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Children's suggestibility research: Things to know before interviewing a child

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A B S T R A C T

Children's testimony is often the only evidence of alleged abuse. Thus, the importance of conducting forensic interviews that are free from bias and misleading information is immense, as these could lead to false reports. In the current paper, we review unexpected findings in children's suggestibility that illustrate the difficulty in distinguishing between false and accurate reports. We explore situations in which a younger person's memory account may be more accurate than that of an adult, when a single suggestive interview may be as detrimental as multiple interviews, and when children can make inaccurate reports spontaneously. We conclude with recommendations for interviewers to decrease false reporting by both children and adults.

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Investigación acerca de la sugestionabilidad infantil: lo que se debe saber antes de entrevistar a un niño

R E S U M E N

El testimonio de los niños es a menudo la única evidencia de un supuesto abuso. Por lo tanto, la importancia de la realización de entrevistas forenses que estén libres de prejuicios y de información engañosa es inmensa, ya que podrían dar lugar a informes falsos. En el presente trabajo se revisan los hallazgos inesperados en la investigación sobre de la sugestionabilidad infantil que ilustra la dificultad de diferenciar los informes falsos de los verdaderos. Se analizan casos en donde las declaraciones de memoria de una persona más joven pueden ser más precisas que las de un adulto, cuando una sola entrevista sugerida puede ser tan perjudicial como múltiples entrevistas y cuando los niños pueden hacer declaraciones inexactas de forma espontánea. Concluimos con unas recomendaciones a los entrevistadores para que reduzcan las declaraciones falsas de niños y adultos.

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During the investigation and prosecution of child abuse cases, children are often the key witnesses (and may be the only eyewitness) to alleged crimes. In particular, their verbal testimony may be the only evidence of abuse that is presented in court as physical evidence of abuse is often limited or non-existent. However, prior research has shown that children's testimony may be inaccurate due to a susceptibility to false memory, in particular false memory resulting from suggestion (Ceci & Bruck, 1995; Ceci & Friedman, 2000). Because the child's testimony is so important and may be the only evidence of the alleged abuse, the quality of this evidence must be protected from contamination by suggestive interviewing. Proper interviewing techniques must be utilized to safeguard children's testimony from the effect of misinformation

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and suggestibility, as these could lead to false reports. In the current paper, we review unexpected findings in children's suggestibility research and make recommendations for interviewers to decrease false reporting by both children and adults.

Before getting to this, however, we define some terms. By false report we are referring to claims made by a child that are factually inaccurate, but the inaccuracy can be due to conscious lies on the part of the child or to unconscious assimilation of false suggestions and pressures made by those (usually adults) who have access to the child. The difference between these two forms of false report is that the one due to lying can potentially be remediated–by persuading the child to tell the truth; however, a false report that is the result of a child incorporating an interviewer's false suggestion is theoretically irremediable. Once the suggestion gets implanted in the memory trace, it is forever altered and no amount of remedial interviewing can undo the damage.

The other term we define is the concept of suggestibility. The most common definition is that proposed by Ceci and Bruck (1993): "suggestibility concerns the degree to which children's encoding, storage, retrieval, and reporting of events can be influenced by a range of social and psychological factors" (p. 404). Note that the inclusion of the word "reporting" extends suggestibility to sociocultural factors that are non-cognitive, such as pressure on a child to misreport an experience even though memory processes themselves (encoding, storage, and retrieval) are uncontaminated.

Suggestibility Does Not Always Decrease with Age

Recent literature on developmental trends in suggestion and false memory has provided insight into the differing ways in which children and adults are susceptible to memory distortion. This is important when reviewing testimony. For example, there may be a case in which a child and an adult (or two children of different ages) give contradictory testimony and it is not always true that the older person's versions of events are more accurate. In order to evaluate which testimony is most reliable (accurate), it is necessary to understand the types of memory distortion that may have taken place and how this can differentially affect the reliability of children and adults' testimony.

Chronological age has emerged as a powerful predictor of suggestibility: studies have shown that susceptibility to false memory and misleading suggestions decrease with age (see Ceci & Bruck, 1995; Ceci & Friedman, 2000; Ceci, Kulkofsky, Klemfuss, Sweeney, & Bruck, 2007), so that young children are most susceptible to both misleading suggestions (Ackil & Zaragoza, 1995; Bjorklund et al., 2000; Bruck & Ceci, 1999) and false memories (Ackerman, 1994; Reyna & Kiernan, 1994). However, as we explain below, recent research has shown that there is much variability within age groups. There are some conditions under which there are no developmental effects or even "reverse developmental effects," which are conditions where older children and even adults are more susceptible to suggestion than younger children (Brainerd, Reyna, & Ceci, 2008; Otgaar, Howe, Peters, Sauerland, & Raymaekers, 2013). For example, Principe, Guiliano, and Root (2008) showed that, because older children are more likely than younger children to draw inferences, they are more likely to falsely report inferences about the causes of ambiguous events and mistake them for actual experiences. In this study, 5- to 6-year-olds reported more false inferences than did 3-year-olds. Likewise, Ornstein et al. (1998) found that when asked to recall the details of an examination by a pediatrician that excluded some commonly-occurring medical procedures (e.g., the pediatrician did not listen to the child's heart with a stethoscope as is normally done during a doctor's visit), 6-year-olds were subsequently more likely than 4-year-olds to wrongly recall expected-but-non-experienced medical procedures.

