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Children's suggestibility for an instance of a repeated event versus a unique event: The effect of degree of association between variable details

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Abstract

Are children who experience an event repeatedly more suggestible about an instance of the event than children who experience it once? Researchers have answered this question both in the affirmative and in the negative. In this study, we hypothesized that the degree of association between details that changed across instantiations of the event would help to explain the discrepancy. Preschoolers (4- and 5-year-olds) and first graders (6- and 7-year-olds) participated in either a single play session or four repeated play sessions, each of which contained 16 critical details. Across play sessions in the repeat-event condition, half of the critical details were associated and half were not associated. During a biasing interview 2 weeks later, children were misinformed about half of the critical details. The next day, children answered free and cued recall questions about the target play session. Among older children, repeat-event participants were more suggestible than single-event participants, especially for high-association details. Among younger children, repeat-event participants were more suggestible than single-event participants for low-association details. Consistent with some current theories of children's memory, older children were more suggestible than younger children.

Keywords: Children; Suggestibility; Memory; Repeated events; Category knowledge; Free and cued recall

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Introduction

Most research on children's suggestibility has dealt with children's reports of an event that had been experienced one time. Only a few published experiments have examined children's suggestibility for details of a complex and naturalistic event that had been experienced several times. Researchers have found that repeat-event children are less suggestible than single-event children about details that remain the same across instances (Connolly & Lindsay, 2001; Powell, Roberts, Ceci, & Hembrooke, 1999). The divergence lies with suggestibility for details that change across instances. Some researchers have found that children with multiple experiences are more suggestible than single-event children (Connolly & Lindsay, 2001; Price & Connolly, 2004), whereas other researchers have found that children with multiple experiences are not more suggestible than single-event children (Powell & Roberts, 2002; Powell et al., 1999).

The most obvious difference between the studies of Connolly and Lindsay (2001) and Powell and colleagues (1999) is that the former tested memory with yes/no recognition questions, whereas the latter used cued recall (i.e., a specific question about each target detail, e.g., "What did you sit on the day you wore the badge to the Deakin activities?"). Indeed, Powell and Roberts (2002) found that when suggestions were provided after a 3-week delay, repeat-event children were more suggestible than single-event children when tested with recognition but not when tested with cued recall. Powell and Roberts reasoned that for repeat-event children, the task of identifying which variable detail was presented during a particular occurrence is very challenging. It involves retrieving memories for experienced exemplars and attributing each to its source. When children's memories are tested with recognition, relatively little cognitive effort is required to answer the questions. Thus, children may accept plausible suggestions contained in the questions rather than engage in the cognitively difficult task of retrieving and attributing experienced details. In contrast, with cued recall, the test itself leads children to retrieve experienced details, and this process could provide children with the information needed to resist suggestions.

Notwithstanding this compelling analysis, there are two reasons why we believe that the type of test cannot explain the discrepant results entirely. First, as Powell and Roberts (2002) discussed, 3 months after the target play session, repeat-event children were more confused by the suggestions than were single-event children. (Children were asked to think about the target play session and to answer one two-alternative forced-choice question about each target detail. Response options were the experienced detail or the suggested detail/novel detail for control items.) Second, using cued recall, Price and Connolly (2004) found that repeat-event children were more suggestible than single-event children about variable details of the target event.

Another methodological issue that may help to explain the divergent findings is the degree of association between variable details. In the aforementioned studies, degree of association between variable details was not specifically controlled or manipulated. Accordingly, variable details would have been a mix of high- and low-association items. Perhaps heightened suggestibility for repeat-event children, compared with that for single-event children, is obtained when variable details are highly associated with each other as opposed to when variable details are not associated. This hypothesis is based on three theories about children's memories and memory distortions: fuzzy trace theory, source monitoring theory, and script theory.

According to fuzzy trace theory (e.g., Brainerd & Reyna, 2002; Reyna, Holliday, & Marche, 2002), when an event is encountered, two independent memory traces are formed: a verbatim trace that contains the surface structure and precise details of the event and a gist trace that contains the general meaning of the event such as semantic relations between event details. Children's suggestibility is influenced by whether they retrieve gist or verbatim memory during postevent interviews. In general, retrieval of gist memory heightens suggestibility.

