Does eyewitness and interviewer gender influence children's reports? An experimental analysis of eyewitness and interviewer gender on children's testimony

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This study examines how children's age, gender and interviewer gender affected children's testimony after witnessing a theft. Children ($N=127$, age = 6–11 years) witnessed an experimenter (E1) find money, which he/she may/may not have taken. E1 then asked the children to falsely deny that the theft occurred, falsely accuse E1 of taking the money, or tell the truth when interviewed by a second experimenter. Falsely denying or falsely accusing influenced children's forthcomingness and quality of their testimony. When accusing, boys were significantly more willing than girls to disclose about the theft earlier and without being asked directly. When truthfully accusing, children gave lengthier testimony to same-gendered adults. When denying, children were significantly more willing to disclose the theft earlier to male interviewers than to females. As children aged, they were significantly less likely to lie, more likely to disclose earlier when accusing, and give lengthier and more consistent testimony.

Key words: children; disclosures; false accusations; false denials; gender; interviewer gender; lying.

Children may be called upon as witnesses in criminal cases and court proceedings (Bala, Lee, Lindsay, & Talwar, 2000, 2010). When children are witnesses or victims of a crime, they are generally interviewed by a variety of different adults and are asked to provide pertinent details regarding the event in question. A central issue for professionals working with child witnesses is eliciting credible, truthful and accurate reports. There are concerns that child witnesses may not always disclose a wrongdoing by others or that they may make false allegations of a wrongdoing (London, Bruck, Wright, & Ceci, 2008). In these cases, it is imperative that children tell the truth. As a result, researchers have focused on the proper

techniques that interviewers can use to promote truthfulness (e.g. National Institute of Child Health and Human Development, NICHD, protocol; cognitive load questions; narrative elaboration). However, little is known about whether environmental variables, such as interviewer gender, and eyewitness characteristics (e.g. respondent gender) may play a role in eliciting truthful or dishonest responses.

Eyewitness characteristics

Age

Lying can be defined as a deliberate act of deception with the intention to mislead and

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deceive another person into falsely believing what the liar knows not to be true (Talwar & Crossman, 2011). Many children begin to lie at a very young age (e.g. Evans & Lee, 2011, 2013; Talwar & Lee 2002, 2008; Williams, Leduc, Crossman, & Talwar, 2017). As children grow older, their reports, regardless of veracity, increase in length, complexity and descriptive detail (Craig, Scheibe, Raskin, Kircher, & Dodd, 1999; Goodman & Reed, 1986; Pipe, Lamb, Orbach & Esplin, 2004; Vrij, 2005), and children become increasingly better at maintaining their lies due to their increasing cognitive maturity (for reviews see Talwar & Crossman, 2011, 2012). Children can tell lies from pre-school onward, and their ability to maintain plausible lies improves with age in relation to their developing cognitive skills (Lee, 2013; Talwar & Crossman, 2011, 2012).

Gender

Children's willingness to lie, and therefore the veracity and credibility of their testimony, may also be influenced by their gender. There have been mixed findings with respect to gender differences in children's suggestibility research (see Bruck & Melnyk, 2004, for a review; Chae & Ceci, 2005). In the area of truth- and lie-telling behaviours, while some studies have found no such difference, others have reported gender differences (e.g. Bussey & Grimbeck, 2000; Engels, Finkenauer & van Kooten, 2006; Gervais, Tremblay, Desmarais-Gervais, & Vitaro, 2000; Popliger, Talwar, & Crossman, 2011). In particular, Bussey and Grimbeck (2000) found that girls aged 4 to 10 years rated truth-telling more positively than boys. Other researchers have found that boys evaluated immoral acts, such as stealing and lying, as more acceptable than did girls (Keltikangas-Jarvinen & Lindeman, 1997). Additionally, in a longitudinal study examining lying and disruptive behaviour in children aged 6–8 years old, it was found that boys lied more frequently than girls (Gervais et al., 2000). Engels et al. (2006) also found that

parents reported that their sons lied more often than their daughters and that boys were less likely to disclose transgressions than girls. Popliger et al. (2011), however, found that girls concealed their prosocial lies to avoid detection better than boys. These results are especially relevant for legal proceedings as the majority of child witnesses are female (Northcott, 2009; Poole & Lamb, 1998), given that girls are more likely to be victims of sexual abuse than boys (Sinha, 2013).

Past research with adults has also shown gender differences in the quality of testimony (i.e. coherence and response length of testimony) of honest compared to dishonest statements. Researchers have found that truthful statements tend to be more coherent, be longer in word length and include more details regarding the event in question than dishonest statements (Colwell, Hiscock, & Memon, 2002; Suckle-Nelson et al., 2010), and that this was especially so for honest women compared to honest men (Suckle-Nelson et al., 2010). Moreover, honest men were more likely to tell an incoherent story than deceptive women (Suckle-Nelson et al., 2010). In the adult literature, gender differences have been found in the nature of lies in young adults; women tend to lie more to spare others' feelings, while men tend to tell more self-centred lies (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). There are also significant gender differences in cognitive ability and interpersonal skill, where women are reported to be more detail-oriented, have higher levels of verbal ability and have higher interpersonal and social sensitivity (see Suckle-Nelson et al., 2010, for a review). In the child literature, similar gender differences have been found in gender-related social and behavioural characteristics (i.e. externalizing behaviours, inattention, intellectual ability, memory and shyness; see Chae & Ceci, 2005; McFarlane, Powell, & Dudgeon, 2002), which may underlie the relationship between suggestibility and gender in children. Therefore, children, especially girls, might be better able to produce

and maintain a more believable lie that follows a story and contains few contradictions from the actual truth. They might also produce longer testimony and disclose more details regarding the event in question.

