

The Development of Metasuggestibility in Children

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Summary: One component of metasuggestibility is the understanding that a person's statements can influence another person's reports. The purpose of the present study was to examine the development of this understanding in school-aged children. We produced a short video in which a boy makes a false allegation about being hit following an adult's suggestive interview. Children aged 6–13 years (N = 196) watched the video and answered open-ended and forced-choice questions about why the boy made a false allegation. The 6- and 7-year-olds performed poorly on all question types, whereas the 12- and 13-year-olds were at ceiling. There were developmental increases in metasuggestibility between 8 and 11 years. Our findings indicate that metasuggestibility undergoes prolonged development well into the school years. Implications for child witness training programs are discussed.
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In the past 25 years, a substantial body of evidence has accumulated on children's suggestibility (e.g. Ceci & Bruck, 1993, 1995; London, Bruck, & Melnyk, 2009; Poole & Lindsay, 2001, 2002; Quas, Wallin, Papini, Lench, & Scullin, 2005). Motivated by the importance of children's testimony in legal proceedings, early research focused on mapping developmental trends in young children's suggestibility (e.g. Ceci, Ross, & Toglia, 1987; Leichtman & Ceci, 1995), exploring the mechanisms that produce these trends (e.g. Ceci, Paperieno, & Kulkofsky, 2007; Kulkofsky, Wang, & Ceci, 2008) and identifying individual differences associated with eyewitness accuracy (for a review, see Bruck & Melnyk, 2004). Recent studies on these topics have more often included older children (e.g. Ackil & Zaragoza, 1998; Finnälä, Mahlberg, Santtila, Sandnabba, & Niemi, 2003; Lindberg, Kiefer, & Thomas, 2000; London et al., 2009; Poole & Lindsay, 2002; Zaragoza, Payment, Ackil, Drivdahl, & Beck, 2001) and have focused on practical issues, such as procedures for training children to resist suggestion (Ghetti & Castelli, 2006; Poole & Lindsay, 2002; Thierry & Spence, 2002).

In this paper, we explore developmental differences in one potentially important predictor of memory distortion in school-age children: *metasuggestibility*. We define metasuggestibility as an awareness of factors and situations that can taint memory and/or event reports. One component of metasuggestibility is the understanding that questions and statements from some individuals can make other individuals inaccurately report their experiences. Because compliance with suggestive questions and comments is an obvious cause of memory distortion (e.g. Ceci & Bruck, 1995), our focus in the current study is children's understanding that conversational pressure can lead someone to make a false report.

We have two long-term objectives for research on metasuggestibility: (a) to determine relationships between metasuggestibility and suggestibility, and (b) to develop

training programs for preserving accurate testimony by enhancing children's awareness of factors that distort memory. Before we can tackle these issues, however, it is necessary to trace the developmental progression of metasuggestibility. This progression will likely be multifaceted, with an appreciation of various suggestibility phenomena occurring at different ages. The purpose of the current study is to document when children understand that false statements can arise due to compliance with suggestive questions.

METACOGNITION

Metacognition is generally conceptualized as including several components (Alexander, Carr, & Schwanenflugel, 1995). The first, declarative metacognitive knowledge, involves knowledge of one's own capabilities and the variables that influence performance, including task characteristics and demands of the immediate situation. Regarding metamemory, for example, young children have a fledgling understanding of concrete factors that can affect memory (e.g. Flavell & Wellman, 1977; Lyon & Flavell, 1993), but they also have unrealistically high expectations about their memory abilities (Bjorklund & Green, 1992; Flavell, 1971; Flavell, Miller, & Miller, 2002). As children gradually learn more about the variables that influence memory acquisition and retention (Joyner & Kurtz-Costes, 1997; O'Sullivan & Howe, 1998), predictions about their own performance improve (Howe, O'Sullivan, & Marche, 1992; Rogoff, Newcombe, & Kagan, 1974). For instance, it is not until the third grade when children consistently judge that central details of an interesting event will be recalled longer than peripheral information (O'Sullivan, Howe, & Marche, 1996).

A second component of metacognition is cognitive monitoring, which is the on-line monitoring of one's own cognitive processes. Unlike simple knowledge about memory, this component of metamemory is involved when

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we realize that we do not understand something or that we need to try harder to remember. Some researchers have included a third component in the definition of metacognition (Brown, 1978; Joyner & Kurtz-Costes, 1997; Nelson & Narens, 1990; Schneider, 1999): the ability to deploy and execute performance-enhancing strategies. Both of these later two components are facets of procedural metacognition. Although there is less agreement about including strategic regulation under the broad umbrella of metacognition, it is the case that strategic knowledge and successful strategic behavior are often correlated (e.g. Borkowski, Levers, & Gruenfelder, 1976; Fabricius & Cavalier, 1989; O'Sullivan, 1996).