Whether children retrieve gist or verbatim memory during postevent interviews is a function of at least three variables: the relative strength of gist and verbatim memories, the content of the postevent interviews, and the age of the children. The relative strength of verbatim and gist memory is influenced by the nature of the target stimuli. When multiple items are strongly associated, each presentation lays a unique verbatim trace and activates the same gist trace. Thus, gist memory is relatively stronger than any of the individual verbatim traces and is more likely to be retrieved during subsequent interviews about the target event. Conversely, unrelated items will not activate the same gist because they do not share meaning; consequent gist memories will be weaker and less likely to be retrieved during postevent interviews. The content of postevent questions during a biasing interview will also influence whether gist or verbatim memory for the previously experienced target event is activated (Brainerd & Reyna, 1998b). Postevent suggestions that are consistent with the gist of the target event are more likely to activate gist memory than are postevent questions that are not consistent with the gist of the target event. In this latter scenario, one of two things may happen: Either verbatim memory will be activated, allowing participants to reject the false suggestions, or information presented during the biasing interview will not be linked to the target instance. Failure to link postevent suggestions to the target event should weaken the suggestibility effect (e.g., Gobbo, 2000; Pezdek & Roe, 1997; Zaragoza & Lane, 1994). Finally, the age of the children affects whether gist or verbatim memory is available. Older children are more likely than younger children to extract and retain the gist of an event, making gist memory more available for older children than for younger children (Brainerd & Reyna, 1998a). Indeed, Brainerd, Reyna, and Forrest (2002) found that older children were more likely to recognize gist and, as such, were more susceptible to the false memory illusion.

A second theory that predicts heightened suggestibility for high-association variable details of a repeated event, compared with low-association ones, is source monitoring theory. According to source monitoring theory, there are at least four conditions under which participants will misattribute a memory from the biasing interview to the target experience (Lindsay, 1990; Roberts, 2002; Roberts & Blades, 2000). First, participants sometimes attribute memories to sources based on a judgments of familiarity rather than on a more rigorous attribution process based on analyses of the content and characteristics of the memories (Johnson, Hastroudi, & Lindsay, 1993). When variable details of a repeated event are associated, participants may come to expect that all relevant details will be members of the same category, leading to a feeling of familiarity when a new member of the experienced category is presented during the biasing interview. Later, during the final memory test, the sense of familiarity for the suggested detail could lead participants to terminate further analysis to determine its source. Conversely, when variable details are not associated, there is no basis for this process to occur and participants may engage in a strategic analysis, sometimes leading to a correct source attribution and rejection of the suggestion.

Second, when the target event contains high-association details, participants may identify the categorical relation between details and generate other nonexperienced category exemplars during the target event. Accordingly, memory for the target event will include experienced details and self-generated but nonexperienced details. Given the possibility that for high-association details some self-generated details will be presented as misleading suggestions, the source attribution task at test would require participants to discriminate between self-generated details and experienced details—a difficult task (e.g., Johnson, Raye, Foley, & Foley, 1981). This process is unlikely to occur for low-association items because it is unlikely that participants would generate such nonexperienced exemplars during the target event.

Third, source monitoring errors are more likely to occur when stimuli are easy to process (Foley, Durso, Wilder, & Friedman, 1991) because they do not require reflective and elaborative thought (Zaragoza & Lane, 1994). That is, easy stimuli are processed relatively quickly, leaving comparatively less memorial information (e.g., cognitive operations) that can be used to attribute memories to their sources. Ease of processing increases for familiar items and familiarity is stronger for highly associated items. In contrast, when variable details are not associated, the same ease of processing would not occur because participants have no basis on which to anticipate the next detail accurately. In sum, there should be less source information available in memory for high-association items than for low-association items, and this will lead to more source errors in the former case than in the latter case.

Given that source monitoring improves with age (Ackil & Zaragoza, 1995; Lindsay, Johnson, & Kwon, 1991; Poole & Lindsay, 2001, 2002; for a review, see Roberts, 2002), to the extent that source monitoring contributes to the effect, suggestibility decreases with age. However, because source misattributions are more likely to occur when items are strongly associated, there should be more source monitoring errors among older children due to their superior semantic networks.

A third theory that predicts heightened suggestibility for high-association variable details of a repeated event, compared with low-association ones, is script theory. When an event is experienced repeatedly, an abstract cognitive representation, or script, of what typically occurs develops (Fivush & Hudson, 1990; Nelson, 1986). Variable details of the script are represented as dynamic list-like sets of experienced details that are not tightly associated with particular instances of the routine (Fivush, 1984; Hudson, Fivush, & Kuebli, 1992; Kuebli & Fivush, 1994). Although this list-like set of experienced details contains information about experienced details, it must be flexible enough to accommodate new details. Thus, it may be useful to think of experienced details as providing expectations about the characteristics of future permissible details.