Interviewer gender

According to Buller and Burgoon's (1996) interpersonal deception theory, an essential component of interpersonal communication is active participation of both the sender and the receiver in conversation (in this case, the child and interviewer, respectively) in a dynamic conversation. When examining deception, one must take into account not only the characteristics of the sender but also those of the receiver. Therefore, a person deciding to lie may take into account who the receiver is (i.e. a male or female interviewer), which may influence their lie-telling behaviour. Therefore, in addition to child characteristics like age and gender, the adults to whom children disclose may influence the honesty and accuracy of their testimony. Children who witness, or are victims of, a crime are asked to provide pertinent details regarding the event in question and can be questioned by several different individuals, including police officers, lawyers, psychologists and forensic interviewers. In the majority of these situations, children have had no prior contact with these individuals. Often, they are asked to disclose sensitive, traumatic and sometimes painful information to someone with whom they are unfamiliar, and children might be reluctant to discuss such events.

For these reasons, it has been recommended that interviewers demonstrate certain qualities, such as having a relaxed, empathetic and warm nature, as well as the ability to establish and maintain rapport through warmth, friendliness and tact, and have experience working with young children (Wood & Garven, 2000; Wright & Powell, 2007). These

key characteristics were found more often in female police officers, and these personal attributes were seen as more important than having knowledge of legislation, child development and interviewing techniques (Wright & Powell, 2007). Moreover, since the majority of child abuse victims are girls, some police officers reported that being female is an advantage, as girls felt more comfortable talking to them because of their gender, and that the female-female bond was essential in getting victims to disclose information accurately (Wright & Powell, 2007). Further support comes from findings suggesting that girls tend to prefer members of their own sex more than members of the opposite sex, and trust same-sex informants more than opposite-sex informants (Glick & Hilt, 2000; Powlishta, 2004). Kaplan, Becker, and Tenke (1991) also found that adolescent sexual abuse offenders who had themselves been abused by male perpetrators preferred disclosing their experiences to female interviewers.

In a notable study on the effects of interviewer gender, Lamb and Garretson (2003) reviewed 672 forensic interviews of alleged children of abuse aged 4 to 14 years old from Britain, Israel and the United States. Their findings indicated that children provided significantly more details to female interviewers than to male interviewers, and this was especially so for girls who provided more detailed responses to female interviewers than boys. Although female interviewers were able to elicit more information from alleged victims of child sexual abuse, this was countered by the fact that the quality and accuracy of the information gained was reduced compared to information acquired from the male interviewers. Female interviewers treated boys and girls differently with respect to the types of prompts used, whereas male interviewers interviewed boys and girls similarly (Lamb & Garretson, 2003).

However, Lamb and Garretson (2003) used archival data from alleged victims of child sexual abuse, but the accuracy of the

children's statements was not examined. In addition, due to the nature of the study, Lamb and Garretson had no control over the distribution of the sample, leading to an unbalanced number of male (29.5%) and female (70.5%) interviewers, and a higher number of female children.

Schaaf, Alexander, and Goodman (2008) also examined the effects of interviewer gender in their study, which found that children's memory and suggestibility for events differed in veracity (true or false) and valence (positive or negative). In contrast to the findings from Lamb and Garretson (2003), boys provided more information than they did female interviewers for true positive events, but girls provided similar amounts of information to both male and female interviewers. Yet, no effects of interviewer gender were found in regards to the most forensically relevant events, such as disclosures about the true-negative and false-negative events (Schaaf et al., 2008).

While Schaaf et al. (2008) directly manipulated the interviewer's gender, they only compared children aged 3 to 5 years old, and, again, the accuracy of the statements could not be verified. Moreover, neither Lamb and Garretson (2003) nor Schaaf et al. (2008) directly examined children's intentional false reports. Therefore, a study that manipulates interviewer gender, with children of a wider age range, and with verifiable statements, is needed. Further investigation into the interaction between child and interviewer gender would also be beneficial to researchers and individuals who interview children.

If there is an interaction between children's gender and that of the interviewer, this could present problems for the legal system in the future. For example, if children are less likely to feel comfortable to disclose to an interviewer and more likely to conceal or maintain a lie based on the gender of the interviewer, this could create bias, and their credibility as witnesses may be called into question. Adults may not trust or believe these children

in subsequent situations where they are telling the truth.

Types of lies: false denials and false accusations

In order to investigate the effects of gender on lying, the two forms of lies typically told by both adults and children – false denials and false accusations – must be examined. False denials are deliberate denials of an event that actually occurred. For example, children can be willing to lie to protect another person (Popliger et al., 2011) and to lie to protect someone who has committed a transgression (Bottoms, Goodman, Schwartz-Kenney, & Thomas, 2002; Lyon, Malloy, Quas, & Talwar, 2008; Talwar, Lee, Bala, & Lindsay, 2004). More recently, Gordon et al. (2014) reported that school-aged children were willing to protect a parent by making a false denial about a broken toy. While some studies have found that older children (middle school age) are more likely than younger children (early elementary) to conceal an adult's transgression (Bottoms et al., 2002; Gordon, Lyon, & Lee, 2014; Lyon, Ahern, Malloy, & Quas, 2010), others have found that willingness decreases with age (Lyon et al., 2014; Pipe & Wilson, 1994).

False accusations, however, incorporate the intentional allegation that an innocent person is responsible for an act or transgression that may or may not have occurred (Ney, 1995). This is the equivalent of saying someone did something when in fact he or she did not. For example, children might be asked to accuse someone falsely of physically or sexually abusing them, such as in custody battles and parental separations (Black, Schweitzer, & Varghese, 2012; Ney, 1995; Trocmé & Bala, 2005). While the majority of disclosures obtained by interviewers are honest (London et al., 2008; Trocmé & Bala, 2005), there have been cases of false allegations resulting in wrongful convictions (e.g. Black et al., 2012; De Becker & Horowitz, 2013; Schreiber et al.,

