less perceived credibility than SE speakers, $b = -1.84$, $t(38) = 2.95$, $p = .006$.

Perceived Consistency

I hypothesized that differences in perceived credibility between RE and SE children would be mediated through perceived consistency. As can be seen in Figure 9, when perceived consistency was included, the model explained 80% of the variance, $F(1, 38) = 72.18$, $p < .001$. After controlling for perceived consistency, the relationship between event frequency and perceived credibility decreased, ($b = -1.84$, $SE = .63$ vs. $b =$

-.30, $SE = .35$), and was no longer significant, $t(38) = -.85, p = .40$. This suggests that perceived consistency fully mediated the relationship between event frequency and perceived credibility, $b = -1.54, 95\% \text{ CI } [-2.57, -.51]$.

Perceived Confidence

I hypothesized that differences in perceived credibility between RE and SE children would be mediated through perceived confidence. As can be seen in Figure 10, when perceived confidence was included, the model explained 32% of the variance, $F(1, 38) = 8.90, p < .001$ (see Figure 2). After controlling for perceived confidence, the relationship between event frequency and perceived credibility decreased, ($b = -1.84, SE = .63$ vs. $b = -.99, SE = .66$), and was no longer significant, $t(38) = -1.51, p = .14$. This suggests that perceived confidence fully mediated the relationship between event frequency and perceived credibility, $b = -.86, 95\% \text{ CI } [-1.80, -.133]$. There was no linear relationship between perceived consistency or perceived confidence and question type. Therefore, the mediational analysis proposed for Hypothesis 5 was not conducted.

3.4. Discussion

To test the effect of age, event frequency, and cross-examination on the perceived credibility of children's reports, undergraduate participants watched a recorded interview of a child from Experiment 1. Participants rated the perceived honesty, accuracy, overall credibility, and susceptibility to suggestive questioning of the child. These dependent variables were used to examine differences in ratings of perceived credibility of the conditions. Participants also rated the perceived confidence and perceived consistency of the children. I examined if these variables mediated differences in ratings of credibility.

3.4.1. Effect of cross-examination on perceived credibility

I predicted that children who were cross-examined would be perceived as less credible, and more susceptible to suggestive questioning than children who responded to the cued recall questions a second time. I had based this prediction on the speculation that although matched on accuracy for experienced details in Interview 1, children who were

cross-examined were less accurate and less consistent in Interviews 2 and 3 than children who were not cross-examined.

I was surprised to see few effects of cross-examination on perceived credibility of the children. There were no differences in perceived honesty, accuracy, or credibility between children who were cross-examined and children who answered the same questions repeatedly. It is possible that our question-type manipulation was not strong enough to be detected by participants. This seems unlikely given that our questions were similar to those used extensively in the cross-examination literature (see Zajac & Hayne, 2003, 2006), which were informed by questions used during actual trials (Zajac et al., 2003). Children in the cross conditions were asked confusing and complex questions, were challenged with suggestive details, and were asked the questions at a faster pace compared to the children in the DD condition. Additionally, our cross-examination manipulation was related to differences in accuracy and consistency in Experiment 1, suggesting that the manipulation was indeed powerful enough.

Children who were cross-examined were challenged with up to eight cross-examination-style questions for each of the four variable details and two deviation details. Children did not necessarily change their responses to each of these six details. Further examination of the changes that children made during the interviews used as stimuli for Experiment 2 revealed that children in the cross conditions were able to completely resist acquiescing on approximately half the details ($M = 2.95 / 6$ details). It may be that children need not be consistent on all details under cross-examination to be perceived as credible. Perhaps if children are consistent on a portion of the details, despite being inconsistent on others, they will be perceived as being as credible as children who are consistent. This explanation would be counter to what most literature on report consistency and witness credibility has shown to date. In general, previous research indicates that consistency of the witness is an important factor when determining the perceived credibility of the witness (Brewer et al., 1999; Connolly et al., 2008; Lieppe & Romanczyk, 1989).

An additional consideration is that the cross-examination questions were perceived by participants as too suggestive. In some circumstances, cross-examination may have more of an influence on how the interviewer is perceived than how the child is perceived (Mugno, Klemfuss, & Lyon, 2016). In the current research, children who were cross-examined were perceived as less susceptible to suggestive questions than children who were in the DD condition. If participants perceived the questioning in the cross condition as too suggestive it may have resulted in participants feeling sympathy towards the child and adjusting their suggestibility ratings. Legal scholars have suggested that cross-examining a child too harshly could backfire, creating sympathy for the child and decreasing perceptions of the cross-examiner (Myers, 2017). If the cross-examiner is perceived poorly for using inappropriate questions, perhaps this results in the child being perceived as less suggestible. Future research should seek to investigate different cross-examination techniques and measure perceptions of the investigator or interviewer of the child.

3.4.2. Effect of frequency on perceived credibility

Children who reported on one of five magic shows were perceived as less honest, accurate, and credible than children who reported on the only show that they experienced. These results are consistent with previous research examining differences in credibility between SE and RE children who were interviewed about an instance of a repeated event. Connolly et al. (2008) video-taped interviews of children who had experienced 1 or 4 magic shows and later answered free and cued recall questions about what had occurred during one of the shows (RE) or the only show (SE). As in the current research, children had been asked about the variable details in the target show. Undergraduate (Experiment 1) and community participants (Experiment 2) rated SE children as more honest, accurate, and credible than RE children.

The current findings showed that both perceived confidence and perceived consistency fully mediated the relationship between event frequency and perceived credibility. Connolly et al. (2008) also showed that consistency of the report mediated the relationship between event frequency and perceived credibility. In that study, children's

verbatim transcripts were coded to create an internal consistency score for the details reported during free and cued recall. These consistency scores partially mediated the relationship between event frequency and perceived credibility when evaluated by undergraduates (Experiment 1), and fully mediated the relationship between event frequency and perceived credibility when evaluated by a community sample (Experiment 2). The results of the current research are also consistent with research comparing perceived credibility of adults reporting on either a single event or repeated event (Weinsheimer, Coburn, Chong, MacLean, & Connolly, 2017). However, in the adult study, confidence fully mediated the relationship between event frequency, while consistency only partially mediated the relationship. Perhaps one reason why perceived consistency was a full mediator in the current research, while not in previous research, is that in the current research participants watched children provide responses to three brief interviews; consistency was probably a salient characteristic of the report.

There is evidence that when children report on the fixed details of a repeated event, they will be evaluated as more credible than children who report on a single event (Pezdek et al., 2004; Blandon-Gitlin et al., 2005; Stromwell et al., 2004). The results of the current study are consistent with Connolly et al. (2008) and provide further evidence that when children are asked about variable details, RE children will be perceived as less credible than SE children.

When interpreting these results, three points should be considered. First, the interviews were matched on accuracy for experienced details reported during Interview 1. Therefore, at least prior to cross-examination or repeated questions, which occurred during Interview 2, there were no differences in actual accuracy between RE and SE children. Second, event frequency was not confounded with delay to recall. In the present study, RE children were questioned one week after participating in the 3rd magic show (i.e., the one they were asked to report on), and SE children were also interviewed one week after participating in their show. Third, event frequency was not confounded with report duration. In previous studies examining differences in perceived credibility of SE and RE reports, RE children and adults were interviewed on all instances. Although only the target instance was used to create stimuli for the perceived credibility studies, RE

interviewees would have been reporting for longer than SE interviewees, raising questions about whether fatigue was contributing to differences in perceived credibility of RE and SE reports (Connolly et al., 2008; Weinsheimer et al., 2017). In the current research, RE children were only interviewed on the target instance and differences in perceived credibility between RE and SE children emerged. The results of the current research suggest that differences in perceived credibility are not due to differences in delay to test, report duration, or fatigue at time of recall.

Participants in the current research were not informed that RE children had experienced more than one magic show. Participants may not have been aware of how many instances the child had experienced. It would be worthwhile to examine if informing participants that children are reporting on a single instance from multiple similar magic shows could provide an explanation for why these children seemed less consistent and confident. Alternatively, given that individuals may already hold stereotypical beliefs about young children's ability to provide accurate reports, informing participants on the difficulty of reporting on a specific instance of a repeated event could exasperate the issue.

3.4.3. Effect of age on perceived credibility

The two-factor theory of credibility proposes that perceived credibility is composed of perceived cognitive competence and perceived honesty. In a novel or complex situation, overall credibility will be based more on perceived cognitive competency than honesty, but in a familiar situation perceived honesty may be more relevant. Generally, younger children (8 years and under) are perceived as more honest but less cognitively competent than older children or adults (Nunez et al., 2011). The cognitive demands of reporting on a familiar situation are arguably lower than those of reporting on a novel task. In a familiar situation a child who is perceived as honest will be perceived as credible; younger children should have the advantage in this situation. In an unfamiliar or complex event, perceptions of credibility should be weighted more heavily on cognitive competency (Bottoms 1993; Leippe & Romanczyk, 1989). In the current research older children were perceived as more accurate and credible than younger

children. These results were hypothesized given the relatively complex and novel nature of the magic shows and are consistent with Connolly et al. (2008) who had participants rate the perceived credibility of children aged 4- to 5-years-old or 6- to 7-years-old.

Typically, when differences in honesty are observed, younger children are perceived as more honest than older children. Therefore, in the current research, I predicted that younger children would be perceived as more honest than older children. This hypothesis was not supported; older children were perceived as more honest than younger children. This finding was surprising. There was nothing about the magic shows or the interview to motivate children to be dishonest. Research by Nunez et al. (2011) might help explain this finding. Nunez et al. observed that in the context of a CSA case, perceptions of having a good memory, being attentive, knowing the truth, and being trustworthy, peaked for children at the age of 8-years. The mean age of our older children was 9 years, and the mean age of our younger children was 5 years. The older children in the current study were at an age where they most benefit from being perceived as knowing the truth and being trustworthy (Nunez et al., 2011).

Another possible explanation for the effect of age on honesty in the current research is that participants were influenced, or primed, to respond in a certain way based on their responses to questions about cognitive competence and overall credibility; rating older children as highly accurate and credible influenced them to respond in a similar manner when asked about perceived honesty (see Connolly et al., 2008 for a similar explanation).

The effect of age on perceived accuracy, honesty, and credibility is interesting but somewhat concerning given that there were no differences with respect to actual accuracy for experienced details between younger and older children; recall that the interviews used as stimuli for Experiment 2 were matched on accuracy. These results are consistent with previous research that show older children are perceived as more credible than younger children when reporting on a complex event and suggest that individuals are influenced by stereotypes of young children's ability to provide accurate information.

Chapter 4.

General Discussion

In the present research, children in kindergarten and grade 1 or grade 3 – grade 5 participated in either one (SE) or five (RE) magic shows. Children in the RE condition participated in one magic show per day for five consecutive days. During the third show RE children experienced a deviation (interruption to the show). One week following the target show, all children received a baseline interview (Interview 1) and answered cued recall questions about 12 of the variable details and the seven deviation details that occurred during the target show. Approximately two minutes later, children were greeted by a new interviewer (Interview 2). Half the children were questioned with eight cross-examination style questions for each of the six variable details. The other children were asked all the cued recall questions again. Finally, the original interviewer returned and provided all children with a re-direct interview (Interview 3). During the re-direct, all children were asked about the six variable details of interest and were encouraged to report the details as they remembered them occurring during the show.

With parent consent I used the recorded interviews as stimuli for Experiment 2. Undergraduate participants watched a single interview of either a younger or older child who had participated in either one or five similar magic shows and was either cross-examined or was asked the same cued recall questions repeatedly (DD). After viewing the interview, undergraduate participants rated the perceived honesty, accuracy, credibility, consistency, confidence, and susceptibility to suggestive questioning of the child.

Cross-examination had negative effects on the accuracy of children's reports when it was defined narrowly and broadly. In almost all analyses, accuracy decreased from Interview 1 to Interview 2 only for children in the cross conditions and not for children in the DD conditions. This shows that the changes children made under cross were from the confusing, complex, and suggestive style, rather than from being questioned repeatedly. For questions about variable details, accuracy was rehabilitated

through a re-direct interview; there were no differences in accuracy between Interview 1 and Interview 3. However, for questions about deviation details, when children were cross-examined, accuracy during Interview 3 was lower than accuracy for Interview 1. These results point to the lasting negative effects of cross-examination on children's accuracy. Additionally, when defined broadly, a redirect interview failed to rehabilitate accuracy for RE children who had been cross-examined; accuracy for Interview 3 was lower than accuracy for Interview 1. In all other conditions there were no differences in accuracy between Interview 1 and Interview 3, pointing to lasting detriments of cross-examination for RE children. I also observed age effects for accuracy of variable and deviation details. Older children were more accurate than younger children, but only in the SE conditions and not in the RE conditions. It could be that the effect of repeated interviews about repeated memory events negates the advantage older children typically demonstrate compared to younger children.

