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Individual Differences in Children's Suggestibility: An Updated Review

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ABSTRACT

The present review is intended as an overview of our current understanding of how children's individual characteristics, in terms of demographic, cognitive, and psycho-social variables, may influence their susceptibility to suggestion. The goals are to revisit conceptual models of the mechanisms of suggestibility, to provide an updated practical guide for practitioners, and to make recommendations for future research. Results suggest that children with intellectual impairment and those with nascent language skills may be particularly vulnerable to suggestion. Further, memory for separate events, theory of mind, executive function, temperament, and social competence may not be related to suggestibility, whereas additional work is needed to clarify the potential contributions of knowledge, stress, mental health, parental elaborative style, and adverse experiences/maltreatment to children's suggestibility.



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The degree to which suggestibility is problematic for children in the legal system has been a point of contention for child suggestibility researchers (e.g., see Ceci & Friedman, 2000; Lyon, 1999). Addressing this question has been important for informing forensic practice, particularly for professionals tasked with interviewing young children about alleged sexual abuse. There is, presently, general agreement that children *can* be susceptible to suggestion, more so than are adults, but that they are not always susceptible. In fact, although some children readily accept suggested information, others within the same age range are able to resist even robust suggestive conditions. Thus, from an applied perspective, the critical question for forensic interviewers becomes not how much children, in general, fall prey to suggestive influences, but to what extent a specific child, or a child with specific characteristics, is likely to be suggestible. The literature relevant to this question was summarized in an excellent review by Bruck and Melnyk in 2004 in which the authors examined the state of the literature on individual differences and suggestibility. The present review surveyed the literature published on this topic in the nearly 14 years since Bruck and Melnyk's comprehensive review,

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and have highlighted implications for forensic practice involving alleged child victims of sexual abuse and suggest promising avenues for future research.

In Bruck and Melnyk's review, the authors provided direction for the burgeoning field of individual differences in suggestibility, pointing out that "although not entirely consistent, there are indeed some concepts and skills that may mirror underlying mechanisms of suggestibility in childhood and deserve future study" (p. 949). The present review addresses the extent to which this call has been answered. However, Bruck and Melnyk also concluded that the only individual difference informative to forensic practice was intellectual impairment. At the time, the body of literature had not identified any other individual differences with sufficiently robust relations with suggestibility. A second goal of the present review was to revisit this question and assess whether we can offer additional guidance to forensic practitioners regarding which characteristics may make children most susceptible to suggestive influence.

We have retained the overall organization of Bruck and Melnyk's (2004) review as it still effectively captures the body of existing research. Thus, the work is divided into three major categories of individual differences: demographic, cognitive, and psycho-social. Within each section, we have reviewed the current state of the research, highlighting where findings support or depart from the conclusions reached by Bruck and Melnyk in 2004, and have given particular attention to new areas of research which are expanding the field's understanding of the mechanisms underlying children's suggestibility.

Method

Articles were identified for potential inclusion by using the PsycINFO database. Searches were restricted to studies published in refereed journals after April 2004, the endpoint of Bruck and Melnyk's (2004) review period, and included studies published up through December of 2017. All searches were limited to research with participants between the ages of 2 and 17 years. Three searches were conducted, each using one of the following search terms: suggestibility, misinformation, and misleading. Articles from these initial searches were selected for inclusion using the following criteria.

Inclusion/exclusion criteria

Studies were included in the present review if they measured suggestibility in one of the following ways: (i) responses to suggestive or misleading questions, (ii) responses to direct questions after being presented with misinformation, (iii) changes to previous responses after receiving suggestive feedback. Studies were excluded if children responded only to direct questions without suggestive techniques.

We included studies that assessed individual differences and suggestibility via separate tasks and if suggestibility was assessed separately from other memory measures. For example, we included studies with children's memory as an individual difference variable only if children's memory and suggestibility were assessed for different events or tasks, or if their memory skills were assessed via standardized tests. We excluded studies that examined the association between suggestibility and memory for the same event. We also excluded studies that did not report suggestibility independent of the total accuracy/inaccuracy score and thus could not specifically assess the effects of individual differences on suggestibility. Finally, unpublished studies that were reported in Bruck and Melnyk (2004), but were published at a later date were excluded.

Coding the database: Descriptive information

The selection criteria resulted in 55 studies, across 51 publications, which included a total of 6,455 children. Studies were coded for the age of the participants, the type of to-be-remembered event, how suggestibility was measured, and the delay between the event and the memory interview.

Age of participants

The age range of participants was quite large across studies, (i.e., 2–18 years old). However, only one study included 18-year-olds in their sample, and only 14 studies included adolescents. Most studies included preschoolers in their sample (72.7%), and of these studies, half (47.5%) included *only* preschoolers, a third (37.5%) included preschoolers and school-age children, and the remaining included children from preschool through adolescence (15.0%).

Measures of suggestibility

The most common methods used were having the child watch a video (27.3%), listen to a story (27.3%), observe a staged event such as a magic show (20%), or engage in an interactive activity such as a game (18.2%). The least common methods asked children to recall a medical procedure (e.g., inoculation, genital exam; 5.4%) or included both a video and a story (1.8%). Children's suggestibility was most commonly measured as children's responses to misleading questions about the to-be-remembered event, in which the interviewer indicated a desired response. Responses to misleading questions were sometimes defined as a "yield" when the child assented to the misleading information, a "shift" when the child changed their previous response in the face of social pressure, or a "false alarm" when the child incorrectly indicated something did occur/was present. Another commonly used measure was the misinformation paradigm, which includes three phases, namely, children were exposed to the to-be-remembered information, were then presented with misinformation, and were

later interviewed about the original to-be-remembered information. The misinformation phase could involve a suggestive interview, in which the interviewer asked misleading questions (e.g., Did *she hug you* [false detail] at the beginning or at the end of the magic show?), or a story that described the original event but included false information. In most of these studies there were several days in between each phase.