There is reason to believe that some metacognitive abilities develop late because they are dependent on earlier advances. For instance, it is unlikely that children will engage in strategies to preserve a memory if they do not believe they will forget (O'Sullivan et al., 1996). Similarly, children who have no understanding that memories from different sources can be confused may not actively try to retrieve information that could specify the source of a memory. Of course, successful metacognition undoubtedly involves more than a simple accumulation of knowledge. Just as neurological maturation supports improvements in memory source monitoring (Schacter, Kagan, & Leichtman, 1995), developmental advances in brain function probably underlie improvements on an array of tasks that require children to compare multiple representations (e.g. Carpendale & Chandler, 1996), to detect inconsistencies (e.g. Markman, 1979; Markman & Gorin, 1981) and to demonstrate explicit awareness of mental processes (Metcalf & Shimamura, 1994). Still, it makes sense to launch a dialogue about metasuggestibility by first exploring the development of this foundational understanding: the realization that misleading comments can lead someone to inaccurately report personally experienced events.

RATIONALE FOR EXAMINING METASUGGESTIBILITY

Knowledge and beliefs about suggestibility (a facet of declarative metamemory), whether correct or incorrect, may well affect children's responses to suggestive information. That is, it is possible that children must first realize that suggestion can affect autobiographical reports before they will acquire strategies to resist suggestion. Supporting this logical connection between declarative metasuggestibility and suggestibility, much research shows an association between metamemory and memory functioning (e.g. Cornoldi, Gobbo, & Massoni, 1991; DeMarie & Ferron, 2003; DeMarie, Miller, Ferron, & Cunningham, 2004; Joyner & Kurtz-Costes, 1997; Schneider, Schlagmuller, & Vise, 1998; Schneider, 1999; Swanson & Hill, 1993, for a review, see Schneider & Pressley, 1997). The argument is that children must realize that memory is fallible in some way before they will actively employ some cognitive strategy. For example, if young children do not realize their memory is not a perfect recording of information, they will not employ strategies intended to promote memory (such as spending time studying to be remembered information).

Similarly, forensic interviewers sometimes instruct children that they can say 'I don't know' or 'that didn't happen' if interviewers give them misleading information. But in order to benefit from these instructions to protect their memory reports from suggestion, it seems logical that children must recognize that these reports could be influenced by interviewers' suggestions.

Despite a large literature on children's understanding of factors that enhance memory performance, little is known about their appreciation of suggestive influences. Three studies are relevant, however. To explore children's understanding of retroactive interference, Kreutzer, Leonard, and Flavell (1975) told kindergarteners through 5th-graders a story about two child protagonists who attended a birthday party. One protagonist went straight home after the party, whereas the other went out and met more friends. By the 3rd grade, children said that the child who went straight home would have better memory for the names of friends at the birthday party. In a related study, Howe et al. (1992) found that a sizable minority (40%) of 1st-graders recognized that a dream could interfere with a child's ability to later remember a list of items.

Finally, one study examined whether children realize that memory about a past event can be affected by later inaccurate statements. Using dolls and small toys, O'Sullivan et al. (1996) told children about two story characters who attended a birthday party. When the characters had difficulty in remembering the party the characters' mothers suggested that a child who was not at the party had actually been there. Using pictures representing the party and the mother's false suggestion, the participants were asked if the story characters' memories would reflect the real party or 'would get mixed up' and look like the mother's false report. Only in the 3rd grade did the majority of children say that the story child's memory would be affected by misinformation. Even at this age ($M = 8.6$ years), however, only 53% of the children believed that the story child's memory would be altered by misinformation delivered a short time after the event. O'Sullivan et al. also found that children's performance was the same whether a mother or a sibling provided the misinformation. Since suggestibility research has revealed that children are more suggestible when interviewed by adults than by children (e.g. Ceci et al., 1987), this finding indicates that children hold some inaccuracies in their metasuggestive knowledge. However, as we discuss below, it is not clear from this study whether children's responses reflected their knowledge about changes in memory due to misinformation or due to pressure and compliance to agree with another person. Nonetheless, these findings led us to predict a gradual emergence of metasuggestibility.