Cross-examination affected consistency of children's reports. In most of the analyses children who were cross-examined were less consistent than children in the DD conditions. The effect of frequency was less robust, with SE children being more consistent than RE children between Interview 1 and 3 when reporting on variable details. Older children were generally more consistent than younger children. Importantly, although interactions were not observed showing that cross-examination was more detrimental to the consistency of RE children, the mean consistency scores illustrate that these children, particularly younger RE cross-examined children, were very inconsistent across interviews.

Consistent with my hypotheses, children reporting on a repeated event were also perceived as less honest, accurate, and credible than children reporting on a single event. These effects were mediated through perceived consistency and perceived confidence. Interestingly, only one effect of cross-examination on perceptions emerged; children who were cross-examined were perceived as less susceptible to suggestive questioning than children in the DD condition.

4.1. Implications for a Forensic Setting

There is a growing body of literature showing that children who have experienced a single event will change their responses under cross-examination. These negative effects impact children of all ages and sometimes occur despite being initially accurate. The current research showed that the deleterious effects of cross-examination are important to consider with children who have experienced a repeated event. Cross-examination negatively affected report consistency and accuracy for all children. A re-direct interview appeared to rehabilitate accuracy for some details; however, for deviation details and broad-based accuracy, the re-direct only partially rehabilitated accuracy. These results indicate that some changes children make under cross-examination will be inaccurate and enduring.

Cross-examination is extremely stressful and has received little attention compared to other procedures involved in obtaining evidence from children (forensic interviewing for example, Zajac & Hayne, 2003). Alternatives are available, and changes are slowly emerging in some jurisdictions. In 2008, England and Wales implemented a national scheme allowing for the use of intermediaries whose job it is to assess and facilitate communication with vulnerable witnesses during direct- and cross-examination (Collins, Harker, & Antonopoulos, 2017).

Another option is to have cross-examining lawyers submit their questions to the judge before trial and have the judge ask the child questions at trial. In some jurisdictions a child's video-taped pre-trial interview is admitted in court as the child's evidence-in-chief, and the opposing party will have access to it before trial. It is possible, therefore, to have defence submit their questions ahead of time and this seems like a reasonable approach to testing the reliability of the child's testimony. Arguably, it would be necessary for the defence to have the opportunity to submit additional questions that arise during cross-examination, but this could possibly be accommodated if defence is given time to confer with the accused in court and provide additional questions to the judge. Future research should examine the effect of this approach on the consistency and accuracy of children's testimony. However, given that part of the cross-examination

technique is to use complex, leading, and suggestive questioning, it seems reasonable that this would be minimized with a non-partisan interviewer such as a judge. Future research should also examine the psychological impact having a non-partisan interviewer has on children. Children who are asked cross-examination questions have been shown to score higher on levels of state anxiety than children who are asked direct-examination questions (Bettenay et al., 2015). Although it seems intuitive that children questioned by a non-partisan interviewer would experience less anxiety than children who are cross-examined by an adversary, this is a question that needs testing.

Finally, it will be important to test the effect of alternatives to traditional cross-examination on the perceived credibility of children's reports. Researchers have recently examined the effect of an intermediary on perceptions of children's testimony, including cross-examination. Participants viewed a recorded mock trial involving a child (either 4-years-old or 13-years-old) being cross-examined about a cartoon that the child had previously watched. In each condition the child was or was not assisted by the intermediary. The intermediary intervened when the child was asked inappropriate questions. In the no-intermediary condition a support person sat next to the child in the same position as the intermediary but did not intervene. Participants rated the child on several variables including credibility, believability, and vulnerability. Children who were assisted by the intermediary were perceived as more credible, more believable, and less vulnerable than children who were in the no-intermediary condition (Collins et al., 2017). The stimuli included only the cross-examination of the child and therefore did not investigate the difference between performance under direct examination and cross-examination with or without an intermediary, but it is early evidence that the use of an intermediary will not have negative effects on children's perceived credibility in court.

The current research also has implications for interviewing and evaluating children who are reporting on a repeated event that occurs similarly across instances. Some children who are victims of abuse, particularly sexual abuse may experience the instances this way, with small changes across abusive incidents. An example of this which is often present in CSA is grooming, small seemingly harmless acts which become progressively more invasive (McAlinden, 2006).

In the current research children who participated in five magic shows were less consistent than children reporting on a single magic show. Given that children who have experienced a repeated event have more variable options to choose from than SE children, it is not surprising that they have more difficulty ascribing the correct variable options to the specific instance they are questioned about. A critical consideration is the impact this has on the perceived credibility of their reports. In Experiment 2 of the current research, SE and RE children were similar with respect to reporting details that they experienced during one of the magic shows. Therefore, RE children were no more likely to report something that never happened than SE children, yet RE children were rated as less honest, accurate, and credible than SE children. This finding speaks to the need to develop interviewing techniques appropriate for children who are reporting on multiple instances of abuse that occur similarly across instances. It also speaks to the importance of those who are evaluating children reporting on repeated abuse to be informed about the challenges of recalling a specific instance of a repeated event.

4.2. Limitations and Future Research

A clear limitation of the current research is the use of the magic shows for our memory event. Participating in a magic show is not analogous to experiencing a traumatic event such as abuse; however, it is possible that memory for these two types of events are organized in the same way. For example, children who displayed high anxiety and low anxiety while participating in a single swimming lesson or multiple swimming lessons showed few differences in recall (Price & Connolly, 2007). After participating in the swimming lesson / lessons, children were read a story that contained biasing details about the lessons. During the free-recall portion of the interview, anxious children reported fewer suggested details than nonanxious children (Price & Connolly, 2007). The effect was not replicated for cued recall or recognition questions and so further research is needed to test the effect of emotionality on suggestive questioning similar to those used during cross-examination in the current research.

It is also possible that some cases of abuse, particularly CSA, may not be experienced as traumatic by the child. For example, for some CSA offences there is a

gradual progression of seriousness in abuse incidents (McAlinden, 2006). In fact, one reason for delayed disclosures of CSA is that children fail to recognize incidents as abusive (Alaggia, Collin-Vézina, & Lateef, 2019). Children therefore do not disclose immediately because the nature of the incidents are ambiguous to young children. In these situations, at least, memory for the abuse may be organized similarly as it is for memory of repeated non-traumatic events such as the one used in the current research.

In the current research children were not prepared to be cross-examined in any way. In a real trial Crown would prepare a child for cross-examination. The lack of training is another limitation of the current research. With training one might expect the effects of cross-examination to be smaller. Additionally, the delay to interview in the current research is not consistent with what would be seen in a typical forensic setting. Some children may be reporting on abusive incidents that happened months and even years prior (Connolly, Chong, Coburn, & Lutgens, 2015). Additionally, even if the abuse is disclosed immediately, children would experience a long delay before the case moved to court and the child was cross-examined. It is probable that the effect of cross-examination would be larger with a longer delay. Some previous cross-examination studies have included a long delay (e.g., 8 months), but this has only been done with SE children. The effect of delay on interviewing, cross-examination, and perceived credibility of children who have experienced a repeated event is an important area for future research.

In the current research, children who experienced a repeated event were only interviewed about one instance (the middle instance). This was done to control delay to recall and duration of the interview. This is a strength of the current research as it eliminates the alternative explanation that fatigue during recall explains the differences in perceived credibility between SE and RE children. Additionally, interviewing children exactly 1-week from the target instance ensured that SE and RE children experienced the same delay. However, this methodological choice results in the inability to examine the accuracy of RE children across all instances. Previous research comparing memory for a repeated and single instance has shown similar results with respect to accuracy of the report. To date, research has not compared the perceived credibility of SE and RE

children, with evaluators viewing the child reporting on all instances. In fact, I am not aware of any research where evaluators are informed that they are watching a child reporting on a RE. It could be that if participants were aware of this, they would intuitively understand the difficulties of recalling a repeated event, they would realize the child experienced many similar shows with variable details and would then compensate in some way for this. Future research should consider examining the effect of informing evaluators that they are watching a child who is reporting on a RE. This could be done through instruction or through having the evaluators watch the child report on all instances of the repeated event.

There are some potential limitations with the perceived credibility questionnaire I used for Experiment 2. Firstly, Cronbach's alpha was low for the two items used to create the confidence variable (perceived confidence, and perceived anxiety (reversed)). Future research could look at those two items separately. Secondly, previous research shows that perceived credibility is comprised of perceived cognitive competence and perceived honesty (e.g., Ross et al., 2003; Bottoms, 1993; Goodman et al., 1989). In the current research there was a strong positive correlation between the two dependent variables meant to measure these two components. Perhaps because the interviews in the current research lacked any obvious reasons for the children to intentionally fabricate, participants used cues related more to the children's perceived cognitive competence to answer questions about honesty. This may have resulted in redundant dependent variables in the current research. Future research should continue to explore the validity and reliability of perceived honesty and perceived accuracy as separate constructs, across different contexts.

4.3. Conclusion

When children testify in court it is often because they have been victims of abuse. These cases unfortunately will sometimes involve multiple similar offences. Some cases will lack physical evidence or corroborating witnesses and the case may be decided based on the perceived credibility of the child and the accused. The current findings show that cross-examination is detrimental to the accuracy and consistency of children's reports. It

also indicates that the combined effects of cross-examination and experiencing repeated events results in reports that are inconsistent and are less accurate than reports generated from repeated questions about a unique event (RE children in the cross conditions had the lowest accuracy and consistency scores in the current research). However, individuals may recognize the suggestive techniques used during cross-examination and compensate when judging perceived credibility. Unfortunately, the current research indicates individuals are not able to adjust ratings for children who are reporting on an instance of a repeated event. These children may be at risk of being judged as inaccurate, even if they are as likely as SE children to accurately report experienced details. These results speak to the need to continue research and to develop interviewing techniques and in-court supports for witnesses reporting on repeated offences.

Tables and Figures

Table 1. Variable Details for Magic Show (Presentation Order 1)

Critical details	Options					
	A	B	C	D	E	F
1. Admissions ticket	Pebble Sunglasses	Sponge Ring	Sand paper Scarf	Fur Sweater	Seashell Gloves	Pom pom Backpack
2. RA removes X						
3. Warm up exercise	Stretching (touch toes)	Jumping jacks	Running in place	Air punch	Hopping on one leg	Arm circles
4. Hat magician wore	Straw Hat	Cowboy Hat	Police Hat	Baseball Hat	Fireman Hat	Chef Hat
5. Magic prop	Handkerchief	Bracelet	Diamond	Wand	Fan	Coin
6. Magic spray	Cherry	Lemon	Blueberry	Mango	Apple	Grapefruit
7. Stuffed assistant	Elephant	Bear	Tiger	Horse	Gorilla	Cow
8. Music to play to start show	Drums	Trumpet	Violin	Guitar	Piano	Flute
9. Magic words	Presto Chango	Shazam	Abra Cadabra	Hocus Pocus	Bippity Boppity Boo	Open Sesame
10. Magic trick	Disappearing Ball	Mystery Box	Egg Pouch	Appearing Flower	Color Blendo	Change Bag
11. Sticker on body part	Leg	Cheek	Hand	Shoulder	Forehead	Foot
12. Secret to tell	Did bad on a test Wave	Lost keys	Slept in & missed class	Broke a cup yesterday	Ripped favorite jeans	Forgot to do my homework
13. Special goodbye		Curtsey	Bow	Thumbs up	Clap	Spirit fingers

Notes:

(Presentation order 2: FCDEB)

Admissions ticket descriptor: A) smooth B) squishy C) rough D) fluffy E) bumpy and F) soft

Deviation Details:

Clever Chloe, 2) Disappearing spell, 3) Skipping rope, 4) Necklace, 5) Red, 6) 3 times, 7) Costume party

Table 2 Mean (Standard Deviation) Accuracy Scores – Narrowly Defined (Experiment 1)