New details that are consistent with the characteristics of past experience (e.g., that are members of the same category) are easily integrated into the script, whereas details that are inconsistent with past experience (e.g., that are not members of the same category) are not easily integrated. According to script theory, suggestions that are quickly and easily integrated into the script will be reported as experienced more often than will items that are not quickly and easily integrated into the script. Although very young children form scripts for repeated events, older children do so faster (Farrar & Goodman, 1990, 1992; Fivush, Kuebli, & Clubb, 1992; Kuebli & Fivush, 1994).

In the current study, preschoolers (4- and 5-year-olds) and first graders (6- and 7-year-olds) participated in either a single play session or four repeated play sessions. Each play session included 16 critical details. For children in the repeat-event condition, all of the critical details varied across sessions, with half of the critical details being high association and half being low association. Two weeks after the target play session, children were presented with erroneous suggestions about half of the target details. One day after this biasing interview, children answered free and cued recall questions about the target play session. We hypothesized that repeat-event children would be more suggestible about high-association details, but not about low-association details, than would single-event children. Because heightened suggestibility for high-association items rests on the assumption that children will recognize the relations between exemplars, the effect of association may be particularly pronounced for older children.

Method

Participants

A total of 96 children completed this study. Of these participants, 48 were preschoolers (4- and 5-year-olds, $M = 56.36$ months, $SD = 7.53$, 25 girls and 23 boys) and 48 were in Grade 1 (6- and 7-year-olds, $M = 78.23$ months, $SD = 4.38$, 30 girls and 18 boys). Half of the children in each age group were assigned to the single play session condition and half were assigned to the repeated play session condition.

Procedure

Children participated in one or four play sessions, a biasing interview, and a final memory test. All sessions were held at the children's school or day care facility. For children in the repeat-event condition, play sessions were scheduled twice a day (morning and afternoon) for 2 days. The target play session, the one about which memory would be tested, was the last play session and was identical to the only play session for children in the single-event condition.

Play sessions, conducted with two to five children, were made up of eight activities. The activities were always presented in the same order, and each contained two critical details. In the following example, the eight activities are described and the 16 critical details are in italics:

1. The children reached for *water* and then pretended to be a *dog*.
2. The children were given a mat that had been cut into the shape of a *moon* and constructed a puzzle of an *ant* on it.
3. The room was decorated with a picture of a *cold* day just before the children colored a sticker of a *pear*.
4. The children were instructed to think about the color *white* while they made up a story about a $*500 bill*.
5. The experimenter put on a badge with the name *"Jamie,"* after which the children drew a picture about *swimming*.
6. The children looked up to the ceiling to see the *ocean* just before they searched the room for a model of a *bicycle*.
7. The children held the lucky #*9* while they made a model *trailer* out of clay.
8. The children looked in the treasure box for a *sombrero* and then looked under one of three cups for a model *stove*.

The play session leader drew the children's attention to the critical details three times. During the target play session, the experimenter wore a special cape and drew the children's attention to the cape. The day was named "Cape Day" as a way of helping children to identify it during the biasing interview and final memory test. Each play session lasted approximately 30 min.

Two weeks after the target play session, a female "biaser" who was not present during any of the play sessions met with each child individually. After a few minutes of rapport building, the biaser asked the child whether he or she remembered Cape Day and then asked whether the child could describe the cape. When the biaser was confident that the child remembered and was thinking about Cape Day, she presented a scripted biasing interview. For instance, a child may have been told the following: "My next questions are about the story that you made up about a *piano* on Cape Day. I heard that the story about the *piano* was pretty neat. Have you ever played a *piano* before?" Control questions were similar in structure but did not contain erroneous information. The following is an example: "My next questions are about the story that you made up on Cape Day. I heard that the story was pretty neat. Do you like to make up stories?" The biasing interview took approximately 5–10 min.