Our prediction was also based on a consideration of related skills that develop during middle childhood. Regardless of whether false event reports stem from altered memory representations or social compliance, metasuggestibility requires one to realize that (a) reports are not necessarily accurate representations of reality, (b) reports can change independent of the original reality and (c) one's reports can be influenced by someone else's alternative representation (i.e. two people can provide different descriptions of events, one of which is incorrect). Research involving conflicting representations has documented rudi-

mentary understanding by 7–8 years of age, with continued development well into the school years and, in some cases, adolescence (Carpendale & Chandler, 1996; Fabricius & Schwanenflugel, 1994; Fabricius, Schwanenflugel, Kyllonen, Barclay, & Denton, 1989). For example, 7-year-olds can sometimes detect and explain logical inconsistencies in short narratives (e.g. Russell & Haworth, 1987; Tunmer, Nesdale, & Pratt, 1983), but even 10-year-olds can have difficulty in deciding if narratives with logical inconsistencies make sense (Markman, 1979; Markman & Gorin, 1981). Based on these data, one might expect that metasuggestibility would also have a rather late developmental trajectory.

These findings provide a potential explanation for significant levels of suggestibility in school-aged children (Bruck, London, Landa, & Goodman, 2007; Ceci *et al.*, 2007; Finniliä *et al.*, 2003). For example, London *et al.* (2009) found that 9-year-olds readily answered misleading questions and virtually never corrected false statements embedded in these questions (*interrogative suggestibility*). When questioned by a different interviewer weeks and months later, these children assented to having experienced 60% of previously suggested false information (*misinformation effects*). Such findings call for additional research on the causal mechanisms of suggestibility in middle childhood, including metasuggestibility.

THE CURRENT STUDY

The current study examined whether children realize that a child can come to make false claims following repeated suggestive statements. Our videotaped vignette depicts two different adults (a male police officer and a female adult passerby) talking to a child about a recently experienced event. The first adult simply asks if hitting took place during this event, which the child correctly denies. The second adult engages in repeated suggestive interviewing that prompts the child to make a false allegation of hitting. After watching the video, child participants were asked to explain why the child actor made a false accusation.

The study most similar to ours was that by O'Sullivan *et al.* (1996). Although 3rd-graders were not at ceiling on their task, the significance of this finding is unclear for several reasons. First, children were told that the mother's suggestions reflected her own memory of what happened, and they were then asked if her memory would affect the story character's memory. If memory researchers were participants in this study, they probably would not agree about whether the child's memory could be affected by one piece of misinformation. In other words, it may be the case that children in the situation described *would* have resisted suggestions or, alternatively, that they would have made false reports based on compliance rather than memory distortion.

We built several features into the current study to expand on this previous finding. First, we enrolled a broad age range (from 6 to 13 years). We sought to test children who fully appreciated that the character was giving a false statement, as the goal of our study was to document when children recognize the source of influence (i.e. suggestive questions). By age 6, the majority of children in the sample should be

able to recognize that beliefs can be counter to reality (Bartsch, 1995). And since metasuggestibility requires a number of related skills that undergo prolonged development into the school years, as discussed earlier, we tested children into early adolescence.

Second, we tested the children about a scenario in which a false report was actually made (rather than asking them to predict whether a false report *would* be made). Third, we expanded the concept of suggestibility to include suggestive interview techniques that are more explicit and that focus on the concept of 'interrogative' suggestibility, a type of suggestibility whereby the interviewer uses pressure to make the interviewee comply by making a false allegation. Fourth, like O'Sullivan *et al.* (1996), we manipulated the status/authority of the interviewer, but our interviewers were a male police officer (high-authority) and a passerby (low-authority). Perhaps these authority distinctions would be more explicit and draw children's attention more toward the suggestive influence of the high-authority interviewer. Fifth, we asked children both open-ended and forced-choice questions to separate spontaneous mention of suggestive influences from prompted knowledge. We reasoned that forced-choice questions would draw children's attention to the issue of the suggestive questioning and possibly allow younger children to display knowledge of suggestibility.

Finally, we included several measures intended to rule out alternative explanations for any developmental trends in metasuggestibility. First, in order to be included in our sample, all children needed to pass a memory check showing they remembered the central details from the video, including that hitting did not take place, that the protagonist told the first person hitting did not take place and that he told the second person hitting did take place. Including this memory check as an inclusion criterion ensured that any developmental trends in our study were not driven by participants' failure to appreciate conflicting mental representations on this task. We also examined performance on two tasks designed to reveal skill deficiencies that would lead children to fail our metasuggestibility questions even if they did, in fact, understand the concept of interrogative suggestibility. A previously used basic source-monitoring task required children to categorize knowledge as seen or heard (Poole & Lindsay, 2002). Children who pass this task can remember and report whether each event in a series of events actually occurred or was only described. Next, a set of questions about the truthfulness of statements in our stimulus video (our truth-lies task) ensured that any developmental trends in metasuggestibility performance would not be due to failures to apply these abilities to our task (i.e. to appreciate and report that the story character described a true event to one individual and a false event to another). Instead, we were interested in whether they could recognize the *reason* the child told the falsehood (i.e. social influence of the interviewer).