		Single Event		Repeated Event		Means Collapsed Across Frequency & Question Type
		Cross	Direct-Direct	Cross	Direct-Direct	
K / Gr. 1	Int. 1	4.24 (2.03)	4.33 (1.93)	1.50 (1.43)	1.56 (1.69)	2.90 (2.22)
	Int. 2	1.92 (1.87)	3.67 (2.33)	.47 (.95)	1.93 (1.62)	2.00 (2.04)
	Int. 3	4.16 (1.99)	4.50 (1.79)	1.25 (1.41)	1.93 (1.71)	2.96 (2.21)
Gr. 3 - 5	Int. 1	5.53 (1.80)	5.68 (1.80)	1.29 (1.65)	1.61 (1.82)	3.52 (2.71)
	Int. 2	3.97 (2.24)	5.60 (1.91)	.39 (.74)	1.55 (1.77)	2.88 (2.64)
	Int. 3	5.47 (1.96)	5.68 (1.97)	1.29 (1.65)	2.13 (1.85)	3.64 (2.68)
Means Collapsed Across Age & Interview		4.21 (2.06)	4.91 (1.96)	1.03 (1.38)	1.78 (1.78)	

Note:
Maximum score = 8

Table 3 Mean (Standard Deviation) Accuracy Scores on Deviation Details

		Single Event		Repeated Event		Means Collapsed Across Frequency & Question Type
		Cross	Direct-Direct	Cross	Direct-Direct	
K / Gr. 1	Int. 1	1.60 (1.15)	1.75 (.90)	2.06 (1.39)	1.56 (1.39)	1.76 (1.24)
	Int. 2	1.04 (1.27)	1.25 (1.15)	1.04 (1.24)	1.56 (1.50)	1.21 (1.30)
	Int. 3	1.36 (1.11)	1.42 (1.10)	1.31 (1.49)	1.56 (1.50)	1.41 (1.32)
Gr. 3 - 5	Int. 1	2.87 (1.55)	2.64 (1.25)	2.36 (1.64)	1.74 (1.61)	2.38 (1.57)
	Int. 2	2.13 (1.48)	2.64 (1.25)	1.21 (1.38)	1.61 (1.58)	1.87 (1.51)
	Int. 3	2.67 (1.52)	2.56 (1.47)	1.79 (1.75)	1.55 (1.61)	2.12 (1.65)
Means Collapsed Across Age & Interview		2.07 (1.49)	2.00 (1.41)	1.53 (1.62)	1.55 (1.55)	

Note:
Maximum score = 4

Table 4 Mean (Standard Deviation) Consistency Scores on Variable Details

		Single Event		Repeated Event		Consistency Collapsed Across Frequency & Question Type
		Cross	Direct-Direct	Cross	Direct-Direct	
K / Gr. 1	Int. 1 / Int. 2	2.56 (2.14)	5.75 (2.31)	2.59 (2.77)	4.00 (2.71)	3.64 (2.79)
	Int. 1 / Int. 3	5.28 (2.57)	6.75 (1.34)	3.06 (2.27)	4.15 (2.66)	4.67 (2.67)
Gr. 3 - 5	Int. 1 / Int. 2	4.63 (2.55)	7.52 (.87)	1.93 (2.15)	4.77 (2.46)	4.64 (2.87)
	Int. 1 / Int. 3	6.73 (1.86)	7.60 (.82)	3.93 (2.69)	4.65 (2.33)	5.67 (2.52)

Note:
Maximum score = 8

Table 5 Mean (Standard Deviation) Consistency Scores on Variable Details

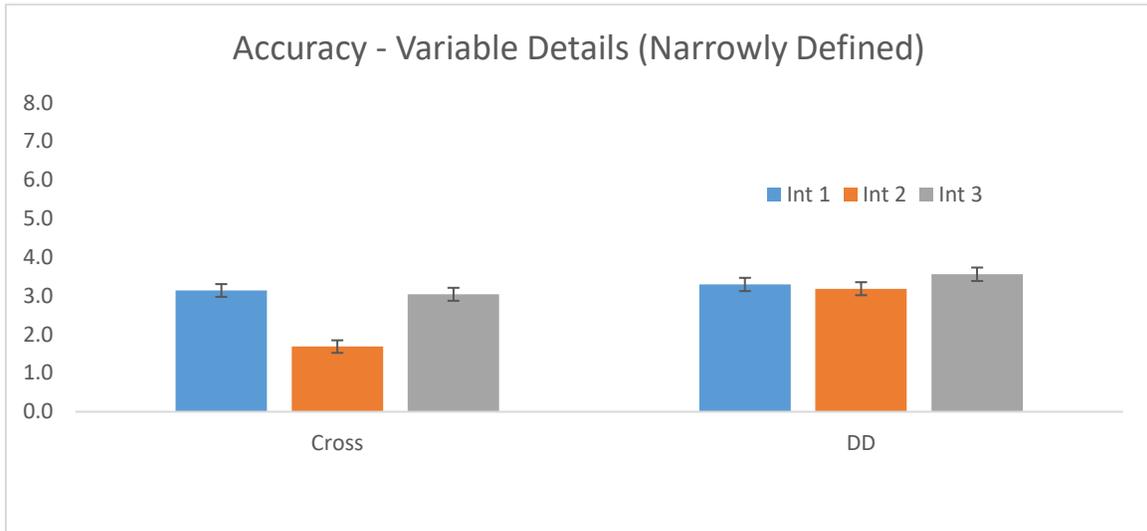
		Single Event		Repeated Event		Consistency Collapsed Across Frequency & Question Type
		Cross	Direct- Direct	Cross	Direct- Direct	
K / Gr. 1	Int. 1 / Int. 2	1.20 (1.38)	2.75 (1.54)	1.44 (1.41)	2.59 (1.44)	1.96 (1.58)
	Int. 1 / Int. 3	2.64 (1.60)	2.67 (1.40)	2.56 (1.63)	3.19 (1.00)	2.72 (1.50)
Gr. 3 - 5	Int. 1 / Int. 2	2.63 (1.54)	3.68 (.75)	1.43 (1.43)	3.55 (.99)	2.82 (1.51)
	Int. 1 / Int. 3	3.20 (1.13)	3.60 (.82)	2.50 (1.69)	3.55 (.99)	3.21 (1.27)

Note:
Maximum score = 4

Table 6 Experiment 2 Perceived Credibility Ratings Means (Standard Deviation)

		Single Event		Repeated Event		Means Collapsed Across Frequency & Question Type
		Cross	Direct-Direct	Cross	Direct-Direct	
K / Gr. 1	Accuracy	4.08 (.69)	4.60 (.45)	4.17 (.65)	4.06 (.55)	4.23 (.59)
	Honesty	4.59 (.86)	5.13 (.47)	4.60 (.41)	4.57 (.63)	4.72 (.61)
	Credibility	4.06 (1.00)	4.73 (.69)	3.85 (.97)	3.84 (.81)	4.12 (.87)
	Suggestibility	3.97 (1.11)	4.93 (.26)	4.59 (1.28)	4.91 (.34)	4.60 (.90)
Gr. 3 - 5	Accuracy	5.37 (.28)	5.20 (.48)	4.14 (.95)	4.55 (.28)	4.82 (.73)
	Honesty	5.61 (.31)	5.41 (.27)	4.78 (.79)	5.00 (.53)	5.20 (.58)
	Credibility	5.42 (.25)	5.20 (.56)	4.15 (.89)	4.33 (.28)	4.77 (.76)
	Suggestibility	3.77 (.73)	4.54 (.30)	4.34 (.81)	4.63 (1.61)	4.32 (.68)

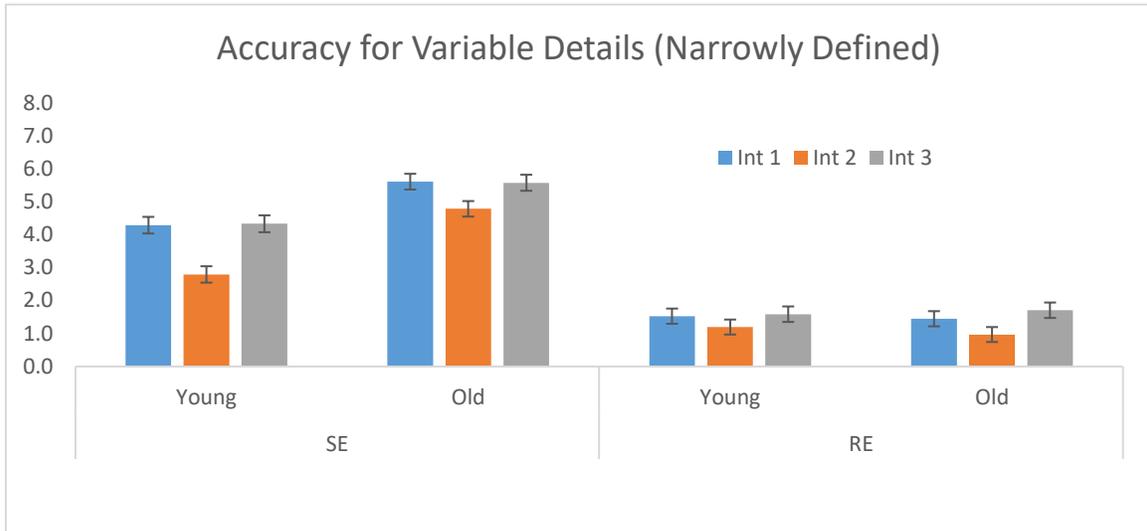
Figure 1 Mean accuracy for variable details (narrowly defined)



Note:

Mean accuracy for variable details (narrowly defined) (maximum score of 8 on 4 details) for children in the cross and DD conditions during each interview (Int. 1 – Direct examination, Int. 2 – Cross/ DD, Int. 3 – Re-direct). Error bars = SEM.

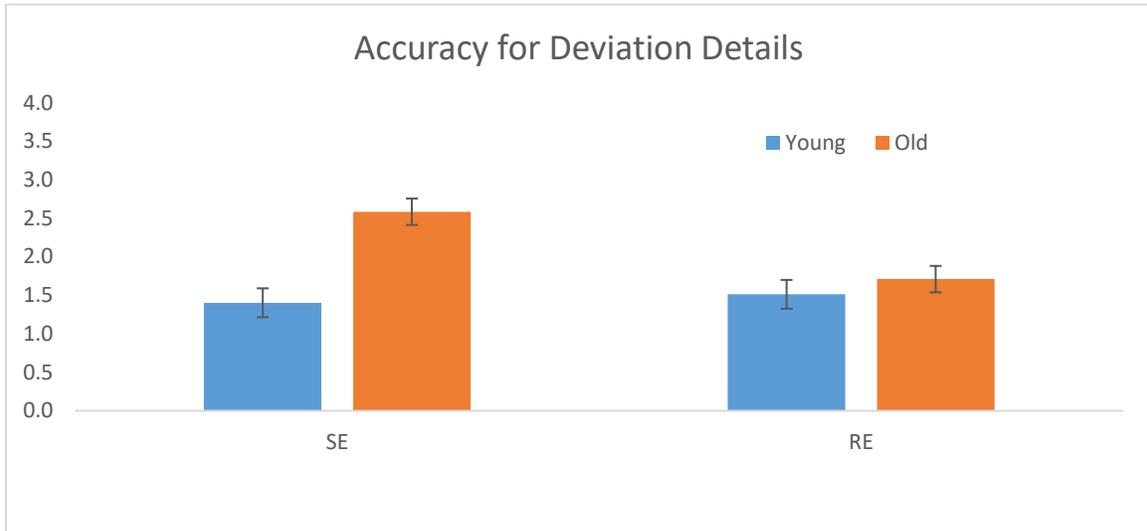
Figure 2 Mean accuracy for variable details (narrowly defined)



Note

Mean accuracy for variable details (narrowly defined) (maximum score of 8 on 4 details) for younger and older SE and RE children during each interview (Int. 1 – Direct examination, Int. 2 – Cross/ DD, Int. 3 – Re-direct). Error bars = SEM.

