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Children Who Experienced a Repeated Event Only Appear Less Accurate in a Second Interview Than Those Who Experienced a Unique Event

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When children have experienced a repeated event, reports of experienced details may be inconsistently reported across multiple interviews. In 3 experiments, we explored consistency of children's reports of an instance of a repeated event after a long delay (Exp. 1, $N = 53$, $M_{age} = 7.95$ years; Exp. 2, $N = 70$, $M_{age} = 5.77$ years, Exp. 3, $N = 59$, $M_{age} = 4.88$ years). In all experiments, children either experienced 1 or 4 activity sessions, followed at a relatively short delay (days or weeks) by an initial memory test. Then, following a longer delay (4 months or 1 year), children were reinterviewed with the same memory questions. We analyzed the consistency of children's memory reports across the 2 interviews, as well as forgetting, reminiscence, and accuracy, defined with both narrow and broad criteria. A highly consistent pattern was observed across the 3 experiments with children who experienced a single event appearing more consistent than children who experienced a repeated event. We conclude that inconsistencies across multiple interviews can be expected from children who have experienced repeated events and these inconsistencies are often reflective of accurate, but different, recall.

Keywords: children, memory, repeated events, consistency, repeated interview

Witness consistency is considered a hallmark of reliability (Myers, Redlich, Goodman, Prizmich, & Imwinkelried, 1999; Potter & Brewer, 1999). For both adults and children, a witness who is inconsistent across reports is often entirely discredited, with little belief in any details of the account because she "changed her story." Compared with consistent child and adult witnesses, inconsistent witnesses are rated as less confident (Brewer & Burke, 2002), credible (Goodman, Goldings, & Haith, 1984; Leippe & Romanczyk, 1989, Exp. 3, but see Exp. 4 for contrary findings), accurate, and believable (Goodman et al., 1998). Consistent adult testimony also elicits higher ratings of defendant culpability (Brewer & Burke, 2002), probability that the defendant committed the crime (Brewer & Hupfeld, 2004), and prosecution case credibility (Semmler & Brewer, 2002).

For children whose testimony often provides the only real evidence against a perpetrator of child abuse, report consistency may be critical to the pursuance of criminal charges, and ultimately, removal from an abusive situation or securing a conviction. But in cases of child abuse, is it reasonable to expect children to be able to consistently recount their experiences? Should inconsistencies observed within and across multiple interviews discredit a child's account of abuse? Though the focus on consistent accounts is understandable from a legal perspective, basic research on memory tells us there are circumstances under which inconsistencies should not alarm investigators, and likely situations in which inconsistencies should be expected. In the present experiments, we explore consistency of children's reports of an instance of a repeated event compared with a single event across two widely spaced interviews.

Repeated Questions and Repeated Interviews

Particularly when a delay from an initial allegation to a disposition of a criminal case is long, children may be subjected to multiple interviews: informal interviews by teachers, parents, and counselors and official interviews by social workers, police investigators, and legal counsel. Indeed, some reports suggest that child complainants may be subjected to four (Malloy, Lyon, & Quas, 2007), 12 (Whitcomb, 1992), or even 25 investigative interviews (Malloy et al., 2007). Thus, many questions will be asked of a child more than once.

The common practice of repeating interviews has historically been criticized by researchers who cite concerns related to decreasing the reliability of children's reports, the enhanced likelihood of inconsistencies across interviews that may unduly discredit children, and the potential emotional costs of being subjected to multiple interviews (see La Rooy, Lamb, & Pipe, 2009 for a discussion). However, as argued by La Rooy, Katz, Malloy, and

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Lamb (2010), concerns about children's reliability across multiple interviews may have been a result of an early focus on repeated suggestive or undesirable interviewing. For example, in their classic "Sam Stone" study, Leichtman and Ceci (1995) demonstrated that children's memory reports changed in response to repeated misleading questioning. Children who participated in four suggestive interviews were more likely to make erroneous statements about Sam Stone's behavior (i.e., that he ripped a book and soiled a teddy bear) than children interviewed in a neutral manner on four occasions. Even absent directly suggestive questions, problems in response to repeated questioning were observed. Poole and White (1993) compared participants' responses after a 2-year delay with their responses 1 week after the event, and found that children provided consistent responses to closed-ended questions only half of the time, though similar costs were not observed with open-ended questions.

Our knowledge of the effects of repeated interviews has often been gleaned indirectly from research on repeated questioning within an interview; that is, within the same interview, an interviewer repeats a question for which he or she presumably received an initially unsatisfactory answer. Several experimental studies have found that children will often change their answer if a closed-ended or suggestive question is asked more than once within an interview, with many researchers speculating that children pick up on implicit cues from questioners and change their answer in response (e.g., Howie, Nash, Kurukulasuriya, & Bowman, 2012; Poole & White, 1991). However, when the repeated question is open-ended in nature, new accurate information is often reported (Memon & Vartoukian, 1996; Poole & White, 1991). Thus, a focus on appropriate questioning may provide more evidence in favor of repeated questioning.

Recent field explorations have reported substantial benefits to repeated questions. For instance, La Rooy and Lamb (2011; see also Andrews & Lamb, 2014) examined 37 transcripts of sexual abuse investigative interviews with children aged 4 to 11 years and found that although children were often asked repeated questions within an interview (an average of eight per interview), they only changed their answers 7% of the time. Of note, children elaborated on previous responses 27% of the time and repeated their responses 54% of the time. The authors point out that though the repeated questions they observed were primarily intended to challenge children's initial response, in contrast to prior work, they rarely observed verbatim question repetition and most repeated questions were open-ended. Other field work has reported similar benefits to open-ended question repetition (Hershkowitz & Terner, 2007; La Rooy et al., 2010).