METHODS

Participants

Participants were 196 children from 6 to 13 years of age. For purpose of analyses, they were categorized into four age

groups: 6–7 years ($n = 47$, $M = 6.5$ years, $SD = 0.51$ years and 50% girls), 8–9 years ($n = 70$, $M = 8.4$ years, $SD = 0.49$ years and 46% girls), 10–11 years ($n = 67$, $M = 6.5$ years, $SD = 0.53$ years and 45% girls) and 12–13 years ($n = 12$, $M = 12.4$ years, $SD = 0.51$ years and 42% girls). Stratifying for age, the children were randomly assigned to the high-authority ($n = 105$) or the low-authority ($n = 91$) suggestive interview condition. Additionally, 11 subjects (ages 6.6–9.4 years, $M = 7.7$ years and $SD = 1.0$ years) were excluded from the analyses because they failed a content check for the metasuggestibility task.

Data collection took place in two Canadian cities (a large and a mid-sized city), and two locations in the Midwestern United States (a small town and a mid-sized city). Approval was obtained from Institutional Review Boards at each author's institution.

Materials and procedures

Children whose parents had signed a consent form were tested individually in a quiet room in their schools or homes. Following oral or written assent, experimenters administered a basic source-monitoring test followed by the metasuggestibility task (in one of two video authority conditions), which included a section to assess the ability to categorize statements in the target video as the truth or a lie. The total testing time was approximately 30 minutes.

Basic source-monitoring task

The source-monitoring test determined whether children possessed rudimentary skills to distinguish activities they actually saw from those they only heard described. Following a procedure from Poole & Lindsay (2001, see Appendix), each child watched the experimenter perform three actions (e.g. sharpening her pencil) and heard her explain that she sometimes performs other actions (e.g. 'Sometimes I push on the eraser to make sure it is on tight'). The children were subsequently questioned to determine whether they could distinguish between seen and heard events (e.g. 'What did I do with the pencil? Did I sharpen the pencil? Did I push the eraser on the pencil?').

Metasuggestibility task

The children watched a 4½ minute video, produced for the study, in which a child is suggestively interviewed by an adult and consequently makes a false allegation. The suggestive interview was constructed to contain a number of suggestive features (e.g. repeated questions, misleading questions and statements and encouragement to provide the misleading information) in order to make the interview explicitly suggestive.

The video showed an 8-year-old male child actor (Jamie) who was visiting his babysitter. During the visit, the babysitter performed a magic trick for Jamie and Jamie played with a hat left earlier by a fireman. While Jamie was playing with the hat, the fireman returned to retrieve it, stated that he was in a hurry and told Jamie that children should not play with firemen's hats. The babysitter responded that Jamie wanted to play with the hat and that it was meant to take it away. The fireman then took his hat and left. Jamie and the

babysitter then went outside to wait for his mother. Next, an adult stopped to ask Jamie whether he had fun at the babysitter's house. Jamie stated that he had but that the fireman came and took his hat, which made him sad. The person inquired why and asked if the fireman had hit the babysitter or him. Jamie responded by denying any hitting, and the person left. A second adult then approached Jamie. Jamie reported that the fireman had visited him and that he was sad when the fireman took his hat. This second person asked Jamie if the babysitter hit him or the babysitter. Jamie again said 'No'. The following dialogue then took place:

Interviewer: I hear that that fireman is not nice. That he hits people. Sometimes he hits big people. What did your babysitter say when he hit her?

Jamie: She said, 'Jamie wants the fire hat'.

Interviewer: Oh so he did hit the babysitter. I bet he hit you also. He hit you too, didn't he?

Jamie: (*Shakes his head*) No.

Interviewer: It is okay. You can tell me that he hit you.

Jamie: He hit me.

Interviewer: Well, you should tell your mom.

At this point, Jamie's mother arrived to pick him up and asked if he had fun. Jamie said 'yes' but that the fireman hit him and the babysitter.

Two versions of the video differed only in terms of the person who conducted the neutral (first adult) and suggestive (second adult) interviews. Half the children viewed a version in which a police officer was the first person to speak (neutrally) with Jamie, followed by a suggestive conversation with a woman passerby dressed in yellow (low-authority condition). In the second version, the 'yellow lady' questioned Jamie first, followed by the police officer (high-authority condition).

For each session, the experimenter stopped the video after Jamie told his mother about the hitting. The experimenter then asked the child a series of questions about the content of the video to ensure that the child understood the major details and, importantly, understood that the fireman did not do any hitting. This portion of the task included open-ended questions about what happened at the babysitter's house, the interactions with the fireman, the neutral adult interviewer, the suggestive adult interviewer and the conversation with Jamie's mother. If the child missed any of the critical details, an appropriate specific question followed (e.g. 'Did the fireman take his hat?'; 'What did Jamie tell the first adult about hitting?'). Children who misreported any of the critical information were re-shown that portion of the video. For example, if the child said the fireman really hit Jamie, that portion of the video was re-shown to the participant prior to a second question about whether the fireman hit Jamie. Eleven children (see Participants section for details) were excluded from the study because they insisted that the fireman had hit. Of the 196 remaining children, some portions of the video were re-shown to 47 (24% of the sample), after which those children correctly reported all critical details. Hence, the remaining 196 participants all showed an understanding that hitting did not take place and that Jamie had said that hitting did take place.