2006), which cause emotional strain for the falsely accused and the accuser (e.g. Gries et al., 2000; Savvidou, Bozikas, & Karavatos, 2002). Moreover, fear of children's false allegations has lowered the public's trust in the validity of child testimony (Pipe, Orbach, Lamb, Abbott, & Stewart, 2013). Tye, Amato, Honts, Devitt, and Peters (1999) reported that more than half of the time, children 6 to 10 years old were willing to lie to falsely accuse an innocent third party of stealing a book and falsely deny the true identity of the perpetrator. Thus, children may be able to make false accusations, and these accusations involve intentional lying by creating a false report; they differ greatly from lying by omission by keeping a secret and avoiding disclosure of information (i.e. a false denial; Quas, Davis, Goodman, & Myers, 2007). However, it is unclear how this willingness to make a false accusation may be affected by child characteristics, such as age and gender. While there has been research on children's false statements when questioned using techniques that are suggestible (see Bruck & Ceci, 1999; Bruck & Melnyk, 2004; Ceci & Bruck, 1993; Goodman & Melinder, 2007; Poole & Lamb, 1998, for reviews; also more recently Paz-Alonso & Goodman, 2016; Volpini, Melis, Petralia, & Rosenberg, 2016) and when children are given misleading suggestions by parents (Poole & Lindsay, 2001), there has been considerably less research on children's intentional false reports.

The current study

While many studies have examined children's lie-telling behaviour in low-cost situations (i.e. Gordon et al., 2014; Lyon et al., 2008; Talwar et al., 2004), few (e.g. Quas et al., 2007; Tye et al., 1999) have actually recreated a situation where a child is asked to either make a false denial lie to protect an offender, or lie by falsely accusing someone of a crime in a high-cost situation, such as a theft of money. Since children are usually reporting about a criminal

event, such as an experience of abuse or witnessing a crime (Lyon & Saywitz, 1999), it is important to study how children recall information about a high-cost event and the factors that influence their lie-telling abilities, as they may differ from those that influence their behaviours in a low-cost situation. Thus, the current study manipulated interviewer gender while evaluating children's ability to tell purposeful lies (false denials and false accusations) in a realistic theft-paradigm in which the experimenters knew the truth and could verify the accuracy of children's statements.

Following the experimental manipulation, children between 6 and 11 years of age were then interviewed using open-ended questions, cognitive load questions and closed-ended questions. Previous research suggests that open-ended questions allow children to provide more coherent and detailed responses, but they can be brief (Andrews, Lamb, & Lyon, 2015). However, children have also been found to have more difficulty withholding information to cognitive load questions (Saykaly, Crossman, Morris, & Talwar, 2016) and closed-ended questions (Lyon et al., 2008; Pipe & Wilson, 1994; Saykaly, Talwar, Lee, Lindsay, & Bala, 2013; Talwar & Lee, 2008; Talwar, Yachison, & Leduc, 2016). Of interest was whether children's age, gender and interviewer gender influenced both when children disclosed about the theft (e.g. early in free-recall questions, or only at the end when asked directly; henceforth referred to as forthcomingness), and the quality of children's eyewitness disclosures after witnessing a crime.

Based on previous research (i.e. Lamb & Garretson, 2003; Schaaf et al., 2008), it was hypothesized that children's willingness to tell a lie during an interview would be influenced by their age, their gender and the gender of the interviewer. Specifically, it was expected that older children would lie more than younger children, that boys would lie more than girls, and that boys would lie more to female than to male interviewers. Additionally, it was hypothesized that children's forthcomingness

to disclose about the theft (i.e. when they disclosed about the theft) would differ based on whether they would make a denial or an accusation. Children's forthcomingness (i.e. when in the interview they disclosed) would also be influenced by their age, gender and the gender of the interviewer. Given that this is the first study to examine forthcomingness, the hypotheses are exploratory in nature, and therefore no specific directional predictions are posited. Finally, it was hypothesized that children would have lengthier and more consistent testimony with age.

Method

Participants

Participants included 127 children (n males = 63, n females = 64) between the ages of 6 and 11 years ($M_{\text{age}} = 8.73$ years, $SD = 1.61$) from a large metropolitan area (i.e. population approximately 3,800,000). The children were predominately of mixed-Canadian descent, English or bilingual speakers, and of various religious backgrounds from predominately middle-income families. Parental consent and children's assent were obtained.

Experimental conditions

Assignment of children to one of four conditions was counterbalanced: (a) the false denial condition (FD; $n = 39$, $M_{\text{age}} = 8.84$ years, $SD = 1.67$), where the primary experimenter (E1) took \$20 from a wallet and asked the children to lie to the interviewer (E2) and say that E1 did not take the money; (b) the false accusation condition (FA; $n = 38$, $M_{\text{age}} = 8.69$ years, $SD = 1.83$), where E1 asked the children to lie and say that E1 did take the money when he/she actually had not; and (c) the true accusation (TA; $n = 39$, $M_{\text{age}} = 9.01$ years, $SD = 1.51$) and (d) the true denial (TD; $n = 39$, $M_{\text{age}} = 8.41$ years, $SD = 1.25$) conditions, which were the control conditions, where the children were asked to tell E2 the truth about whether E1 had taken the money (TA) or had not taken the money (TD).

Measures and procedures

Experimental manipulation

After completing the consent form, children and E1 went to a testing room to complete a series of activities (e.g. memory games; reading short stories), which were predominately used to build rapport between E1 and the child. Following the activities, E1 notified the children that they had to retrieve a forgotten jacket, which was located on a nearby table. E1 then found a wallet that had been placed near the jacket. E1 showed the wallet to the children and advised the children that the wallet belonged to another researcher. Then, E1 took out a \$20 bill from the wallet and showed it to the children. Depending on the experimental condition the children were placed in (see above), E1 either took the money or placed it back into the wallet.