Reverse developmental trends are most likely to occur in situations involving "meaning connection" and semantic association (Brainerd et al., 2008). Younger children may be less suggestible in situations where older children possess more meaning-connectedness knowledge, providing an opportunity for a suggestion to interact with such knowledge. The role of knowledge-representation in false memory has been shown to exist in studies using categorized word lists, such as the Deese-Roediger-McDermott (DRM) paradigm (Brainerd et al., 2008). In the DRM paradigm, children and adults are given a list of words that are semantically related (e.g., cake, pie, honey, candy, sugar, taste, sour, chocolate). After the completion of the list, they are asked to record all of the words they can remember. Studies using the DRM paradigm have found that it is more likely that adults will falsely remember a non-presented but related word (e.g., sweet). This may occur because *sweet* is semantically activated by hearing the other words on the list. Younger children often lack the semantic knowledge to activate *sweet* in the context of the related words; therefore, they are less likely to falsely recall hearing it (for a review, see Brainerd et al., 2008; Brainerd, Reyna, & Zember, 2011).

Recently, the DRM paradigm has been used to develop a greater understanding of age trends in false memory, for example Khanna and Cortese (2009) found that there is no age increase in false memory for phonological (as opposed to semantic) lists. Thus, adults are not more likely to falsely recall a word that rhymes with the ones they heard. In addition, there is a greater increase in false memories with age for words evoking negative emotions (e.g., cold, hurt, sick) than for words evoking positive emotions (e.g., baby, love, hug; Brainerd, Holliday, Reyna, Yang, & Toglia, 2010). Furthermore, when children are instructed to forget a previous word list and focus on the subsequent list, the rates of remembering words not presented in the first list decreases (Howe, 2005). This benefit of directed forgetting is not shown in adults.

Reverse developmental trends in suggestibility have been shown in cases of eyewitness identification of an innocent, but familiar, subject. An experiment by Ross et al. (2006) showed children aged 5 to 11 a video depicting either a female teacher reading a story to children (the control condition) or a male teacher reading a story to children (the suggestion condition). All the children were then shown a female teacher entering a cafeteria and having her wallet stolen by a man whom the children had not seen before. Later, the children were asked to identify the thief from a lineup of four innocent faces and the male teacher who was reading the story in the suggestion condition (the real thief was not in the line up). For children who had seen the male teacher reading the story, the probability of falsely identifying this male teacher increased from 0.18 for five-year-olds to 0.64 for 11-year-olds. Although the male teacher was familiar to both the 11-year-olds and the five-year-olds, the 11-year-olds were more vulnerable to suggestion based on "conscious inference" (for a definition, see Read, Tollestrup, Hammersley, McFazden, & Christensen, 1990; Ross, Ceci, Dunning, & Toglia, 1994), meaning significantly more 11-year-olds falsely believed they had seen the teacher steal the wallet because he was familiar to them but they forgot the reason why he was familiar.

Similar research on eyewitness identification has also found adults to be less accurate witnesses than children when exposed to misinformation (Royer, 2014). In this study, participants were shown a video of a crime and then asked to make an identification from a lineup in which the real perpetrator was not present. After a short delay, participants were shown two photographs and asked to again identify the perpetrator. Participants were randomly shown two of the following: the real thief, a completely unfamiliar face, and the suspect they'd chosen from the first lineup. Adults were less likely than children to correctly identify the real perpetrator during the second session. Additionally, adults were more likely to show commitment to their original choice by reidentifying

the same innocent suspect from the first lineup. One potential explanation for the decreased performance by adults is that they were more susceptible to the misinformation altering their initial memory traces, and thus came to recognize the innocent suspect as the true perpetrator.

Recent research has provided additional insight into the reasons for reverse developmental trends, and cases in which it may not apply. In a 2007 study, researchers administered a suggestibility test to four-year-olds and nine-year-olds (Ceci et al., 2007b). Children were read a short story and two days later they were given incorrect information about several of the objects in the story. Five to seven days later, children were asked to recall the objects that were part of the original story. The study found that semantic distance (children's representations of the similarity between the actual and suggested object) was more powerful than chronological age as a predictor of suggestibility. Thus, in some cases, older children were more susceptible to suggestion than younger children. For example, compared with younger children, older children were significantly more likely to erroneously report that there was an orange in a story instead of a grapefruit because they are both citrus fruits. Because older children have a citrus dimension in their mental representation they are more likely to substitute one item from the citrus category for another, something younger children do not do because they lack a citrus dimension (see Ceci et al., 2007b). On the other hand, younger children were more likely to erroneously report objects that were closer in their semantic representations such as substituting one character in a children's video for another. This suggests that reverse developmental trends in false memory based on semantic association may be caused by stronger semantic associations as people get older. This is also supported by results showing that children's low levels of false memory for semantically-organized word lists can be increased by making semantic associations in the lists more obvious, encouraging the younger children to process meaning and hence make more errors (Carneiro, Fernandez, & Diaz, 2009). However, in general, older children and adults have much more semantic knowledge than younger children and in this case their superior semantic knowledge actually makes them more vulnerable to false memory.