Delay between the event and memory interview

The length of the delay between the event and the memory interview varied from no delay to a 44-month delay. The tested delays are as follows; 21 studies questioned the children immediately after the event, 21 studies questioned the children between 1 and 14 days after the event, and 7 studies questioned the children between 3 and 7 weeks after the event. An additional 4 studies questioned the children more than once, yielding suggestibility measures for each interview, one study compared a 1-week delay to a 6-month delay, and one study included a 44-month delay.

Coding the database: Individual difference measures

The measures were categorized as demographic (socioeconomic status, gender, culture), cognitive (intelligence, language, memory, theory of mind, executive functioning, and knowledge) or psychosocial (social competence, stress/emotional arousal/state anxiety, attachment and parent–child relationships, parental elaborative style, temperament, mental health, and adverse experiences/maltreatment). In each section, new developments within subcategories examined by Bruck and Melnyk (2004) are addressed, areas that have not been addressed since the 2004 review are acknowledged, and new areas of inquiry are discussed.

Results

Demographic factors

Our search did not reveal any new studies examining socioeconomic status (SES) and suggestibility, but it did uncover eight studies examining gender differences in suggestibility (Eisen, Goodman, Qin, Davis, & Crayton, 2007; Ghetti, Papini, & Angelini, 2006; Gilstrap & Ceci, 2005; Gudjonsson, Vagni, Maiorano, & Pajardi, 2016; Kim, Kwon, & Ceci, 2017; Uhl, Camilletti, Scullin, & Wood, 2016; Volpini, Melis, Petralia, & Rosenberg, 2016; Warren & Peterson, 2014). Only one found a significant association between gender and suggestibility, such that boys were more likely to acquiesce to misleading questions (Gilstrap & Ceci, 2005).

We also identified a study that examined the effects of culture on suggestibility, representing a new direction in individual differences research. Melinder, Scullin, Gunnerød, and Nyborg (2005, study 2) found that Norwegian preschoolers were less likely to yield to interviewers' leading questions and less likely to shift their responses in the face of negative feedback compared with American preschoolers. Because this was a single study, with a single cross-cultural comparison, and unclear underlying mechanisms, considerable future research is needed before we can draw conclusions about the relations between culture and suggestibility.

Cognitive factors

Intelligence

Researchers examining the relations between individual differences in intelligence and children's suggestibility have taken two primary approaches. One body of work has examined continuous differences in intelligence within the population whereas another body of work has compared suggestibility in children with, or without, intellectual impairment. The results regarding continuous assessments of intelligence are mixed. Bruck and Melnyk (2004) proposed that perhaps the relation between intelligence and suggestibility is most pronounced for children under the age of eight years. This pattern was not apparent, however, in the present sample (Bettenay, Ridley, Henry, & Crane, 2015; Caprin et al., 2016; Gignac & Powell, 2006; Gilstrap & Papierno, 2004; Gudjonsson et al., 2016; Melinder et al., 2010; Roma, Sabatello, Verrastro, & Ferracuti, 2011). Although there was some evidence of an association between intelligence and suggestibility in two studies with children under the age of 8 years (Bettenay et al., 2015; Gignac & Powell, 2006), another found links in a sample of 8–10-year olds (Roma et al., 2011), and there was no association in the remaining four studies that included children under the age of 8 (6–11-year olds: Caprin et al., 2016; 3–7-year olds: Gilstrap & Papierno, 2004; 7–16-year olds: Gudjonsson et al., 2016; 4-year olds: Melinder et al., 2010).

The explanation for these mixed findings is unclear. Caprin et al. (2016) did not expect to find intelligence differences given that they included only a nonverbal measure of intelligence and expected language to play an important role. In line with this hypothesis, both Bettenay et al. (2015) and Gignac and Powell (2006) included combined verbal and nonverbal intelligence measures and found some associations with suggestibility. However, Melinder et al. (2010) did not find an association between verbal IQ and suggestibility, and Roma et al. (2011) did find links between nonverbal intelligence and suggestibility. Thus, the conclusion that verbal intelligence, specifically, is associated with suggestibility is also not supported.