The children were then brought into an interview room to be interviewed by E2. After introducing the children to E2, E1 stated that they forgot their jacket in the testing room. At this time, E2 indicated that they go with E1 to the testing room because they forgot their clipboard with the interview questions in the same room. The purpose of this interaction was for the children to learn how E2 became aware of the wallet and alleged theft upstairs. Two minutes after leaving with E2, E1 returned to the interview room and asked the children to tell the truth (true denial or true accusation) or a lie (false denial or false accusation) regarding the alleged theft and recited one of four possible scripts verbatim (see Appendix). Children were asked to practise the truth or lie-script once to ensure that they understood the experimental condition; however, they were not required to agree to tell the truth or a lie. E1 proceeded to leave the room after setting the experimental condition.

Interview

One minute after E1 left the room, E2 returned to interview the children regarding their experiences in the testing room with E1.

Interviewer gender was counterbalanced, as 59.1% of E2s were male. Gender of child by gender of interviewer was also balanced; male children were interviewed by male interviewers 61.9% of the time, and female children were interviewed by female interviewers 43.8% of the time. No significant differences were found between male interviewers ($\chi^2 = 4.45$, *ns*), or between female interviewers ($\chi^2 = 2.18$, *ns*) across children's gender and across conditions. To avoid any biases during the interview, all interviewers were blind to each child's experimental conditions. The interviewers were also advised to maintain a consistent tone of voice throughout the interview, and to avoid non-verbal behaviours (e.g. nodding or shaking head) that could influence the children's responses, as children's responses can be influenced by an interviewer's non-verbal cues (Brown & Lamb, 2015).

All interviewers followed a standardized interview protocol, where the interview questions and structure were based on the Reality Interview method (RI; Ansarra et al., 2011; Colwell et al., 2002), which is a derivative of the ecologically valid Cognitive Interview (CI; Fisher & Geiselman, 1992; Memon, Meissner, & Fraser, 2010). The interview started with four *rappport building* questions, which were open-ended questions (e.g. 'What is your favourite subject in school?') and were used to develop a bond between the children and E2. An open-ended *free recall* question ('Please describe in as much detail as possible, everything you can about what happened when you were with E1 from the time you arrived until the time you left') was asked to allow each child to describe in as much detail as possible everything they remembered from their time spent with E1. Children also received prompts ('Did anything else happen?') to encourage the child to elaborate on their previous statements. *Cognitive load* questions were asked to enhance the memory of the interviewees, and make it more difficult for lie-tellers to

maintain their false story ('Now, I want you to imagine your mom was in the room with you and E1. What would she remember from that time?' and 'Please describe everything you remember but backwards. Start with from just before you left the room with E1 and end with when you arrived at the room to do the activities with E1. Please describe everything you did with E1 upstairs backwards.'). Children received prompts to help them elaborate on their previous statements. Finally, children were asked *yes/no* questions that required the children to provide a yes/no word response (e.g. 'Did someone take the money from the wallet?' and 'Did E1 take the money from the wallet?'). The last closed-ended yes/no question ('Did E1 take the money from the wallet?') was used to determine whether the children were telling the truth (scored as 0) or a lie (scored as 1) about the theft situation when being directly prompted by E2. Once the interview was completed, the children were debriefed with the parents and were notified that the theft was not real and that it is important to tell a trusted adult if they are ever asked to lie for someone.

Coding procedures

The interview was video-taped by three separate cameras and then transcribed into written manuscripts. First, children's responses to the free recall question, the cognitive load questions and their prompts were evaluated for consistency. Consistency was evaluated based on whether a script included a clear and logical story with no notable contradictions. Thus, a script was rated as consistent (coded as 1) if the reader was able to understand what the child was saying, and if there were no contradictions in terms of major details. In contrast, a script was deemed inconsistent if it contained an implausible story and/or contradictions regarding major details. Two independent coders rated inconsistent scripts as a '0' and consistent scripts as a '1'. This dichotomous coding was used as the overall impression of

consistency was of interest, and such coding has been used in adult literature to evaluate a testimony's coherence (see Colwell et al., 2002; Colwell, Hiscock-Anisman, & Fede, 2013). Moreover, in real-life situations, investigators evaluate the overall perception of a witness's testimony. The evaluators in the current study had also received training in statement analysis lie-detection. A Cohen's K analysis indicated a substantial agreement between the two coders, $K = .65$, $p < .001$ (Landis & Koch, 1977; Viera & Garrett, 2005). The length of testimony (children's total number of words spoken) in response to the free recall question, the cognitive load questions and their prompts was measured using a word processing program.

Children's testimony was examined for forthcomingness, which was measured by evaluating when children disclosed about the theft. First, whether or not children disclosed E1's involvement with the theft before the last question was coded by two independent coders. If children disclosed before the last question that directly inquired about E1's involvement with the theft, then the script was coded with a 1; if children only disclosed E1's involvement with the theft during the last question, the script was coded as 0. The two raters had almost perfect agreement, Cohen's $K = .94$, $p < .001$.

Results

Analysis plan

For all analyses, child and interviewer gender were coded as 0 for males and 1 for females. In order to address the hypothesis that children's willingness to tell a lie during an interview would be influenced by their age, their gender and the gender of the interviewer, logistic regression analyses were conducted. When analysing all four conditions, a hierarchical logistic regression analysis was used. Another hierarchical logistic regression was conducted to assess further the influence of being in a lying condition on children's

willingness to lie. To further differentiate differences in willingness to lie based on lying condition, each condition was examined separately using two binary logistic regression analyses.

To address forthcomingness (i.e. when in the interview they disclosed about the theft), a binary logistic regression was first conducted for all participants. Following this, separate binary logistic regression analyses were conducted to assess the influence of disclosure type (i.e. an accusation or a denial) on children's forthcomingness to disclose the theft. Finally, in order to examine children's length and consistency of testimony, two multivariate analyses of covariance (MANCOVAs) were performed based on whether children made an accusation or a denial.

Willingness to lie

Of the children in the two lying conditions ($n = 77$), 72.7% of the children lied during the interview, and all the children told the truth in the two truth conditions ($n = 50$). More specifically, 59% ($n = 23$) of the children in the FD condition falsely denied the theft, and 86.8% ($n = 33$) of the children in the FA condition lied and falsely accused E1 of taking the money.