Further insight has been provided by a series of studies finding that knowledge represented in memory can affect recall, recognition, and even the subprocesses that underpin them, such as metamemory (Ceci, Fitneva, & Williams, 2010; Ceci et al., 2007b). Some materials were represented more elaborately or richly by younger children (such as *Sesame Street* television characters whom younger children know very well) and other materials were represented more elaborately by older children (e.g., items that belong to categories such as predatory animals, citrus fruits, or dairy foods). When viewed against this backdrop, those who possessed more elaborate representations of the items (which was sometimes younger and sometimes older children) were almost always more suggestible. In Figure 1, we show the typical representation of a 9-year-old. As can be seen, suggesting something that is near an experienced item results in greater suggestibility errors than suggesting something far away. For example, suggesting to a nine-year-old that they saw a lemon would result in greater errors if they actually saw an orange (because they possess a citrus dimension that links both items) whereas a four-year-old is less likely to make this suggestibility error because they do not understand the citrus dimension. Although it is not shown in this figure, a four-year-old is more likely to claim they saw milk when they actually saw soda because in their representation both items are closely linked as "things to drink", whereas a nine-year-old links milk closer to dairy items (cheese, butter). The bottom line is that the way children represent their world influences what suggestions cause errors.

Thus, depending on how they represented the materials, children were differentially suggestible and their metamemory

Figure 1. A spatial depiction of a typical 9-year-old's representation of a set of animals and foods. The proximity between words represents how closely related the child believes these objects are.

(thinking about their own memories) was differentially effective. When older children's representation of material was elaborate, they were more suggestible than were younger children whose representation was not elaborate. The reverse was true of items whose representations were more elaborate for younger children (see Table 1 of Ceci et al., 2007b, for targeted predictions that were confirmed for both age trends and reverse age trends as a result of how older and younger children represented the same material). The bottom line is that the nature and richness of the way information is represented influences proneness to suggestibility. Sometimes this can lead to older individuals being more suggestible than younger ones.

These findings are highly significant forensically. They mean that in some situations children's evidence may be less likely than adult's evidence to be tainted by suggestion or false memory. This necessitates a more refined approach in reviewing of testimony and in forensic examination, taking into account the subject matter, how elaborately it would be represented by witnesses, any semantic associations the witness may have made, and the type of potential memory distortions. These factors are likely to be more important than age itself in predicting memory distortion.

Demographic Variables Are Not Consistent Predictors of Suggestibility

As illustrated by the reverse developmental trends in suggestibility, interviewers should not assume an individual is more or less vulnerable to all forms of suggestion based on demographic variables. Research examining race, socioeconomic status, and gender have lead to inconsistent results that are better explained by other factors such as language ability.

Race and Socioeconomic Status

Very few studies have considered race or socioeconomic status as an influence on suggestibility and false memory (Bruck & Melnyk, 2004). Race is often tied to measures of intelligence and even language. For instance, Kulkofsky (2010) cites several studies that reveal a correlation between socioeconomic backgrounds and a child's language and intellectual abilities (Patterson, Kupersmidt, & Vaden, 1990; Vernon-Feagans, Hammer, Miccio, & Manlove, 2002; Walker, Greenwood, Hart, & Carta, 1994). She also

highlights the concern with racial discrepancies in language abilities. Because minority-raced children (e.g., Latino/Hispanic and African-American in the United States) are commonly over-represented as witnesses in criminal proceedings (Kulkofsky, 2010), substandard verbal skills should be of great concern to investigators. Nonetheless, more research must be conducted before any responsible conclusions can be drawn concerning racial influences on suggestibility and false memories.

Gender

In their review of research on individual differences in children's suggestibility, Bruck and Melnyk (2004) identified 20 studies that examined gender and suggestibility, of which only four found significant differences–and the results of these four studies were inconsistent. Other studies have found that there is a contextual relation between gender and suggestibility in children. In a study exploring individual differences in suggestibility, Chae and Ceci (2005) found that, during cued recall, girls gave more accurate responses than boys. In another study exploring the relationship between child and interviewer gender, researchers observed that girls provided more information when asked directed questions posed by female interviewers rather than male interviewers (Lamb & Garretson, 2003). In contrast, boys did not differ in their responding to male or female interviewers. Other research suggests that boys may be more suggestible than girls (e.g., Crossman, 2001; Warren, Lane, Snyder-Boggs, & Blevins, 1995, as cited in Bruck & Melnyk, 2004). However, some studies suggest that girls may be more suggestible than boys (e.g., McFarlane, Powell, & Dudgeon, 2002, as cited in Bruck & Melnyk, 2004). Thus, there does not appear to be consistent gender differences across varied situations.

Alternatively, Some Individual Differences May Impact Suggestibility

Although some demographic variables are not reliable predictors of suggestibility, other individual differences appear to be consistently related to suggestibility. These variables are important to explore for both applied and theoretical reasons. They inform interviewers about when to be cautious about the types of interviewing techniques they utilize. In addition, as was illustrated with representational complexity theory, they suggest underlying mechanisms impacting suggestibility.

Cognitive Factors

A wealth of research has explored the relation between cognitive function and suggestibility in children. Results from several studies suggest that higher cognitive functioning is associated with fewer memory inaccuracies than lower cognitive functioning (e.g., Chae, Goodman, Eisen, & Qin, 2011; Eisen, Goodman, Qin, Davis, & Crayton, 2007; Karpinski & Scullin, 2009). For example, in one study by Eisen et al. (2007), cognitive functioning (a composite of short-term memory, intelligence, and language ability) significantly predicted correct responses to open-ended questions and free recall and was associated with so-called "commission errors" (claiming something occurred that did not) to specific and misleading questions. In contrast, cognitive ability in this study was not related to "omission errors" (failing to report something occurred which actually did occur). Therefore, it is important that forensic interviewers assess children's cognitive abilities during the investigative process, as this ability may be associated with susceptibility to suggestibility and memory errors.