In terms of comparisons between children with intellectual disabilities (ID) and typically developing (TD) control participants, the body of literature to date is more consistent, despite differences in the definition, measurement, and threshold for ID across studies. Children with ID tend to be as suggestible as mental age-matched TD children (see London, Henry, Conradt, & Corser, 2013 for a review), and more suggestible than chronological age-matched TD children (see Bowles & Sharman, 2014 for a review). Brown, Lewis, Lamb, and Stephens (2012) found that children with mild or moderate ID were more suggestible than chronological age-matched TD children and that children with mild ID were as suggestible as mental age-matched TD children. Miles, Powell, Gignac, and Thomson (2007) found no differences between children with ID and chronological age-matched children in terms of incorporation of suggested details into an event narrative, but this was likely because rates of suggestibility were at floor across groups. Miles et al. (2007) did, however, find that ID children were more suggestible on the Gudjonsson Suggestibility Scale for Children, version 2 (GSS-2: Gudjonsson, 1997). Robinson and McGuire (2006) found no differences in GSS-2 performance between children with mild ID and chronological age-matched TD children. However, in a study with a similar sample size and age range, Milne, Sharman, Powell, and Mead (2013) found that children who attended a school for children with ID were more suggestible than TD children when asked misleading questions about a video. Finally, Henry and Gudjonsson (2007) found that children whose ID was identified based on verbal intelligence, but not nonverbal intelligence scores, were more suggestible than chronological age-matched TD children. In sum, the links between continuous measures of intelligence and suggestibility remain inconsistent, and ID itself does not appear to predict suggestibility given that there is no evidence for suggestibility differences between children with ID and mental age-matched TD controls, but ID typically predicts children's performance when children are matched by chronological age.

A handful of recent studies have explored the relations between two categories of common developmental disorders, Autism Spectrum Disorder and Down Syndrome, and suggestibility. These studies find no differences in susceptibility between children with developmental disorders and those without (Bruck, London, Landa, & Goodman, 2007; Collins & Henry, 2016; Hsu & Teoh, 2017; McCrory, Henry, & Happé, 2007). Of note, three of these studies focused on children with Autism Spectrum Disorder (Bruck et al., 2007; Hsu & Teoh, 2017; McCrory et al., 2007), which does not necessarily present with intellectual impairment, and the fourth focused on children with Down Syndrome (Collins & Henry, 2016). Though Down Syndrome is a common cause of ID, in the presented study, the sample with Down Syndrome was compared to mental age-matched controls rather than chronological age-matched controls. Thus, this finding is in line with the previously presented research on suggestibility in children with ID which

suggests that impairments are only present when ID children are compared with chronological age-matched controls (London et al., 2013).

Language

Our search identified ten studies, across nine published manuscripts, which tested relations between children's language and suggestibility. The vast majority of these studies (9/10) measured receptive or productive language skills via standardized measures such as the Peabody Picture Vocabulary Test or the Adaptive Language Inventory. Most of these studies found a significant negative association between language skill and suggestibility (Curci, Bianco, & Gudjonsson, 2017; Klemfuss, 2015; Kulkofsky, 2010; Kulkofsky & Klemfuss, 2008; study 2; Quas, Wallin, Papini, Lench, & Scullin, 2005; Uhl et al., 2016). However, Melinder et al. (2005) found somewhat inconsistent results across two experiments. In the first, verbal ability was negatively correlated with children's tendency to yield to suggestions about a video and their total suggestibility (yield + shift) for a book after a delay of 1–4 days. The correlation did not hold in a second experiment in which a small sample of children ($N = 31$) was interviewed suggestively about a shortened version of the book within a single experimental session. The lack of an association in the second study may have been due to a lack of power given the small sample size, due to the fact that children were asked suggestive questions after a very brief delay (i.e., 20 minutes), or a product of the language assessment used. Melinder et al. (2005) assessed vocabulary whereas the other studies assessed receptive language skills, or used a more comprehensive battery and language tasks. Finally, Kirk, Gurney, Edwards, and Dodimead (2015) found no association between language skill and children's resistance to gestural misinformation. However, language skill appears to consistently protect children against standard (verbal) forms of suggestion, particularly after a significant delay between exposure to the to-be-remembered information and the test interview.

Interestingly, across the period covered within this review, two new types of measures within the language domain emerged as predictors of children's suggestibility. The first of these is narrative skills. Kulkofsky and Klemfuss (2008, study 2) measured children's narrative skills when describing a staged event and an autobiographical event, as assessed via the amount of information children reported about the to-be-remembered event, as well as the complexity, descriptiveness, and cohesion with which children reported that information. The researchers compared these two comprehensive assessments of narrative skills with children's suggestibility about the staged event. Because narrative skills when discussing the autobiographical event are expected to tap global narrative skills rather than the structure and organization of children's memory for the event about which they were suggestively questioned, only the analyses regarding autobiographical narrative skills are included as an individual difference factor in the present review. Children

with high autobiographical narrative skills tended to shift their responses in line with interviewer suggestions. The authors argue that this pattern of findings may indicate that both autobiographical narrative quality and shifting are linked to children's tendency to use memory sharing as a social, collaborative process.

The second novel language factor is the presence or absence of evidentiality in children's native language. Evidentiality refers to mandated markers of the source of reported information (e.g., witnessing directly, hearing second hand) in a language (Aydin & Ceci, 2009). Aydin and Ceci (2013, study 2) found some preliminary evidence that Turkish children, whose native language includes such evidential markers, may be more resistant to suggested information. Thus, in addition to language skill, there are other promising aspects of language that may similarly contribute to a child's ability to resist suggestion. However, the relations of both narrative skills and evidentiality with suggestibility require further investigation.