A hierarchical logistic regression analysis was conducted to assess the influence of condition, children's age and gender, the interviewer gender and the interaction between child and interviewer gender on children's willingness to tell a lie in all four conditions. Condition was entered on the first step, children's age on the second step, their gender on the third step, the gender of the interviewer on the fourth step and the interaction between the child's and interviewer's genders on the fifth step. There was a significant effect for condition, $\chi^2(1, N = 127) = 46.32$, $p < .001$, Nagelkerke $R^2 = .41$, indicating that condition was a significant predictor of children's true and false reports, b coefficient = -1.36 , $SE = 0.25$, Wald = 30.01, $p < .001$, $\exp(B) = 0.26$. However, this included both

Table 1. Questions during which children disclosed the theft.

	During the free recall question (%)	During cognitive load questions (%)	During yes/no questions (%)	At direct inquiry (last question) (%)
Across all conditions	31.5	11.0	7.9	49.6
Told a truth	38.0	15.5	8.5	38.0
Told a lie	23.2	5.4	7.1	64.3

the truth- and lie-telling conditions. There was also a significant effect for age, $\chi^2(1, N = 127) = 4.89$, $p = .027$, Nagelkerke $R^2 = .45$. As children aged, they were less likely to lie, b coefficient $= -0.03$, $SE = 0.01$, Wald $= 4.56$, $p = .033$, $\exp(B) = 0.98$. None of the other steps were significant.

In order to investigate the effects of condition further, a hierarchical logistic regression analysis was conducted to assess the influence of being in a lying condition (i.e. in the FD and FA conditions), children's age, gender, the gender of E2 and the interaction between the child and interviewer's genders on children's willingness to tell a lie. Condition (FD and FA together) was entered in the first step, and children's age, gender, the gender of E2 and their interaction were entered in Steps 2 to 5 as outlined above. There was a significant effect for condition, $\chi^2(1, N = 77) = 7.84$, $p = .005$, Nagelkerke $R^2 = .14$, indicating that lying condition was a significant predictor of children's true and false reports, b coefficient $= 1.52$, $SE = 0.58$, Wald $= 6.91$, $p < .009$, $\exp(B) = 4.60$. There was also a significant effect for age, $\chi^2(1, N = 77) = 5.45$, $p = .020$, Nagelkerke $R^2 = .23$. As children aged, they were less likely to lie, b coefficient $= -0.03$, $SE = 0.02$, Wald $= 4.92$, $p = .027$, $\exp(B) = 0.97$. None of the other steps were significant.

Given the results stated above, of interest was whether there were differences in willingness to lie based on each lying condition; thus, each lying condition was examined using two separate binary logistic regression analyses. In both analyses, children's age, gender, the gender of E2 and the interaction between genders

were entered as predictors in Steps 1 to 4, respectively, and whether or not children lied was the dependent variable. Overall, no significant effects were found in either of the FD and FA conditions.

Forthcomingness to disclose

A binary logistic regression was conducted to assess the influence of willingness to lie, children's age and gender, the gender of E2 and the interaction between the genders on children's forthcomingness to disclose the theft (i.e. when they disclosed about the theft) in all four conditions. First, whether or not children disclosed information about the theft before the last question was examined in all children. The model was significant, $\chi^2(5, N = 127) = 17.65$, $p = .003$, Nagelkerke $R^2 = .17$. However, only age was a significant predictor of whether children disclosed about the theft before the last question, b coefficient $= 0.24$, $SE = 0.10$, Wald $= 5.66$, $p = .017$, $\exp(B) = 1.03$. As children's age increased, so did their willingness to disclose before being directly prompted by E2. Children's gender also approached significance, b coefficient $= -0.97$, $SE = 0.52$, Wald $= 3.54$, $p = .06$, $\exp(B) = 0.38$, with boys being more willing to disclose about the theft before being directly prompted by E2 on the last interview question. Interviewer gender and the interaction between child and interviewer gender were not significant predictors. See Table 1 for a description of when children disclosed the theft in the interview based on whether they told the truth or a lie and based on their condition.

Next, separate binary logistic regression analyses were conducted for the accusation or denial conditions to assess the influence of disclosure type on children's forthcomingness to disclose the theft. To evaluate children's accusations, those who truthfully accused E1 of the theft (TA condition and truth-tellers in FD condition because they gave the same disclosures: truthful accusations of E1 taking the money) were compared with lie-tellers in the FA condition. Forthcomingness to disclose was the dependent variable, and children's age, gender, veracity of disclosure (TA vs. FA) and interviewer gender were the predictors. The model was significant, $\chi^2(4, N=76)=26.79$, $p<.001$, Nagelkerke $R^2=.40$. Child age and gender were significant predictors of disclosure forthcomingness. Specifically, when making an accusation, children were significantly more willing to disclose the theft before the direct prompt by E2 with age, b coefficient = 0.84, $SE=0.22$, Wald = 14.32, $p<.001$, $\exp(B)=2.31$. In addition, boys (73%) were significantly more willing than the girls (50%) to disclose the theft before being directly prompted by E2, b coefficient = 1.37, $SE=0.60$, Wald = 5.26, $p=.022$, $\exp(B)=3.95$. Interviewer gender and disclosure veracity were not significant predictors of disclosure forthcomingness when evaluating children's accusations.

For denials, children who truthfully denied the theft (TD condition and truth-tellers in the FA condition because they gave the same disclosures: truthful denials of E1 not taking the money) were evaluated against the lie-tellers in the FD condition. Again, forthcomingness to disclose was the dependent variable, and children's age, gender, veracity of disclosure (TD vs. FD) and interviewer gender were the predictors. The model was significant, $\chi^2(4, N=51)=10.34$, $p=.035$, Nagelkerke $R^2=.25$, with interviewer gender and disclosure veracity being significant predictors of disclosure forthcomingness. Children were significantly more willing to disclose the theft before being directly prompted to male

interviewers (55%) than to females (22%), b coefficient = 1.37, $SE=0.71$, Wald = 3.74, $p=.053$, $\exp(B)=3.92$. Moreover, children who truthfully denied the theft were more forthcoming in their disclosure of the theft (57%) than those who falsely denied the theft (26%), b coefficient = 1.39, $SE=0.70$, Wald = 3.90, $p=.048$, $\exp(B)=4.00$. Child age and gender were not significant predictors of disclosure forthcomingness when making true or false denials.