One particular cognitive function that would seem to be forensically relevant is memory ability. Several studies have examined the possible relation between memory ability and suggestibility

in children. Generally, results are inconsistent: while some studies found a significant relation between memory performance and suggestibility, others did not. For example, Brown found that increased memory ability was actually associated with higher rates of event creation compared to lower memory ability (as cited in Bruck & Melnyk, 2004, p. 965). Researchers have also explored the relation between event memory and suggestibility and have found inconsistent results. Generally, it appears that children's event memory proficiency is not significantly related to suggestibility (Bruck & Melnyk, 2004). Perhaps those children who are best at creating events are the most imaginative, hence suggestible. We do not know at this time.

Past research yields very consistent results that indicate children with intellectual disabilities are more prone to errors than typically-developing children when they are presented with closed, misleading questions (Gudjonsson & Henry, 2003; Bruck & Melnyk, 2004). In addition, several studies indicate that there are often no differences between children with mental retardation and typically-developing children on accuracy of misleading, open-ended questions (Bruck & Melnyk, 2004). However, when considering the relation between IQ and suggestibility for typically-developing children only, the association between suggestibility and IQ is inconsistent (Bruck & Melnyk, 2004). Age may account for more of the variability in suggestibility for children with normal IQ.

Distracted children may process information less effectively, causing them to confuse actual experiences with suggested information or to impulsively assent to suggestive questions. Unexpectedly, few studies have found a specific correlation between suggestibility and distractibility (Bruck & Melnyk, 2004). A recent study did find that levels of attention may impact adult's vulnerability to suggestibility, but not children's (Otgaar, Peters, & Howe, 2012). Otgaar et al. (2012) found that divided attention decreased false memory frequency in children but increased false memory frequency in adults for both negative and neutral information. Because attention may differentially impact children's recall of information, attention should be considered during investigative interviews of child abuse.

In addition, researchers have explored the relation between suggestibility and executive function, those frontal-lobe mediated activities that include inhibiting impulses, monitoring memory, working memory, and tracking performance. Theoretically, executive functioning should be correlated with suggestion because both involve keeping track of original events and resisting subsequent contradictory information related to the events. Researchers often explored this connection using tasks focused on various sub-components of executive functioning. Many studies revealed a significant relation between executive function and suggestibility, but others have revealed non-significant results or significant results in the non-predicted direction (Bruck & Melnyk, 2004). Some of these results may be qualified by further examination on the impact of age on suggestibility: younger children, who are still developing executive function, may be more prone to suggestibility. These results may indicate that age rather than executive function is related to suggestibility.

Several studies have investigated the correlation between creativity and suggestibility. Results indicate that highly creative children with active imaginations are more likely to elaborate on false beliefs and to be suggestible than children with less creativity and imagination. High creativity and imagination was associated with increases in answers to misleading questions, misinformation, and the creation of false events (Bruck & Melnyk, 2004).

Language

Recent years of research have produced the greatest understanding on key developmental differences between child and adult

witnesses. One of the most apparent disparities is in language development. Language abilities have been closely tied to questions of child competency and the reliability of their testimony. For instance, several studies have supported an inverse relationship between a child's linguistic skills and their vulnerability to suggestion (Chae & Ceci, 2005; Clarke-Stewart, Malloy, & Allhusen, 2004; Danielsdottir, Sigurgeirsdottir, Einarsdottir, & Haraldsson, 1993; Kulkofsky & Klemfuss, 2008; McFarlane et al., 2002; Newcombe & Dour, 2001; Roebers & Schneider, 2005). One possible explanation is that higher aptitude in language production is closely related to higher degrees of comprehension. This linguistic advantage facilitates the processing of new information and increases the likelihood the child will encode the event into memory (Ornstein, Haden, & Hedrick, 2004). Taken together, an emerging line of research proposes that language abilities should be considered by forensic interviewers as a factor affecting child suggestibility that is independent of other measures of cognitive functioning such as IQ.

How is language conceptualized as an individual difference? Language skill is often measured through vocabulary assessments, such as the Vocabulary subtest of the *Weschler's Intelligence Test for Children* (Danielsdottir et al., 1993; Howe, Gagnon, & Thouas (2008); Newcombe & Dour, 2001) or the *Peabody Picture Vocabulary Test* (Dunn & Dunn, 2007; Kulkofsky, 2010). Several studies that investigated the relationship between language ability and suggestibility have found that increased ability is positively correlated with increased resistance to suggestion (Bruck & Melnyk, 2004; Danielsdottir et al., 1993).

A mechanism that may be driving the relationship between language ability and suggestion is the ability to speak about memories. Lower vocabulary skills are associated with a reduction of information provided by a child when asked for free recall (Chae & Ceci, 2005; Kulkofsky, 2010). Furthermore, children with more accurate cued recall were less suggestible than those with less accurate recall (Chae & Ceci, 2005). In addition, suggestibility has been found to be highest for children with below-average verbal intelligence.