Memory

Like Bruck and Melnyk (2004), we included only studies that tested associations between memory and suggestibility for different events in order to operationalize memory as a general individual difference variable rather than as evidence of memory strength for the specific event for which suggestibility was tested. Six studies fit our criteria and included data from children ranging from 2 to 14 years of age. Three of these studies examined associations between recall of a video or storybook and suggestibility about a live event (Klemfuss, 2015; Melinder, Scullin, Gravvold, & Iversen, 2007; Quas et al., 2005), three compared recall of a live event with suggestibility for a video or story (Gilstrap & Papierno, 2004; Miles et al., 2007; Quas et al., 2005), and one examined the associations between the unbiased recall phases and the direct questioning phases of two standard interrogative suggestibility paradigms (Melinder et al., 2005). There was no evidence of associations between recall of a video and suggestibility about a live event, at least in terms of children's inaccurate responses to suggestive procedures. Miles et al. (2007) presented weak evidence for links between recall of a live event and suggestibility about a video. Recalling more correct details of a magic show was negatively correlated with one of three measures of interrogative suggestibility (yield, but not shift or total suggestibility). Quas et al. (2005) found no such association between correctly recalled details of a laboratory event and any measure of suggestibility about a video, nor did Gilstrap and Papierno (2004) find associations between event recall and suggestibility regarding a story. Finally, Melinder et al. (2005) tested eight total correlations between recall and interrogative suggestibility. Of the eight, only three of the associations were significant, all in the predicted direction. All three significant correlations compared recall of a video with suggestibility about a

storybook. Thus, in line with the conclusions made by Bruck and Melnyk (2004), there remains no clear association between memory and suggestibility when assessed separately.

Theory of mind

Theory of Mind (ToM) has been defined as the cognitive ability to understand that people can have different mental states than one's own, and this skillset is typically acquired by five years of age (Astington, 1993). The findings regarding the links between ToM and suggestibility are somewhat mixed across five experiments in four separate manuscripts (Bright-Paul, Jarrod, & Wright, 2008; Karpinski & Scullin, 2009; Klemfuss, Rush, & Quas, 2016; Melinder, Endestad, & Magnussen, 2006). In four of the five experiments ToM was assessed via a battery of tests. Karpinski and Scullin (2009) assessed five dimensions of ToM. Researchers presented correlations between each of these dimensions, as well as a combined ToM scale, and six measures of interrogative suggestibility. Of the 36 correlations, 10 were significant and all were negative. However, the number of significant correlations decreased to four when age was controlled, only one of which was a negative correlation between the full ToM scale and suggestibility. Melinder et al. (2006) also used a ToM composite score based on two ToM tasks with two sub-tasks each, and found that the negative association between ToM and interrogative suggestibility was no longer apparent after controlling for age and executive function skills. Klemfuss et al. (2016) used a single measure of ToM and found no association with children's interrogative suggestibility. Bright-Paul et al. (2008) created a ToM composite measure from six ToM tasks and found, across two experiments, that ToM predicted resistance to suggestion in a misinformation paradigm even when controlling for both age and verbal mental age. Thus, it appears that composite measures of ToM may be related to children's resistance to suggestion in a misinformation paradigm, but that the association with interrogative suggestibility is tenuous.

Executive functioning

Our review included five studies which examined the links between executive functioning (EF) and suggestibility. The results are complicated by the fact that EF can be operationalized into a number of different subcomponents (e.g., inhibition, working memory, and cognitive flexibility; Diamond, 2013). Karpinski and Scullin (2009) conducted the most comprehensive assessment of EF. They included eight measures of EF and created a composite EF scale to compare children's performance on these EF measures with six assessments of suggestibility. Of the 54 resulting correlations, 17 were significant and all of these were negative. Eleven correlations were significant after controlling for age, and of these, two were correlations between the composite EF variable and suggestibility. EF was more strongly associated with

children's resistance to suggestive questioning about a staged event (10/11 significant correlations) than with measures of yield, shift, and total suggestibility elicited from the Video Suggestibility Scale for Children (VSSC: Scullin & Ceci, 2001). Thus, the composite measure of EF was quite predictive of children's ability to resist suggestive questions about a live event.

Caprin et al. (2016) assessed children with three primary tests of EF and found that only one – digit span – predicted reduced suggestibility about a storybook. Note that digit span was only associated with shifts in Karpinski and Scullin (2009) study with the VSSC. This discrepancy may be explained by the differences in participant ages, given that Karpinski and Scullin's sample included 3–5-year olds and Caprin et al.'s included 6–11-year olds. In a sample of yet older children (i.e., 11–14 years of age), McCrory et al. (2007) found no significant correlations between EF measures and suggestibility in children's responses to misleading questions about a live-staged event.

Melinder et al. (2006) found that, with age partialled, inhibitory control predicted children's resistance to suggestive questions about events presented via video, whereas neither Klemfuss et al. (2016), nor Karpinski and Scullin (2009) found such an association when assessing suggestibility about an interactive event, or when administering the VSSC, respectively. This conflict is surprising given that the age groups overlapped significantly across the three studies, but may have been a product of varying procedures for assessing suggestibility. In line with Bruck and Melnyk's (2004) assessment, it appears that there remain inconsistent associations between executive functions and resistance to suggestion.

Knowledge

An additional cognitive individual difference category not included in Bruck and Melnyk (2004) is that of prior knowledge. Elischberger (2005) randomly assigned half of a group of 5–6-year-old children to receive factual information about a topic and then, for half of these children, tested their resistance to suggestive questions that ran counter to that factual content. Children who were exposed to the factual content prior to being exposed to false suggestions were significantly more resistant to those suggestions. This finding supports the classic claim that knowledge can aid memory (Chi, 1978). On the other hand, Ceci, Papierno, and Kulkofsky (2007) examined children's suggestibility based on their existing knowledge of semantic categories (e.g., “predators”, or “citrus”). Children were more suggestible when they perceived falsely suggested items as more semantically similar to the items that were actually presented to them in a story. Thus, the authors demonstrated that prior knowledge, specifically, of semantic relations, can lead to increased suggestibility. Together these results tentatively suggest that knowledge may have different implications for susceptibility to suggestion based on the nature of the knowledge and the nature of the suggested information.