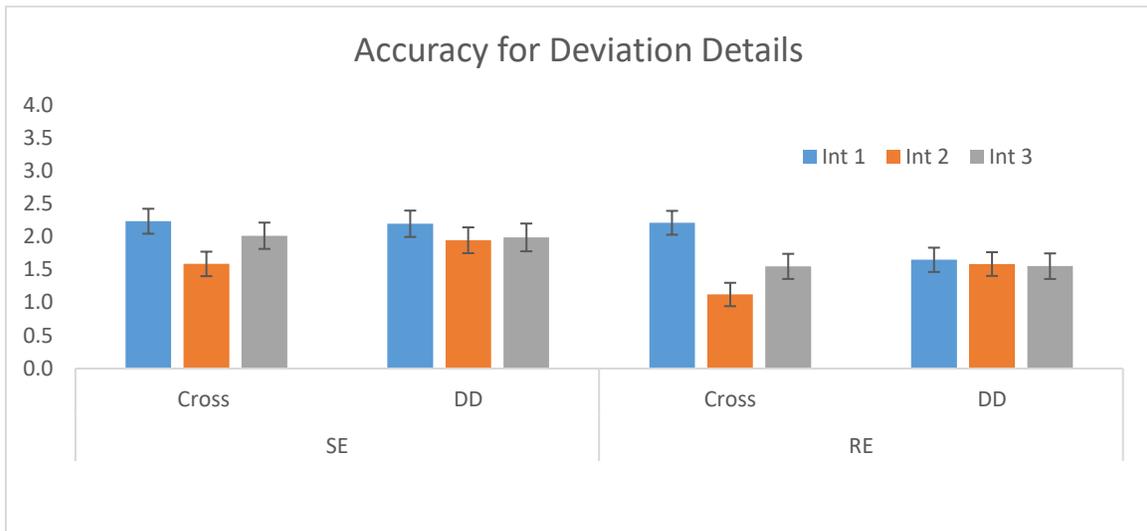
Figure 3 Mean accuracy for deviation details



Note:

Mean accuracy for deviation details (maximum score of 4 on 2 details) for younger and older children in the SE and RE conditions. Error bars = SEM.

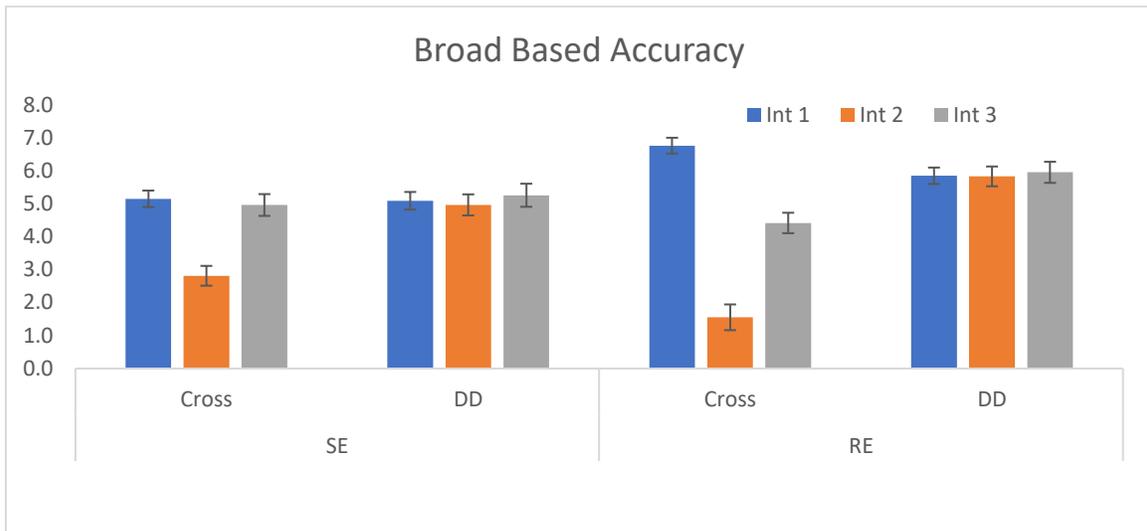
Figure 4 Mean accuracy for deviation details



Note:

Mean accuracy for deviation details (maximum score of 4 on 2 details) for SE and RE children in the Cross and DD conditions during each interview. (Int. 1 – Direct examination, Int. 2 – Cross/ DD, Int. 3 – Re-direct). Error bars = SEM.

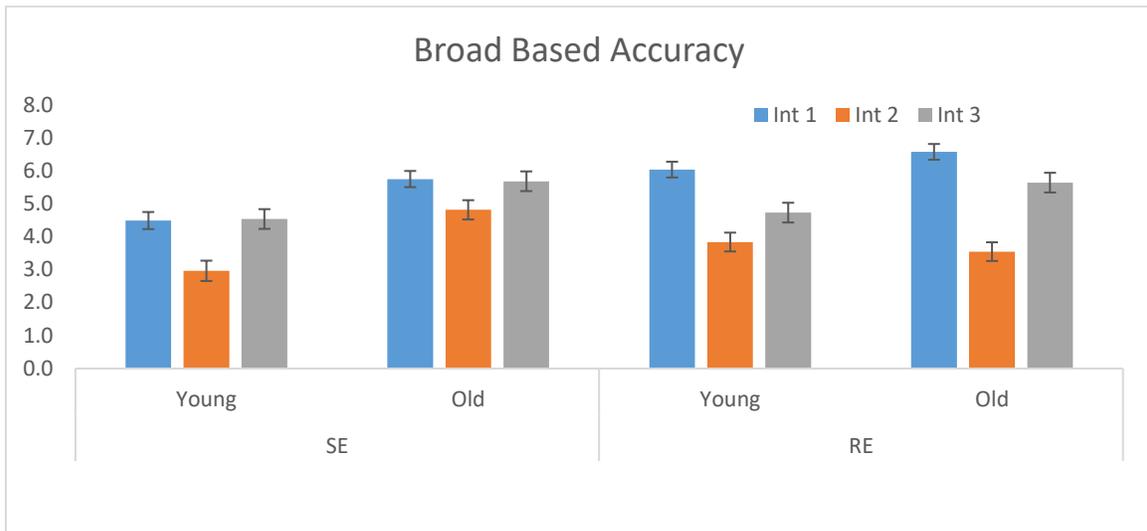
Figure 5 Mean broad-based accuracy



Note:

Mean broad-based accuracy (maximum score of 8 on 4 details) for Cross and DD children in the SE and RE conditions during each interview. (Int. 1 – Direct examination, Int. 2 – Cross/ DD, Int. 3 – Re-direct). Error bars = SEM.

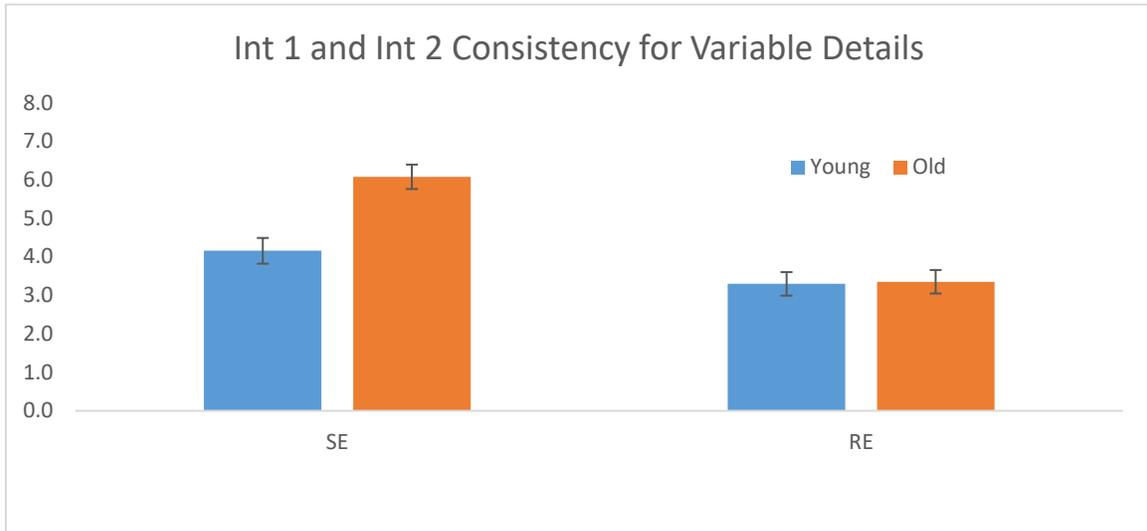
Figure 6 Mean broad-based accuracy



Note:

Mean broad-based accuracy (maximum score of 8 on 4 details) for younger and older children in the SE and RE conditions during each interview. (Int. 1 – Direct examination, Int. 2 – Cross/ DD, Int. 3 – Re-direct). Error bars = SEM.

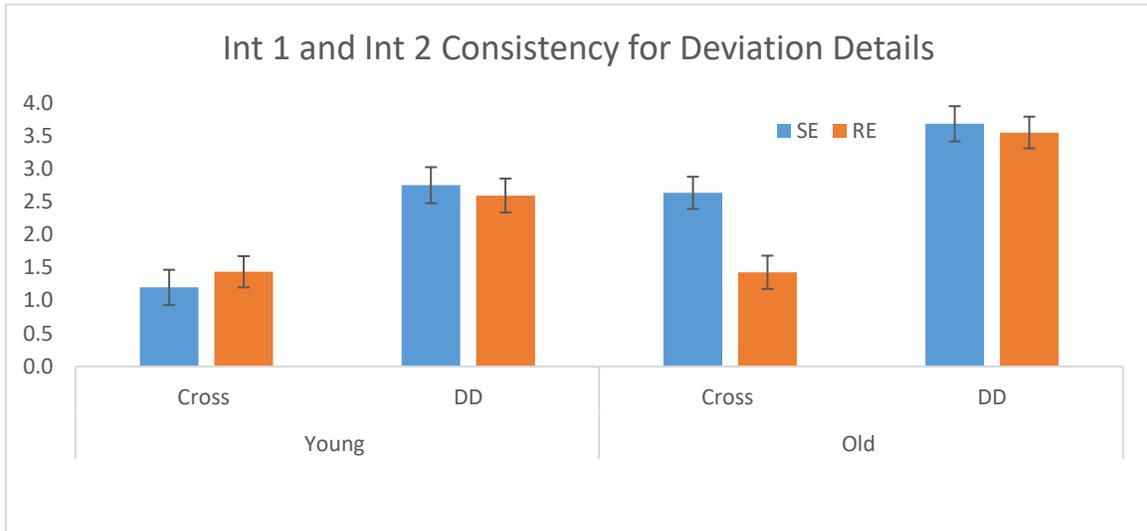
Figure 7 Mean consistency for variable details



Note:

Mean consistency for variable details (maximum score of 8 on 4 details) for younger and older children in the SE and RE conditions. (Int. 1 – Direct examination, Int. 2 – Cross/ DD). Error bars = SEM.

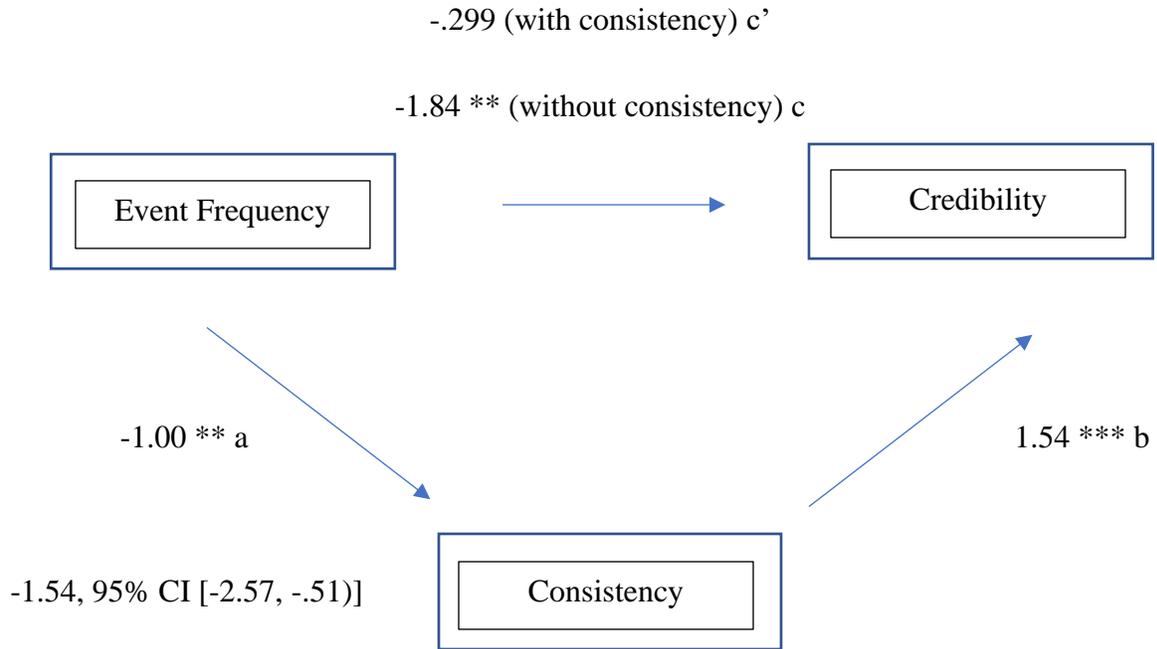
Figure 8 Mean consistency for deviation details



Note:

Mean consistency for deviation details (maximum score of 4 on 2 details) for older and younger RE and SE children (Int. 1 – Direct examination, Int. 2 – Cross/ DD). Error bars = SEM.