Although providing child witnesses with a vocabulary "boot camp" or intensive linguistic training may not be a practical solution, several researchers have proposed methods to work within the limitations of the current system. Brown and Pipe (2003) proposed a modification of the narrative elaboration technique, a method called the verbal labels procedure. Findings have shown that this method is able to counteract some of the predispositions to suggestibility stemming from low vocabulary skills (Brown & Pipe, 2003). A narrower attribute of the English language that has received attention is linguistic referents. This refers to a child's use of productive (article system, number specification, and semantic mapping of words) and receptive (filtering and appropriately responding to confusing and misleading questions) skills. Findings indicate young children failed to correct false suggestions, while most children had a misidentification (78%) under various conditions (Battin, Ceci & Lust, 2012). In this research, preschool-aged children were especially prone to describing a perpetrator in the plural ("They knocked over the cans") when in actuality it was a single perpetrator. Perhaps, the use of the plural in English lessened the negativity in the children's minds by diffusing responsibility among a group of individuals rather than a single perpetrator. Forensic interviewers would be well-served to precede their interviewers with preschool-aged children with a short session to instruct them to use the definite article (the) rather than the indefinite (a) and to use singular rather than plural when referring to a unique individual.

Finally, future research is greatly needed to determine how suggestibility and false memory effects differ for bilingual and non-native English speaking children. Howe et al. (2008) have begun to investigate how false memories vary in bilingual speakers

(including measures of language exposure and proficiency). Results indicate that false memory development was more prevalent for bilingual speakers regardless of age. These findings collectively illustrate language as a complex, multifaceted factor affecting suggestibility.

Mental State

Forensic interviews, especially relating to child abuse, are highly emotional and stressful events for children. Stress may affect children's encoding as well as retrieval of their abuse. In addition, children with different temperaments and attachment styles may be more greatly affected by stress.

Research has shown that parental attachment style is related to suggestibility in certain contexts. For example, researchers found that children's inaccurate responses to direct questioning were predicted by parental insecurity (Quas et al., 1999). Children of fearful avoidant parents made more omission errors to misleading questioning than children of parents who did not display as fearful and avoidant attachment styles. Further, children whose parents displayed dismissive avoidant attachment exhibited increased suggestibility compared to children whose parents displayed less dismissive avoidant attachment styles (Quas et al., 1999). In addition, research suggests that securely attached children are less suggestible than those who are insecurely attached (Bruck & Melnyk, 2004). Given that parental attachment may impact children's susceptibility to misinformation and suggestion, the investigative interview should be conducted in manner that takes these factors into consideration, including an assessment of the child's and parent's attachment style.

Research suggests that stress may impact children's susceptibility to false suggestions during both the encoding and retrieval of information. In one study, the impact of stress was examined when children were interviewed about distressing medical visits. Results indicated that for children with avoidant parents, high distress during the medical visit led to increased memory inaccuracy while children with less avoidant parents were more accurate regardless of stress level (Chae et al., 2014). In another example, increased stress was related to less detailed responses during interviews with children about a medical procedure they had experienced years earlier (Quas et al., 1999). Quas et al. (1999) also found that increased stress levels were related to greater accuracy during misleading questioning. This unexpected finding may be due to the fact that the medical procedure varied across children and therefore perceived stress may not have been consistent. A lack of empirical control may also explain the findings in other studies that higher levels of stress or arousal are associated with decreased suggestibility (Bruck & Melnyk, 2004). In addition, a positive relationship between stress and suggestibility may not be found in studies where children do not experience high stress levels (Bruck & Melnyk, 2004). Thus, children's level of experienced stress during the investigative process may differentially impact children's ability to encode and recall information in different contexts, although results across studies are highly inconsistent.

Emotionality has also been linked to suggestibility but, as will be seen, the findings have been contradictory. In Chae and Ceci (2005), children with high emotionality (or neuroticism) complied more with interviewers' suggestions than did less emotional children. However, Chae (as cited in Bruck & Melnyk, 2004) found that highly emotional children were more prone to suggestibility, but this relationship diminished when age was controlled. Further, other research suggests an opposite relationship: Scullin (as cited in Bruck & Melnyk, 2004) and Chen (as cited in Bruck & Melnyk, 2004) found that highly emotional children were less susceptible to suggestion. Thus, the findings are inconsistent for the relation between emotionality and susceptibility to suggestion.

Several aspects of self-concept may also be related to suggestibility in children. For example, Chae and Ceci (2005) found that shy children produced less voluntary recall and produced fewer correct answers to non-leading, direct questions compared to less shy children. In addition, Vrij and Bush (2000) investigated the relation between self-confidence and suggestibility in children. Results indicated that after controlling for age, self-confidence significantly predicted suggestibility. Other studies also indicate that high levels of self-concept may be associated with decreased suggestibility (Bruck & Melnyk, 2004). Bruck and Melnyk (2004) suggested that attachment style and self-concept may interact, such that children raised by secure and supportive parents may develop positive self-concepts, which in turn make them more resistant to suggestions that are inconsistent with their own experiences. More research is necessary to fully explore this relationship.