In addition to the observed benefits of repeated questioning noted in experimental and field studies, there are theoretical reasons to believe there will be benefits to repeating entire interviews, including providing an inoculation against forgetting and increasing the likelihood of reminiscence (i.e., recalling previously *un*reported correct information). In a seminal paper, Dent and Stephenson (1979) showed children a videotaped theft and later interviewed them either repeatedly or one time. Children provided more correct information during a recall interview 2 months after viewing the tape when it was preceded by multiple interviews than when it was the only interview. These findings have been replicated multiple times, suggesting that early interviews assist with consolidation of memory for an event (e.g., Baker-Ward, Hess, & Flannagan, 1990; Hudson, 1990; Warren & Lane, 1995). Evidence for reminiscence in children's reports is also compelling. In a series of three experiments, La Rooy, Pipe, and Murray (2005) found strong evidence of reminiscence in 5- to 6-year-old children's reports of a visit to a pirate. Consistent with other research, reminiscence was reliably observed even after a long delay, provided that the first interview occurred shortly after the event (e.g., La Rooy, Pipe, & Murray, 2007; Salmon & Pipe, 1997).

In two thoughtful reviews of the extant literature, La Rooy and colleagues (La Rooy et al., 2010) concluded that there are some very real benefits to repeated interviewing—perhaps so substantial that recommendation of repeated interviewing may be appropriate. La Rooy and colleagues noted that although suggestive interviews are clearly problematic, repeated nonsuggestive high quality interviews are likely to elicit additional correct details that were not recalled at the initial interview (i.e., reminiscence). In particular, when the first interview occurs shortly after the event (Odinot, Memon, La Rooy, & Millen, 2013) and when these interviews are conducted close in time, substantial new and reliable information is likely to be recalled in a follow-up interview.

Repeated Interviews of Repeated Events

Most of what we know about children's consistency across multiple interviews is limited to children who have experienced only one event. This is an important limitation for several reasons. Many, perhaps most, children who are abused report repeated abuse (Connolly & Read, 2006) and there is evidence that children who are repeatedly abused may be more likely to require repeated interviews (La Rooy et al., 2009). When a child is repeatedly abused, there is often a requirement to report details from one instance of the series of events (Guadagno, Powell, & Wright, 2006; Lamb et al., 2007; *R v. B.G.,* 1990). This taxes children's memory capabilities and can pose a substantial challenge, with children consistently reporting more correct details and fewer incorrect details from a unique event than from an instance of a repeated event (Connolly & Price, 2006). When recalling an instance of a repeated event, children often err by reporting details that were experienced but were not experienced during the target event (Powell & Roberts, 2002). That is, children confuse the source of the memory. These predictable errors may diminish a child's credibility either because new details contradict previously reported details or because children report new information that is seen as inconsistent with prior reports (Connolly, Price, Lavoie, & Gordon, 2008), yet we know virtually nothing about how these types of mistakes are made across multiple interviews.

There are several theoretical perspectives that help to predict how event frequency might influence report consistency across repeated interviews and all predict lower report consistency for children recalling an instance of a repeated event relative to children recalling a single event (fuzzy-trace theory: Brainerd & Reyna, 2002, 2004; Reyna, Holliday, & Marche, 2002; source monitoring framework: Johnson, Hashtroudi, & Lindsay, 1993; Johnson & Raye, 1981; script theory: Nelson, 1986). Though the precise mechanisms proposed differ across theories, all predict that repetition of similar events will lead to reports that contain details from instances not under investigation. This opportunity for confusion may result in different, but *experienced*, details recalled across multiple tellings of the same event.

Even when memory for repeated events is expected to be relatively strong (i.e., by reporting details at a general level), there is clear evidence that reporting such general detail across repeated interviews elicits only a low to moderate level of consistency, either through omissions across interviews or direct contradictions (e.g., Engelhard, van den Hout, & McNally, 2008; Fergusson, Horwood, & Woodward, 2000; Southwick, Morgan, Nicolaou, & Charney, 1997). However, there has been very limited empirical exploration of theoretical expectations that repeated experience leads to greater inconsistency when reporting about *instances* of repeated events, rather than reporting general event details. We were only able to locate three studies that have explicitly explored recall of an instance of a repeated event across repeated interviews—and all are with adults (one case study of memory for conversations, Neisser, 1981; one field study of memory for trauma, Wagenaar & Groeneweg, 1990; one case study of memory for armed robberies, Connolly & Price, 2013). All three studies reported that interviewees had a great deal of difficulty attributing experienced details to the correct instance. There have been no such studies, lab or field, conducted with children.

The two most relevant studies conducted with children have explored repeated-event children's report consistency within a single interview. Powell and Thomson (1996) had 4- to 8-year-old children participate in one or six different activity sessions and examined consistency of their responses to repeated questions. Due to floor performance in free recall, they were unable to make statistical comparisons between free- and cued-recall responses. However, they were able to report that 34% of repeated-event children's descriptions in free recall changed in response to cued recall questions. This was markedly higher than the percentage of changed responses provided by children who experienced one session only (9%). In addition, children in the repeated-event condition were more likely to change their responses between cued recall and forced-choice recognition questions than children in the single-event condition. Connolly and colleagues (2008) found a similar pattern of results with 4- to 7-year-old children who experienced either one or four activity sessions. Comparing free- and cued-recall responses within a single interview, children who experienced four activity sessions provided fewer consistent responses than children who experienced one activity session. These studies provide evidence that repeated similar experiences can be detrimental to report consistency within a single interview but do not provide insight into how children's reports change across repeated interviews. The current study extends this research by examining the consistency of children's reports of an instance of a repeated event to two independently conducted interviews across a long delay.

Importantly, consistency in the present work refers to different responses to the same question at two interviews separated in time. In the present experiments, this means that inconsistencies are also contradictions. However, this distinction is not always clear in a forensic context: The appearance of inconsistency may be a result of reporting different information at different time points but may not always represent a direct contradiction. It is likely that direct contradictions have a greater influence on judgments of credibility than inconsistencies, but this work has not yet been done.

The Present Experiments

Across three experiments, we explored children's report consistency and the accuracy of recall after a long delay. In all experiments, children either experienced one (single event) or four activity sessions (repeated event), followed at a relatively short delay (days or weeks) by an initial memory test. Then, following a longer delay (4 months or 1 year), children were reinterviewed with the same memory questions by a different interviewer. We analyzed the consistency of children's memory reports across the two interviews, as well as forgetting, reminiscence, and accuracy, defined with both narrow and broad criteria.