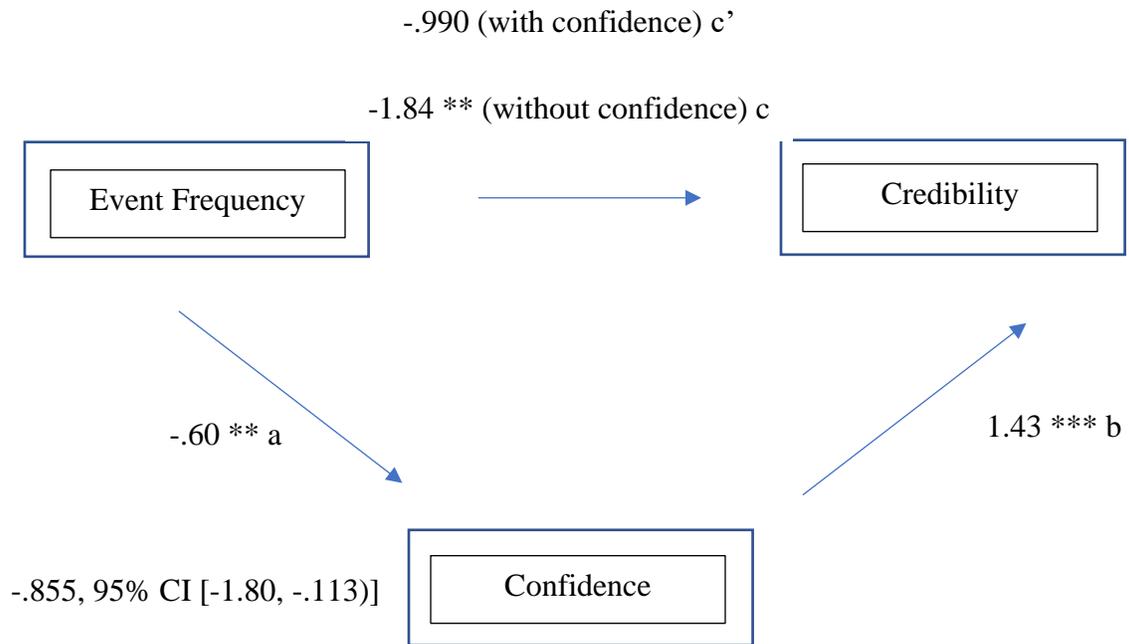
Figure 9 Relationship between event frequency, credibility, and consistency (Experiment 2)



Note:

Unstandardized beta coefficients are reported for a, b, c, and c' pathways, where b controls for the effect of event frequency, and c' is the effect of event frequency on credibility when the mediator is controlled. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 10 Relationship between event frequency, credibility, and confidence (Experiment 2)



Note:

Unstandardized beta coefficients are reported for a, b, c, and c' pathways, where b controls for the effect of event frequency, and c' is the effect of event frequency on credibility when the mediator is controlled. * $p < .05$, ** $p < .01$, *** $p < .001$

References

- Ackerman, R., & Koriat, A. (2011). Response latency as a predictor of the accuracy of children's reports. *Journal of Experimental Psychology: Applied*, *17*(4), 406. doi: 10.1037/a0025129
- Alaggia, R., Collin-Vézina, D., & Lateef, R. (2019). Facilitators and barriers to child sexual abuse (CSA) disclosures: A research update (2000–2016). *Trauma, Violence, & Abuse*, *20*, 260-283. doi: 10.1177/1524838017697312
- Alaggia, R., Lambert, E., & Regehr, C. (2009). Where is the justice? Parental experiences of the Canadian justice system in cases of child sexual abuse. *Family Court Review*, *47*(4), 634-649. doi: 10.1111/j.1744-1617.2009.01278.x
- Berman, G. L., & Cutler, B. L. (1996). Effects of inconsistencies in eyewitness testimony on mock-juror decision making. *Journal of Applied Psychology*, *81*(2), 170 - 177. doi: 10.1037/0021-9010.81.2.170
- Berman, G. L., Narby, D. J., & Cutler, B. L. (1995). Effects of inconsistent eyewitness statements on mock-jurors??? Evaluations of the eyewitness, perceptions of defendant culpability and verdicts. *Law and Human Behavior*, *19*(1), 79-88. doi: 10.1007/BF01499074
- Bettenay, C., Ridley, A. M., Henry, L. A., & Crane, L. (2015). Changed responses under cross-examination: The role of anxiety and individual differences in child witnesses. *Applied Cognitive Psychology*, *29*(3), 485-491. doi:10.1002/acp.3125
- Black's (1990) Law Dictionary 6th ed. (West Publishing).
- Blandon-Gitlin, I., Pezdek, K., Rogers, M., & Brodie, L. (2005). Detecting deception in children: An experimental study of the effect of event familiarity on CBCA ratings. *Law and Human Behavior*, *29*(2), 187 – 197. doi: 10.1007/s10979-005-2417-8
- Bottoms, B. L. (1993). Individual differences in perceptions of child sexual assault victims. In G. S. Goodman and B. L. Bottoms (Eds.), *Child victims, child witnesses: Understanding and improving testimony* (pp. 229-261). New York: Guilford.
- Bottoms, B. L., & Goodman, G. S. (1994). Perceptions of children's credibility in sexual assault cases. *Journal of Applied Social Psychology*, *24*, 702-732. doi: 10.1111/j.1559-1816.1994.tb00608.x

- Brennan, M. (1994). The battle for credibility-themes in the cross-examination of child victim witnesses. *International Journal for the Semiotics of Law*, 7(1), 51-73.
- Brennan, M. (1995). The discourse of denial: Cross-examining child victim witnesses. *Journal of Pragmatics*, 23(1), 71-91.
- Brewer, N., Potter, R., Fisher, R. P., Bond, N., & Luszcz, M. A. (1999). Beliefs and data on the relationship between consistency and accuracy of eyewitness testimony. *Applied Cognitive Psychology*, 13(4), 297-313. doi :10.1002/(SICI)1099-0720(199908)13:4<297::AID-ACP578>3.0.CO;2-S
- Brubacher, S. P., Roberts, K. P., & Powell, M. (2012). Retrieval of episodic versus generic information: Does the order of recall affect the amount and accuracy of details reported by children about repeated events? *Developmental Psychology*, 48(1), 111 - 122. doi: 10.1037/a0025864
- Carter, C. A., Bottoms, B. L., & Levine, M. (1996). Linguistic and socioemotional influences on the accuracy of children's reports. *Law and Human Behavior*, 20, 335-358. doi: /10.1007/BF01499027
- Cashmore, J., & Trimboli, L. (2006). Child sexual assault trials: A survey of juror perceptions. *BOCSAR NSW Crime and Justice Bulletins*, 102, 1 - 20.
- Cashmore, J., & Trimboli, L. (2005). *An evaluation of the NSW child sexual assault specialist jurisdiction pilot*. Sydney: NSW Bureau of Crime Statistics and Research.
- Ceci, S. J., Ross, D. F., & Toglia, M. P. (1987). Suggestibility of children's memory: Psycholegal implications. *Journal of Experimental Psychology: General*, 116(1), 38 - 49. doi :10.1037/0096-3445.116.1.38
- Collins, K., Harker, N., & Antonopoulos, G. (2017). The impact of the registered intermediary on adults' perceptions of child witnesses: Evidence from a mock cross examination. *European Journal on Criminal Policy and Research*, 23(2), 211-225. doi: 0.1007/s10610-016-9314-1
- Connolly, D. A., Chong, K., Coburn, P. I., & Lutgens, D. (2015). Factors associated with delays of days to decades to criminal prosecutions of child sexual abuse. *Behavioral sciences & the law*, 33, 546-560. doi: 10.1002/bsl.2185
- Connolly, D. A. & Gordon, H. M. (2014). Can order of general and specific memory prompts help children to recall an instance of a repeated event that was different from the others? *Psychology, Crime, and Law*, 20, 852-864. doi :10.1080/1068316X.2014.885969

- Connolly, D.A., & Lavoie, J. A. A. (2015). Discriminating veracity between children's reports of single, repeated, and fabricated events: A critical analysis of criteria-based content analysis. *American Journal of Forensic Psychology*, 33, 25-48.
- Connolly, D. A., Price, H. L., Lavoie, J. A., & Gordon, H. M. (2008). Perceptions and predictors of children's credibility of a unique event and an instance of a repeated event. *Law and Human Behavior*, 32(1), 92 - 112. doi: 10.1007/s10979-006-9083-3
- Connolly, D. A., Gordon, H. M., Woiwod, D., & Price, H. L. (2016). The influence of a deviation on children's recall of an instance of a repeated event. *Child Development*, 52, 1038–1051. doi: 10.1037/dev0000137
- Connolly, D. A., & Price, H. L. (2006). Children's suggestibility for an instance of a repeated event versus a unique event: The effect of degree of association between variable details. *Journal of Experimental Child Psychology*, 93(3), 207-223. doi: 10.1016/j.jecp.2005.06.004
- Connolly, D. A., & Read, J. D. (2006). Delayed prosecutions of historic child sexual abuse: Analyses of 2064 Canadian criminal complaints. *Law and Human Behavior*, 30(4), 409. doi :10.1007/s10979-006-9011-6
- Connolly, D. A., & Read, J. D. (2003). Remembering historical child sexual abuse. *Criminal Law Quarterly*, 47, 438–480.
- Davies, E., Henderson, E., & Seymour, F. (1997). In the interests of justice? The cross-examination of child complainants of sexual abuse in criminal proceedings. *Psychiatry, Psychology, and Law*, 4, 217 - 229. doi : 10.1080/13218719709524912
- Davis, S. L., & Bottoms, B. L. (2002). Effects of social support on children's eyewitness reports: a test of the underlying mechanism. *Law and Human Behavior*, 26(2), 185-215. doi: 10.1023/A:1014692009941
- Eastwood, C. J., & Patton, W. (2002). *The experiences of child complainants of sexual abuse in the criminal justice system*. Griffith, ACT: Criminology Research Council.
- Farrar, M. J., & Goodman, G. S. (1992). Developmental changes in event memory. *Child Development*, 63, 173-187. doi:10.2307/1130911
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavioral Research Methods*, 39, 175-191. doi: 10.3758/BF03193146