Global cognitive functioning

Finally, two studies (Chae, Goodman, Eisen, & Qin, 2011; Eisen et al., 2007) examined the relations between a composite cognitive functioning score and children's suggestibility in samples of maltreated children. Cognitive functioning included intelligence, short-term memory, and receptive language skills, and this composite variable predicted 3–16-year-old children's resistance to suggestion about both a negative event (Eisen et al., 2007) and a neutral event (Chae et al., 2011). These studies suggest that perhaps more comprehensive batteries of cognitive skills may better predict children's suggestibility, but are less informative about the specific mechanisms driving individual differences in suggestibility.

Psycho-social factors

Social competence

In a study examining the relations between social understanding and suggestibility (Uhl et al., 2016), researchers found no associations between children's social understanding and suggestibility about a classroom visit across two high social pressure interviews.

Stress/emotional arousal/state anxiety

Findings regarding links between stress and suggestibility remain somewhat inconsistent. Eisen et al. (2007) examined a sample of children who were suspected to have experienced maltreatment and a control sample of 3–16-year olds. Observer ratings of children's distress during a routine medical exam were associated with increased suggestibility. Larger increases in cortisol reactivity (indicative of increased activation of the HPA-axis stress response system) during the examination were associated with increased suggestibility when children had high dissociation symptoms and decreased suggestibility when children had low dissociation symptoms. Quas, Rush, Yim, and Nikolayev (2014) found similarly complex associations between stress and suggestibility. Experiencing a more stressful version of a laboratory event was associated with decreased suggestibility amongst 12–14-year olds, but it had no effect on suggestibility in 7–8-year olds. Chae et al. (2014) found no direct associations between observer ratings of 3–6-year-old children's distress during an inoculation and children's suggestibility about the inoculation after a 1-week delay. There was, however, an interaction between children's distress and parental attachment style, described below in the section on attachment and parent–child relationships.

In two experiments, Levine and colleagues (2008) found that discrete emotions were differentially associated with increased suggestibility in 4–6-year-old children. In the first, sadness, anger, and happiness were induced by manipulating the outcome of a goal-directed activity, within subjects. When children were

in the sadness or anger conditions they were more suggestible than in the happiness condition. However, not all children demonstrated condition-congruent emotion. Observer ratings of children's emotional reactions revealed that sadness was associated with more suggestibility than were anger or happiness. The second experiment used a between-subjects design, elicited emotion via recall of autobiographical experiences, and assessed suggestibility for negatively valenced material. Suggestibility was assessed as acquiescence to misleading questions and inclusion of suggested details in free recall with a new interviewer. There was some evidence that children assented more to misleading questions when they were sad compared to happy, and children in the sadness condition included more of the misinformation in the neutral interview compared to children in the angry or happy conditions.

Finally, three studies examined the relations between anxiety and suggestibility. Almerigogna, Ost, Bull, and Akehurst (2007) found that 8–11-year-old children with both high state and trait anxiety were more inaccurate when responding to misleading questions compared to children with both low state and trait anxiety. Importantly, participants were randomly assigned to be interviewed by either a supportive or non-supportive interviewer, and children in the non-supportive interviewer condition exhibited high state anxiety. Thus, although trait anxiety was a relatively pure measurement of an individual difference between children, the interviewing condition affected the measurement of state anxiety. Bettenay et al. (2015), on the other hand, assessed 4–6-year-old children's state anxiety after experiencing a standardized cross-examination-style interview. Researchers found that children's reported state anxiety after the interview predicted more, and earlier, cedes to interviewer challenges. Finally, Wright, London, and Waechter (2010) tested associations between three components of social anxiety, and suggestibility in the form of response conformity, in 11–18-year olds. Fear of negative evaluation, which was proposed to index the perceived cost of disagreeing, significantly predicted increased suggestibility. Social avoidance and distress in new situations, proposed to entail avoiding information from others, predicted decreased suggestibility, but only with fear of negative evaluation controlled. General social avoidance and distress did not predict suggestibility.

Attachment and parent–child relationships

Just three published papers examining attachment and parent–child relationships as predictors of suggestibility were identified (Chae et al., 2014; Melinder et al., 2010; Schaaf, Alexander, & Goodman, 2008). Only two of the studies included suggestibility as an independent outcome measure in the individual difference analyses. This is surprising given that Bruck and Melnyk identified maternal attachment and parent–child relationship style as two of the three top psycho-social predictors of suggestibility and specifically called for additional work within this domain.

Chae et al. (2014) assessed children's perceptions of their parents, observer-reported child distress during a to-be-remembered inoculation, and parental attachment as individual difference predictors of children's suggestibility. Children's positive representations of their parents were negatively correlated with suggestibility and parental avoidance was positively correlated with suggestibility. Regression models confirmed the link between positive representations of parents and resistance to suggestion and further revealed a significant interaction between parental attachment and children's distress during the inoculation. Amongst children who were highly distressed during the inoculation, those with highly avoidant parents were more suggestible than were those with low avoidant parents.