Although all studies included a suggestibility manipulation, due to overall low rates of reporting suggestions at the long delay across experiments, in the present work we did not analyze whether a particular detail was the subject of a suggestion. Rather, children's few reports of suggested details were included in the "incorrect" category. Though we have reported elsewhere that children continue to report suggested details after up to a 1-year delay in response to recognition questions (Price & Connolly, 2013), they rarely did so in cued recall. Nonetheless, we outline the suggestion procedures below for reader interest and because elements of the procedure may affect children's recall. Methodological differences between the experiments are summarized in Table 1. Please note that accuracy data from the initial interviews are published elsewhere (Exp. 1: Price, Connolly, & Gordon, 2006, Exp. 2; Exp. 2: Connolly & Price, 2006; Exp. 3: Price & Connolly, 2007). Accuracy data for the follow-up interview for Experiment 2 are published in Price & Connolly, 2013). These papers also contain intercoder reliability information.

Experiment 1

Method

Participants and design. Fifty-three 7- to 8-year-old children (25 boys; M_{age} = 7.95 years, SD = 0.62 years) were interviewed at two time points: (a) 1 week following the target play session, and b) approximately 4 months after the target play session. This

Table 1
Comparison of Methodology Across Experiments

Experiment	Age (yrs) at initial interview	Activity sessions	No. of critical details	Delay from final event to bias	Delay from bias to 1st interview	Delay from 1st to 2nd interview
Exp. 1 (N = 53)	7–8	Single, 4 in 1 day	8	1 week	1 day	4 months
Exp. 2 (N = 71)	4–5, 6–7	Single, 4 in 2 days	16	2 weeks	1 day	1 year
Exp. 3 (N = 59)	4–5	Single, 4 in 2 weeks	16	1 per week for 3 weeks after final session	2 days	1 year

was a two-condition study: children either experienced a single play session or four play sessions in 1 day (frequency).

Procedure. There were four phases in the present study: a play session, a biasing interview, an initial memory interview, and a final memory interview. All sessions were conducted by different research assistants.

Play sessions. Play sessions consisted of four activities, each of which contained two critical details, for a total of eight critical details. For children in the repeated-event condition, a different option of each critical detail was presented during each instance of the play session (options are listed in parentheses below; each repeated-event child experienced one of two option orders). The order in which children experienced the critical details remained the same across instances: children played a pretend game (baseball, tennis, soccer, hockey, or bowling) while the play-session leader wore a nametag (Jessie, Pat, Alex, Ricky, or Dale); they colored a sticker (car, airplane, truck, motorcycle, or scooter) while thinking about a color (red, green, orange, purple, or pink); they drew a building (house, shack, cottage, apartment, or cave) while the play-session leader showed them her lucky number (2, 4, 10, 3, or 5); and they played a game in which money was hidden under a cup ($20, $10,000, $1, $100, or $10) after the play-session leader decorated the room to demonstrate a weather state (foggy, clear, lightning, windy, or sunny). The target play session, the only session for children in the single-event condition and the fourth session for children in the repeated-event condition was identical for all children, and the play-session leader wore a large, silver bowtie and called the session "Bowtie Playtime." This was done to "tag" the target play session so it could easily be referred to during interviews.

Biasing interview. One week after the target play session children were presented with false suggestions about half of the critical details. As described above, the focus of the current paper is consistency and accuracy after a long delay and so the biasing aspect of the interview is not considered further.

Initial memory interview. Memory interviews were conducted with children individually 1 day after the biasing interview. The interviewer began with rapport-building and asked the child to identify the target instance by describing the play-session leader's bowtie. The interviewer then moved to free recall, in which children were asked to recall everything they could remember about "Bowtie Playtime." Finally, interviewers asked children one cued-recall question about each critical detail (e.g., "During the sticker game you colored a sticker. What picture was on the sticker?"). Interviewers asked one nondirective prompt (e.g., "Can you tell me?") if the child did not initially provide a response. Note that the cued-recall questions all required little more than a one- or two-word response, and were not questions that would be desirable as initial prompts for obtaining information in a forensic context.

Follow-up interview. Four months after the initial memory interview, two new trained interviewers reinterviewed the children. Follow-up memory interviews were conducted in the same manner as the initial memory interviews.

Coding. The same coding protocol was used for all three experiments and was adapted from Odinot et al. (2013). Although free recall questions were asked in all interviews, children's free recall reports at the delayed interview were so sparse that we report only cued-recall responses. Each code represents a response pair based on responses to the same cued-recall question in the first and second interviews. Coding was separated into two sections. First, we considered consistency and accuracy on the basis of what happened during the target instance. Children's response pairs were categorized into one of the first five categories (a)—(e) described below. Second, we considered accuracy on the basis of what happened during all experienced sessions for repeated-event children (code f):

(1) Consistent responses

(a) *Consistently correct:* correct target details reported at both interviews.

(b) *Consistently incorrect*: details reported at both interviews that had not occurred during the target instance. This includes details not experienced during any of the instances as well as details experienced during nontarget instances. A child may have reported the same incorrect details or different incorrect details across the two interviews.

(c) *Consistent "don't know"*: child responded with "don't know" at both interviews.

(2) Inconsistent responses

(d) *Forgotten*: correct target details reported at the first interview, but not the second interview (may have been incorrect or "don't know" at the second interview).

(e) *Reminiscence*: correct target details reported at the second interview, but not the first interview (may have been incorrect or "don't know" responses at the first interview).

When asked about one instance of a repeated event, children often report details that had occurred during nontarget instances (i.e., internal intrusions). Consistent with much past research, these responses were coded as incorrect in the above coding; however, the details were experienced by repeated-event children and so are not actually incorrect. To explore these kinds of "correct" responses we included one additional coding category that captured children's reports of internal intrusions. Only responses from repeated-event children were included.

(3) The special case of repeated-event children:

(f) *Experienced*: different details reported in each interview, but both details were experienced. A pair could comprise multiple internal intrusions or a correct detail paired with an internal intrusion. These pairs were combined with the "correct and consistent" code for repeated event children to form the final code.