Next, children were asked increasingly directed questions to test their recognition of the social influence of the interviewer. Each child was asked two open-ended target questions: (a) Why did Jamie tell the first adult that there was no hitting but then told the second adult that there was hitting? and (b) Why did Jamie tell the first person that there was no hitting but told his mom that there was hitting? Correct answers included the concept that the second interviewer somehow prompted Jamie to make the false statement (see Scoring section for details).

Children who inaccurately answered either of these two target questions were shown a 40-second continuation of the video that depicted Jamie and his mother at home later that night. Jamie's mother said she was upset that the fireman had hit him, that she was going to call the fireman's boss and that the fireman should get in trouble. Jamie said not to call the boss because the fireman did not really hit him. Jamie's mom then asked, 'Why did you tell me that the fireman hit you?' and Jamie whispered something to his mother. The video was stopped and the experimenter asked, 'What did Jamie whisper to his mother?' If children responded that he whispered that the fireman did not really hit him, they were reminded that Jamie's mom asked *why* he told her the fireman hit him.

If children failed to give any suggestibility relevant responses to this question, they were given five possible explanations which were forced-choice options: Jamie forgot, Jamie was mixed up, Jamie wanted the fireman to get in trouble, Jamie said there was hitting because of something the first person said or did, and Jamie was mixed up because of something that the second person said or did. If the child assented to any of these choices, they were asked to justify their response (i.e. Why? How did that happen?). The child could select any of the forced choice options, but in order to be scored correct, the child had to give some suggestibility-relevant response (as defined below, any statement that referred to the influence of the suggestive interviewer).

Truth-lie task

Finally, the experimenter asked six questions (in a random order) about the truthfulness of Jamie's statements (see Appendix).

Scoring

Source-monitoring and truth-lie questions were scored correct or incorrect (maximum score = 6 for each task).

For the metasuggestibility test, children's responses to the two target questions and the continuation video question were scored for suggestibility relevance (yes or no). Suggestibility relevant responses included any statement related to the suggestive questioning, such as 'the [suggestive interviewer] said to say it', 'the [suggestive interviewer] said it was okay to tell' and 'the [suggestive interviewer] got Jamie mixed up'. Hence, children did not need to attribute Jamie's statements specifically to social compliance or cognitive error but simply had to acknowledge that the suggestive interviewer influenced the character to say hitting took place. Nonsuggestive relevant responses, scored as 0, included statements such as 'Jamie wanted to get the fireman in trouble' and 'Jamie said "No" to

the first person and "Yes" to the second person'. Children were given one point per question for a suggestibility relevant response, so they could score 0–2 on the two target questions and then 0–1 on the continuation video. To ensure the reliability of scoring, two undergraduate students naïve to the study's hypotheses coded all responses for the first two questions ($n = 196$ for each question). They agreed on 382 of 392 responses for 97.5% agreement, $\kappa = .95$, which is considered almost perfect inter-rater reliability (Landis & Koch, 1977). The few instances where discrepancies occurred were resolved by discussion. Remaining questions were scored by one research assistant.

Children who missed all three open-ended questions (i.e. the two target questions and the continuation video question) were asked the multiple choice questions and were given one point if they endorsed at least one of the suggestibility relevant responses and could elaborate on their choice. For example, a child received one point if he said 'Yes' to the option of 'The interviewer made him say it' and elaborated by saying, 'Yeah, the policeman kept bugging him about it'.

RESULTS

Performance on the metasuggestibility task

Preliminary analyses (correlations and logistic regression) revealed no significant impact of status of the suggestive interviewer (police officer or yellow lady) on performance (all $ps > .05$); therefore, data were collapsed across this variable. There were also no metasuggestibility differences between children who had to review portions of the video and those who did not.

Total scores on the first two target questions were submitted to a one-way analysis of variance with age group (6–7, 8–9, 10–11 and 12–13 years) as the independent variable (see Table 1). There was a significant effect of age group, $F(3, 192) = 7.76, p < .001$ and $\eta_p^2 = .11$. All Helmert comparisons were significant ($df = 1, p < .001$), indicating that the youngest group performed most poorly and that each increase in age was associated with significantly better performance. Only one child in the oldest age group failed to correctly answer these questions, and he continued to fail the task throughout. Since the oldest age group was at ceiling except for this one child, we excluded this group from the next two analyses.