Quality of testimony

First, children's length of testimony (i.e. the number of words disclosed to the interviewer in the free recall question, the cognitive load questions and their prompts) was examined. Overall, children provided an average of 347.87 words ($SD=276.54$) to the interviewer. Second, the free recall question, the cognitive load questions and their prompts were examined for consistency of testimony (i.e. whether a script included a clear and logistical story with no notable contradictions). The higher the score (i.e. closer to 1), the more consistent the testimony. Children received an average consistency score of .82 ($SD=.35$) indicating that the majority of testimonies were deemed consistent.

Of interest was whether children would have lengthier and more consistent testimony based on whether or not children made a denial or accusation, children's age, gender, the gender of the interviewer and the interaction between genders. Given that the two dependent variables (length of testimony and consistency) were significantly correlated together ($r=.44$, $p<.001$), two MANCOVAs were performed.

In the first MANCOVA, children who made an accusation (i.e. children in the FA condition vs. children in the TA condition and children who told the truth in the FD condition) were examined. The independent variables were making an accusation, gender and gender of the interviewer; children's age was a covariate. The results of this analysis indicated

Table 2. Mean length of testimony for children who made true and false accusations, based on children's gender and E2's gender.

Accusations of E1	Male E2	Female E2
False		
Male children	258.89 (72.82)	351.63 (88.39)
Female children	396.67 (80.41)	289.75 (80.53)
True		
Male children	458.95 (63.08)	286.55 (71.90)
Female children	237.59 (68.67)	398.34 (75.83)

Note: E1 = primary experimenter; E2 = interviewer. Standard errors in parentheses.

a multivariate effect for the two variables in relation to children's age, Wilks's $\Lambda = 13.14$, $p < .001$, $\eta_p^2 = .29$. Children's age significantly predicted length of testimony, $F(1, 67) = 23.15$, $p < .001$, $\eta_p^2 = .26$, and consistency, $F(1, 67) = 11.22$, $p = .001$, $\eta_p^2 = .14$. As children got older, their testimony increased in length and were more consistent. There was also a multivariate effect for the three-way interaction between accusation, children's gender and E2's gender, Wilks's $\Lambda = 3.55$, $p = .034$, $\eta_p^2 = .01$. The interaction significantly predicted length of testimony, $F(1, 67) = 6.18$, $p = .015$, $\eta_p^2 = .08$; consistency approached significance, $F(1, 67) = 3.13$, $p = .082$, $\eta_p^2 = .05$. Follow-up analysis of covariance (ANCOVA) analyses were performed to further understand the three-way interaction for length of testimony. Within the children who falsely accused E1 of taking the money, the interaction between children's gender and E2's gender was not significant, $F(1, 28) = 2.89$, $p = .102$, $\eta_p^2 = .09$. However, the interaction between children's gender and E2's gender approached significance when children truthfully accused E1 of taking the money $F(1, 38) = 3.95$, $p = .054$, $\eta_p^2 = .09$. See Table 2 and Figures 1 and 2 for the mean length of testimony for children who made true and false accusations, based on children's gender and E2's gender. None of the other variables significantly contributed to the model.

Another MANCOVA was performed on the length of testimony and consistency for

children who made a denial (i.e. children in the FD condition vs. children in the TD condition and children who told the truth in the FA condition); the independent variables were making a denial, gender and gender of the interviewer; children's age was a covariate. Again, the results of this analysis indicated a multivariate effect for the two variables in relation to children's age, Wilks's $\Lambda = 7.52$, $p = .002$, $\eta_p^2 = .27$. Children's age significantly predicted length of testimony, $F(1, 42) = 11.37$, $p = .002$, $\eta_p^2 = .21$, and consistency, $F(1, 42) = 7.94$, $p = .007$, $\eta_p^2 = .16$. As children got older, their testimony increased in length and were more consistent. The multivariate effect for the interaction between denial and children's gender approached significance, Wilks's $\Lambda = 3.11$, $p = .055$, $\eta_p^2 = .13$, and in particular for length of testimony, $F(1, 42) = 3.33$, $p = .075$. There was a trend that when making a false denial, boys ($M = 355.99$, $SD = 73.81$) appeared to provide lengthier testimony than girls ($M = 275.55$, $SD = 87.27$). However, the data suggest that the reverse occurred when truthfully denying the theft: girls ($M = 505.03$, $SD = 64.89$) appeared to provide lengthier testimony than boys ($M = 281.22$, $SD = 104.20$). None of the other variables significantly contributed to the model.

Discussion

The present study contributes to the way researchers and the forensic community understand how interviewer variables influence

Figure 1. Mean length of testimony in the false accusation (FA) and true accusation (TA) conditions for male and female children, interviewed by male interviewers.

Figure 2. Mean length of testimony in the false accusation (FA) and true accusation (TA) conditions for male and female children, interviewed by female interviewers.

children's lie-telling behaviours. The purpose of this study was to examine the influence of children's age, their gender and the interviewer's gender on their willingness to falsely deny a theft that occurred, or falsely accuse someone of a theft that did not take place by examining the characteristics of children's true and false testimony, including their forthcomingness to disclose about the theft, and the length and consistency of their testimony.

This study was one of the few to examine children's abilities to tell both false denials and false accusations in a high-cost situation. By using a theft paradigm that the children believed was true and which they believed would have real and significant

consequences to the perpetrator, the methodology provided ecological validity to the study, with the goal of provoking the same emotions and behaviours as those that children would experience witnessing a real-life crime. While the children were instructed to lie, this is analogous to a situation where a child who has witnessed a crime is coached or encouraged by someone to conceal it or falsely accuse someone of something he/she did not do. Surprisingly, no previous research has addressed the factors related to a child witness's willingness to disclose to an investigator. Therefore, these results provide initial insight into disclosure decision-making among child witnesses.