The day after the biasing interview, a new experimenter met with each child individually. After spending a few minutes establishing rapport, the interviewer asked the child to answer the questions based on what he or she remembered about Cape Day. The same procedure that was used during the biasing interview was used again to encourage the child to think about Cape Day only. Free recall began with an open request for the child to report all that he or she could remember about Cape Day. When the child stopped talking for approximately 10 s, he or she was prompted with the names of the eight activities, presented one at a time. When the child appeared to have exhausted his or her free recall of the event, the cued recall test was administered. The child was asked about each critical detail in the order in which the critical details were presented (e.g., "On Cape Day, you put together a puzzle. What was the picture on the puzzle?"). All cued recall questions were asked regardless of whether the child had reported the information in free recall. Finally, yes/no recognition questions were asked. The final memory test lasted approximately 20–30 min.

Materials

In each play session, there were eight activities each with two critical details. Tables 1 and 2 present a complete list of activities (two successive cells in the first column represent an activity) and associated details (columns 1–5). In Table 1, half of the activities are high association (e.g., shape of mat, treasure chest), and half are low association (e.g., pretend to be, puzzle). In Table 2, assignment of activities to high and low association is reversed. Half of the children were presented with the details displayed in Table 1, and the other children were presented with the details displayed in Table 2. There were two orders of presentation of details. Referring to the top row of Tables 1 and 2, half of the repeat-event children experienced Details 1, 2, 3, and 4 on Days 1, 2, 3, and 4, respectively, and the other children experienced Details 3, 5, 2, and 1 on Days 1, 2, 3, and 4, respectively. For details assigned to be suggestive, the first group just referred to was biased with Detail 5 and the second group was biased with Detail 4. We selected as many high-association details as possible from the Battig and Montague (1969) norms, and the others were selected as intuitively high-association details. Half of the children in the single-event condition experienced Detail 4 while Detail 5 was used for details assigned to be suggestive, and half of the children experienced Detail 1 while Detail 4 was used for details assigned to be suggestive.

There were eight high-association details and eight low-association details. Four high- and four low-association details were suggested, and others were control.

Table 1
Activities and variable details presented to half of the children

Activity	1	2	3	4	5
1. Pretend to be	Dog	Fly	Apple	$1	Mountain
2. Reach for	Water	Coke	Kool-Aid	Ginger ale	Root beer
3. Puzzle	Ant	Grapefruit	$5	Socks	Doll
4. Shape of mat	Moon	Star	Egg	Stop sign	Square
5. Sticker	Pear	$100	Pants	Horse	Leg
6. Decorate with a picture of	Cold	Hot	Rain	Snow	Cloudy
7. Make up a story	$500	Shoes	Cow	Mosquito	Piano
8. Wear a special	White	Brown	Blue	Yellow	Black
9. Draw a picture	Swimming	Truck	Hut	Pot	Hammer
10. Think about	Jamie	Sam	Don	Jo	Taylor
11. Look for	Bicycle	House	Spatula	Lamp	Robin
12. Look up to see	Ocean	Songbird	Heart beat	Summer night	Stream
13. Build with clay	Trailer	Can opener	Couch	Golf	Rose
14. Hold a lucky	9	8	6	1	7
15. Hide under cup	Stove	Dresser	Hockey	Boat	Batman
16. Treasure chest	Sombrero	Chef hat	Police hat	Pirate hat	Construction hat

Table 2
Activities and variable details presented to half of the children

Activity	1	2	3	4	5
1. Pretend to be	Baseball	Tennis	Soccer	Hockey	Bowling
2. Reach for	Circle	Red	Stream	Police	Crayon
3. Puzzle	Cow	Tiger	Pig	Mouse	Cat
4. Shape of mat	Blue	Waterfall	Fire	Big Bird	Magic wand
5. Sticker	Bicycle	Boat	Wagon	Bus	Train
6. Decorate with a picture of	Ocean	Pirate	Ernie	Triangle	Slide
7. Make up a story	Wasp	Ladybug	Ant	Mosquito	Beetle
8. Wear a special	Birthday	Elmo	Moon	Yellow	Tooth fairy
9. Draw a picture	House	Tent	Hut	Trailer	Mansion
10. Think about	Lemonade	Sunny	Don/Dawn	9	Tree
11. Look for	Pear	Peach	Cherry	Orange	Apple
12. Look up to see	Cold	Alex	2	6:00	Cake
13. Build with clay	Pot	Can opener	Bowl	Knife	Fork
14. Hold a lucky	Jo	8	7:00	Hot chocolate	Chocolate chip cookies
15. Hide under cup	$20	$10,000	$1	$100	$10
16. Treasure chest	4	8:00	Ginger ale	Hot	Cotton balls