- Fivush, R. (1984). Learning about school: The development of kindergartners' school scripts. *Child Development*, 55(5), 1697-709. doi: 10.2307/1129917
- Fogliati, R., & Bussey, K. (2014). The effects of cross-examination on children's reports of neutral and transgressive events. *Legal and Criminological Psychology*, 19, 296–315. doi:10.1111/lcrp.12010
- Fogliati, R., & Bussey, K. (2015). The effects of cross-examination on children's coached reports. *Psychology, Public Policy, and Law*, 21(1), 10-23. doi:10.1037/law0000036
- Glissan, J.L. (1991). Cross-examination practice and procedure: An Australian perspective (2nd ed.). Sydney: Butterworths.
- Grice, H. Paul (1975). Logic and conversation. In P. Cole and J. Morgan, eds., *Syntax and Semantics* 3, 41-58. New York: Academic Press.
- Goodman, G. S., Bottoms, B. L., Herscovici, B. B., & Shaver, P. (1989). Determinants of the child victim's perceived credibility. In *Perspectives on Children's Testimony* (pp. 1-22). Springer New York.
- Goodman, G. S., Taub, E. P., Jones, D. P., England, P., Port, L. K., Rudy, L., ... & Melton, G. B. (1992). Testifying in criminal court: Emotional effects on child sexual assault victims. *Monographs of the Society for Research in Child Development*, 1-159. doi : 10.2307/1166127
- Hall, S.R., & Sales, B.D. (2008). Courtroom modifications for child witnesses: Law and science forensic evaluations. Washington, D.C.: American Psychological Association. doi: 10.1037/11808-004
- Hanna, K., Davies, E., Crothers, C., & Henderson, E. (2012). Questioning child witnesses in New Zealand's criminal justice system: Is cross-examination fair? *Psychiatry, Psychology and Law*, 19(4), 530-546. doi: 10.1080/13218719.2011.615813
- Hudson, J. A., & Mayhew, E. M. (2009). Hudson, J. A., & Mayhew, E. M. Y. (2009). The development of memory for recurring events. In M. Courage and N. Cowan (Eds.), *The development of memory in infancy and childhood* (pp. 69-92). New York, NY: Psychology Press.
- Jack, F., & Zajac, R. (2014). The effect of age and reminders on witnesses' responses to cross-examination-style questioning. *Journal of Applied Research in Memory and Cognition*, 3(1), 1–6. doi: 10.1016/j.jarmac.2013.12.001

- Klemfuss, J. Z., Quas, J. A., & Lyon, T. D. (2014). Attorneys' questions and children's productivity in child sexual abuse criminal trials. *Applied Cognitive Psychology*, 28(5), 780-788. doi:10.1002/acp.3048
- Lamb, M. E., Orbach, Y., Hershkowitz, I., Esplin, P. W., & Horowitz, D. (2007). A structured forensic interview protocol improves the quality and informativeness of investigative interviews with children: A review of research using the NICHD Investigative Interview Protocol. *Child Abuse & Neglect*, 31(11), 1201-1231. doi:10.1016/j.chiabu.2007.03.021
- Leippe, M. R., & Romanczyk, A. (1989). Reactions to child (versus adult) eyewitnesses: The influence of jurors' preconceptions and witness behavior. *Law and Human Behavior*, 13 (2), 103-132. <https://doi.org/10.1007/BF01055919>
- Leippe, M. R., Manion, A. P., & Romanczyk, A. (1992). Eyewitness persuasion: How and how well do fact finders judge the accuracy of adults' and children's memory reports? *Journal of Personality and Social Psychology*, 63, 181-197.
- McAlinden, A. M. (2006). 'Setting'Em Up': Personal, familial and institutional grooming in the sexual abuse of children. *Social & Legal Studies*, 15(3), 339-362. doi: 10.1177/0964663906066613
- Markman, E.M. (1977). Realizing that you don't understand. *Child Development*, 48, 986-992. doi: 10.2307/1128350
- Markman, E.M. (1979). Realizing that you don't understand: Elementary school children's awareness of inconsistencies. *Child Development*, 50, 643-655. doi: 10.2307/1128929
- Mugno, A. P., Klemfuss, J. Z., & Lyon, T. D. (2016). Attorney questions predict jury-eligible adult assessments of attorneys, child witnesses, and defendant guilt. *Behavioral Sciences & the Law*, 34, 178-199. doi:10.1002/bsl.2214
- Mulder, M. R., & Vrij, A. (1996). Explaining conversation rules to children: An intervention study to facilitate children's accurate responses. *Child Abuse & Neglect*, 20(7), 623-631. doi:10.1016/0145-2134(96)00050-6
- Myers, J. E. (1992). *Evidence in child abuse cases*. Thousand Oaks, CA: Sage.
- Myers, J. E. B., Redlich, A. D., Goodman, G. S., Prizmich, L. P., & Imwinkelreid, E. (1999). Jurors' perceptions of hearsay in child sexual abuse cases. *Psychology, Public Policy and Law*, 5, 388-419. doi:10.1037/1076-8971.5.2.388
- Myers, J. E. B. (2017). Cross-examination: A defense. *Psychology, Public Policy, and Law*, 23(4), 472-477. <http://dx.doi.org/10.1037/law0000131>

- Nunez, N., Kehn, A., & Wright, D. B. (2011). When children are witnesses: The effects of context, age and gender on adults' perceptions of cognitive ability and honesty. *Applied Cognitive Psychology, 24*, 1-15. <https://doi.org/10.1002/acp.1713>
- O'Neill, S., & Zajac, R. (2013) a. The role of repeated interviewing in children's responses to cross-examination-style questioning. *British Journal of Psychology, 104*(1), 14-38. doi:10.1111/j.2044-8295.2011.02096
- O'Neill, S., & Zajac, R. (2013) b. Preparing children for cross-examination: How does intervention timing influence efficacy? *Psychology, Public Policy, and Law, 19*(3), 307 - 320. doi: 10.1037/a0031538
- Pezdek, K., Morrow, A., Blandon-Gitlin, I., Goodman, G. S., Quas, J. A., Saywitz, K. J., Bidrose, S., Pipe, M-E., Rogers, M., & Brodie, L. (2004). Deception detection in children: Event familiarity affects criterion-based content analysis ratings. *Journal of Applied Psychology, 89*, 119–126. doi: 10.1037/0021-9010.89.1.119
- Poole, D. A., & White, L. T. (1991). Effects of question repetition on the eyewitness testimony of children and adults. *Developmental Psychology, 27*, 975 - 986.
- Poole, D. A., & White, L. T. (1993). Two years later: Effect of question repetition and retention interval on the eyewitness testimony of children and adults. *Developmental Psychology, 29*(5), 844 - 853. doi :10.1037/0012-1649.29.5.844
- Powell, M. B., & Roberts, K. P. (2002). The effect of repeated experience on children's suggestibility across two question types. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition, 16*, 367-386. doi: 10.1002/acp.801
- Price, H. L., & Connolly, D. A. (2007). Anxious and nonanxious children's recall of a repeated or unique event. *Journal of Experimental Child Psychology, 98*(2), 94-112. doi:10.1016/j.jecp.2007.05.002
- Righarts, S., Jack, F., Zajac, R., & Hayne, H. (2015). Young children's responses to cross-examination style questioning: The effects of delay and subsequent questioning. *Psychology, Crime & Law, 21*(3), 274-296. doi:10.1080/1068316X.2014.951650
- Roebbers, C. M. (2002). Confidence judgments in children's and adult's event recall and suggestibility. *Developmental Psychology, 38*(6), 1052. doi: 10.1037/0012-1649.38.6.1052
- Roberts, K. P., & Powell, M. B. (2005). Evidence of metacognitive awareness in young children who have experienced a repeated event. *Applied Cognitive Psychology, 19*(8), 1019-1032. doi: 10.1002/acp.1145

- Ross, D. F., Jurden, F. H., Linsday, R. C., & Keeney, J. M. (2003). Replications and limitations of a two-factor model of child witness credibility. *Journal of Applied Social Psychology, 33*(2), 418-430. <https://doi.org/10.1111/j.1559-1816.2003.tb01903.x>
- R. v. B.S., [2005] Q.J. No. 18675
- Saywitz, K. J., & Camparo, L. B. (2009). Contemporary child forensic interviewing: Evolving consensus and innovation over 25 years. In B. L. Bottoms, C. J. Najdowski, & G. S. Goodman (Eds.), *Children as victims, witnesses, and offenders: Psychological science and the law* (pp. 102–127). New York, NY: Guilford Press.
- Saywitz, K. J., & Moan-Hardie, S. (1994). Reducing the potential for distortion of childhood memories. *Consciousness and Cognition, 3*(3-4), 408-425. doi:10.1006/ccog.1994.1023
- Slackman, E., & Nelson, K. (1984). Acquisition of an unfamiliar script in story form by young children. *Child Development, 55*, 329-340. doi:10.2307/1129946
- Strömwall, L. A., Bengtsson, L., Leander, L., & Granhag, P. A. (2004). Assessing children's statements: The impact of a repeated experience on CBCA and RM ratings. *Applied Cognitive Psychology, 18*(6), 653-668. doi: 10.1002/acp.1021
- Waterman, A.H., Blades, M., & Spencer, C. (2000). Do children try to answer nonsensical questions? *British Journal of Developmental Psychology, 18*, 211–225. doi: 10.1348/026151000165652
- Weinsheimer, C., Coburn, P., Chong, K., MacLean, C., & Connolly, D. (2017). Perceptions of credibility for a memory report of a single versus repeated event. *Applied Cognitive Psychology, 31*(4), 414-423. doi: 10.1002/acp.3340
- Woiwod, D. M. (2018). *An examination of children's memory for instances and the effects of mental context reinstatement* (Doctoral dissertation, Arts & Social Sciences: Department of Psychology).
- Woiwod, D. M., & Connolly, D. A. (2017). Continuous child sexual abuse: Balancing defendants' rights and victims' capabilities to particularize individual acts of repeated abuse. *Criminal Justice Review, 42*(2) 206-225. doi: 10.1177/0734016817704700.
- Woiwod, D. M., Fitzgerald, R. J., Sheahan, C. L., Price, H. L., & Connolly, D. A. (2019). A meta-analysis of differences in children's memory for single and repeated events. *Law and Human Behavior, 43*, 99 – 116. doi: 10.1037/lhb0000312

- Zajac, R., & Hayne, H. (2003). I don't think that's what really happened: The effect of cross-examination on the accuracy of children's reports. *Journal of Experimental Psychology: Applied*, 9(3), 187 - 195. doi:10.1037/1076-898X.9.3.187
- Zajac, R., Gross, J., & Hayne, H. (2003). Asked and answered: Questioning children in the courtroom. *Psychiatry, Psychology and Law*, 10(1), 199-209. doi: 10.1375/pplt.2003.10.1.199
- Zajac, R., & Hayne, H. (2006). The negative effect of cross-examination style questioning on children's accuracy: older children are not immune. *Applied Cognitive Psychology*, 20(1), 3-16. doi:10.1002/acp.1169
- Zajac, R., Irvine, B., Ingram, J., & Jack, F. (2016). The diagnostic value of children's responses to cross-examination questioning. *Behavioral Sciences & the Law*, 34(1), 160-177. doi: 10.1002/bsl.221

Appendix A

Cross-examination Event

The studies reported from the Zajac lab used the following paradigm or slight variations thereof. Children go to the local police station and participate in several activities: have their fingerprints and mugshot taken, visit the jail cell, see the police car with the siren and lights on, and are made an honorary police persons by being spun around three times and given a police badge with his or her name on it. Several days later, children are interviewed individually in a way that is analogous to direct examination in court. In the beginning of the interview each child is asked to say everything that happened at the police station. Next, the child is asked four yes/no questions about 4 events: two had actually occurred (e.g., photo taken and having been spun around) and two had not occurred (tried on handcuffs and a lady came into the police station to report that her child's bike had been stolen). If the child answers "yes" to any of the four events, he or she is asked to describe the event. Several days, weeks, or months after direct examination, each child is interviewed again, this time in a way that is analogous to cross-examination. Cross-examination questions were informed by actual cross-examination questions studied by Zajac, Gross, and Hayne (2003). The point of cross-examination is to have the child change the original response—whether the original response was correct or incorrect. The child is first shown a videotape of his or her direct examination. He or she is then asked four sets of 10 questions, one set for each of the four events queried during the direct-examination interview. In each set of 10 questions, the child is first asked to confirm the response from direct examination. Next, the child is asked six questions that are complex and irrelevant (e.g., "you lined up at some point, didn't you?"). In the 8th question, the challenge begins with a question about the child's certainty; for instance, "Are you sure you didn't get to try on handcuffs?" (if the child reported in the first interview that he or she did not try on handcuffs). Question 9 is more challenging; for instance, "I think you did get to try on handcuffs, but you just weren't paying attention. That's what happened, isn't it?" If the child does not acquiesce to this, the 10th question is asked; "But that might be what happened, don't you think?"