The remaining 120 children from the youngest three age groups who did not pass both of these two target questions were shown the final video scene and asked the third target question ('What did Jamie whisper in his mother's ear?'). Only 21.5% of these children answered this question correctly (see Table 1 for performance by age group). A logistic regression analysis found no relationship between age group and performance on this question, Wald $\chi^2(2) = 0.39, p > .05$.

Next, we examined performance on the forced-choice questions for the remaining 95 children who did not mention the impact of the suggestive questions in any of the three previous open-ended questions; 48% of these children answered correctly (see Table 1). Results from a logistic

Table 1. Children's Performance on Metasuggestibility Questions by Age

Task	Age group (years)				Overall
	6–7	8–9	10–11	12–13	
Initial open-ended prompts [mean number correct out of two (with <i>SDs</i>); <i>N</i> = 196]	.55 (.83)	.89 (.89)	1.08 (.93)	1.83 (.58)	.93 (.92)
Continuation video (proportion passing; <i>N</i> = 121) ¹	.18	.22	.22	.00	.21
Forced-choice questions (proportion answering one question with explanation; <i>N</i> = 95) ¹	.17	.51	.77	.00	.48
Proportion who failed all tasks (<i>N</i> = 196)	.47	.23	.10	.08	.26

¹Tasks only included children who did not pass an earlier task.

regression analysis showed that children performed better on this task with increasing age, Wald $\chi^2(2) = 17.45$, $p < .001$. Follow-up tests indicated that there was a linear relationship, such that children performed better with each increase in age group, all Wald $\chi^2 s(1) > 4.36$, $p s < .05$.

In the final analysis that included all 196 children, we examined the proportion of children who failed all four questions (Target Question 1, Target Question 2, Continuation Video Question and forced choice questions). As shown in Table 1, there is a linear trend for performance improvement with age, Wald $\chi^2(1) = 42.43$, $p < .001$. Consistent with previous analyses, the youngest children performed worst, all $\chi^2 s(1) > 6.04$, $p s < .05$. The 8–9-year group performed more poorly than the 10–11-year group, Wald $\chi^2(1) = 3.31$, $p < .05$.

Performance on basic source monitoring and truth-lie tasks

Source-monitoring data were missing for 25 children due to experimenter error. There were no age differences on this measure, $F(2, 173) = 2.66$, $p > .05$, $\eta_p^2 = .03$, with children of all ages performing at ceiling on the six questions ($M = 5.58$ correct responses, $SD = 0.73$). It is not surprising, then, that biserial correlation coefficients revealed no significant association between source-monitoring and performance on the metasuggestibility task (r_{bs} varied from $-.09$ to $.01$, $p s > .05$). These findings indicate that the difficulty children experienced answering metasuggestibility questions was not due to rudimentary source-monitoring skills (i.e. a general difficulty answering questions about whether they actually saw particular events or only heard descriptions of those events).

The children also performed at ceiling on the six truth-lie questions about statements from the target video ($M = 5.73$ correct responses, $SD = 0.67$). This means that the children had excellent memory for and understanding of the critical dialogue they were asked to explain. As expected for a task at ceiling, there was no relationship between age group and truth-lie performance, $F(2, 172) = 0.39$, $p > .05$ and $\eta_p^2 = .005$, or between truth-lie performance and metasuggestibility task performance (r_{bs} between $-.11$ and $.04$, $p s > .05$).

DISCUSSION

The goal of this study was to examine the development of children's understanding of interrogative suggestibility. This is the first of a series of studies that will be needed to determine whether and how metasuggestibility combines

with other mechanisms to produce suggestibility in school-aged children. In the current study, we produced a video in which a child makes a false statement following very obvious and explicit suggestive interviewing. Our child participants were asked to *explain why* the child made a false report, rather than being asked to *predict if* they would make a false report (as in O'Sullivan et al., 1996). We reasoned that this requirement, in addition to the explicitness of the suggestions, might result in higher levels of metasuggestibility than previously reported. This did not turn out to be the case.

The major finding of the study is that children's understanding of interrogative suggestibility undergoes continued development into the elementary school years. The youngest children correctly answered less than 30% of the two initial questions about why the child actor had made a false allegation, and almost 50% of this age group failed all questions. Similar to results from O'Sullivan et al. (1996), children ages 8 and 9 years were beginning to perform around the 50% level on most measures. But was not until 12 and 13 years that most children passed all items and consistently acknowledged that it was the social pressure of the interviewer that influenced the child protagonist to make a false allegation. Although there was a linear increase in performance with age, ceiling was only achieved by children 12–13 years of age.