Culture

Little attention has been given to cultural influences on suggestibility. Siegal (1996) highlights a few ways a child's culture can influence their testimony. For instance, a child may hesitate to reveal abuse if the consequences appear more damaging than the continuation of harm (Berliner & Barbieri, 1984). For example, a mother may threaten her child that if she tells the police that her father sexually abused her, the father will go to jail and the child will go to an orphanage. Another cultural impact may come in the form of social judgments. Social Judgment Theory, crafted by Sherif and Hovland (1961) proposed that a person appraises a situation by beginning with their preferred position, then negotiates the novel facts with the ego to arrive at the final judgment. Brothers and Ring (1992) proposed that social judgments are affected on some level by culture. Therefore, when determining the factors that may influence a child's response during an interview, it is important to remember that cultural forces may be bearing weight on the responses disclosed.

Siegal (1996) also discusses how culture molds the conversational styles that can affect a child's autobiographical memory. Although a witness interview is seldom perceived as a casual conversation, there are several qualities of an autobiographical memory that make both acts strikingly similar, such as the need for free recall and recognition. These conversational attributes can vary significantly among various cultural groups. Western cultures' individualistic natures are strikingly different from the collectivistic conception of Japanese culture, even in terms of one's mind (Kashima, 1994). The notion of a mind molded by others allows for memory talk, where a person's experiences are freely shared, heightening the development of a child's autobiographical memory. Memory talk has a particularly significant effect on the free recall of preschoolers, with significant implications for false belief tasks (Chandler & Hala, 1994).

It is important to note that certain cultures participate in conversation as a routine cultural practice, developing a better understanding of mental states due to the need for memory, sensitivity, honesty, intelligence, and courage (Siegal, 1996). An improved awareness of mental states has led to better performance on false belief tasks, appreciating that others have beliefs that may differ from your own and that motivate their questioning (Dunn, 1994). In spite of limited associations between culture and children, these findings propose its influence on suggestibility and false memories could begin earlier than previously considered. When an interviewer asks a young child in the course of a murder investigation if he can remember if his father had a knife when he left the house, the child must recognize not only that others regard her as having an obligation to speak accurately but equally importantly that her statement may cause serious adverse consequences for another person (her father). This is why it is so important to understand that others have beliefs that may differ from your own and that motivate their questioning. Without this understanding, a child may tell an interviewer what she assumes the interviewer wants to hear, simply to terminate what may be an uncomfortable discussion.

Even One Suggestive Interview Can Create False Memories

A number of studies demonstrate that repeated suggestive interviews taint the accuracy of children's memories (e.g., Bruck, Ceci, Francoeur, & Barr, 1995; Bruck, Ceci, & Hembrooke, 2002; Leichtman & Ceci, 1995). Many studies have also reported that children can incorporate suggestions about salient events after a single suggestive interview (e.g., Ceci et al., 2007a). In one study, Hritz (2014) found that asking children to knowingly make a false accusation in one interview caused a third of the children to maintain the false accusation during a later neutral interview, even after being told the first interviewer had made a mistake.

Current research has explored how a single suggestive interview can have equally detrimental effects as multiple interviews when (1) the strength of the original memory trace is weak or the memory is of repeated events and (2) the timing of the misinformation occurs relatively close to the original event compared to the time from the memory test. These findings illustrate the importance of evaluating every interview with a child, as even one biased interviewer can taint a child's testimony.

Strength of Original Memory Trace

The memory trace strength theory proposes that children with better memory for an event are less suggestible to misinformation about that event (e.g., Bruck & Melnyk, 2004; Marche, 1999; Marche & Howe, 1995; Pezdek & Roe, 1995). This theory has been consistently supported in the literature. For example, after showing children a slide show multiple times (and thus strengthening their memory of the slide show), Marche (1999) found that these children reported less misinformation than children who saw the slide show only once and thus had a weaker memory for it. In addition, children who experienced the event once were equally susceptible to misinformation if it was presented in only one interview compared to multiple interviews. This suggests that a single suggestive interview can have detrimental effects on the accuracy of the reports of children with weaker memories of an event.

Recent research suggests a relationship may exist between suggestibility and the effect that repeated events have on memory (e.g., Brainerd et al., 2008). For example, Price and Connolly (2013) found that children who experienced a repeated event were more likely to be suggestible to false details than children who only experienced a single event. This suggestibility effect was still present after one year. Price and Connolly (2013) hypothesized that the children who experienced repeated events had a stronger general representation of the events (as opposed to a specific memory), and were therefore more likely to accept plausible misinformation as accurate.

Delay Between Event and Interviews

Another factor that influences the impact of a suggestive interview is the timing of the interview after the original event. Studies have shown that neutral open-ended interviews immediately after an event can have a positive impact on children's accuracy (Howe, 1991; Lehman et al., 2010; Marche & Howe, 1995). Trace-integrity theory suggests that this is because the neutral interview can strengthen the child's original memory. An immediate neutral interview can consolidate memory for an event and thus protect against forgetting, prevent normally occurring errors of commission, promote reporting of previously unmentioned details in later

recall, or facilitate hypermnesia, an increase in the amount of new information recalled over increasing retention intervals that exceeds the amount of information forgotten (for a review, see Melnyk & Bruck, 2004). The protective effect of an early neutral interview would not occur if the original memory trace is weakened, or at least not strengthened, by the introduction of misinformation through a biased interview.

