

October 27, 2014

39. Young Children's Difficulty with Indirect Speech Acts: Implications for Questioning Child Witnesses

Angela D. Evans, *Brock University*

Stacia N. Stolzenberg, *University of Southern California*

Kang Lee, *University of Toronto, Canada*

Thomas D. Lyon, *University of Southern California*

Young Children’s Difficulty with Indirect Speech Acts: Implications for Questioning Child Witnesses

Angela D. Evans^{*,†}, Stacia N. Stolzenberg[‡], Kang Lee[§]
and Thomas D. Lyon[‡]

Prior research suggests that infelicitous choice of questions can significantly underestimate children’s actual abilities, independently of suggestiveness. One possibly difficult question type is indirect speech acts such as “Do you know...” questions (DYK, e.g., “Do you know where it happened?”). These questions directly ask *if* respondents know, while indirectly asking *what* respondents know. If respondents answer “yes,” but fail to elaborate, they are either ignoring or failing to recognize the indirect question (known as pragmatic failure). Two studies examined the effect of indirect speech acts on maltreated and non-maltreated 2- to 7-year-olds’ post-event interview responses. Children were read a story and later interviewed using DYK and Wh- questions. Additionally, children completed a series of executive functioning tasks. Both studies revealed that using DYK questions increased the chances of pragmatic failure, particularly for younger children and those with lower inhibitory control skills. Copyright © 2014 John Wiley & Sons, Ltd.

Prior research on child interviewing suggests that inappropriate questions can significantly underestimate children’s abilities, independent of suggestiveness (Evans & Lyon, 2012a; Lyon, Carrick, & Quas, 2010; Lyon, Quas, & Carrick, 2013; Wandrey, Quas, & Lyon, 2012). Further, failure to answer such inappropriate questions in the manner that adults expect may undermine a child’s credibility (e.g., Ruva & Bryant, 2004; Saywitz, Nathanson, & Snyder, 1993).

Yes–no questions predominate in interviews with children (Fritzley & Lee, 2003). However, children tend to provide unelaborated “yes” or “no” responses to such questions (Stolzenberg & Lyon, 2014). The lack of elaboration makes yes–no questions less productive than open-ended questions, which ask for a narrative response rather than a single word or detail (Lamb, Hershkowitz, Orbach, & Esplin, 2008). Children may also exhibit response biases in answering yes–no questions. However, the nature of those biases is unclear; whereas some studies identified a “yes” bias (Peterson, Dowden, & Tobin, 1999; Steffensen, 1978), other research has found a “no” bias (Peterson & Biggs, 1997), and a number of studies have found no consistent bias (Brady, Poole, Warren, & Jones, 1999; Greenhoot, Ornstein, Gordon, & Baker-Ward, 1999).

*Correspondence to: Dr. Angela Evans, Department of Psychology, Brock University, 500 Glenridge Ave., St. Catharines, Ontario, L2S 3A1 Canada. E-mail: aevans@brocku.ca

[†]Department of Psychology, Brock University, 500 Glenridge Ave., St. Catharines, Ontario L2S 3A1, Canada

[‡]University of Southern California, CA

[§]University of Toronto, Canada

Moreover, Fritzley and Lee (2003) and Fritzley, Lindsay, and Lee (2013) discovered a transition from a “yes” bias to a “no” bias among 2- to 4-year-old children who were asked incomprehensible questions. The present study examined how children respond to a specific type of yes–no question: indirect speech acts.

Indirect Speech Acts

According to Clark (1979), indirect speech acts directly ask *if* respondents know, while indirectly asking *what* respondents know. For example, the question, “Do you know where it happened?” is explicitly a yes–no question asking whether addressees know information (e.g., “Yes I know” or “No I do not know”), and implicitly a request for that information. Indirect speech acts are considered polite, because they do not presume that respondents know the information (Lakoff, 1973). However, if respondents answer “yes,” but then fail to elaborate, they are either ignoring or failing to recognize the implicit question. They will be viewed as an uncooperative conversational partner, a situation that can be called pragmatic failure. Conversely, directly requesting information with a Wh- question (questions beginning with “what,” “how,” “where,” or “who”; e.g., “Where did it happen?”) is potentially suggestive, insofar as it presupposes that respondents know the information.

There has been little laboratory research on the development of children’s understanding of indirect speech acts, probably because early research found that even very young children responded appropriately to indirect speech acts that implicitly asked children to perform an action (Bara & Bucciarelli, 1998; Bucciarelli, Colle, & Bara, 2003; Reeder, 1980; Shatz, 1978). However, observational research suggests that children may have difficulty with indirect speech acts that request information about experienced events. For example, Walker and Hunt (1998) examined transcripts of child protective services interviews with children between 2 and 13 years of age and found that in response to “Can you tell/Can you show me...?” questions, children provided an unelaborated “yes” response 28% of the time (see also Walker, 1993). Further, Evans and Lyon’s (2012b) examination of court transcripts revealed that 4- to 9-year-old children provided unelaborated “yes” responses 46% of the time to “Do you know/do you remember...?” questions that implicitly asked a Wh- question.