Results

The presence of each code was calculated as a proportion out of a total possible eight responses. Each response-pair type was entered into a one-way analysis of variance (ANOVA) with event frequency (single, repeated) as the independent variable. Descriptive data and related statistics for the main effects of frequency are presented in Table 2. Due to the number of tests conducted on

Table 2
Proportion of Response-Pairs in Each Category and Associated Statistics for Experiment 1

Response	Single	Repeat	*d*	*LL*	*UL*	*p*
Consistent						
Correct	.27 (.14)	.07 (.10)	1.60	.98	2.22	<.01
Incorrect	.32 (.16)	.49 (.22)	.89	−1.44	−.31	<.01
Don't know	.11 (.09)	.04 (.07)	.85	.29	1.41	<.01
Inconsistent						
Forgotten	.14 (.13)	.19 (.15)	−.33	−.90	.19	.22
Reminiscence	.003 (.01)	.01 (.01)	−.70	−1.24	.13	.08
Repeated events						
Experienced		.25 (.18)				

Note. *LL* = lower limit 95% confidence interval; *UL* = upper limit of 95% confidence interval. Standard deviations are in parentheses. Statistics refer to the comparison of single- and repeated-event conditions.

children's responses, the false discovery rate correction was applied to the *p* values for each Experiment, resulting in an adjusted *p* value of .02 for Experiment 1 (Benjamini & Hochberg, 1995).

Consistent responses.

Correct, incorrect, and "don't know" responses. Single-event children were more often consistently correct, $F(1, 52) = 35.40$, $p < .001$, and less often consistently incorrect, $F(1, 52) = 9.52$, $p < .01$, than repeated-event children. Single-event children were also significantly more likely to consistently say "don't know" than repeated-event children, $F(1, 52) = 11.65$, $p = .001$.

Inconsistent responses.

Forgotten and reminiscence. Children in the single- and repeated-event conditions did not differ in the likelihood of correct details forgotten in the second interview, $F(1, 52) = 1.55$, $p = .22$. Single-event children recalled fewer correct new target (reminiscence) details, $F(1, 52) = 3.18$, $p = .08$, than repeated-event children, but the difference was not statistically significant.

The special case of repeated-event children.

Experienced. Most (88%) repeated-event children reported at least one inconsistent, but experienced response pair across the two interviews ($M = 1.92$, $SD = 1.32$). In the strict instance-based coding above, internal intrusions would be considered incorrect responses. However, with a broader conceptualization of accuracy which includes internal intrusions for repeated-event children, the difference in correct response pairs between single-event ($M = .27$, $SD = .14$) and repeated-event children disappeared ($M = .25$, $SD = .18$), $F(1, 52) = 0.38$, $p = .54$, $\eta_p^2 = .01$.

Discussion

In sum, as predicted, single-event children were more often consistently correct and less often consistently incorrect than repeated-event children when accuracy was linked to details experienced during the target instance only. However, when we explored the nature of repeated-event children's inconsistency, it is clear that many of their errors were the result of reporting details that were experienced, but not in the target instance. That is, repeated-event children were just as consistent in reporting experienced details as single-event children, but they struggled with identifying which details took place during what instance.

One advantage of a repeated interview is reminiscence, or new correct information reported at a second interview. However, if a second interview elicits new incorrect details too, its value is undermined. We cannot conduct a direct statistical comparison of the ratio of correct-to-incorrect information between single- and repeated-event children because repeated-event children have the opportunity to recall far more correct information (approximately four times the possible details). However, it is worth exploring this ratio to better understand the costs and benefits of a second interview. When accuracy was defined as the number of target details reported, the ratio of correct to incorrect reminiscence of target details was not favorable. Single-event children reported eight times more new incorrect ($M = 1.68$) than new correct ($M = 0.21$) details at the second interview and repeated-event children reported five times more new incorrect ($M = 2.44$) than new correct ($M = 0.48$) details. Importantly, however, when repeated-event children's new reports of internal intrusions were considered ($M = 2.96$), the balance of correct to incorrect new details was much more favorable. That is, when we considered all experienced details as "accurate' (not just target details), repeated-event children reported an average of almost three new experienced details at the second interview, a number that exceeds their average recall of new incorrect information. Figure 1 depicts differences in broad and narrow definitions of accuracy across the three experiments.

Close to one quarter of children's responses were consistently correct, even after a lengthy delay of 4 months. Although this rate is not particularly striking as a function of the total possible recall, given the long delay and the nature of the to-be-remembered event, children's ability to respond with such precision to these detailed questions is impressive. In the next experiment we explored whether differences in repeated- and single-event children's reports would persist after a longer delay: 1 year. This experiment also included a younger age group (preschoolers) to allow exploration of effects of event frequency on recall after a long delay across a wider age range.

Experiment 2

Method

Participants and design. Seventy children aged 4 to 5 ($n = 28$; 9 boys; $M_{age} = 4.60$ years, $SD = 0.61$ years) and 6 to 7 years ($n = 43$; 15 boys; $M_{age} = 6.53$ years, $SD = 0.38$ years) were interviewed at two time points: (a) 2 weeks after a target play session, and (b) approximately one year after the target play

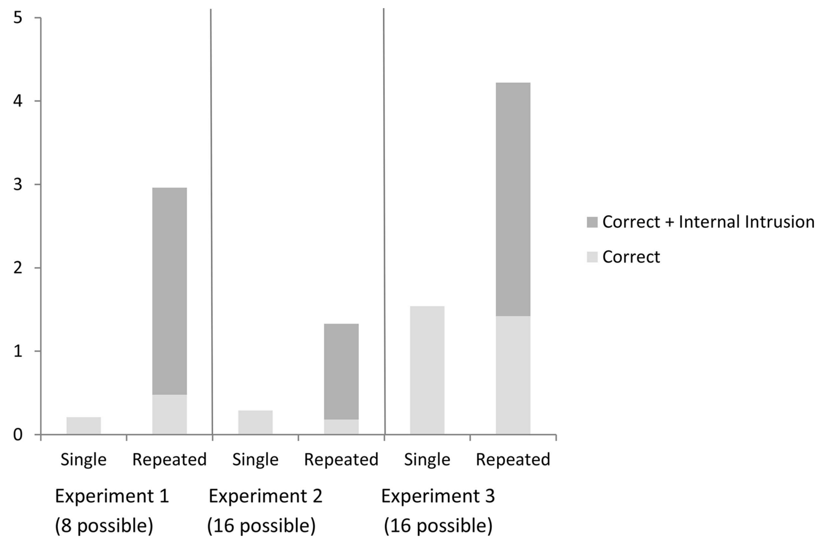

Figure 1. Mean reminiscence broadly (correct responses + internal intrusions) and narrowly (correct responses) defined.

session. This study was a 2 (frequency: single, repeated) × 2 (age: 4 to 5, 6 to 7 years at initial interview) between-subjects design.