For instance, for half of the children who experienced details displayed in Table 1, activities numbered (in the first column) 2, 3, 6, 8, 9, 11, 14, and 15 were suggested (i.e., the suggestion in column 5 was presented) and the others were control (i.e., the suggestion in column 5 was *not* presented). For the other children in the condition displayed in Table 1, activities numbered 1, 4, 5, 7, 10, 12, 13, and 16 were suggested and the others were control. The same procedure was used for children in the condition displayed in Table 2. As can be seen in these two tables, suggested details were not experienced during any of the play sessions. For high-association items, suggestions were members of the experienced categories, whereas for low-association items, suggestions were not members of any of the categories from which experienced details were taken.

The biasing interview contained 16 questions presented in eight pairs. Each pair of questions was introduced with a brief reminder of the activity followed by one suggestive question and one control question. Each suggestion was presented three times in total: once or twice in the brief introduction and once or twice in the question itself. Answers to the suggestive questions did not require acquiescence to the suggestions. Control questions did not include information about the critical detail.

Coding

All final interviews were transcribed, and responses were coded for correct responses and false suggestions. A correct response occurred when children reported the detail that had been associated with the correct activity on the target day. A suggested response occurred when children reported that the detail they had been told about during the biasing interview really had occurred during the target day. Intercoder agreement was 86%.

Results

Data analysis

The mean numbers of critical details reported in free and cued recall are displayed in Table 3 (correct responses) and Table 4 (suggested responses). When coding free and cued recall separately, critical details reported in both were recorded twice: once in free recall and once in cued recall. As can be seen in Tables 3 and 4, free and cued recall data are highly similar. Only 13% of the correct responses and 18% of the suggested responses were unique to free recall. Furthermore, when free and cued recall data were analyzed separately, the conclusions were the same as those reported below. Accordingly, free and cued recall data were combined such that only unique responses were recorded. That is, if a critical detail was reported in free and cued recall, it was counted once. The last column of Tables 3 and 4 reports the means for the combined data.

Table 3
Means (standard deviations in parentheses) of correct responses in free recall, cued recall, and free and cued recall combined

			Free recall	Cued recall	Free and cued recall
Single event: 4- and 5-year-olds	Suggested	High	1.58 (1.32)	1.46 (1.28)	1.92 (1.50)
		Low	1.13 (1.23)	1.37 (1.17)	1.58 (1.56)
	Control	High	1.25 (1.15)	1.42 (0.88)	1.71 (1.08)
		Low	1.29 (1.30)	1.29 (1.28)	1.54 (1.53)
Single event: 6- and 7-year-olds	Suggested	High	1.58 (1.44)	1.79 (1.23)	1.83 (1.24)
		Low	1.46 (1.35)	1.79 (1.50)	1.96 (1.52)
	Control	High	1.42 (1.25)	1.92 (1.10)	1.96 (1.16)
		Low	1.54 (1.53)	1.71 (1.30)	1.92 (1.59)
Repeat event: 4- and 5-year-olds	Suggested	High	0.17 (0.38)	0.42 (0.58)	0.42 (0.58)
		Low	0.21 (0.41)	0.25 (0.53)	0.37 (0.71)
	Control	High	0.33 (0.70)	0.21 (0.41)	0.46 (0.66)
		Low	0.08 (0.28)	0.17 (0.38)	0.17 (0.38)
Repeat event: 6- and 7-year-olds	Suggested	High	0.21 (0.41)	0.54 (0.88)	0.63 (0.87)
		Low	0.29 (0.55)	0.54 (0.78)	0.59 (0.83)
	Control	High	0.50 (0.78)	1.17 (1.09)	1.29 (1.23)
		Low	0.46 (0.59)	0.50 (0.59)	0.58 (0.65)
Overall means	4- and 5-year-olds				4.08 (3.46)
	6- and 7-year-olds				5.37 (3.01)
	Single event				7.21 (2.50)
	Repeated event				2.25 (1.77)

Table 4
Means (standard deviations in parentheses) of suggested responses in free recall, cued recall, and free and cued recall combined