One possible developmental mechanism behind children’s responses to indirect speech acts is children’s executive functioning skills, which are a set of higher-order psychological processes involved in goal-oriented behavior under conscious control (Zelazo & Muller, 2002). A “yes” response to a yes–no question may be impulsive; Moriguchi *et al.* (2008) found that a “yes” bias among 3- to 5-year-old children was related to poorer executive functioning as measured by performance on the Dimensional Change Card Sort (DCCS) task. Moreover, as noted above, Fritzley and colleagues (Fritzley & Lee, 2003; Fritzley, Lindsay, & Lee, 2013) found a “yes” bias among the youngest children (2-year-olds). Taken together, these findings suggest that children’s inhibitory control skills (the ability to suppress an automatic response while producing an alternative response) may be particularly important for avoiding a “yes” bias. In particular, Carlson and Moses (2001) propose that there are two different types of inhibitory control tasks: delay and conflict. Delay tasks involve measures of children’s ability to delay, temper, or suppress an impulsive response, whereas conflict tasks require children to respond a certain way in the face of a highly salient, conflicting response option. Given that, to prevent pragmatic failure, children must delay their

impulsive “yes” response to the explicit request of whether they know in order to identify the implicit request for further information, it is possible that children’s performance on delay tasks may be particularly important for avoiding pragmatic failure. Working memory (the ability to hold information in memory while manipulating the information) may also be implicated in children’s responses to indirect speech acts, insofar as children have to keep in mind both the explicit question (“Do you know...”) and the implicit question (“...where it happened?”). To our knowledge, no research has examined the developmental trajectory of children’s responses to indirect speech acts, including the relation between their responses and their executive functioning skills.

Present Investigation

Across two studies, the present investigation examined non-maltreated and maltreated 2- to 7-year-old children’s ability to provide elaborative and accurate responses to indirect speech acts (i.e., DYK questions) when questioned about a story following a short delay. We predicted that children would frequently provide unelaborated “yes” responses to DYK questions, and that this tendency would be related to age and to inhibitory control, working memory, and verbal ability. Further, we examined whether children’s avoidance of pragmatic failure was related to inhibitory control in general or whether children’s performance on a delay, compared with the conflict task, would be particularly important. We compared children’s performance in response to Wh- questions and predicted that Wh- questions would elicit more elaborative responses.

STUDY 1

Method

Participants

Participants were 98 English-speaking children age 2 years 10 months to 6 years 0 months ($M = 55$ months, $SD = 10$ months, 50% male) from a major Canadian city. The ethnic breakdown of the sample was 71% Caucasian, 5% Asian, 5% East Indian, 6% African Canadian, and 13% biracial, other, or unknown. Written consent was obtained from all parents, as well as verbal assent from children.

Materials and Procedures

The experimenter read a story about a day in the life of a fictional character, Jessie Jones (gender was matched to the participant), to children individually. During the story, Jessie participates in activities such as eating breakfast, making an art project, going to a park, eating ice cream, attending a birthday party, and going to bed. After reading the story, participants completed a series of cognitive assessments (order randomized between participants). See Table 1 for the means and standard deviations for each of the cognitive tasks and Table 2 for the intercorrelations among age and the cognitive tasks.

Table 1. Means (SD) for each of the cognitive tasks by study

Task	Study 1	Study 2
Day/night	10.67 (4.65)	12.97 (3.99)
Bear-dragon	8.85 (2.01)	9.08 (1.88)
Six-box scramble	7.71 (2.23)	7.89 (2.05)
PPVT (age standardized)	112.95 (16.49)	–
Woodcock Johnson	–	14.95 (3.14)

PPVT, Peabody Picture Vocabulary Test.

Table 2. Correlation matrix for age and the cognitive assessments in Study 1

	Age (months)	Day/night	Bear-dragon	Six box	PPVT
Age (months)					
Day/night	0.32*				
Bear-dragon	0.36*	0.32*			
Six box	-0.25*	-0.22*	-0.29*		
PPVT	0.52*	0.31*	0.51*	-0.27*	

* $p < 0.05$.

PPVT, Peabody Picture Vocabulary Test

Cognitive Tasks

A series of tasks were completed that measure children's inhibitory control, working memory, and receptive vocabulary skills. All scores for the cognitive tasks were z -scored for analyses.

Bear-dragon. (Reed, Pien, & Rothbart, 1984). The bear-dragon task assesses delay inhibitory control. Children were asked to do what the friendly bear says (e.g., "touch your leg") but not what the mean dragon says. Children were given 10 test trials in which either the bear or the dragon asked them to complete an action. Children received a score out of 10 for the number of trials they completed according to the rule.

Day/night Stroop. (Gerstadt, Hong, & Diamond, 1994). This task tests conflict inhibitory control. Children were shown a card with a picture of the sun and asked to say "night" when they were shown this card, and another card with a picture of the moon and asked to say "day" when shown this card. Children were then shown 16 cards sequentially with either a sun or a moon picture. Children received a score out of 16, with one point for each picture they successfully labeled according to the rules.