Procedure. The procedure was the same as Experiment 1, with four substantive exceptions. First, repeated play sessions took place twice a day for 2 days (compared with 4 in 1 day in Experiment 1). Each play session involved eight activities, 16 critical details, and four options related to each critical detail (options are listed in parentheses). Thus, a different, larger item set was used from that of Experiment 1. One set of activities included: (a) children reached for something (kool-ade, root beer, coke, or water) and then played a pretend game (apple, shirt, fly, or dog), (b) children were given a mat that had been cut into a shape (moon, square, egg, or star) and constructed a puzzle on it (socks, ant, cat, or $5), (c) the room was decorated with a picture (cloudy, snow, hot, or cold) just before the children colored a sticker (bee, horse, $100, or pear), (d) children were instructed to think about something (blue, white, black, or brown) while they made up a story (about a cow, $500, banana, or shoes), (e) the experimenter put on a badge (with the name Don, Jamie, Sam, or Taylor), after which the children drew a picture (hut, swimming, truck, or desk), (f) children looked up to the ceiling to see something (stream, ocean, summer night, or songbird) just before they searched the room for something (soccer ball, bicycle, lamp, or spatula), (g) children held something lucky (7, 6, 8, or 4) while they made a model out of play-dough (motorcycle, couch, can opener, or $20), and (h) children looked in the treasure box (chef's hat, sombrero, witch's hat, or police hat) and then looked under one of three cups for a model (dresser, superman, $1,000, or hockey). The second change from Experiment 1 was that the level of association (high or low) between the options was manipulated. That is, options associated with each critical detail varied in their relation to each other. Options were either categorically related (e.g., animal—pig, cow, horse, dog) or not related (e.g., tree, car, banana, house). For ease of interpretation of the findings, and because it was not central to our hypotheses, we collapsed across this variable in the present analyses. Third, this experiment differed from Experiment 1 in that the delay from the target instance to the biasing interview was 2 weeks (compared with 1 week in Experiment 1). Fourth, the delay to the final memory test was 1 year (compared with 4 months in Experiment 1).

Results

Each response type was entered into a 2 (age) × 2 (frequency) ANOVA. Descriptive data and related statistics for the main effects of frequency are presented in Table 3. The false discovery rate correction was applied and the p value was set at .04.

Consistent responses.

Consistently correct. There were main effects of age, $F(1, 69) = 8.25$, $p = .01$, and frequency, $F(1, 69) = 20.88$, $p < .001$, that were qualified by an interaction between the two variables, $F(1, 69) = 5.04$, $p = .03$, $\eta_p^2 = .07$. For both younger and older children, single-event children reported more consistently correct responses; however, this difference was significant for older, $F(1, 42) = 24.98$, $p < .001$, $\eta_p^2 = .38$, but not younger, $F(1, 26) = 3.47$, $p = .07$, $\eta_p^2 = .12$, children.

Consistently incorrect. There were main effects of frequency, $F(1, 69) = 21.48$, $p < .001$, and age, $F(1, 69) = 10.12$, $p = .01$, $\eta_p^2 = .13$, that were qualified by an interaction between age and frequency, $F(1, 69) = 7.21$, $p = .01$, $\eta_p^2 = .10$. For both younger and older children, those in the repeated-event condition were more likely to report consistently incorrect responses than children in the single-event condition [younger: $F(1, 26) = 17.95$, $p < .001$, $\eta_p^2 = .42$; older: $F(1, 42) = 14.93$, $p < .001$, $\eta_p^2 = .27$] and the difference was larger for younger than older children.

Consistent "don't know." For consistent "don't know" responses, there was a main effect of age, $F(1, 69) = 8.74$, $p = .004$, $\eta_p^2 = .12$, with younger children more likely to consistently respond "don't know" ($M = .14$, $SD = .13$) than older children ($M = .07$, $SD = .08$). There was also a main effect of frequency, $F(1, 69) = 5.38$, $p = .02$, with single-event children more likely to say "don't know" ($M = .13$, $SD = .11$) than repeated-event children

Table 3
Proportion of Response-Pairs in Each Category and Associated Statistics for Experiment 2

Response	Single	Repeat	*d*	*LL*	*UL*	*p*
Consistent						
Correct	.09 (.10)	.01 (.03)	1.14	.62	1.64	<.01[a]
Incorrect	.21 (.13)	.44 (.25)	1.12	−1.61	−.60	<.01[a]
Don't know	.13 (.11)	.07 (.10)	.57	.09	1.05	.02
Inconsistent						
Forgotten	.68 (.27)	.25 (.18)	2.39	−.45	.45	<.01
Reminiscence	.04 (.40)	.02 (.08)	.25	−.20	.75	.89
Repeated events						
Experienced		.16 (.17)				

Note. *LL* = lower limit 95% confidence interval; *UL* = upper limit of 95% confidence interval. Standard deviations are in parentheses. Statistics refer to the comparison of single- and repeated-event conditions.
[a] This main effect was qualified by an interaction between age and frequency, described in the text.

(M = .07, SD = .10). There was no interaction between age and frequency, $F(1, 69) = 0.86$, $p = .36$, $\eta_p^2 = .01$.

Inconsistent responses.

Forgotten and reminiscence. Single-event children forgot significantly more details than repeated-event children, $F(1, 69) = 61.20$, $p < .001$. There was no effect of age, $F(1, 69) = 2.74$, $p = .10$, and no interaction between age and frequency on forgetting, $F(1, 69) = 0.14$, $p = .71$. Single- and repeated-event children responded with a similar proportion of correct new details (reminiscence), $F(1, 69) = 0.12$, $p = .73$. There was no effect of age, $F(1, 69) = 0.10$, $p = .76$, nor an Age × Frequency interaction, $F(1, 69) = 4.01$, $p = .05$, $\eta_p^2 = .06$.

The special case of repeated-event children.