The late development of metasuggestibility does not parallel the increase in resistance to interviewer pressure that occurs after the preschool years. However, it is consistent with studies documenting that school-aged children (7–10 years) often are suggestible, even in the context of explicit and seemingly obvious suggestive questions and even with warnings about suggestive questions (e.g. Gee, Gregory, & Pipe, 1999; Saywitz & Moan-Hardie, 1994; Warren, Hulse-Trotter, & Tubbs, 1991). Thus, our findings on the development of metasuggestibility provide a foundation for investigating the precursors and mechanisms of interrogative suggestibility in older children.

A second finding was that children's performance on the metasuggestibility task did not vary according to the level of authority of the person giving the suggestive questions (a police officer vs. a lady dressed in yellow). While studies have found that children show heightened suggestibility to authority figures (e.g. Ceci et al., 1987; Tobey & Goodman, 1992), their metacognitive ability to appreciate that suggestive questions can produce compliance does not appear to be contingent upon level of authority. Interestingly, similar findings have also been reported in adults (McAuliff & Kovera, 2007). Perhaps it is not authority but rather

the credibility (or knowledge) of the interviewer that is the major factor producing compliance in studies of children's suggestibility. As shown in several studies, children are more likely to be misled by interviewers who profess to know about the target event (e.g. Lampinen & Smith, 1995; Smith & Ellsworth, 1987; Toglia, Ross, Ceci, & Hembrooke, 1992; Welch-Ross, 1999, 2000). In this study and in O'Sullivan *et al.* (1996), high- and low-authority interviewers provided the same suggestions, revealing that both knew equally about the situation. Perhaps if only one of the interviewers had said 'You can trust me. . . I saw it happen once', then children may have picked up on these cues to assist their metasuggestibility responses.

What accounts for children's poor metasuggestibility performance? This study was only able to rule out factors. Poor metasuggestibility performance was not attributable to a general confusion about the distinction between actual and described events, or to poor truth-lie understanding, as performance on two tasks measuring these skills were at ceiling. Additionally, all children included in our study had to pass a memory check showing they understood that the protagonist's statement that hitting occurred conflicted with reality. These findings make us more confident that late emergence of an understanding of interrogative suggestibility is not due to unrelated memory or conceptual developments necessary to navigate our task. However, our tasks required only rudimentary skills, and thus future research is needed to explore whether more sensitive measures of source-monitoring and truth-lie understanding might account for some of the variance in metasuggestibility.

Finally, it is worth noting that the metasuggestibility performance of our youngest age group (reported in Table 1) is actually an overestimate of this age group's metasuggestibility performance. This is because 11 children in our 6- and 7-year-old sample (19% of that age group) were excluded from the study because they persisted in saying that hitting must have taken place. These findings are consistent with past research that has examined children's understanding of truths and lies. For example, Haugaard and colleagues (Haugaard, 1993; Haugaard, Reppucci, Laird, & Nauful, 1992) were interested in whether children viewed false statements as lies when those statements were made under an adult's direction. Haugaard *et al.* (1992) showed children videotaped vignettes in which a child lied about being hit after being told to lie by another person. Hitting clearly did not take place in the video. Similar to our findings, they found around 20–30% of preschool and young school-aged children failed to appreciate that reality (no hitting) is discrepant with the child's statements (that hitting did occur). This work also is consistent with theory of mind work showing that although most children understand that beliefs can be counter to reality by 4–5 years (Wellman & Bartsch, 1988), applying this understanding during dynamic social situations may undergo prolonged development (Bartsch & London, 2000; Bartsch, London, & Campbell, 2007).

Future directions in research on metasuggestibility

Among children who demonstrated metasuggestibility awareness, it is unclear to what extent they believed the

false statement was produced by social compliance *versus* unwitting memory error. A fuller understanding of metasuggestibility will involve examining children's appreciation that genuine false memories can be produced *via* post-event misinformation and autosuggestibility. Given that many adults fail to recognize the impact of post-event information in memory reconstruction (Benton, Ross, Bradshaw, Thomas, & Bradshaw, 2006), we expect a late development of these components of metasuggestibility. Future studies should also document the extent to which metasuggestibility varies according to the context. For example, our vignette described events that occurred over a short time period, but perhaps children would be more apt to acknowledge that memory can be socially influenced if the protagonist's memory for the event was said to be weak (see O'Sullivan *et al.*, 1996).