Here is an example of cross-examination about an accurate event (photo taken) (from O'Neill & Zajac, 2013a):

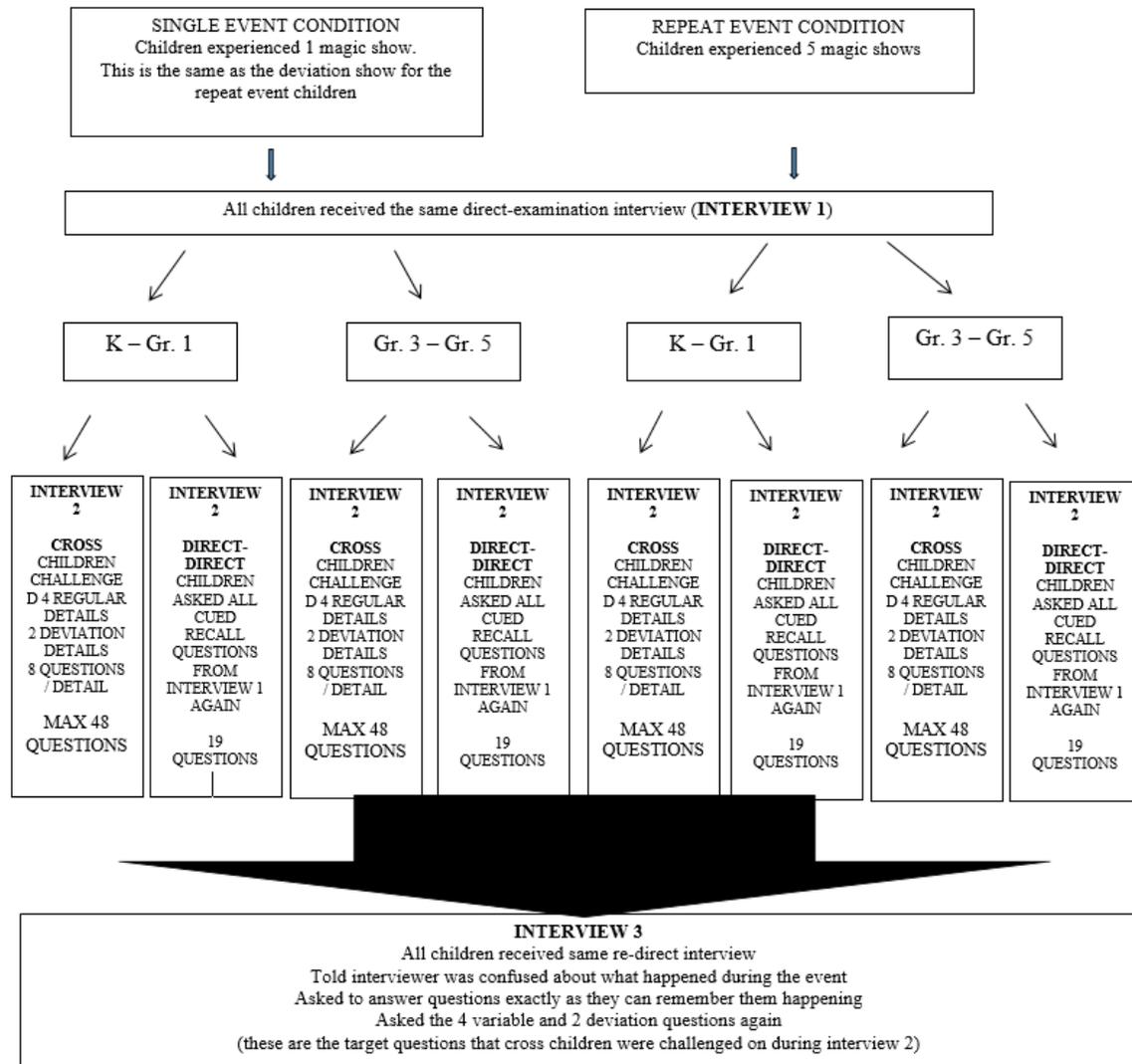
1. In the video, you said that you got your photo taken, didn't you?
2. Can you tell me why you think that?
3. You got your fingerprints taken, didn't you?
4. Can you remember what you did straight after that?
5. You lined up at some point, didn't you?
6. Did you do maths yesterday at school?
7. Did you like going to the police station?
8. Are you sure you didn't get your photo taken?
9. I think maybe you just forgot about getting your photo taken. That's what happened, isn't it?
10. That might be what happened though, don't you think?

Here is an example of cross-examination about an inaccurate event that the child said had happened (trying on handcuffs) (from O'Neill & Zajac, 2013a):

1. You said on the video that you got to try on handcuffs, didn't you?
2. Who was there when that happened?
3. The handcuffs would have been pretty heavy, were they?
4. Did you have them on for a long time or a short time?
5. Did they feel funny?
6. Did someone drive you to school this morning?
7. And the policeman put them on you?
8. Are you sure you got to try on handcuffs?
9. I think maybe your friends got to try on handcuffs, but you didn't. That's what really happened isn't it?
10. That might have happened though, mightn't it?

Appendix B

Schematic of Procedure in Experiment 1



Appendix C

Direct Examination Interview (same for all children)

Instructions/ Ground rules

Hello, my name is ____ and I would like to ask you about one of the magic shows you participated in with Dazzling Dylan. I wasn't there when you saw the magic shows and I was wondering if it would be ok for me to ask you questions about what happened during one of the magic shows; is it ok? [Allow child to respond; if the child assents, continue]. Great! As you can see, we have a *video-camera/audio-recorder* here. It will record our conversation so I can remember everything you tell me. Sometimes I forget things and the recorder allows me to listen to you without having to write everything down. Is that ok? [Allow child to respond]. I also have a certificate with your name on it; after you answer some of my questions, I will let you pick out a sticker to put on your certificate. How does that sound? [Wait for child's response]. Great!

Turn on the recording device (audio or video) and say the participant number into the recording device.

Today is _____ and it is now _____ o'clock and we are interviewing at _____ school.

Part of my job is to learn what happened during one of the magic shows. I have to ask you all of the questions that I brought with me, but I would like to tell you how to answer my questions first. Before we begin, I want to make sure you understand how important it is to tell the truth. It is very important that you only tell me the truth about things that really happened during the magic show I'm going to ask you about.

If I ask a question that you don't understand, just say, "I don't understand." Okay? [pause to let the child respond]

If I don't understand what you say, I'll ask you to explain. [pause]

If I ask a question, and you don't know the answer, just tell me "I don't know."

So, if I ask you, 'When is my birthday?' what would you say?

[wait for an answer].

If the child says, 'I don't know', say: "Right. You don't know, do you?"

If the child offers a GUESS, say: "No, you don't know because you don't me.

When you don't know the answer, don't guess—say that you don't know."

[pause]

But, if you know the answer, be sure to tell me.

If I say things that are wrong, you should tell me. Okay? [wait for an answer]

Rapport building

"Now, I would like to get to know you better."

1. "Tell me about a favorite place you like to go with your family and tell me about everything that happens when you go there."

[Wait for child to respond]

[If the child gives a fairly detailed response, skip to practice phase]

[If the child does not answer, gives a short answer, or gets stuck, say:]

2. "I really want to know you better. Tell me more about what happens when you go to your favorite place with your family." [Wait for an answer]

Notes (write the child's favorite place, was (s)he detailed, shy, other observations):

Practice Phase

"I want to know more about you and the things you do."

I would like to ask you about one time you went to gym class. I would like you to tell me about the time that something different or surprising happened in gym class this year.

MCR instruction: Close your eyes and think about the time that something different or surprising happened in gym class this year as if you were there again. (Pause). Think about where you were (Pause), think about what was happening around you (Pause), think about all of the things you felt (Pause), think about what special smells you could smell (Pause), and think of what sounds or voices you could hear (Pause). Think about all of the things you did and all of the people who were there. (Pause). Open your eyes.

Think hard about what happened the time that something different or surprising happened in gym class this year and tell me about everything that happened in gym class from beginning to end, as best as you can remember. [Wait for an answer].

[Provide one follow-up utterance]:

“I don’t want you to leave anything out. Tell me what else you can remember.”

Thank you for answering my questions and helping me get to know you better! I think you’ve earned a sticker. Which sticker would you like to put on your certificate? [Allow the child time to pick out a sticker. After the child has chosen a sticker, turn over the certificate and put away the stickers so the child is not distracted.]

Substantive portion

Free recall

Now that I know you a little better, I would like to talk with you about one of the magic shows (**the magic show for SE children**) you learned with Dazzling Dylan. Remember that I was not there when you learned the magic show(s). It is important that you concentrate on what you can remember and tell me everything you can in as much detail as possible, even things you don’t think are important. Remember that it is ok to say “I

don't know" or "I don't remember" when I ask you a question. Remember not to guess and only tell me things that really happened during the magic show.

1. I am going to ask you about the time that something different or surprising happened in the magic show.

Do you remember that time? Do you remember the trick you learned during that (**the for SE**) show? [Allow the child to describe the trick to ensure they are thinking about the correct show. Only if the child nominates the wrong time, say the name of the trick and direct the child to the proper instance]

MCR condition: Close your eyes and think about the time that something different or surprising happened in the magic show, as if you were there right now. (Pause). Think about where you were (Pause), think about what was happening around you (Pause), think about all of the things you felt (Pause), think about what special smells you could smell (Pause), and think of what sounds or voices you could hear (Pause). Think about all of the things Dazzling Dylan did, you did, and all of the people who were there. (Pause). Open your eyes.

Think hard about the time that something different or surprising happened in the magic show and tell me about everything that happened during that show from beginning to end, as best as you can remember.

[Provide one follow-up utterance]:

"I don't want you to leave anything out. Tell me what else you can remember."

You've told me a lot, and that's really helpful. To be sure I understand, please start at the beginning and tell me exactly what happened from beginning to end.

You're doing great answering all my questions! I think you've earned a sticker to put on your certificate [allow child to pick sticker and then turn over the certificate and stickers]

2. Now, I have some specific questions about the time that something different or surprising happened in one of the magic shows. You may have already told me the

answers to some of these questions, but I still have to ask all of the questions that are on my sheet. Some of these questions might be hard and it is OK to say “I don’t know” if I ask you a question and you don’t remember.

Cued recall

Ask 1 prompt per question [try to concentrate] if the child initially says, “I don’t know.”

- 1) What was on the magic show ticket the time that something different or surprising happened in the magic show?
- 2) What did Dazzling Dylan remove to prepare the time that something different or surprising happened in the magic show?
- 3) What warm-up exercise did you do the time that something different or surprising happened in the magic show?
- 4) What kind of juice did Dazzling Dylan drink the time that something different or surprising happened in the magic show?
- 5) What kind of hat did Dazzling Dylan wear the time that something different or surprising happened in the magic show?
- 6) What magic item did you get to use the time that something different or surprising happened in the magic show?
- 7) What stuffed animal did Dazzling Dylan bring as her assistant the time that something different or surprising happened in the magic show?
- 8) What musical instrument did you listen to the time that something different or surprising happened in the magic show?
- 9) What magic words did you say the time that something different or surprising happened in the magic show?
- 10) Where did Dazzling Dylan put the sticker on your body the time that something different or surprising happened in the magic show?
- 11) What was the secret Dazzling Dylan told you the time that something different or surprising happened in the magic show?
- 12) What action did Dazzling Dylan do to end the show and say goodbye the time that something different or surprising happened in the magic show?

Deviation Questions

Now, I want to ask you about the things that happened when a different magician came into the room and needed Dazzling Dylan's help. Do you remember that happened? [If the child says no, say "during one of the magic shows another magician came into the room because she needed Dazzling Dylan's help (Pause), I have to ask you some questions about what happened when the different magician interrupted the show].

MCR instruction: Close your eyes and think about what happened when a different magician interrupted the show, as if you were there right now (Pause). Think about where you were (Pause), think about what was happening around you (Pause), think about all of the things you felt (Pause), think about what special smells you could smell (Pause), and think of what sounds or voices you could hear (Pause). Think about all of the things Dazzling Dylan did, you did, and all of the people who were there. (Pause). Open your eyes.

- 1) What was the name of the different magician who interrupted the show?
- 2) What was the name of the spell the different magician accidentally put on herself that she needed Dazzling Dylan to break?
- 3) What was the different magician carrying in her hand that Dazzling Dylan said she'd never seen her carry before?
- 4) What did Dazzling Dylan put on the different magician to help break the spell?
- 5) What color was the thing that Dazzling Dylan put on the different magician?
- 6) How many times did Dazzling Dylan spin the different magician around in order for the antidote to break the spell?
- 7) What kind of party did the different magician invite Dazzling Dylan to go to before she left?