Melinder et al. (2010) assessed parental attachment avoidance and parental attachment anxiety and children's correct rejections of suggested information in two interview contexts – a police interview and a prop-assisted clinical interview. The researchers found no correlations between parental attachment avoidance or anxiety and children's rejection of false suggestions. However, they did find that children with more anxiously attached parents were better able to correctly reject false suggestions in the clinical interview than in the police interview.

Parental elaborative style

When parents discuss past events with their children they tend to vary along a continuum of elaborativeness (Fivush & Fromhoff, 1988). Highly elaborative parents hold lengthier past event conversations that encourage children to provide information about their experiences by asking WH-questions, following children's interests, giving children feedback, and providing information when their child fails to do so. Parents with low elaborativeness hold shorter, more focused conversations that entail repeated questions. Considerable research has demonstrated that elaborative style helps children organize their experiences in a way that facilitates improved recall (Kleinknecht & Beike, 2004; Kulkofsky, Wang, & Ceci, 2008; Morris, Baker-Ward, & Bauer, 2010; Nelson & Fivush, 2004; Wang, Bui, & Song, 2015). However, researchers have also proposed that highly elaborative parents may encourage children to be more cooperative when discussing past experiences, such that children of elaborative parents may learn to include false information from their conversational partner. Recent research has addressed the question of whether parental elaborativeness reduces suggestibility by improving memory, or increases suggestibility by encouraging collaborative past event conversations. Principe and colleagues (Principe, DiPuppo, & Gammel, 2013; Principe, Trumbull, Gardner, Van Horn, & Dean, 2017) have shown that when elaborative parents are misled about a child's past experience, parents tend to be more suggestive with their children and as such, children of elaborative parents include more suggested details into their

reports with their parents and later, with an interviewer. In their 2017 paper, Principe et al. further showed that there were two dissociable dimensions of parental conversation style that predicted children's suggestibility. The first was parental inclusion of elaborative questions, the second was the degree to which parents controlled the conversation, for example, by providing negative feedback and steering the conversation towards their own beliefs.

Klemfuss et al. (2016) examined associations between parental elaborative style and children's suggestibility, with three key methodological differences from the previously described studies. First, children's suggestibility was assessed when discussing a more serious event – a potential transgression, opposed to a magic show. Second, parental elaborativeness was assessed in a separate parent-child conversation from that in which they discussed the transgression. Third, elaborativeness was measured as a proportion of elaborative questions asked out of the total number of questions asked in order to examine elaborative questions, statements, and evaluations, independent of conversational length. Here, parental elaborativeness was associated with decreased suggestibility about peripheral event details and no differences in suggestibility for central details.

Temperament

Four studies across three published manuscripts examined associations between children's temperament and suggestibility (Gilstrap & Papierno, 2004; Shapiro, Blackford, & Chen, 2005; Shapiro & Purdy, 2005). Across studies, there was little evidence for links between temperament and suggestibility. In one, researchers found no significant associations between 5 and 8-year olds' temperament (activity, irregularity, shyness, adaptability, intensity, mood, persistence, distractibility, sensitivity) and suggestibility (Shapiro & Purdy, 2005). In the other, there was weak evidence for an association (Shapiro et al., 2005). Shapiro et al. (2005) conducted 450 total correlations across two studies between sub-categories of temperament and measures of suggestibility. Of these, 24 were statistically significant. The majority of the significant correlations in the first study ($n = 12$) were between temperament dimensions and children's incorporation of suggested details at a second interview after non-compliance to those suggested items in an immediate interview. Otherwise, there was no clear pattern to the results. In the second study, again, there was no consistent pattern to the results except that all three significant within-interview suggestibility correlations were for children within the 9–10-year-old age group. Thus, consistent with Bruck and Melnyk (2004), there is no convincing evidence for associations between children's temperament and suggestibility.

Mental health

Chae et al. (2011) measured mental health and suggestibility in 322 3–16-year-old children suspected of maltreatment. Self-reported dissociation and trauma symptoms and observer-reported dissociative symptoms were positively correlated with

the proportion of incorrect responses children provided to misleading questions about a neutral event, whereas there was no correlation between global functioning and suggestibility, and a negative correlation between PTSD symptoms and suggestibility. When these individual differences variables were included in regression equations with children's age, no significant associations remained. Eisen et al. (2007) similarly found that self-reported trauma symptoms significantly predicted commission errors to misleading questions about a stressful experience in a comparable sample. Here, the effects were independent of age. Shapiro and Purdy (2005) found that dissociation in 5–8-year olds was positively correlated with suggestibility after a 1-week delay (but not in an immediate interview). Of note, however, children in this sample were not trauma-exposed and thus the dissociative tendency measure was adapted accordingly. Finally, Curci et al. (2017) assessed mental health via The Depression and Anxiety Youth Scale, and found no associations between depression and anxiety scores and suggestibility in a sample of 6–14-year olds, half of whom had experienced significant life adversity.