Six-box Scramble. (Diamond, Prevor, Callender, & Druin, 1997). The six-box scramble is a test of working memory. Stickers were placed in six different-colored boxes. Children were asked to find all of the stickers, and were told that they could keep the ones they found. Children were allowed to open one box at a time. After each trial, the experimenter shuffled all of the boxes before allowing them to open the next box. This was repeated until children retrieved all stickers up to a maximum of 15 trials. Children received a score based on the number of trials to find all stickers subtracted from 15 (the maximum number of trials allowed).

Peabody Picture Vocabulary Test – 4th edition. (PPVT-4; Dunn & Dunn, 2007). This task assesses children's receptive vocabulary. Children were presented with a series of pages with four pictures per page, and for each page, children were asked to select

which picture best depicted the meaning of the word stated by the experimenter. PPVT raw scores were *z*-scored and used for analyses.

Distractor Task. After completing the assessments, participants were presented with a hidden picture task, whereby they needed to find concealed objects in a drawing. This was used as a distractor task to increase children’s cognitive load to more closely simulate answering questions in a stressful environment.

Interview

After 2 minutes of working on the distractor task, the experimenter began the interview. Participants were asked to continue working on the hidden pictures task during the interview phase. Each participant was asked about both events that had occurred and events that had not occurred (e.g. “What did Jessie’s dad say?” when Jessie’s dad never spoke). Participants received two phases of questions. In phase 1, children were asked six direct questions about the target event, (e.g., “Did anything happen with the cereal?”) and one summary question (i.e., “Is there *anything/something* else that you want to tell me?”). In phase 2, children were asked 12 more questions about the target event: six Wh- and six DYK questions (two of each about non-occurring events). The order of questions was randomized within each phase. The question content (e.g., cereal spilling) was also counterbalanced across question type. For the purpose of this investigation, only the second phase of questions were examined.

Coding

Children’s responses to all questions were coded as the following: unelaborated “yes,” unelaborated “no,” “I don’t know” (IDK), and elaborated responses categorized as either accurate or inaccurate. Unelaborated “no” and IDK responses were combined (No + IDK) because a “no” response to a DYK questions is equivalent to an IDK response to a Wh- question. For occurring-event questions, accurate responses included descriptions of what occurred in relation to the question asked. For non-occurring event questions, accurate responses were explicit denials that the proposed event occurred (e.g., “The dog didn’t do anything”). Reliability was assessed for 20% of the sample with all kappa values >0.80.

Results

We examined whether children provided unelaborated “yes” responses to DYK questions compared with Wh- questions, and whether this tendency would decrease with age. We also examined whether children would be more likely to provide an elaborated answer in response to Wh- than in response to DYK questions, as well as the accuracy of such elaborations. Finally, we assessed whether increased inhibitory control (as measured by the bear–dragon as well as the day/night stroop tasks), working memory (as measured by the six-box scramble), and verbal ability (as measured by the PPVT) would be related to children’s responses to the WH- and DYK questions. Both children’s responses to the occurring and non-occurring events were assessed to examine whether children would acquiesce or elaborate to questions about events that did not occur. All analyses were performed using a general linear model (GLM) on children’s response type, with question type (DYK vs. Wh-) as a repeated measure

and with age (in months) and the four cognitive assessments entered as continuous variables, unless otherwise stated. For all continuous variables that were significant in the GLM, we examined the correlation between the continuous variable and the dependent variable to determine the direction of the effect. Partial correlations, controlling for age, were used for all cognitive measures. See Table 3 for means and standard deviations by response type.

Occurring Event Questions

“Yes” Responses. Children never responded to Wh- questions with a simple “yes,” and therefore only children’s responses to DYK questions were analyzed. Children provided unelaborated “yes” responses to DYK questions 18% of the time (SD = 0.28). Thus, a GLM was conducted on the proportion of unelaborated “yes” responses to DYK questions, with age (in months) and the cognitive assessments entered as continuous variables. Bear–dragon score was the only significant variable [$F(1, 90) = 10.13, p = 0.002, \eta_p^2 = 0.11$]. Specifically, controlling for age, children were significantly less likely to provide a “yes” response with increased bear–dragon scores ($r = -0.41$).

No+IDK Responses. Results revealed a significant effect of age [$F(1, 90) = 5.45, p = 0.022, \eta_p^2 = 0.06$], with children’s use of No+IDK decreasing with age ($r = -0.27$). Further, there was a significant question type \times day/night interaction [$F(1, 90) = 4.85, p = 0.030, \eta_p^2 = 0.05$]. After controlling for age, neither correlation was significant but increased day/night scores were marginally related to children being less likely to respond to DYK questions with a No+IDK response (r -values = -0.14 and 0.07 for DYK and Wh- questions, respectively).

Inaccurate Elaborative Responses. No significant effects were found for children’s inaccurate elaborative responses.