Experienced. As with Experiment 1, we dug deeper into repeated-event children's responses by coding children's mean reports of experienced (including both correct target details and internal intrusions), but different details reported across interviews. Over half (54%) of repeated-event children reported at least one inconsistent, but experienced response pair across the two interviews ($M = 0.85$, $SD = 0.90$). There was no age difference in the likelihood of such reports, $F(1, 38) = 2.80$, $p = .10$, $\eta_p^2 = .07$. When these inconsistent, but correct response pairs were added to the consistently correct response pairs for repeated-event children, correct response pairs were almost twice as common for repeated-event (M = .16, SD = .17), compared with single-event children (M = .09, SD = .10), $F(1, 69) = 4.34$, $p = .04$, $\eta_p^2 = .06$.

Discussion

The patterns observed in Experiment 2 were very similar to Experiment 1. When accuracy was defined as reports of details experienced during the target instance only, older single-event children were more often consistently correct (the same trend was observed among younger children), but single-event children also forgot more than repeated-event children and they were more likely to consistently say "don't know." However, when we considered repeated-event children's inconsistent response pairs that were a result of reporting different experienced details across interviews, repeated-event children provided more correct response pairs than did single-event children. This finding implies that repeated-event children had stronger overall event memory, which makes sense considering that they experienced the event structure more often than did single-event children.

As with Experiment 1, benefits of a second interview were evident, particularly for repeated-event children. A full year after experiencing a fun and engaging, but not particularly salient series of play sessions, repeated-event children were still able to report new experienced event details, though again the rate was much higher when both correct details and internal intrusions were considered ($M = 1.33$) than when only correct details were counted ($M = 0.18$); see Figure 1). Though the benefits for single-event children were not as pronounced, new correct details were also reported by these children ($M = 0.29$). Importantly, however, children also reported many new incorrect details. For single-event children, 44% of response pairs comprised changes from accurate to inaccurate responses across the two interviews, whereas for repeated-event children, this was 18% of response pairs. It appears that the cost to a second interview may be larger for single-event than repeated-event children. However, greater target instance recall at the initial interview, which is typical of single-event children, provides greater opportunity for forgetting and for changes in accuracy at the second interview. Nonetheless, this apparent greater disadvantage for single-event children at a long delay to a second interview is worth further exploration.

The first two experiments demonstrated that children were less likely to be consistently correct in their responses to questions about an instance of a repeated event than about a single event, but that a broad definition of accuracy that allows for any experienced detail to be coded as correct erased this difference. In fact, the pattern was reversed in Experiment 2 such that repeated-event children were almost twice as likely to provide correct response pairs as single-event children. Nonetheless, all children showed a relatively low rate of correct response pairs overall, and this was particularly the case in Experiment 2 when the delay was 1 year between interviews. However, the questions targeted recall of a fun, but not particularly noteworthy, play activity. As discussed in the introduction, there are reasons to believe that some of the inconsistency across repeated interviews may be due to the salience of the event. La Rooy and colleagues (2010) concluded that for stressful events, in particular, there was often no change in amount of information recalled after long delays (Burgwyn-Bailes, Baker-Ward, Gordon, & Ornstein, 2001; Merritt, Ornstein, & Spicker, 1994), and sometimes recall of stressful events improved over time (Fivush, McDermott Sales, Goldberg, Bahrick, & Parkar, 2004). La Rooy et al. hypothesized that the salience of the event may have played a role in memorability and led to additional rehearsal of the event, which helped to inoculate against forgetting. In Experiment 3, we studied a salient event that was stressful for some children to explore this possibility. Children who were nonswimmers participated in one or four private swimming lessons and were later interviewed at two time points.

Experiment 3

Method

Participants and design. Fifty-nine children aged 4 to 5 years (34 boys; $M_{age} = 4.88$ years, $SD = 0.70$ years) were interviewed at two time points: (a) approximately five weeks after a target swimming lesson and again, and (b) approximately one year after the target lesson. This study was a 2 (frequency: single, repeated) × 2 (anxiety: nonanxious, anxious) between-subjects design.

Procedure. The procedure was the same as in Experiments 1 and 2 with important exceptions outlined below (and summarized in Table 1).

Lessons. Rather than participate in small group play sessions, children in Experiment 3 participated in one or four private scripted swimming lessons. In the repeated-lesson condition, lessons took place twice per week for 2 weeks. Each lesson involved 16 critical details with four options related to each critical detail (options are listed in parentheses). Each lesson began as the instructor pointed out her bathing cap color (red, white, black, or blue) and the insect badge (ant, ladybug, spider, or bee) she wore. Next, they discussed a pool safety issue (pool orientation, how to call for help, personal flotation device use, or safe entries) and played a game to enter the water (tree game, crab walk, alligator crawl, or Simon says) while a "friend" floated nearby (shark, whale, ducky, or fishy). Children warmed up by painting a body part with water (face, back, legs, or arms), while a lucky number floated nearby (2, 8, 7, or 3). Children then played a game (motorboat, what time is it Mr. Shark?, hokey pokey, or purple soup) while wearing a special wrist band (Bugs Bunny, Tweety, Daffy Duck, or Scooby-Doo), splashed their instructor to get her wet (with hands, squirty frog, sponges, or kicking), and hunted for treasure at the pool bottom (ring, ball, dice, or puck) while their instructor played a musical instrument (guitar, maraca, cymbals, or drums). Children moved through the water in a special way (run, back float, front float, or creep) and performed a trick (spin, jump in water, hands on bottom, or sit on bottom). Finally, children stood on a foam mat of a particular shape (triangle, octagon, circle, or rectangle) and received a sticker with a picture of a fruit (orange, banana, grapes, or pear). Importantly, the lesson targeted for recall in Experiment 3 was the first lesson (in Experiments 1 and 2, the target was the *final* session for repeated-event children).

Children were selected for the study if they lacked experience in the water and thus, it was anticipated that many children would be anxious during their swimming lesson(s). Children's anxiety was rated on a 9-point scale (1 = not anxious to 9 = extremely anxious) by instructors and an independent rater ($ICC_2 = .81$). Children rated 2 or lower were classified as nonanxious, whereas children rated 4 or higher were classified as anxious. Children whose anxiety level was less clear, and by instructor accounts, mixed throughout the lesson (i.e., those who received a '3' may have been very anxious at the beginning of the lesson but having fun by the end) were excluded from analyses.