Children's false denials and false allegations

Overall, whether it be a false denial or a false accusation, most children were willing to lie. This supports previous research on children's lie-telling behaviour (i.e. Gervais et al., 2000; Tye et al., 1999; Williams, Kirmayer, Simon, & Talwar, 2013). In the present study, children were more willing to make a false accusation than a false denial. The current study's rate of false accusation is higher than that reported by Tye et al. (1999). However, Tye and colleagues asked children to accuse a research assistant of stealing a book that a family member had actually stolen, and thus their false accusations were confounded by a need to falsely deny the family member's complicity. Importantly for the current study, the differences in forthcomingness to disclose and the quality of children's testimony were influenced not only by whether or not they made an accusation or a denial, but also by their gender, the interviewer's gender and their age, as detailed below.

Gender

The present study is one of only a few to examine the effects of interviewer gender on children's willingness to lie, their forthcomingness and the quality of their testimony. The interaction between child and interviewer gender was of interest because of the possible effects the interviewer's gender may have on children's testimony. Children may consider certain characteristics of the interviewer, including his/her gender, when deciding whether to disclose the truth, especially when they have been asked to keep another's actions a secret.

In the current study, the results indicated a trend for children's gender to influence when children disclosed the theft during the interview. It was implied that boys tend to disclose the theft earlier in the interview than did girls. This disclosure prior to direct prompting occurred for boys whether they were making a true or a false accusation. Thus, boys may be more willing to lie prior to prompting than

girls. Interestingly, boys were more willing, in general, to broach the topic of theft altogether. Alternatively, girls were more withholding of information regarding the theft than were boys.

There was a three-way interaction between type of accusation (true or false), children's gender and the interviewer's gender for length of testimony. When making false accusations, girls provided longer testimony to male interviewers; but when making true accusations, girls provided longer testimony to female interviewers (see Table 2). When making true accusations to male interviewers, boys provided longer testimony than did girls. The relationship between gender of respondent and gender of interviewer, and simply the gender of respondent, to statement characteristics is complex. Suckle-Nelson et al. (2010), for example, reported that honest women provided more words and details than honest men, whereas deceptive women provided fewer words and details than deceptive men. These researchers did not take into account the gender of the interviewer, and these were adult participants. Lamb and Garretson (2003) also found that girls provided more detailed responses than boys, and that interviewer gender did not affect the amount of details children disclosed when interviewers used structured protocols. In the present study, the interviewer's gender influenced both boys' and girls' length of testimony when they were honest and when they were lying.

Results differed, however, when children were asked to deny that the money was taken. When making a false denial, only 26% of children mentioned the theft without being directly prompted. Children were more willing to make unprompted denials to males (55%) than to females (22%). Importantly, honest denials were more likely to emerge unprompted than were false denials. When lying, boys tended to provide lengthier testimony, but when telling the truth, girls appeared to speak for longer.

Age

Generally, age influenced willingness to lie, children's forthcomingness to disclose, and the

length and consistency of their testimony. In terms of willingness to lie, children were significantly less likely to lie as they got older. Overall, regardless of condition, children's forthcomingness to disclose about the theft before being asked directly increased as their age increased. More specifically, children's age significantly predicted their forthcomingness to disclose when they were making an accusation, whether it be a true or a false accusation. Again, older children disclosed earlier in the interview. Conversely, older children were not more likely to disclose earlier when making a denial. Finally, when asked to make either an accusation or a denial, children's testimony increased in both consistency and length as children aged.

The current study's results are consistent with those of previous research. Older children have been found to be less willing to lie overall and less willing to lie to protect another (e.g. Lyon et al., 2014; Pipe & Wilson, 1994). Recently, Talwar et al. (2016) reported that children's knowledge about truth and lies and their understanding of morality increase with age. The older children in the current study may have felt badly about lying to the interviewer and realized the potential consequences a lie might produce. They may have believed that lying to falsely deny or falsely accuse another of the theft was morally wrong, and therefore decided not to lie.

Age, the development of executive function (i.e. inhibition, working memory; verbal understanding and language) and theory-of-mind have been related not only to children's ability to lie, but also to provide a coherent and consistent lie (Evans, Xu, & Lee, 2011; Polak & Harris, 1999; Talwar & Crossman, 2011; Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2002, 2008). To tell an effective, consistent and convincing lie, children must understand that their thoughts and knowledge differ from those of others and that others have their own unique attitudes and beliefs that can only be known to themselves (theory-of-mind; Talwar & Crossman, 2011).

Children's verbal knowledge and fluency also influence their abilities to effectively produce and maintain a consistent lie. Therefore, as children grow older, their cognitive abilities improve, allowing them to provide more information in their testimony, and more consistent stories, and to better choose when to disclose or not disclose information.

Implications

The present study is one of the first to examine directly the complex interplay of gender of respondent, gender of interviewer and type of statement as they relate to whether children will disclose and what type of statement they will produce. When lying and denying that the theft occurred, all children avoided mentioning the theft of the 20 dollars until they were directly asked about it. This was especially so when children were interviewed by females. These results suggest that when interviewed about a witnessed event, children may wait until directly asked about an event to disclose about it, especially when interviewed by women. However, when telling the truth about an accusation (i.e. correctly accusing E1 of taking the money when he/she had done so), children gave lengthier testimony to adults of the same gender. Boys provided longer testimony to male interviewers and girls to female interviewers. Therefore, in order to promote honesty outside of a laboratory context, children might be more willing to disclose a negative event to an adult of the same gender. The results of the present study suggest that the gender differences and gender interactions are another avenue that researchers should examine further in the child eyewitness literature. Legal professionals should be aware of the possibilities of a gender by gender interaction when interviewing children. With time and replication, researchers may be able to provide these legal professionals with a more concrete idea of whether interviewer gender positively or negatively increases children's willingness to lie, their forthcomingness to disclose, and

the quality of their testimony when making both false denials and false accusations.