Recent research has explored the impact of a single biased interview performed shortly after the event. The theory of trace strength suggests that extending the interval between event and misinformation increases the likelihood of suggestibility because the biased interview has a recency advantage over the event (the details of the event have more opportunity to be forgotten), so misinformation is more likely to be preserved at time of the test (e.g. Bright-Paul & Jarrold, 2009). Alternatively, source monitoring theory suggests that shortening interval between event and misinformation increases likelihood of suggestibility because when the event and the biased interview are close in proximity, the information gained from these two events is more likely to be confused (Bright-Paul & Jarrold, 2009). A third possibility, temporal distinctiveness theory, suggests that it is the ratio of the time between the experienced event and subsequent exposure to misinformation to the time between exposure to misinformation and the test of the experienced memory that is important. This is because as the latter increases, the former becomes relatively less distinguishable (Bright-Paul & Jarrold, 2009). For example, it is harder to discriminate between 21 and 24 months than bewteen one and four months even though the time difference is the same. This also fits with source-monitoring theory, as it is more likely that individuals will confuse information gained from the event with information from the suggestive interview when temporal distinctiveness decreases. In support of this theory, Bright-Paul and Jarrold (2009) found that when the time between misinformation and memory recall was increased compared to the time between event and misinformation, participants were more suggestible. Interestingly, their results indicated that the total delay between the event and the final interview did not impact suggestibility.

Melnyk and Bruck (2004) examined the extent to which timing moderates the impact of repeated interviews. For example, one suggestive interview could have the same impact as two interviews depending on when each interview occurs. Results indicated that one suggestive interview, when isolated from the specific influences of timing, had the same effect on the accuracy of children's recall as multiple interviews. When the timing was manipulated so the suggestive interview was either very close to the event, very close to the final neutral interview, or there were two suggestive interviews, repetition did play a role; participants were most suggestible when they experienced two interviews. Importantly, all three groups incorporated the misinformation into their accounts, suggesting there should be cause for concern even when only one suggestive interview has occurred.

The results of these findings suggest that even when suggestive techniques are not used in subsequent interviews, suggestions introduced previously may still influence children's responses. An implication of this finding is that forensic interviewers should attempt to find out if a child has been suggestively interviewed in the past, either in formal interviews with police and social services or in informal conversations with members of their family and neighborhood.

Even Professionals Cannot Differentiate Between False and Accurate Reports

Research has demonstrated children can speak sincerely and emotionally about events that never occurred and appear much like children providing accurate reports (Ceci, Loftus, Leichtman, & Bruck, 1994; Leichtman & Ceci, 1995). In one study, Kassin, Tubb, Hosch, and Memon (2001) surveyed 64 eyewitness experts in the United States about basic eyewitness topics and two-thirds of the respondents reported that young children were less accurate than adults. However, this is not always the case. As with many eyewitness topics, the reliability and credibility of child eyewitness reports depend on a multitude of other factors, such as the inclusion of yes or no questions, repeated questioning, or even the anatomical dolls used during questioning (Ceci & Bruck, 1995). The belief among experts that children are less reliable witnesses than adults may compromise the retrieval of accurate information from child witnesses.

Confirmatory Bias

It has been shown that people have the tendency to be biased towards information that confirms their own personal beliefs, rejecting information that disagrees with those beliefs (Goodman & Melinder, 2007). This tendency has been demonstrated even among professionals and social scientists. A person's established beliefs are often difficult to change and resist contradictory evidence (Ross, Lepper, & Hubbard, 1975). This phenomenon, referred to as "confirmation bias", can have especially detrimental effects when working with child witnesses. If an interviewer enters a room, prepared to question a child, and brings along pre-established beliefs about the case or the accuracy and credibility of the child, the interviewer may unintentionally put disproportional weight on some statements the child makes while ignoring others. If the interviewer's initial suspicions are incorrect, this could create a false report. Confirmation bias is potentially a problem for all people who may interact with a child witness, even professionals in the field of forensics, human development, and social science. In fact, experts tend to be more confident in their evaluations of witnesses than others, despite not necessarily being more skilled at distinguishing accurate from inaccurate statements (DePaulo et al., 2003; Wessel, Drevland, Eilertsen, & Magnussen, 2006).

Interviewer bias can develop quickly in natural interviewing situations, and contaminate not only the child's accuracy but also the accuracy of the interviewer. In a study by Bruck et al. (1999) a surprise birthday party was staged for 90 preschool children in their school. In groups of three, the children surprised a research assistant for her birthday, played games, ate food, and watched magic tricks. Another 30 children were also told that it was the assistant's birthday, however they did not attend the birthday party but instead they colored a picture with the research assistant. University graduate students in programs in social work or counseling and who had training and experience in interviewing children each interviewed four children about what had happened. They were not told about the events but were simply told to find out from each child what had happened. The first three children that each interviewer questioned attended the birthday party but the fourth child attended the coloring event. Several weeks later, the interviewers were questioned about what they had learned from the children.

Bruck et al. (1999) found that the children who were interviewed last (all of whom attended the coloring event) produced twice as many errors as the children who actually attended the birthday party; 60% of the children who only colored made false claims that involved attending a birthday party. This result suggests that the interviewers had built up an expectation that all the children had attended a birthday party. By the time they interviewed the fourth child in their group, they structured their interviews in such a way as to elicit claims consistent with their expectation. Thus if interviewers have the belief that all the children they interview have experienced a certain event, then it is probable that many of the children will come to make such claims even though they

were non-participants (or non-victims). Interestingly, even when the child who only colored correctly denied attending a birthday party, 84% of their interviewers reported later that all the children told them they had attended a birthday party. These data suggest that regardless of what children actually say, confirmatory bias leads interviewers to inaccurately report the child's claims in order to make them consistent with their own hypotheses.