Biasing procedure. Biasing information was also presented in a different way from Experiments 1 and 2. Children were read a story by their parents on three separate occasions that contained suggestive information about the target lesson. As with the above experiments, we do not review this procedure in detail because our focus is not on suggestibility.

Results and Discussion

Analyses were conducted as in Experiments 1 and 2. Each response type was entered into a 2 (anxiety) × 2 (frequency) ANOVA. Descriptive data and related statistics for frequency main effects are presented in Table 4. The false discovery rate correction was applied and the p value was set at .03.

Consistent responses.

Correct, incorrect, and "don't know" responses. Single-event children were more often consistently correct than repeated-event children, $F(1, 58) = 4.51$, $p = .04$, but this effect did not reach statistical significance. For children's consistently incorrect details, there was a main effect of frequency, $F(1, 69) = 7.41$, $p = .01$, with repeated-event children more often consistently incorrect than single-event children. For consistent "don't know" responses, there was no effect of event frequency, $F(1, 58) = 0.03$, $p = .87$. No effects of

Table 4
Proportion of Response-Pairs in Each Category and Associated Statistics for Experiment 3

Response	Single	Repeat	*d*	*LL*	*UL*	*p*
Consistent						
Correct	.10 (.09)	.05 (.06)	.63	.09	1.15	.04
Incorrect	.26 (.15)	.39 (.22)	.72	−1.24	−.17	.01
Don't know	.09 (.11)	.10 (.13)	.08	−.60	.44	.72
Inconsistent						
Forgotten	.28 (.12)	.15 (.13)	1.00	.48	1.59	<.01
Reminiscence	.10 (.07)	.09 (.07)	.14	−.38	.66	.64
Repeated events						
Experienced		.29 (.18)				

Note. *LL* = lower limit 95% confidence interval; *UL* = upper limit of 95% confidence interval. Standard deviations are in parentheses. Statistics refer to the comparison of single- and repeated-event conditions.

anxiety or interactions between frequency and anxiety were observed.

Inconsistent responses.

Forgotten and reminiscence. There was a main effect of event frequency on forgetting, $F(1, 58) = 15.55$, $p < .001$; single-event children were significantly more likely to forget details than repeated-event children. There was no effect of anxiety on forgetting, $F(1, 58) = 020$, $p = .65$, $\eta_p^2 = .004$. There were no differences between anxiety, $F(1, 58) = 0.12$, $p = .74$, or frequency, $F(1, 58) = 0.28$, $p = .64$, conditions in the likelihood of reminiscence.

The special case of repeated-event children.

Experienced. As with the previous experiments, we coded children's mean reports of experienced (correct target details and internal intrusions), but different details reported across interviews. Over half (54%) of repeated-event children reported at least one inconsistent, but experienced response pair across the two interviews ($M = 1.00$, $SD = 1.18$). There was no difference between anxious and nonanxious children in the likelihood of such reports, $F(1, 23) = 0.47$, $p = .50$, $\eta_p^2 = .02$. When these inconsistent, but correct response pairs were added to the correct response pair total for repeated-event children, we found that the rate of correct response pairs was significantly higher for repeated-event ($M = .29$, $SD = .18$), than for single-event children ($M = .10$, $SD = .09$), $F(1, 72) = 21.14$, $p < .001$, $\eta_p^2 = .23$.

The results from Experiment 3 were highly consistent with the results from Experiments 1 and 2. With the more salient event in Experiment 3, however, more details were reported after a long delay including more correct responses (single-event $M = 1.54$; repeated-event $M = 1.42$) and more internal intrusions (correct details + internal intrusions for repeated-event children $M = 4.22$; see Figure 1). This is particularly noteworthy given that participants in Experiment 3 were the youngest of all the participants in these experiments (the same age as the youngest group in Experiment 2). Again, however, these accurate reports came with the cost of new incorrect details. Single-event children reported an average of 3.23 new incorrect details per interview, and repeated-event children reported an average of 4.89 new incorrect details (this includes reports of multiple details to a single question).

General Discussion

In three experiments, we demonstrated that after long delays single-event children were more often consistently correct and less often consistently incorrect in their recall of a target instance, but they also forgot more than repeated-event children. This pattern of data was remarkably similar across three different experiments, with different samples of children, across different ages, events, and delays. Children's report consistency across the interviews was moderate, but was best when the delay was shorter (Experiment 1) and when the event was more salient (Experiment 3). The picture painted by the analysis of children's consistency in reports of a target instance, however, drastically distorts the bigger picture of overall event recall for repeated-event children.

What Is Accurate?

When accuracy was narrowly defined, children who experienced a repeated event were significantly less often consistently correct and more often consistently incorrect than children who experienced a single event; however, we argue that it is critical to explore the nature of reporting errors and to define accuracy more broadly. When assessing recall of a target instance of a repeated event, a detail that is reported from another experienced instance (i.e., not the target) has been considered incorrect. These errors are referred to as internal intrusions because the child made an error by reporting an experienced detail from a nontarget instance. Scholars have previously argued for a broader definition of accuracy; that is, internal intrusions are more appropriately considered accurate, nontarget recall (e.g., Connolly et al., 2008). In the present experiments, the majority of repeated-event children reported at least one response pair that included reports of two different, but experienced details. When the definition of accuracy was broadened and internal intrusions were added to the narrowly coded "consistently correct" pairs, repeated-event children either matched or exceeded the proportion of correct response pairs reported by single-event children.

Notwithstanding that repeated-event children were actually as or more accurate than single-event children when a broad definition of accuracy was used, they were also more inconsistent. It was not uncommon for repeated-event children to report one experienced detail during an initial interview, but a different experienced detail during a later interview. These inconsistent reports, although accurate, may lead an assessor to conclude that the child's memory is poor (if the event happened at all; Connolly et al., 2008).