Adverse experiences/maltreatment

Five recent studies captured in our review compared suggestibility in children exposed to adversity relative to controls. Vagni, Maiorano, Pajardi, and Gudjonsson (2015) compared 7–16-year olds who were suspected child sexual abuse victims (half intra- and half extra-family abuse) and controls. Children in the victim group showed significantly greater vulnerability to interrogative suggestibility in an immediate and 1-week delayed interview. The results varied amongst the victim group such that children suspected of intra-family abuse were more suggestible than those suspected of extra-family abuse. Curci et al. (2017) compared 6–14-year olds who did or did not require government assistance as a result of significant life adversity. They too found that children in the adversity group were more vulnerable to interrogative suggestibility compared to controls. Eisen et al. (2007) included a large sample of suspected maltreatment victims and as such, were able to examine differences in suggestibility by abuse type (sexual, physical, sexual and physical, neglect, none/control). Sexual and physical abuse victims were less susceptible than neglected children regarding an experienced anogenital exam and venipuncture, but there were no differences between maltreated children as a group, and control children. The between-group differences were eliminated when age was statistically controlled. Finally, Chae et al. (2011) included a very similar sample to Eisen et al. (2007) and tested their suggestibility for a neutral event. They found no significant abuse-related differences in susceptibility to misinformation. Finally, Otgaar, Howe, and Muris (2017) examined susceptibility to misinformation in a group of 4–12-year-old children who were suspected victims of maltreatment (physical or sexual abuse) relative to a larger sample of control children. As a group, the maltreated children were *less* susceptible to misinformation about a video of a bank robbery.

Discussion

In the present review, we provided an overview of the body of literature on children's individual differences and suggestibility that has accumulated since Bruck and Melnyk's comprehensive review published in 2004. Each of the broad categories of individual differences Bruck and Melnyk identified have seen recent growth and development, and many of the central findings and conclusions remain consistent. Although some areas that previously lacked clarity have received additional research attention, some of Bruck and Melnyk's calls for inquiry have, as of yet, gone unheeded. As a result of the burgeoning body of work in this area, we are moving toward a better understanding of the mechanisms behind children's suggestibility, and we can make some tentative recommendations for professionals engaged in forensic practice with young alleged victims of abuse.

Demographic factors

In terms of findings regarding the contributions of demographic factors to children's suggestibility, there remains no convincing evidence to suggest that either a child's SES or their gender is likely to affect their susceptibility to suggestion. The latter is somewhat surprising given documented gender differences in language and recall (Flannagan & Baker-Ward, 1996; Haden, Haine, & Fivush, 1997; Herlitz & Rehnman, 2008; Klemfuss & Wang, 2017; Reese & Fivush, 1993), but supports prior evidence regarding suggestibility and inaccuracy (Bruck & Melnyk, 2004). There was one study representing a new perspective on individual differences by showing evidence of cultural differences in suggestibility. Whether, for whom, and why culture may predict differential susceptibility to suggestion, however, are not yet understood.

Cognitive factors

The more widely studied category of cognitive factors presents an array of mixed results, potentially important moderators, and the most consistently predictive individual difference category available – intellectual impairment. The data present a convincing message that (1) intellectual variation within a typically developing population is not a useful tool for predicting suggestibility, (2) children with intellectual impairment resist suggestibility at a similar rate to typically developing children matched in mental age, and (3) children with intellectual impairment are more suggestible than typically developing chronological age matched peers. Forensic professionals should take mental age into account and be particularly vigilant of interviewing practices used with children with intellectual impairment.

Language has also remained a promising cognitive individual difference variable. Recent studies have identified important nuances to be considered, for example, that receptive language skills may predict suggestibility better than productive language skills. Further, preliminary investigations into two additional aspects of language suggest that narrative quality may be associated with increased suggestibility about a separate event, and children whose native languages mandatorily indicate the source of information can be less suggestible.

Individual differences in memory, ToM, and EF appear to be, at best, inconsistently linked with suggestibility. When memory and suggestibility are assessed separately (e.g., memory for one event and suggestibility for a second event), one does not appear to predict the other. One tentative explanation is that the narrative quality and amount of information children share about past events in general tends to be associated with a lower accuracy criterion, perhaps because children who usually talk more or try to tell more engaging stories, are willing to sacrifice accuracy (Kulkofsky & Klemfuss, 2008; Kulkofsky et al., 2008). However, children with particularly strong memory about the specific event for which they receive suggestive details are poised to resist suggestion about that specific event. These results help to explain the “particular[ly] surpris[ing]” finding that memory for one event does not predict suggestibility for a separate event in a consistent direction (Bruck & Melnyk, 2004, pg. 987). What is less clear, is why neither ToM nor EF reliably predict suggestibility. ToM findings are not only inconsistent, but this measure is likely to lose any potential predictive power after age 6, when children have typically mastered this skillset. EF develops over a longer age span, which could theoretically lead to a longer period in which to identify individual differences, yet results are highly inconsistent across age.

There were some additional departures from the research on cognitive factors and suggestibility carried out prior to the present review period. First, we did not identify additional studies examining the links between creativity and suggestibility. Second, we presented two studies examining knowledge as an individual difference variable predicting suggestibility. The results of one study suggest that content knowledge may protect children against suggestibility, supporting the established claim that being more knowledgeable about a topic can aid memory for that topic (Chi, 1978). The second study is in line with previous research and theories suggesting that semantic knowledge may make children more vulnerable to suggestions when the to-be-remembered content and the suggested content are within the same semantic category (Brainerd, Reyna, & Ceci, 2008; Ceci et al., 2007). Third, two studies examined cognitive functioning not in terms of individual elements, but rather, as a composite variable. These studies suggest that perhaps more comprehensive batteries of cognitive skills may be more informative tools for professionals interested in predicting a child’s ability to resist suggestion.

Psycho-social factors

Relative to cognitive factors, recent evidence is less convincing regarding links between psycho-social factors and children's suggestibility. Bruck and Melnyk (2004) cited self-concept/self-efficacy, maternal attachment, and parent-child relationship as the most promising psycho-social individual difference categories. However, there has been minimal recent research within these categories.