Accurate Elaborative Responses. Findings indicated that both age [$F(1, 90) = 4.28, p = 0.04, \eta_p^2 = 0.17$] and PPVT scores [$F(1, 90) = 11.21, p = 0.001, \eta_p^2 = 0.09$] were significant. Specifically, with increased age, children were significantly more likely to provide an elaborated accurate response ($r = 0.44$). Further, after controlling for age, children were significantly more likely to provide accurate responses with increased PPVT scores ($r = 0.42$).

Table 3. Mean proportion (SD) of various response types for occurring and non-occurring event questions in Study 1

Response	Occurring				Non-occurring			
	DYK		Wh-		DYK		Wh-	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
“Yes”	0.18	(0.28)	0.00	(0.00)	0.13	(0.27)	0.01	(0.01)
“No” + IDK	0.29	(0.31)	0.25	(0.29)	0.62	(0.40)	0.52	(0.43)
Inaccurate Elaborative	0.10	(0.17)	0.19	(0.23)	0.17	(0.28)	0.32	(0.39)
Accurate Elaborative	0.44	(0.32)	0.56	(0.31)	0.08	(0.21)	0.15	(0.32)

* $p < 0.05$.

DYK, “Do you know...?”; IDK, “I don’t know.”

Non-occurring Event Questions

“Yes” Responses. As with occurring events, children rarely responded to Wh-questions with a simple “yes,” and therefore, only children’s “yes” responses to DYK questions were analyzed. Children provided unelaborated “yes” responses to 13% of the DYK questions ($SD = 0.27$). A GLM was conducted on the proportion of simple “yes” responses to DYK questions, with age (in months) and the cognitive assessments entered as continuous variables. There were three significant variables: age [$F(1, 90) = 8.03, p = 0.006, \eta_p^2 = 0.11$], day/night scores [$F(1, 90) = 5.17, p = 0.025, \eta_p^2 = 0.05$], and bear–dragon scores [$F(1, 90) = 9.90, p = 0.002, \eta_p^2 = 0.11$]. Specifically, as age increased, children were significantly less likely to provide an unelaborated “yes” response ($r = -0.35$). After controlling for age, children were significantly less likely to do so with increased bear–dragon scores ($r = -0.32$), and non-significantly more likely to do so with increased day/night scores ($r = 0.14$).

No+IDK Responses. There was a significant question type \times bear–dragon scores interaction [$F(1, 90) = 8.94, p = 0.004, \eta_p^2 = 0.09$]. After controlling for age, with increased bear–dragon scores, children were significantly more likely to provide a No + IDK response to DYK questions ($r = 0.29$). In contrast, there was no significant relation between bear–dragon scores and children’s No + IDK response to WH- questions ($r = -0.04$).

Inaccurate Elaborative Responses. No significant effects were found for inaccurate elaborative responses.

Accurate Elaborative Responses. No significant effects were found for children’s accurate elaborative responses.

Discussion

The aim of Study 1 was to assess young children’s productivity and accuracy when responding to DYK compared with Wh- questions. A fair number of children gave unelaborated “yes” responses to DYK questions, and we found some evidence that they were more likely to do so if they exhibited weaker inhibitory control as measured by the bear–dragon task. This suggests that pragmatic failure is related to children’s inability to inhibit an impulsive “yes” response to questions that explicitly ask a yes–no question and implicitly ask a Wh- question.

Recall that unelaborated “no” and IDK responses were combined (No + IDK) because a “no” response to a DYK questions is equivalent to an IDK response to a Wh- question. With respect to No + IDK responses, children with weaker inhibitory control were less likely to answer “no” to DYK questions about non-occurring events. When an event has not occurred, “no” is an appropriate response. There was some (albeit weak) support for a tendency among children with weaker inhibitory skills to simply answer “no” to DYK questions about occurring events.

With increased age, children were significantly less likely to provide an unelaborated “yes” response to DYK questions about non-occurring events, and less likely to say No + IDK to questions about occurring events. Furthermore, children’s age and vocabulary scores were positively related to accurate elaborations of their answers. In addition to supporting the fact that as children mature, they overcome pragmatic failure, these changes probably reflect better recall for the story and greater ability to provide narrative responses to the questions.

STUDY 2

A second study was conducted to further assess children's responses to questions with indirect speech acts in a sample of maltreated children. Given that maltreated children tend to exhibit lower scores on both executive functioning measures (e.g., Beers & De Bellis, 2002) and measures of vocabulary (Lyon & Evans, 2014) than non-maltreated children, at least when compared with middle- and upper-middle class children typically studied in developmental research, it was useful to examine how maltreated children would respond. Moreover, we sought to replicate the effects found in Study 1. Because of our anticipation that maltreated children would perform less well, the age range was increased to include children between 3 years 11 months and 7 years 11 months.

Based on Study 1, children were asked both DYK and Wh- questions about occurring and non-occurring events. Further, we were interested in assessing whether the distractor task from Study 1 influenced children's performance, and as such, we randomly assigned half of the sample to a no-distraction interview condition.