Great work answering all of my questions! Thank you for trying so hard! How about you select a sticker to put on your SFU certificate? (Ask (RE) the two exploratory questions).

Just out of curiosity, of all of the magic shows, what magic show do you remember best? (Ask if child did not specify the exact trick: Ok, what trick did you learn during that time?)

I have no more questions for you. We are going to return to your classroom now. Before we do, you can pick out a special prize.

Appendix D

Cross condition Interview 2

Interview 2 (includes a cross-direct and direct-direct interview for one order)

TWO MINUTE FILLER (COLORING)

“Hello, my name is XXXXX. I know that you just answered some questions about a magic show that you saw last week. I just need to ask you about the show again. Is that okay?”

Ask these questions at a regular pace. If the child doesn’t respond within 3-4 seconds move on to the next question. If the child does respond, move on to the next question without feedback.

If the child says yes to questions **3** or **7** move on to the next detail.

- 1) *(Question confirms that that the child remembers what they said during direct examination. Children will be cross-examined on six details with a block of questions. Below is an example of a block used for one detail.*
 - a. The last time you answered the question about what was on the magic show ticket during the Egg Pouch trick you said it was a XXXX (based on what the child provides during Int1), didn’t you?
- 2) *(Filler question that begins to challenge the child’s response. Fixed)*

How do you know that?
- 3) *(Challenges the child’s response with an unexperienced detail)*
 - a. ***** It was actually a pom pom wasn’t it?
- 4) *(Filler question. Fixed).*

Do you remember what happened right after that?
- 5) *(Ambiguous and confusing question)*
 - a. What colour was it?
- 6) *(Provides child with another opportunity to confirm original response. Listed is an example for one set of six details children were cross-examined on)*
 - a. Are you sure that it was a XXXX (based on what the child provides during Interview 1)?

7) *(Directly challenging question. Provides a plausible explanation for why the child remembered incorrectly. There are four of these which are counterbalanced across details. Listed is an example of one. Please see below for the full set).*

a. ***** I think that it might have been a pom pom and I think that you might have remembered it incorrectly didn't you?

8) *(Final challenge. Coded as a partial acquiesce).*

But that might have been what happened, right?

"I know my questions may have been a bit tricky but thank you for answering them".

2 MINUTE FILLER

"Okay, so I would just like you to colour your picture for a couple of more minutes, okay?"

Full set of directly challenging questions (#7 in question set for each detail in cross interviews) which are to be counterbalanced across details.

a. ***** I think that it might have been a pom pom and I think that you might have remembered it incorrectly didn't you?

b. ***** If the person that remembered the show the best said that it was a chef hat, they might be right about that don't you think?

c. ***** Most people who saw the show said you used open sesame. I think that they might be right about that don't you?

d. ***** If your teacher told me that you listened to a flute, she would probably be right don't you think?"

DIRECT-DIRECT CONDITION INTERVIEW 2

"Hello, my name is XXXX. I know that you just answered some questions about a magic show that you saw last week. I just need to ask you about the show again".

Allow children as long as they would like to answer the questions.

- 1) What was on the magic show ticket during the Egg Pouch Trick?
- 2) What did Dazzling Dylan remove when she was ready to begin the Egg Pouch Trick?
- 3) What warm-up exercise did you do during the Egg Pouch Trick?
- 4) What kind of juice did Dazzling Dylan drink during the Egg Pouch Trick?
- 5) What kind of hat did Dazzling Dylan wear during the Egg Pouch Trick?
- 6) What magic item did you get to use during the Egg Pouch Trick?

- 7) What stuffed animal did Dazzling Dylan bring as her assistant during the Egg Pouch Trick?
- 8) What musical instrument did you listen to during the Egg Pouch Trick?
- 9) What magic words did you use during the Egg Pouch Trick?
- 10) Where did Dazzling Dylan put the sticker on your body during the Egg Pouch Trick?
- 11) What was the secret Dazzling Dylan told you during the Egg Pouch Trick?
- 12) What did Dazzling Dylan do to end the show and say goodbye during the Egg Pouch Trick?
- 13) What was the name of the different magician who interrupted the show?
- 14) What was the name of the spell the different magician accidentally put on herself that she needed Dazzling Dylan to break?
- 15) What was the different magician carrying in her hand that Dazzling Dylan said she'd never seen her carry before?
- 16) What did Dazzling Dylan put on the different magician to help break the spell?
- 17) What color was the thing that Dazzling Dylan put on the different magician?
- 18) How many times did Dazzling Dylan spin the different magician around in order for the antidote to break the spell?
- 19) What kind of party did the different magician invite Dazzling Dylan to go to before she left? "I know my questions may have been a bit tricky but thank you for answering them.

2 MINUTE FILLER

"Okay, so I would just like you to colour your picture for a couple of more minutes. Okay?"

Appendix E

Re-direct Interview (same for all children)

“Hello XXXX. I know XXXX just asked you more questions about a magic show, but I think she may have been a little confused about what happened during that show. I am going to ask you a few more questions and I would like you to answer them exactly as you remember them happening when you learned the Egg Pouch trick. “I have misplaced a couple of pages of the interview and I don’t know the answers that you told me the first time, so I need to ask you the questions again. Is that okay?”

*******Only if the child says they cannot remember ask them: “can you remember what you told me when I first asked you this question?” If they provide a response follow-up with: “Is that how you remember it happening during the show?”**

1. What was on the magic show ticket during the Egg Pouch Trick?
 - a. Can you remember what you told me the first time I asked you?
 - b. Is that how you remember it happening during the show?
2. What kind of hat did Dazzling Dylan wear during the Egg Pouch trick?
 - a. Can you remember what you told me the first time I asked you?
 - b. Is that how you remember it happening during the show?
3. What magic words did you use during the Egg Pouch Trick?
 - a. Can you remember what you told me the first time I asked you?
 - b. Is that how you remember it happening during the show?
4. What was the musical instrument that you listened to during the Egg Pouch trick?
 - a. Can you remember what you told me the first time I asked you?
 - b. Is that how you remember it happening during the show?
5. What colour was the thing that Dazzling Dylan put on the different magician during the Egg Pouch Trick?
 - a. Can you remember what you told me the first time I asked you?
 - b. Is that how you remember it happening during the show?
6. What kind of party did the different magician invite Dazzling Dylan to during the Egg Pouch Trick?
 - a. Can you remember what you told me the first time I asked you?
 - b. Is that how you remember it happening during the show?

I have no more questions for you. We are going to return to your classroom now. Before we do, you can pick out another sticker for your certificate. You can also pick out a special pencil.”

Appendix F

Credibility Questionnaire for Experiment Two

Please answer all of the following questions based on your memory of the child's report.

1. How **truthful** was the child?

Not at all truthful	1	2	3	4	5	6	7	Very truthful
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2. How likely is it that the child **fabricated** the event?

Not at all likely	1	2	3	4	5	6	7	Very likely
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3. How **accurately** do you think the child recalled the event?

Very inaccurately	1	2	3	4	5	6	7	Very accurately
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4. How **consistent** was the child?

Not consistent	1	2	3	4	5	6	7	Very consistent
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5. How **believable** was the child?

Not at all believable	1	2	3	4	5	6	7	Very believable
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6. How **intelligent** do you think the child was?

Not at all intelligent	1	2	3	4	5	6	7	Very intelligent
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7. How susceptible do you think the child was to misleading or **suggestive** questions?

Not at all susceptible	1	2	3	4	5	6	7	Very susceptible
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8. How **confident** was the child?

Not at all confident	1	2	3	4	5	6	7	Very confident
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9. How well did the child **understand** the events he/she described?

Not at all understood	1	2	3	4	5	6	7	Fully
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10. How **likeable** was the child?

Not at all likeable	1	2	3	4	5	6	7	Very likeable
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11. How **honest** do you think the child was?

Not at all honest	1	2	3	4	5	5	7	Very
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12. Overall, how **credible** was the child?

Not at all credible	1	2	3	4	5	6	7	Very credible
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13. Overall, how **anxious** did the child appear to be?

Not at all anxious	1	2	3	4	5	6	7	Very anxious
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14. Please provide the most important reason for your overall rating of credibility.

The following questions are your own demographics

Your age: _____

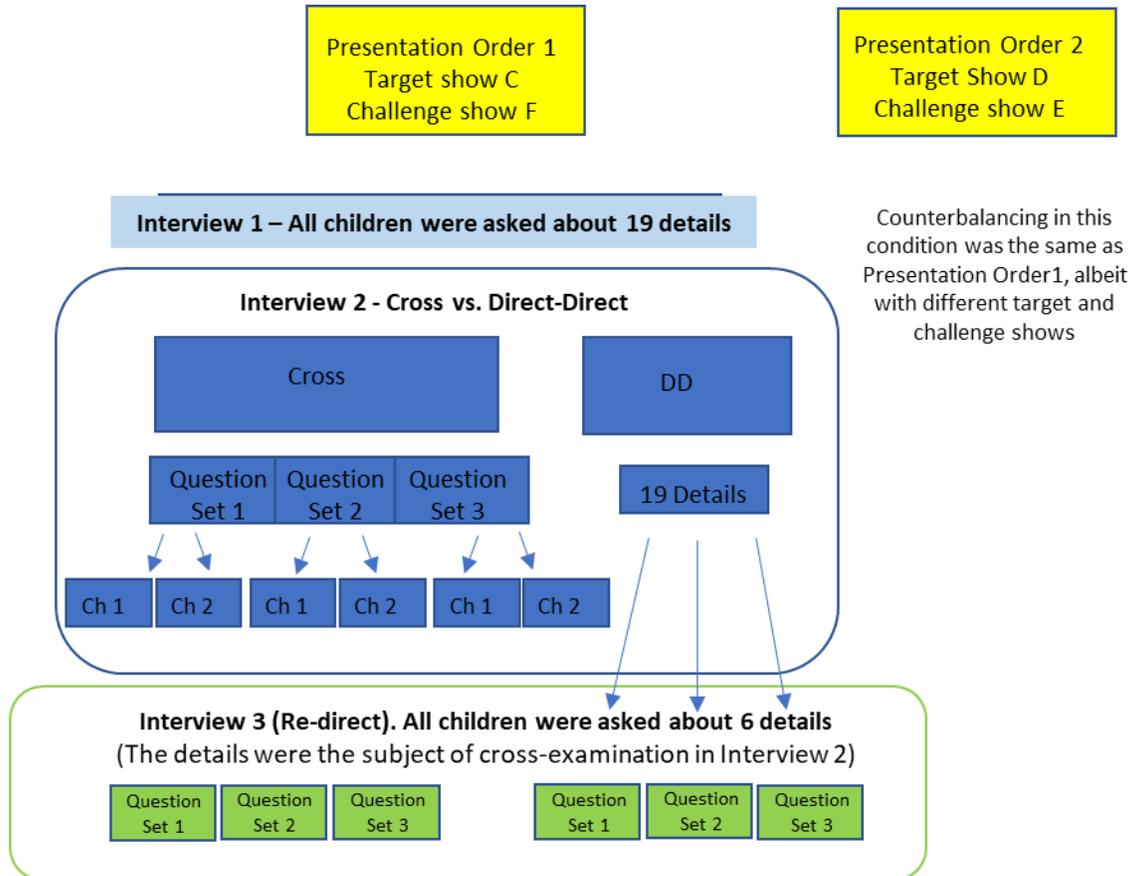
What is your first language? _____

If English is not your first language, how many years have you been speaking English?

What is your ethnic background? _____

Appendix G

Counterbalancing Schematic



Counterbalancing in this condition was the same as Presentation Order1, albeit with different target and challenge shows

Ch = Challenge order

Ch 1 = Remembered incorrectly, Person remembered show best, Most people said, If teacher said, Remembered incorrectly, Person remembered show best

Ch 2 = Person remembered show best, If teacher said, Remembered incorrectly, Most people said, Person remembered show best, If teacher said

Question Set 1 = Item Removed(2), Magic Item(6), Juice(4), End Show(12), Spins (Dev 6), Item Carried (Dev 3)

Questions Set 2 = Ticket(1), Hat(5), Instrument(8), Magic Words(9), Colour Item(Dev 5), Party (Dev 7)

Question Set 3 = Exercise(3), Animal(7), Sticker(10), Secret(11), Spell Name (Dev 2), Break Spell (Dev 4)

Dev = Deviation Detail