There was new work conducted on several other subcategories, however. Consistent with prior work, child temperament was not predictive of suggestibility. Within the categories of stress/emotional arousal/state anxiety and mental health, some new approaches have helped to develop our understanding of the potential associations with children's suggestibility. The literature in this area appears to be shifting from an emphasis on testing suggestibility for naturally occurring medical procedures to controlled laboratory procedures that minimize variation in children's experiences. Although the majority of the studies did find some associations, a number of important moderation effects were identified that somewhat muddy the parsimonious message that stress, arousal, or anxiety, cause increases in suggestibility in children. These moderators included dissociative symptoms, age, state anxiety, interviewer support, and parental attachment style. New work has also increasingly included physiological assessments of arousal. Although some of these studies were captured using the present article search methodology, others may have been missed due to the fact that our search was restricted to psychological research available on PsycINFO. For example, Quas, Yim, Rush, and Sumaroka (2012) found that physiological stress reactivity at encoding predicted resistance to misleading questions about a laboratory stressor.

In terms of mental health, only one of the studies reviewed by Bruck and Melnyk (2004) included a clinical sample. The present review included four new studies, three of which had samples that included children with suspected or documented histories of trauma or significant adversity exposure. There was some converging evidence that trauma symptoms and dissociative symptoms predicted increased suggestibility.¹ However, in general there are still too few studies conducted in this domain to draw firm conclusions about links between mental health and suggestibility.

Finally, research has begun to examine several new categories within the psycho-social domain – (1) social competence, (2) parental elaborative style, and (3) adverse experiences/maltreatment – that are predicted to impact children's suggestibility. Social competence has been defined as children's social understanding, sociability, and competence in social interactions and represents a slight departure from prior research that has assessed links between suggestibility and "social engagement", which included approachability, withdrawal, and compliance. Withdrawal/shyness was included in our "temperament"

category, but we did not identify new work examining approachability or compliance. Similar to prior findings regarding social engagement, social competence was not reliably associated with suggestibility.

The second new category, parental elaborative style, has been studied in conjunction with children's episodic memory skills since the 1980s (Fivush & Fromhoff, 1988), but only recently have researchers begun to examine how it might impact children's susceptibility to suggestion. The direction and strength of the association between parental elaborative style and children's suggestibility seems to be sensitive to variation in context (e.g., fantastical vs. transgression events) and methodology (e.g., elaborativeness coded for the to-be-remembered event or a separate event), and requires further study before researchers or practitioners can be confident in predicting children's performance from their parent's elaborative style.

The third novel area of research, which entails examining potential differences in suggestibility between children who have endured adverse experiences/maltreatment and those who have not, is particularly relevant from an applied perspective. The vast majority of research on children's suggestibility has focused on typically developing populations and legal professionals may be concerned about the extent to which this research applies to children who have been exposed to violence and crime, such as sexual abuse. There appears to be some evidence that children's age, and the suggestibility paradigm utilized, may contribute to result patterns, such that the studies that excluded preschoolers and used an interrogative suggestibility procedure found that children exposed to adversity may be more suggestible. However, given that there were a number of other differences between studies (e.g., definition of adversity/maltreatment, other individual differences included in the models) and as of yet, a small body of research, these are tentative conclusions.

Summary and conclusions

In line with earlier findings, the present review identified intellectual impairment as the most reliable individual difference predicting children's suggestibility. However, it is critical to qualify this conclusion by pointing out that intellectual impairment should only be considered a risk factor when children with intellectual impairment are compared to chronological age-matched peers. Language continues to show promise as a predictor of suggestibility, particularly when it is assessed via a comprehensive standardized language measure, or a measure of receptive language skills. Within the psycho-social domain, the field has not progressed to the point at which we can make confident conclusions. This is partially because there has been minimal recent attention to categories that historically showed promise, such as self-concept/self-efficacy, maternal attachment, and parent-child relationship quality. Overall, the body of research regarding individual differences and children's suggestibility

supports using particular vigilance and adherence to best practices when interviewing young children with intellectual impairment and those with nascent language skills, particularly when the child's accuracy is paramount, as it is in CSA investigations. The literature also suggests that memory for separate events, ToM, EF, temperament, and social competence may not be related to suggestibility, whereas additional work is needed to clarify the potential contributions of knowledge, stress, mental health, parental elaborative style, and adverse experiences/maltreatment to children's suggestibility.

These findings can be used both to guide future research examining individual differences affecting children's suggestibility and to help forensic practitioners to identify children who may be especially susceptible to false suggestion. However, there are notable caveats. As is always the case with research applicable to child forensic interviews, there is a tradeoff between experimental methodology, which allows for causal conclusions, and ecological validity, which enhances confidence with which findings can be applied in the field. Practitioners should also keep in mind that the reviewed studies report patterns across children, and that there is variability in the degree to which the individual difference measures will predict suggestibility in any given child. Thus, the findings are not meant to be used strictly as diagnostic tools with individual children. Rather, they may be most useful as a tool to raise awareness of the potential risk, which should be accompanied by particular attention to best practices that include minimized suggestive influence.

Note

1. Note that one prior study (Eisen, Morgan, & Mickes, 2002) reviewed in Bruck and Melnyk (2004) did not find links between dissociative symptoms and suggestibility.

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