Method

Participants

Participants were 98 children aged 3 years 11 months to 7 years 11 months ($M=72$ months, $SD=13$ months, 49% male) who were awaiting a court appearance in the Los Angeles County Dependency Court. Children had been removed from the custody of their parent or guardian due to substantiated maltreatment. Children were ineligible to participate if they were Spanish-speaking (either officially recognized as Spanish-speaking by the court or clearly incapable of communicating in English), or if they were awaiting an adjudication hearing on the day of their appearance in court (as they might have to testify). The sample included 58% Latino, 28% African American, 11% Caucasian, and 3% biracial, other, or unknown.

Materials and Procedure

The materials and procedures were identical to Study 1, except for the following modifications. In Study 2, half of the children did not receive the hidden pictures distractor task (no-distraction condition). Children completed the Woodcock Johnson, instead of the PPVT, as a measure of verbal ability, and a cow puppet was used in place of the dragon puppet in the bear–dragon task. Again, all raw scores for the cognitive tasks were then z -scored for analyses. See Table 1 for the means and standard deviations for each of the cognitive tasks and Table 4 for the intercorrelations among age and the cognitive tasks. Additionally, children in Study 2 were not asked the six direct questions. Instead, the 18 event questions were divided into DYK and Wh- questions across six blocks. Each block included three questions: two about occurring events and one about a non-occurring event. Blocks alternated between DYK and Wh- question formats, and the question format of the starting block was counterbalanced between participants. Coding was identical to Study 1 (all kappa-values >0.80).

Table 4. Correlation matrix for age and the cognitive assessments in Study 2

	Age (months)	Day/night	Bear-dragon	Six box	Woodcock Johnson
Age (months)					
Day/night	0.39*				
Bear-dragon	0.41*	0.37*			
Six box	-0.21*	-0.08	-0.11*		
Woodcock Johnson	0.56*	0.33*	0.39*	-0.07	

* $p < 0.05$.

Results

We adopted an analytical approach similar to that in Study 1. Specifically, we examined whether maltreated children provided unelaborated “yes” responses to DYK questions compared with Wh- questions and whether this tendency would decrease with age. We also examined whether children would be more likely to provide elaborated answers in response to Wh- compared with DYK questions, as well as the accuracy of such elaborations. Additionally, we assessed whether children’s cognitive skills were related to their responses. We began by examining children’s responses to questions about events that occurred followed by questions about non-occurring event questions. All analyses used a GLM on children’s response type, with question type (DYK vs. Wh-) as a repeated measure, distraction (distraction vs. no-distraction) as a between-subjects variable, and age (in months) and the four cognitive assessments entered as continuous variables unless otherwise stated. For all continuous variables that were significant in the GLM, we examined correlations between the continuous variable and dependent variable to determine the direction of the effect. Partial correlations, controlling for age, were used for all cognitive measures. See Table 5 for means and standard deviations by response type.

Occurring Event Questions

“Yes” Responses. Children never responded to Wh- questions with a simple “yes,” and therefore only children’s “yes” responses to DYK questions were analyzed. Children provided unelaborated “yes” responses to 14% of the DYK questions ($SD = 0.27$). A GLM was conducted on the proportion of “yes” responses to DYK questions only,

Table 5. Mean proportion (SD) of various response types for occurring and non-occurring event questions in Study 2

Response	Occurring				Non-occurring			
	DYK		Wh-		DYK		Wh-	
	<i>M</i>	(SD)	<i>M</i>	(SD)	<i>M</i>	(SD)	<i>M</i>	(SD)
“Yes”	0.14	(0.27)	0.00	(0.02)	0.11	(0.25)	0.00	(0.03)
“No” + IDK	0.14	(0.18)	0.13	(0.18)	0.48	(0.33)	0.39	(0.32)
Inaccurate Elaborative	0.26	(0.21)	0.29	(0.14)	0.35	(0.32)	0.47	(0.33)
Accurate Elaborative	0.46	(0.25)	0.58	(0.18)	0.06	(0.19)	0.14	(0.27)

DYK, “Do you know...?”; IDK, “I don’t know.”

with distraction entered as a between-subjects factor and age (in months) and the cognitive assessments entered as continuous variables. Bear-dragon scores [$F(1, 75) = 8.39, p = 0.005, \eta_p^2 = 0.10$] were significant. After controlling for age, with increased bear-dragon scores, children were significantly less likely to provide unelaborated “yes” responses ($r = -0.26$).

No + IDK Responses. Results revealed a significant effect of age [$F(1, 75) = 6.95, p = 0.010, \eta_p^2 = 0.09$], with children’s No + IDK responses decreasing with age ($r = -0.46$). Further, there was a significant question type by bear-dragon interaction [$F(1, 75) = 8.42, p = 0.005, \eta_p^2 = 0.10$], indicating that, after controlling for age, with increased bear-dragon scores, children were significantly less likely to provide a No + IDK response to WH questions ($r = -0.40$), while, in contrast, children’s bear-dragon scores were not significantly related to No + IDK responses to DYK questions ($r = 0.12$).

Inaccurate Elaborative Responses. Results revealed a significant effect of age [$F(1, 75) = 4.51, p = 0.04, \eta_p^2 = 0.06$], indicating that, as age increased, children were significantly more likely to provide an inaccurate elaboration ($r = 0.22$).