To counteract this confirmation bias, researchers have recommended that interviewers questioning a child about an event should test alternative hypotheses about what may have happened. For example, if the interviewer believes a parent abused the child, the interviewer should also ask questions that allow the child to disclose information that could suggest the parent is innocent such as asking about whether a neighbor or babysitter abused them. Testing alternative hypotheses is important because there are many situations in which a child's statements may be misunderstood, even in the absence of blatant suggestive questioning or situations in which a child gives the interviewer the answer they assume the latter wants to hear.

Some interviewers appear to believe that behavior when giving a false or suggested statement is distinguishable from behavior when telling a true statement. If an interviewer believes there are certain behaviors a truth-teller displays that a child telling misinformation would not, they may not naturally explore alternative options during the interview when a child displays these behaviors. However, research shows people are unable to distinguish false reports made by children from true reports. Children who have been interviewed suggestively and report false information are later rated as highly credible, even by trained professionals in child development, mental health, and forensic interviews (Leichtman & Ceci, 1995). In fact, children who give false reports can speak sincerely and even emotionally about the event, much like some children giving true reports (Ceci et al., 1994; Leichtman & Ceci, 1995).

In one study, children were interviewed about a man who visited their classroom (Leichtman & Ceci, 1995). Some of the children were interviewed suggestively about the man's behavior, while some were told negative stereotypes about man, and others were given no suggestion at all. Afterwards, videos of three different children's interviews about the man's behavior were shown to adults who were asked to rate the accuracy of claims made by children. Many of the claims made by the children did not happen. Only one of the children told the truth about how the man behaved. Adults were unable to correctly identify which of the events had occurred, and furthermore rated the truth-telling child as the least credible of the three witnesses.

A study conducted by Bruck et al. (2002) included multiple highly suggestive interviews of preschool-aged children about both true and fictional events and found that children gave additional information in their false reports beyond what was suggested to them. In fact, children who were questioned about false narratives actually gave more details and lengthy embellishments than children who were questioned about a true event they had actually experienced. Additionally, linguistic markers such as elaboration did not consistently differentiate false narratives from true stories. In a real life context, this may be problematic because children may interweave false suggestion with details about their life and their real interactions with the suspected perpetrator. If the interviewer expects children to be reticent to discuss an event that did not occur, they may likely believe a child who goes into great detail, even if that child is not accurate.

While children do not always generate false statements when asked specific, misleading questions, they also do not always provide truthful, accurate information when they speak spontaneously, that is, in the absence of any misleading questions (Poole & Lindsay, 2001; Poole & White, 1993). As long as children are

exposed to suggestive questioning, they can later spontaneously report the suggested information despite best practices followed by subsequent interviewers. This is demonstrated when children are asked open-ended questions after suggestive interviewing has occurred. In one study in which children were asked to give a free recall of everything they remembered about an event after being given misleading information about the event by their parents, 21% of statements made by children contained suggested false information (Poole & Lindsay, 2001). This spontaneous generation of false information can even occur after a long delay between the suggested interview and the free memory recall. In another study, children were subjected to repeat suggestive questioning about an event (Poole & White, 1993). Two years later, the children were asked to report everything they remembered from the event: 39% of six-year-olds and 23% of ten-year-olds reported incorrect information.

Even if no suggestion has occurred, spontaneous reports made by children are not necessarily accurate. As discussed previously, confusing or ambiguous events may spur spontaneous false memories for related events. In one study, children were interviewed after a mock medical exam in which certain common features (e.g., a doctor listen to their heart examined with a stethoscope) of an exam were left out and some unusual features (e.g., having the circumference of their wrists measured) were added (Ornstein et al., 1998). When questioned after the event, 42% of four-year-olds and 74% of six-year-olds reported to remember experiences common to medical exams that had not in fact occurred. Thus, while responses to free-recall and spontaneous statements are indeed more likely to be accurate than responses to direct questioning, children may indeed report incorrect information spontaneously.

As already noted, it is important to not discount a child's testimony merely because they have been exposed to suggestive questioning. Misinformation has been found to actually increase memory accuracy in certain contexts when a child's memory for the event is obviously different from the misinformation, as was found by Peterson, Parsons, and Dean (2004). In that study, children were suggestively interviewed about an emergency medical procedure they had just undergone. After a two-year delay, none of the children reported experiencing the suggested information and their memory for the medical procedure was intact. In situations like this, the false information may reinforce memory for the true event and the child may therefore give a more accurate report.

Conclusion

The importance of conducting forensic interviews that are free from bias and misleading information is immense. As illustrated by the research discussed in this paper, all people are susceptible to interviewers' suggestions. In addition, while research has identified some of the underlying mechanisms that cause suggestibility, results are often inconsistent. These findings highlight the importance of interviewers having an open mind and considering alternative theories of the events, as even one suggestive interview can taint an individual's reports years later and even highly trained professionals are not able to differentiate reports based on true and false beliefs. Future forensic experts would be well-served to examine the child's language, theory of mind, and emotional attachment prior to conducting the actual interview and to prepare a line of questioning that tests alternative hypotheses. Armed with such information, the interviewer can better understand any limitations and hopefully intervene to surmount them.

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