This presents a conundrum in an applied context: repeated-event children may be inconsistent *and* accurate. Inconsistent reports can substantially harm perceptions of a witness' credibility (Myers et al., 1999; Potter & Brewer, 1999) because such reports are often perceived as indicative of dishonesty or weak memory. The present findings make it clear that consideration of the possible origins of inconsistencies is critical. Encouragingly, there is some evidence that judges evaluating cases involving allegations of child sexual abuse may be less concerned with inconsistencies than the broader literature typically reports (Connolly, Price, & Gordon, 2009). Nonetheless, awareness of the typicality of such errors may reduce unwarranted skepticism about repeated-event children's reports.

Implications

As reviewed earlier, several relevant memory theories predict that children who experience a repeated event will have at least some difficulty in accessing memory for an instance of a repeated event. We consistently observed this pattern in the present studies. Repeated-event children can clearly recall a substantial number of experienced details, even after delays of up to one year. However, these children struggle to pinpoint the particular instance in which those details were experienced.

An interesting implication of the present data is that even a year after experiencing an event at a young age, children have not lost access to memory for experienced details. In fact, it could be postulated that repeated-event children have *better* memory for experienced details than single-event children (as evidenced by correct reminiscence when a broad definition of accuracy was used). This possibility requires a carefully controlled study for direct evidence, but these indirect data raise intriguing questions for the study of memory for repeated events. If repeated-event children do indeed have superior memory for experienced details over the long term relative to single-event children, this implies that the repeated experience strengthens not only memory for the gist of the overall event, but also memory for the details experienced during the series. Event repetition, then, may serve as an inoculation against forgetting experienced details.

A critical point to acknowledge with the present experimental designs is the lack of a single-interview condition. Because we did not include such a condition in any of the experiments, we cannot comment on specific benefits or costs to repeated interviewing. We can, however, comment on the benefits and costs of a second interview as a function of event frequency. Indeed, benefits to a second interview were observed. Children correctly reminisced in all studies, though this was most pronounced at the shortest delay (Experiment 1) and for the most salient event (Experiment 3). However, a second interview also came with the expected cost of forgetting and reports of incorrect details. Children's reports of new experienced details after such a long delay are exciting and could mean the development of new investigative directions in a forensic setting. However, distinguishing between these new correct details and new incorrect details will continue to pose a challenge for investigators and raise the issue of a cost-benefit analysis to a second interview about a repeated event. This issue is particularly clear in Experiment 2, for which only a very small proportion (6%) of children's reports of new information was correct. Of course, the present data also suggest that the salience of the event may influence the likelihood of reminiscence, and forensic events are more likely to be memorable than are laboratory experiences.

The observation of a difficult balance between new correct and new incorrect reports was interesting, but not a central aim of the present study. Of much more interest is the comparable likelihood of reporting such details in single- and repeated-event children's reports. Indeed, there was some evidence that repeated interviewing was more problematic for single-event children than for repeated-event children. Though differences were small in Experiment 1, in the longer delays in Experiments 2 and 3, single-event children showed much higher levels of forgetting, both in comparison to repeated-event children's, and to their own reminiscence. Similar patterns were observed when reminiscence was broadly defined (for repeated-event children). Thus, the cost of repeated interviewing to single-event children appears higher than for repeated-event children. As discussed above, repeated-event children may have had stronger memory for experienced details after a delay than single-event children. This potentially weaker memory for single-event children may thus have been more challenging to maintain across two interviews separated by a long period of time.

In a review of the extant literature, Brubacher, Powell, and Roberts (2014) recommended requesting an initial generic account when interviewing children about a repeated event (see also Connolly & Gordon, 2014). These authors argued that providing initial overall event recall can enhance the ability to compare differences across instances and subsequently, reports of particular instances. This practice may have the added benefit of cuing a trier of fact to children's strength of overall event memory and the inherent difficulty of retrieving one instance from a series. Though the current data do not allow us to speak specifically to this recommendation, such a strategy may be particularly important to consider when children are interviewed about a repeated event more than once, and may highlight to both the interviewee and interviewer the need for, and the difficulty of, eliciting consistent recall of an instance from the series.

Limitations

In the present experiments, children experienced exactly the same highly scripted interview each time (though with a different interviewer). Our focus on cued-recall responses to direct questions was possible because we were aware of the play-session details. However, examining responses to these cued questions allows us to comment on memory reports across repeated memory interviews, but not on how children would perform when interviewed with best practices. Recall that free-recall reports were so sparse at the delayed interviews that we were only able to code cued-recall questions. Although this analysis provided us with valuable information about children's memory over time and under a great deal of mnemonic support, a series of directive cued recall questions certainly does not follow best practice interviewing recommendations (e.g., Lamb et al., 2007). Studying children's memory for repeated events across repeated best practice interviews is a critical area of future research.

Further, we deliberately elicited memory reports of only the target instance—an instance that we selected. Though the location of the target instance differed in the present experiments (in Experiments 1 and 2 it was the final instance, in Experiment 3 it was the first instance), children were not asked to select the instance they believed they remembered best. Were they allowed to select the instance to report, consistency may have been greater for repeated-event children. Further, had we invited memory reports of multiple instances, this could have broadened our understanding of children's inconsistency. For example, Brubacher, Roberts, and Powell (2011) found that asking children to recall two instances from a series helped to cue children to the importance of separating out individual instances. Finally, in all of the present experiments, children experienced a biasing interview prior to the initial recall interview in which half of the details were misrepresented. Although there were very low overall reports of suggested details at the second interview in cued recall (so low we did not include these data in the present analyses), the present conclusions can only be directly applied to circumstances in which a biasing interview was experienced.

Finally, though we studied several different ages of children in the present studies, age was not a systematically manipulated variable across experiments. Developmental differences in memory representations over time are a hearty focus of the literature (e.g., Brainerd, Reyna, & Ceci, 2008), and it would have been desirable to contribute to that work. Though few developmental differences have been observed in the amount of information reported across repeated interviews (La Rooy et al., 2011), in the future, framing the study of memory for repeated events over repeated interviews with a solid developmental focus would bring much-needed attention to the theoretical underpinnings of memory for repeated events.

Conclusion

The data from these three experimental studies indicate that inconsistencies across multiple interviews can be expected from children who have experienced repeated events and these inconsistencies are often reflective of accurate, but different, recall. Though there are certainly new inaccuracies that arose in a second interview, there was also an impressive rate of reporting new experienced details. This work further highlights the need for special consideration when investigating allegations involving repeated events.

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