Accurate Elaborative Responses. Results indicated that age [$F(1, 75) = 4.89, p = 0.030, \eta_p^2 = 0.06$], bear-dragon scores [$F(1, 75) = 14.25, p < 0.001, \eta_p^2 = 0.16$], and Woodcock Johnson scores [$F(1, 75) = 7.29, p = 0.009, \eta_p^2 = 0.16$] were significant. Specifically, as age increased, children were significantly more likely to provide accurate elaborative responses ($r = 0.49$). Additionally, after controlling for age, with increased performance on the bear-dragon task or Woodcock Johnson, children were also significantly more likely to provide accurate elaborative responses ($r = 0.41$ and 0.29 for bear-dragon and Woodcock Johnson, respectively).

Non-occurring Event Questions

“Yes” Responses. Children very rarely responded to Wh- questions with a simple “yes,” and therefore only “yes” responses to DYK were examined. Children provided unelaborated “yes” responses to 11% of the DYK questions ($SD = 0.25$). A GLM was conducted on the proportion of “yes” responses, with distraction entered as a between-subjects factor and age and the cognitive assessments entered as continuous variables. There was only a significant effect for bear-dragon scores [$F(1, 75) = 32.60, p < 0.001, \eta_p^2 = 0.30$]. After controlling for age, with increased bear-dragon scores children were significantly less likely to respond with a simple “yes” ($r = -0.47$).

No + IDK Responses. A significant question type \times age interaction was found [$F(1, 75) = 4.39, p = 0.04, \eta_p^2 = 0.06$]. Specifically, with increased age, children were significantly more likely to provide a No + IDK response to DYK questions ($r = 0.22$) but not significantly more likely to provide such a response to Wh- questions ($r = -0.10$).

Inaccurate Elaborative Responses. Findings indicated that only children’s bear-dragon scores were significant [$F(1, 76) = 5.13, p = 0.026, \eta_p^2 = 0.06$]. After controlling for age, children’s performance on the bear-dragon task was marginally positively related to inaccurate elaborative responses ($r = 0.17$).

Accurate Elaborative Responses. A significant question type \times bear-dragon interaction was found [$F(1, 75) = 5.62, p = 0.020, \eta_p^2 = 0.07$]. Specifically, after controlling for age, neither correlation was significant, but bear-dragon scores were marginally related to increased accurate elaborations for DYK question ($r = 0.10$) and marginally related to decreased accurate elaborations for Wh- questions ($r = -0.15$).

Discussion

Study 2 was conducted to assess maltreated children’s responses to DYK questions compared with Wh- questions and to assess the effects of distraction and cognitive functioning. A number of the findings were consistent with Study 1. A fair number of children gave unelaborated “yes” responses to the DYK questions, and this was related to their inhibitory abilities, as measured by the bear–dragon task. With increased age, children were significantly less likely to provide an unelaborated “yes” response to DYK questions about non-occurring events. Moreover, children’s age and vocabulary scores were again positively related to accurate elaborations of their answers. Consistent with Study 1, working memory did not predict children’s responses. This may help explain why children in the distraction condition performed as well as children who were not distracted; taxing children’s working memory did not appear to affect their tendency to respond impulsively to the questions.

However, we failed to fully replicate the pattern of results with respect to No + IDK responses. We found limited evidence that inhibitory skills affected children’s tendency to respond “no” to DYK questions about occurring events. Moreover, although older children were more capable of responding “no” to DYK questions about non-occurring events, this was not related to inhibitory skills. There were also two anomalous findings inconsistent with Study 1: older children provided more inaccurate elaborations to occurring events, and children with better inhibitory abilities provided more inaccurate elaborations to non-occurring events.

GENERAL DISCUSSION

In the present investigation, we assessed non-maltreated and maltreated children’s ability to provide accurate and elaborative responses to questions containing implicit DYK questions during a post-event interview. Consistent with our predictions, both studies revealed that children demonstrate pragmatic failure (gave unelaborated “yes” responses to DYK questions) in a sizable percentage of cases, including when answering questions about events that did not occur. In these cases, children are indicating that they know the answer to the implicit Wh- question, but failing to answer it. One of the novel findings of the present investigation is the importance of children’s inhibitory control skills in relation to their responses to DYK questions. Consistent with our hypothesis, children were significantly more likely to avoid pragmatic failure with improved inhibitory control skills.

This investigation was also the first to assess the connection between children’s working memory in relation to their responses to indirect speech acts. However, no significant relation was found. This suggests that the difficulty with responding to indirect speech acts is not the necessity of holding both the explicit and implicit questions in mind, but the need to inhibit an impulsive response to the explicit question. Interestingly, we found that children’s performance on the bear–dragon task, rather than the day/night task, was particularly related to children’s ability to inhibit a pragmatic failure response (Study 1 and Study 2) and often provide a more elaborate response (Study 2). As suggested by Carlson and Moses (2001) there are two different types of inhibitory control tasks: delay and conflict. Delay tasks involve measures of children’s ability to delay, temper, or suppress an impulsive response (e.g., the bear–dragon task requires children to inhibit the requested action when the dragon makes the request).