			Free recall	Cued recall	Free and cued recall[a]
Single event: 4- and 5-year-olds	Suggested	High	0.33 (0.57)	0.38 (0.65)	0.42 (0.72)
		Low	0.00 (0.00)	0.04 (0.20)	0.04 (0.20)
	Control	High	0.00 (0.00)	0.04 (0.20)	
		Low	0.00 (0.00)	0.00 (0.00)	
Single event: 6- and 7-year-olds	Suggested	High	0.08 (0.28)	0.25 (0.53)	0.33 (0.64)
		Low	0.04 (0.20)	0.00 (0.00)	0.21 (0.41)
	Control	High	0.00 (0.00)	0.17 (0.38)	
		Low	0.00 (0.00)	0.00 (0.00)	
Repeat event: 4- and 5-year-olds	Suggested	High	0.25 (0.53)	0.33 (0.64)	0.42 (0.78)
		Low	0.13 (0.45)	0.17 (0.38)	0.25 (0.61)
	Control	High	0.00 (0.00)	0.08 (0.21)	
		Low	0.04 (0.20)	0.04 (0.20)	
Repeat event: 6- and 7-year-olds	Suggested	High	0.75 (0.74)	1.25 (1.03)	1.46 (1.10)
		Low	0.33 (0.64)	0.50 (0.59)	0.67 (0.82)
	Control	High	0.08 (0.28)	0.08 (0.28)	
		Low	0.00 (0.00)	0.00 (0.00)	

[a] For reasons explained in the text, control items are not included in the analyses of suggested responses, and so the values are not reported in the combined column. They are reported in the free recall and cued recall columns to illustrate the prevalence of zero values in the data.

Because children were asked recognition questions only if they failed to provide information in free or cued recall, recognition focused on details that either had been forgotten or were very difficult to access. Indeed, of the 3072 questions that could have been asked (2 recognition questions for each of the 16 critical details for each of the 96 children), only 22.8% were asked during the interviews. In hindsight, this was not a very reliable test of the effects of our manipulations. There were few significant effects, and none of the effects would change the conclusions reported here. Accordingly, we do not discuss recognition question construction or analyses further.

Reports of correct details

Correct responses were analyzed with a 2 (Age: 4- and 5-year-olds vs. 6- and 7-year-olds) × 2 (Sessions: one session vs. four sessions) × 2 (Item: suggested vs. control) × 2 (Association: high vs. low) mixed-factorial design with age and sessions as between-subjects variables. Across age and sessions, there were 16 questions that could have been answered correctly. There was a main effect of age, $F(1, 92) = 9.31$, $p = .003$, because older children provided more correct responses than did younger children, and a main effect of sessions, $F(1, 92) = 137.25$, $p < .001$, because single-event children provided more correct responses than did repeat-event children. There were no other main effects or interactions.

Reports of suggested details

As can be seen in Table 4, the number of suggested responses to questions about control items was very low. In fact, of 768 questions about control details (8 control questions for each of 96 children), only 7 responses were suggested details (and 6 of these related to high-association items). Children's suggested responses to questions about control items measure the extent to which children will guess a suggested detail. Although there was some such guessing (more commonly in reports of high-association details), the number is extremely low and does not raise the concern that the suggestibility effect reflects a nontrivial guessing bias. Given this and the substantial number of zeros in the control data, we analyze only suggested details. The following analysis is a 2 (Age: 4- and 5-year-olds vs. 6- and 7-year-olds) × 2 (Sessions: one session vs. four sessions) × 2 (Association: high vs. low) mixed-factorial design with age and sessions as between-subjects variables.

The main effects of age, $F(1, 92) = 13.40$, $p < .001$, sessions, $F(1, 92) = 18.10$, $p < .001$, and association, $F(1, 92) = 13.72$, $p < .001$, as well as the interaction between age and sessions, $F(1, 92) = 10.66$, $p = .002$, were qualified by the interaction among age, sessions, and association, $F(1, 92) = 4.94$, $p = .029$. This interaction is illustrated in Fig. 1, and the means are given in Table 4.