In addition to exploring the different facets of metasuggestibility, the next phase of research should focus on its relationship to children's suggestibility. Specifically, is metasuggestibility a prerequisite for spontaneously resisting suggestibility, and are high metasuggestibility children uniformly better at resisting suggestion? Based on source-monitoring and strategy development research, relationships might not be simple. Regarding source-monitoring, preschoolers know to accept suggested answers from adults only when adults have better information than themselves, yet they are poor at describing how they arrived at their decisions (e.g. 'How do you know it's the red bug, because you saw it or because I said so?') (Robinson & Whitcombe, 2003). Because explicit understanding often lags behind implicit skill, children may learn to resist interviewing pressure before they have the reflective ability to describe their knowledge. But research on memory strategies suggests the opposite possibility (Pressley & Hilden, 2006). Just as children often fail to spontaneously produce strategies that would help them, those who are high on metasuggestibility may fail to apply their knowledge to actual situations in which they are involved. This is especially likely to occur when a difficult task hinders their ability to perform the online monitoring necessary to detect and resist suggestive influences.

Turning to issues of forensic practice, some research has focused on training children to resist interviewers' suggestions (e.g. Moston, 1987; Poole & Lindsay, 2002) and forensic interview protocols often advise interviewers to establish ground rules by explaining that children can say 'I don't know', 'I don't understand' and correct interviewers who misunderstand a response. Such training studies and practices, in part, are based on the assumption that children have the necessary metasuggestibility understanding to benefit from these instructions. That is, these practices assume that children can appreciate the conversational pragmatics of the interview and identify when interviewers make statements that contradict or might influence children's memory for events. But consistent with the results of the present study, many researchers have found that such training programs either do not reduce suggestibility or do so by generally increasing children's tendency to say 'No' or 'I don't know' (Ellis, Powell, Thomson, & Jones, 2003; Gee *et al.*, 1999; Saywitz & Moan-Hardie, 1994). With added instructions

that emphasize the importance of 'correct' and 'don't know' answers, training in some studies does increase overall accuracy and reduce (but not abolish) suggestibility (e.g. Saywitz & Moan-Hardie, 1994). These added training studies, however, have used very comprehensive training modules that included more than metasuggestibility components. Therefore, data from such studies are unable to determine the specific effects of metamemory or metasuggestibility training.

The results of the present study indicate why such approaches, which are highly common in many protocols for interviewing children, might fail: Even at 10 years of age, many children do not show an explicit appreciation of the effects or even the occurrence of suggestive techniques. Without this awareness, they may not benefit from instructions that require them to monitor and resist these techniques.

Based on conclusions from the metamemory training literature (e.g. Cornoldi et al., 1991; Kurtz & Borkowski, 1984), we predict that training will be most beneficial in reducing interrogative suggestibility in children with good declarative metasuggestibility but will have little effect for children with no metasuggestibility insights. Providing children with strategies in training may be useless unless children possess metadecorative knowledge that their memory can be socially influenced. Such an understanding is necessary to understand the importance of the strategies. If forensic interviewers incorporate instructions to children about resisting questions that might distort their reports, then interviewers must first ascertain whether children have a basic understanding that their memory report can in fact be distorted. Otherwise, the use of these methods may simply distort, rather than bolster, children's reports.

In some cases, metasuggestibility may not be enough to preserve accurate reports. Many suggestive mechanisms are implicit and subtle, producing unwitting memory errors (see Davis & Loftus, 2007, for a review). For example, young children might not be aware that memories can be tainted by listening to a parent invoke a stereotype about someone who 'always does bad things'. Metasuggestibility knowledge may also afford little protection from question formats that promote the gist-based memory errors associated with reverse age trends in suggestibility (Brainerd, Reyna, & Ceci, 2008). Logically, metasuggestibility understanding will only benefit children who recognize the situation as one that requires resisting some suggestive influence (for an example, see Peters, Jelicic, Gorski, Sijstermans, Giesbrecht, & Merckelbach, 2008). It follows, then, that studies targeting varied suggestibility phenomena will be needed before a full understanding of metasuggestibility-suggestibility relationships will emerge.

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APPENDIX A

Source-monitoring test events

- A. First I am going to wipe off the tape recorder so that it is clean (wipe). Sometimes I push the orange button on the top to set the counter. When I push the button, it makes a click sound and the little numbers on the counter move around.
- B. Now I am going to sharpen my pencil (sharpen). Sometimes I push the eraser to make sure that it is on tight. The

eraser is soft and rubbery, and sometimes it gets loose unless I push it hard.

- C. Now I am going to make myself look nice by combing my hair (comb). Sometimes I spray a little hairspray on my hair. I like my hair to stay in place all day, and the spray keeps it from sticking up on top.

Truth-lie questions

1. When Jamie told the policeman that there was no hitting, was this the truth?
2. When Jamie told the yellow-lady that there was hitting, was this a lie?
3. When Jamie told his mom that there was hitting, was this the truth?
4. When Jamie told the policeman that there was no hitting, was this a lie?
5. When Jamie told the yellow-lady that there was hitting, was this the truth?
6. When Jamie told his mom that there was hitting, was this a lie?