Limitations and future directions

In real-life cases involving false accusations, children are often asked by an offender to falsely accuse a third party of a transgression that he/she did not commit (Black et al., 2012; Trocmé & Bala, 2005). In the present study, however, for ethical reasons, we were not able to have a false accusation of a third party. In the present study, children were asked to falsely accuse the instigator whom they did not know well of a theft that he/she did not commit, at the behest of the instigator. Although more uncommon, such a situation is plausible. An example would be that of a man who lives with his wife and child who has been arrested numerous times for drug possession and is on probation. The police come to their house and find drugs. The mother tells the child to say that the drugs were hers so that the father does not get another drug possession charge. In such a case, she has asked the child to falsely accuse her of something she did not do.

However, given the ethical limitations of this study, it was not possible to study false accusations where participants falsely incriminated another without the consent of the accused. False accusations of an innocent third party may result in more emotional discomfort than the FA condition used here (Gries et al., 2000; Savvidou et al., 2002). The potential increase in anxiety, guilt and/or cognitive effort could reduce the consistency, coherence and/or vividness of a child's testimony (Almerigogna, Ost, Bull, & Akehurst, 2007; Nolan & Markham, 1998; Rush et al., 2014), which may result in more discernible differences between true and false accusations. In the current study, the rate of false accusation is likely to be inflated and perhaps a result of the children believing that they were helping the instigator, and they lied to please him/her and believed that the instigator would not get into trouble if they lied. Despite this, children were

free to tell the truth in the false accusation condition, and some children did choose to do so. Therefore, a challenge for future studies is to ethically and ecologically examine children's accusations of innocent third parties. Children may be less willing to lie if they know that they are covering up a wrongdoing.

Researchers should also investigate children's rationale for lying in false accusation conditions by providing children with a post-interview questionnaire to examine why children chose to lie or tell the truth. Asking children about their comfort with and perceptions of the interviewer may provide more insight into whether interviewer gender plays a role in children's decisions of whether or not to lie. The perceived authority of the interviewer based on gender may also be an area worthy of further investigation (Lamb & Garretson, 2003). Finally, the context of the disclosure and the decision-making processes associated with disclosure versus omission of information from children's testimony needs to be studied in detail. When, why and how do children decide to disclose or withhold a piece of information from an investigator, and what can be done to facilitate complete and accurate disclosures?

Conclusion

The present study evaluated children's (aged 6 to 11 years) abilities to falsely deny a theft committed by an instigator or falsely accuse the instigator of a theft he/she did not commit. This ecologically relevant theft paradigm with apparent negative consequences to the instigator was used to increase the generalizability of the results and incite the same emotions and behaviours as those that children would experience witnessing a real-life crime. Of particular interest for this study was whether children's age, their gender and the interviewer's gender influenced children's willingness to lie, forthcomingness to disclose and the quality of their reports. Indeed, this study was the first known study to directly manipulate

interviewer gender in such a high-cost situation.

Overall, the findings suggest that children's willingness to lie, forthcomingness to disclose and the quality of their testimony are influenced by their age, gender and the gender of the interviewer. Moreover, whether children were asked to falsely deny or falsely accuse another influenced children's forthcomingness and quality of testimony. Children's age and gender influenced when children disclosed about the theft when they were making an accusation. When making a denial, children were more willing to disclose about the theft earlier to male interviewers. Therefore, these results suggest that children might be willing to avoid disclosing the truth in an interview until directly asked about an event in question, especially to a woman, and when denying an event. However, when making a truthful accusation, children gave lengthier testimonies to adults of the same gender. These findings could have important consequences for individuals who interview children when they witness or are victims of a crime. Professionals should be aware of the possibilities of multiple gender by gender interactions when interviewing children.

Ethical standards

Declaration of conflicts of interest

Ida Foster has declared no conflicts of interest.

Joshua Wyman has declared no conflicts of interest.

Donia Tong has declared no conflicts of interest.

Kevin Colwell has declared no conflicts of interest.

Victoria Talwar has declared no conflicts of interest.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or

national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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Appendix

Experimental conditions

False denial

Remember when we were upstairs and I found Victoria's wallet? Remember how there was 20\$ in the wallet and I took it? E2 thinks I took Victoria's money. Please tell E2 I did not take the money. Victoria didn't tell me to take the money – but I really need it. It's a secret. Let's practice. If E2 asks about the money, say I didn't take it. If E2 asks about the money, what do you say? After child responds say: Good, because it's a secret.

False accusation

Remember when we were upstairs and I found Victoria's wallet? Remember how there was 20\$ in the wallet and I did not take it? E2 thinks that I took the money. Please tell E2 that I took the money even though I did not take the money. Victoria didn't tell me to take the money – so I did not take it. But, I want you to tell a secret for me. If E2 asks about the money, say I took it, even though I didn't. Let's practice. If E2 asks about the money, what do you say? After child responds say: Good, because it's a secret.

True accusation

Remember when we were upstairs and I found Victoria's wallet? Remember how there was 20\$ in the wallet and I took it? E2 thinks that I took the money. Please tell E2 that I did take the money. Victoria had told me to take the 20\$ and I

need it. So if E2 asks about the wallet, say I took it, because it's not a secret. If E2 asks about the wallet, what do you say? After child responds say: Good, because it's not a secret.

True denial

Remember when we were upstairs and I found Victoria's wallet? Remember how there was

20\$ in the wallet and I did not take the 20\$? E2 thinks that I took the money. Please tell E2 that I did not take the money. Victoria had told me to take the 20\$ but I do not need it. So if E2 asks about the wallet say I didn't take it, because it's not a secret. If E2 asks about the wallet, what do you say? After child responds say: Good, because it's not a secret.