We now turn to our hypotheses to interpret the three-way interaction. We hypothesized that repeat-event children would be more suggestible than single-event children for high-association details but not for low-association details. We

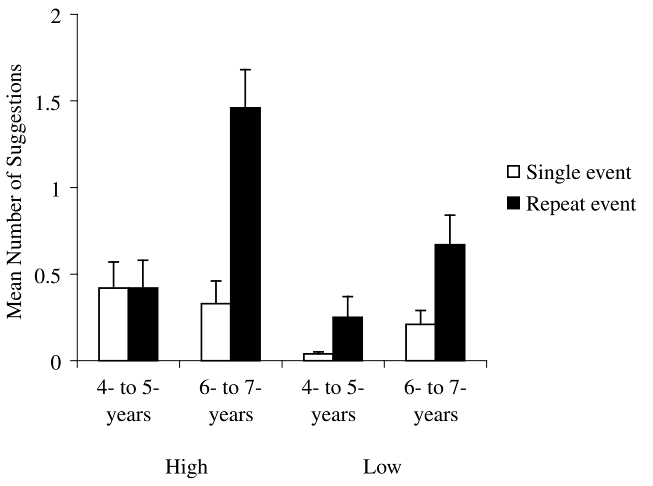

Fig. 1. Mean numbers of suggested responses in combined free and cued recall as a function of age, sessions, and association. Error bars show 1 standard error above the mean.

further expected this effect to be more pronounced for older children than for younger children. As can be seen in Fig. 1, our hypotheses were partially supported. For high-association details, older repeat-event children were more suggestible than older single-event children, but there was no difference in the mean numbers of suggestions reported by younger single-event children and younger repeat-event children, $F(1, 92) = 7.59$, $p = .001$. Also, older repeat-event children were more suggestible than younger repeat-event children, but there was no such difference in the single-event condition. For low-association details, repeat-event children were also more suggestible than single-event children, $F(1, 92) = 8.53$, $p = .004$, and older children were more suggestible than younger children in both the single- and repeat-event conditions, $F(1, 92) = 6.533$, $p = .012$.

Discussion

In this study, we examined the effect of repeated experience and degree of association between variable details on children's suggestibility. Powell and colleagues have consistently found that repeated experience does not heighten suggestibility for variable details (Powell et al., 1999; Powell & Roberts, 2002). In contrast, we have consistently found that repeated experience does heighten suggestibility for variable details (Connolly & Lindsay, 2001; Price & Connolly, 2004). Powell and Roberts (2002) provided evidence that part of the explanation for the divergent results concerns differences in children's responses to recognition questions (used by Connolly & Lindsay, 2001) and cued recall questions (used by Powell et al., 1999, Powell & Roberts, 2002). Another possibility is that heightened suggestibility in the repeat-event condition could be partially explained by the degree of association between variable details. For reasons described in the Introduction, we expected a heightened suggestibility effect for repeat-event children, relative to that for single-event children, in responses to questions about high-association items but not in responses to questions about low-association items.

The data partially support this hypothesis. With the exception of younger children's responses to high-association details, repeat-event children were more suggestible than single-event children. Also, for older repeat-event children, the size of the suggestibility effect was larger for high-association items than for low-association items. For both younger and older children, however, repeat-event children were more suggestible than single-event children for low-association details. This is contrary to our hypothesis, but it is consistent with previous studies in which we did not manipulate degree of association (Connolly & Lindsay, 2001; Price & Connolly, 2004). For now, we conclude that for older children, degree of association between variable details heightens, but does not entirely account for, the effect of repeated experience on suggestibility.

In the repeat-event condition, the suggestibility effect was smaller for younger children than for older children. This heightened suggestibility among older repeat-event children, relative to that among younger repeat-event children, was not part of an overall pattern of elevated errors among older children. Indeed, in free and cued recall, older children provided more correct details than did younger children. This reverse developmental trend in the suggestibility effect is consistent with data reported by Brainerd and colleagues (2002). The Deese–Roediger–McDermott procedure was used to study developmental changes in the false memory illusion. Five- to eleven-year-olds and adults were presented with a list of thematically related words and were later asked to recall the words. Typically, adults report thematically related yet nonpresented words with alarmingly high frequency (e.g., Roediger & McDermott, 1995). In the first two experiments, 5- and 7-year-olds were not susceptible to this illusion. In fact, their most common errors were intrusions from nonthematically related words. If children "got the gist," they would have suppressed unrelated intrusions because they would have known that such words could not have been in the list.

In the current study, we did not present children with a list of thematically related words. However, for high-association items, the details were semantically related, and this may have engaged similar processes. Brainerd and colleagues (2002) reported that neither 5- nor 7-year-olds were susceptible to the false memory illusion. We found that repeated events, relative to single events, heightened suggestibility for 6- and 7-year-olds but not for 4- and 5-year-olds. As can be seen in Fig. 1, this was particularly pronounced for high-association items. It could be that the paradigm used in the current study was simply more engaging (participatory games rather than listening to a list of words) and encouraged the children to process the stimuli more deeply. This may have made the relation between items more salient and encouraged stronger gist memory. This possibility is speculative and awaits further investigation.