Conflict tasks require children to respond a certain way in the face of a highly salient, conflicting response option (e.g., the day/night task requires children to say “night” when faced with the salient “day” image). To prevent pragmatic failure, children must delay their impulsive “yes” response to the explicit request to identify the implicit request for further information. Children are not necessarily providing a conflicting response but rather inhibiting their impulse to answer and taking their time (or delaying) to ensure they are identifying the pragmatics of the question. Thus, it appears that children’s delay inhibition is particularly important for avoiding pragmatic failure.

We found no evidence that asking Wh- questions increased confabulation. Hence we found no justification for prefacing Wh- questions with DYK questions. In our studies, children’s unelaborated “yes” responses to DYK questions were not followed up with a Wh- question, which would be expected in an actual forensic interview. That is, if a child answered “yes” to “Do you know where it happened?”, an interviewer would likely follow-up with “Where did it happen?” Indeed, the interviewer might interpret the child’s reticence as a sign of reluctance, and utilize other interviewing tools to attempt to overcome it, such as a series of yes–no or forced-choice questions. Future work should test whether impulsive “yes” responses to DYK questions lead to further errors.

Future work should also consider the extent to which DYK questions might lead to unelaborated “no” responses among children who do in fact know the answer to the implicit question. We did not find consistent evidence that unelaborated “no” responses are related to immaturity or weak inhibitory skills. However, motivational factors may lead children to respond “no” to DYK questions. Research on children’s developing understanding of the difference between truth and lies has found that children who exhibit competency will nevertheless frequently answer “no” to a question such as, “Do you know what a lie is?” (Evans & Lyon, 2012a; Lyon & Saywitz, 1999). We suspect that if the topic is clearly negative, or the question accusatory, then impulsive “no” responses will increase.

In addition to examining children’s responses to DYK questions that include a Wh- implicit request (e.g., “Do you know where she was?”), future studies should examine children’s responses to DYK questions that include a yes–no implicit request (e.g., “Do you know if someone was home?”). An unelaborated response to DYK questions with an implicit yes–no question can lead to referential ambiguity, in which it is unclear whether the child is answering the implicit (“Do you know...?”) or explicit (“Was someone home?”) part of the question. For example, if the child provides an unelaborated “no” response, it is unclear whether the child meant “I don’t know” or “Someone was not home.”

In sum, this research has suggested that the use of DYK questions increases the chance of pragmatic failure, risking negative consequences to the child’s credibility as a witness, particularly for younger children and those with lower inhibitory control skills. Because they cannot be answered with an unelaborated “yes,” Wh- questions clearly avoid the potential for pragmatic failure.

ACKNOWLEDGEMENTS

This research was supported by NICHD grant HD047290 awarded to Thomas Lyon, a Social Sciences and Humanities Research Council of Canada grant awarded to Angela

Evans and a Social Sciences and Humanities Research Council of Canada grant awarded to Kang Lee. We thank the individuals who helped with project management and data collection: Vera Chelyapov, Jason Ellenberg, Hae Jin Ham, Jeta Haxhimanka, and Danielle Omrin.