Another explanation for the increase in suggestibility across age relies on script theory. All things being equal, older children script events faster than do younger children (Farrar & Boyer-Pennington, 1999; Farrar & Goodman, 1992; Fivush, 1997). Farrar and Goodman's (1990, 1992) schema confirmation deployment hypothesis can be used to explain a developmental increase in suggestibility. According to this theory, there are two information-processing phases of schematization: confirmation and deployment. When an event is encountered, the child will look for a relevant schema to guide comprehension. If no schema exists, the child will attend to both discrepant and common elements in an attempt to schematize the event. If an appropriate schema exists, the child will enter the deployment phase, where relatively little attention is given to schema-consistent information and relatively more attention is given to schema-discrepant information. In the current study, children who had scripted the event (more likely older children than younger children) would have devoted relatively more attention to variable details. For low-association details, this would have led to superior memory for the particular details presented, and as several scholars have reported, resistance to suggestions is heightened when memory for the target detail is strong (Brainerd & Reyna, 1988; Holliday, Douglas, & Hayes, 1999; Marche, 1999; Pezdek & Roe, 1995). However, the attention devoted to high-association details would have made the relation between them salient, and as discussed previously, recognition of the relation between details may have heightened suggestibility. In contrast, children who were still in the schema confirmation phase (more likely younger children than older children) would have allocated equal attention to schema-consistent and schema-inconsistent details as they attempted to schematize the event. Given this abridged attention to variable details, those in the schema confirmation stage would have been less likely to identify the category relations between high-association items. This, as described previously, would reduce suggestibility for high-association items.

A smaller but still significant reverse developmental trend was also observed for low-association details. This finding may be a methodological artifact. In the current study, degree of association was a within-subjects manipulation. Particularly for older children, the relation between high-association items was salient, and this may have led some older children to look for associations between the low-association details. There was no formal association; however, children may have tried to impose an idiosyncratic association on these details (e.g., things that can be made of paper, things mentioned in their favorite story). This would heighten suggestibility to the extent that the suggestion could be seen as a member of the idiosyncratic category generated by the children. Future research should manipulate degree of association between subjects.

In both free and cued recall, children in the single-event condition provided more correct responses than did children in the repeat-event condition. This is consistent with a body of literature finding that children who have multiple similar experiences provide fewer correct details about a particular instance than do children who experience only the target instance (Farrar & Goodman, 1992; Fivush, Hudson, & Nelson, 1984; Hudson, 1990; Pearse, Powell, & Thomson, 2003; Price & Connolly, 2004). Also consistent with this, errors made in cued recall by repeat-event children were far more likely to be details that had been experienced on non-target days ($M = 5.56$, $SD = 2.33$) than to be details that had never been experienced ($M = 3.00$, $SD = 2.68$). Thus, the most substantial accuracy problem faced by children who repeatedly experience similar instances is intrusions from other similar experiences.

An anonymous reviewer pointed out that the event used in the current study involved several discrete activities, and this may have influenced the pattern of results. Although the activities were linked in the sense that they all were activities that occurred when "Scott" came to play with the children, the individual activities were not logically or causally connected. Several scholars have found that children are faster to script an event that is causally connected rather than merely temporally related (Bauer & Fivush, 1992; Bauer & Shore, 1987; Price & Goodman, 1990; Ratner, Smith, & Dion, 1986). A more causally connected event may have facilitated the process of scripting for the younger children and heightened their suggestibility to a level equal to or greater than the level of suggestibility of the older children. Future research may consider designing a study involving an event that is causally connected.

This study provides additional evidence that repeated similar experiences with an event sometimes heightens children's suggestibility for variable details of the event.

However, it is clear that the number of similar experiences with an event is not a simple main effect; its influence on suggestibility is complicated. As reported by Powell and Roberts (2002), the manner in which memory is tested is an important consideration. In some circumstances, the deleterious effect of prior similar experience on suggestibility for variable details of a particular instance of the event may be evident on a recognition test but not on a cued recall test. In the current study, we found that prior similar experiences can heighten suggestibility, even when memory is measured with cued recall, and this effect is particularly pronounced when the variable details are strongly associated with each other.

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