REFERENCES

- Bara, B., & Bucciarelli, M. (1998). Language in context: The emergence of pragmatic competence. In A. C. Quelhas & F. Pereira (Eds.), *Special issue of Analise psicologica: Cognition in context* (pp. 317–345). Lisbona: Instituto Superior de Psicologia Aplicada.
- Beers, S. R., & De Bellis, M. D. (2002). Neuropsychological function in children with maltreatment-related posttraumatic stress disorder. *American Journal of Psychiatry*, *159*, 483–486.
- Brady, M. S., Poole, D. A., Warren, A. R., & Jones, H. R. (1999). Young children’s responses to yes-no questions: Patterns and problems. *Applied Developmental Science*, *3*, 47–57.
- Bucciarelli, M., Colle, L., & Bara, B. G. (2003). How children comprehend speech acts and communicative gestures. *Journal of Pragmatics*, *35*, 207–241.
- Carlson, S. M., & Moses, L. J. (2001). Individual differences in inhibitory control and children’s theory of mind. *Child Development*, *72*, 1032–1053.
- Clark, H. H. (1979). Responding to indirect speech acts. *Cognitive Psychology*, *11*, 430–477.
- Diamond, A., Prevor, M. B., Callender, G., & Druin, D. P. (1997). Prefrontal cortex cognitive deficits in children treated early and continuously for PKU. *Monographs of the Society for Research in Child Development*, *62*, 194–205.
- Dunn, L. M., & Dunn, D. M. (2007). *Peabody Picture Vocabulary Test* (4th ed.). Minneapolis, MN: NCS Pearson.
- Evans, A. D., & Lyon, T. D. (2012a). Assessing children’s competency to take the oath in court: The influence of question type on children’s accuracy. *Law and Human Behavior*, *36*, 195–205.
- Evans, A. D., & Lyon, T. D. (2012b). The influence of indirect speech acts on child witnesses responses: An examination of court transcripts. In L. Wandrey (Chair), *Field research on child victims: Questioning strategies and children’s responses*. San Juan, Puerto Rico: American Psychology-Law Society Annual Conference.
- Fritzley, H. V., & Lee, K. (2003). Do young children always say yes to yes–no questions? A metadepvelopmental study of the affirmation bias. *Child Development*, *74*, 1297–1313.
- Fritzley, H. V., Lindsay, R. C. L., & Lee, K. (2013). Young children’s response tendencies towards yes-no questions concerning actions. *Child Development*, *84*, 711–725.
- Gerstadt, C. L., Hong, Y. J., & Diamond, A. (1994). The relationship between cognition and action: Performance of children 3 ½–7 years old on a Stroop-like Day/Night test. *Cognition*, *53*, 129–153.
- Greenhoot, A.F., Ornstein, P.A., Gordon, B. N., & Baker-Ward, L. (1999). Acting out the details of a pediatric check-up: The impact of interview condition and behavioral style on children’s memory reports. *Child Development*, *70*, 363–380.
- Lakoff, R. (1973). The logic of politeness; or minding your p’s and q’s. In *Papers from the Ninth Regional Meeting of the Chicago Linguistic Society* (pp. 292–305). Chicago: Chicago Linguistics Society.
- Lamb, M. E., Hershkowitz, I., Orbach, Y., & Esplin, P. W. (2008). *Tell me what happened: Structured investigative interviews of child victims and witnesses*. Hoboken, NJ US: John Wiley & Sons Inc.
- Lyon, T. D., Carrick, N., & Quas, J. A. (2010). Young children’s competency to take the oath: Effects of task, maltreatment, and age. *Law and Human Behavior*, *34*, 141–149.
- Lyon, T. D., & Evans, A. D. (2014). Young children’s understanding that promising guarantees performance: The effects of age and maltreatment. *Law and Human Behavior*, *38*, 162–170.
- Lyon, T. D., & Saywitz, K. J. (1999). Young maltreated children’s competence to take the oath. *Applied Developmental Science*, *3*, 16–27.
- Lyon, T. D., Quas, J. A., & Carrick, N. (2013). Right and righteous: Children’s incipient understanding and evaluation of true and false statements. *Journal of Cognition and Development*, *14*, 437–454.
- Moriguchi, Y., Okanda, M., & Itakura, S. (2008). Young children’s yes bias: How does it relate to verbal ability, inhibitory control, and theory of mind? *First Language*, *28*, 431–442.
- Peterson, C., & Biggs, M. (1997). Interviewing children about trauma: Problems with “specific” questions. *Journal of Traumatic Stress*, *10*, 279–290.
- Peterson, C., Dowden, C., & Tobin, J. (1999). Interviewing preschoolers: Comparisons of yes-no and Wh- questions. *Law and Human Behavior*, *23*, 539–555.
- Reed, M. A., Pien, D. L., & Rothbart, M. K. (1984). Inhibitory self-control in preschool children. *Merrill-Palmer Quarterly: Journal of Developmental Psychology*, *30*, 131–147. <http://www.jstor.org/stable/23086229>
- Reeder, K. (1980). The emergence of illocutionary skills. *Journal of Child Language*, *7*, 13–28.

- Ruva, C. L., & Bryant, J. B. (2004). The impact of age, speech style, and question form on perceptions of witness credibility and trial outcome. *Journal of Applied Social Psychology, 34*, 1919–1944.
- Saywitz, K. J., Nathanson, R., & Snyder, L. S. (1993). Credibility of child witnesses: The role of communicative competence. *Topics in Language Disorders, 13*, 59–78.
- Shatz, M. (1978). Children's comprehension of their mothers' question-directives. *Journal of Child Language, 5*, 39–46.
- Steffensen, M. S. (1978). Satisfying inquisitive adults: Some simple methods of answering yes – no questions. *Journal of Child Language, 5*, 221–236.
- Stolzenberg, S. N., & Lyon, T. D. (2014). How attorneys question children about the dynamics of sexual abuse and disclosure in criminal trials. *Psychology, Public Policy, and Law, 20*, 19–30.
- Walker, A. G. (1993). Questioning young children in court: A linguistic case study. *Law and Human Behavior, 17*, 59.
- Walker, N. E., & Hunt, J. S. (1998). Interviewing child victim-witnesses: How you ask is what you get. In C. P. Thompson, D. J. Herrmann, J. Read, & D. Bruce (Eds.), *Eye witness memory: Theoretical and applied perspectives* (pp. 55–87). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.
- Wandrey, L., Quas, J. A., & Lyon, T. D. (2012). Does valence matter? Effects of negativity on children's early understanding of the truth and lies. *Journal of Experimental Child Psychology, 113*, 295–303.
- Zelazo, P., & Müller, U. (2002). Executive function in typical and atypical development. In U. Goswami (Ed.), *Blackwell handbook of childhood cognitive development* (pp. 445–469). Malden: Blackwell Publishing.