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Interviewing Children about Repeated Events: Does Mental Context Reinstatement Improve Young Children's Narratives?

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Canada

INTERVIEWING CHILDREN ABOUT REPEATED EVENTS: DOES MENTAL CONTEXT
REINSTATEMENT IMPROVE YOUNG CHILDREN'S NARRATIVES?

By

Donna M. Drohan-Jennings

Honours Bachelor of Arts, Wilfrid Laurier University, 2009

Thesis

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in partial fulfillment of the requirements

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Abstract

This study examined mental context reinstatement (MCR) as a technique to increase the quantity and accuracy of information provided by children during repeated-event narratives. Children ($N = 46$, 4-, 5- and 6-year olds) participated in four repeated laboratory activities and were interviewed 4-7 days later about the last occurrence with a control or MCR interview, including both a free narrative and specific questions about the events. Older children (6-year olds) provided a greater number of accurate instantiations (specific details) compared to 4-year olds. Five and 6-year olds reported a greater number of instantiations than 4-year olds, but this effect was marginal. All children were equally accurate in both interview conditions. However, children in the MCR condition did not provide more information than controls, suggesting that 4-6-year old children may not benefit from the use of MCR when interviewed about repeated events. Implications of the results and suggestions for future research are discussed.

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Interviewing Children about Repeated Events: Does Mental Context Reinstatement Improve Young Children's Narratives?

Repeated, routine events are a part of children's everyday experiences. For example, children may have swimming lessons or sports practices and attend school or church. Unfortunately, some children also experience repeated events of a negative nature such as child abuse or bullying; and these incidents may occur on a regular basis and have routine aspects. It is well established that repeated-event memory differs qualitatively from memory for novel experiences (Powell & Thomson, 1996, 1997; Roberts & Blades, 1998; see also Roberts, 2002; and Roberts & Powell, 2001, for reviews) and that children typically find it quite challenging to distinguish and discuss a single occurrence of a repeated event (Connolly & Lindsay, 2001; Powell, Roberts, Ceci, & Hembrooke, 1999; Powell & Thomson, 1996, 1997). The current study examined whether the use of mental context reinstatement (MCR) would help children distinguish between episodes of repeated events. How children's repeated-event memory differs from novel-event memory will now be described based on script theory, fuzzy-trace theory and the source-monitoring framework; additionally, how children's abilities vary developmentally according to each of these theories is addressed. This will be followed by a review of the Cognitive Interview and MCR specifically; the current study is then described in detail.

Script Theory

Repeated childhood events such as swimming lessons and sport practices tend to be highly similar across occurrences, although particular episodes may include unique details (e.g., an awards ceremony at the end of swimming lessons). As children experience multiple occurrences of these highly similar events, they develop scripts for what usually happens, and these scripts provide children with a general framework for what is or is not a typical aspect of

the events (Farrar & Goodman, 1992). As scripts become solidified, children's memorial representations tend to become more script-like and it may be more difficult for them to accurately distinguish which time unique details occurred (although they are still able to accurately recall that, for example, the awards ceremony did occur and it was at swimming lessons; Hudson & Nelson, 1986; Pearse, Powell & Thomson, 2003; Powell & Thomson, 1996). Consequently, children with repeated-event experience can recall general event details that usually happen every time more accurately than children who experience an event only once can recall the overall structure of the novel event (Hudson & Nelson, 1986; Pearse, et al., 2003; Powell & Thomson, 1996). However, children who experience an event just once can recall specific details unique to the novel event more accurately than children who have experienced an event multiple times (i.e., children with repeated-event experience are less accurate about specific details unique to one instance of a repeated event than children who only experience an event once).

Children's ability to develop and effectively use scripts varies with age. According to one model, there are two stages to the development of scripts (Farrar & Goodman, 1992). During the first stage, schema-confirmation, an individual generates a script consisting of the typical actions involved in an event; in the second phase, schema-deployment, individuals can use the script to identify details that do not fit in with the normal sequence of events (Farrar & Boyer-Pennington, 1999; Farrar & Goodman, 1992). Younger children do not develop effective scripts (i.e., their scripts are not as robust) as quickly as older children and thus younger children have more difficulty distinguishing between standard and non-standard occurrences of an event (Farrar & Goodman, 1992) and attaching atypical differences to a particular occurrence of a repeated event (Farrar & Boyer-Pennington, 1999). Younger children (4-year olds) therefore tend to find it more

difficult than older children (7-year olds) to attribute variable details to the correct episode (Farrar & Goodman, 1992). However, younger children improve in their ability to correctly identify atypical changes as part of an episodic occurrence the more experience they have with repeated events (Farrar & Boyer-Pennington, 1999). Thus there are developmental differences in the amount of experience required in order to develop an adequate script for what constitutes a standard event in a series of repeated events, and in the ability of children to use scripts to make decisions about whether a recalled detail was part of a given episode of a repeated event. Although not designed as an extension of script theory, *fuzzy-trace theory* suggests more precise mechanisms as to how generic and episodic details are recalled.

Fuzzy-Trace Theory

Children may have difficulty distinguishing between episodes of a repeated event because, according to *fuzzy-trace theory* (Brainerd & Reyna, 1998, 2004), memories are stored in parallel as two different traces: verbatim and gist. Verbatim traces contain specific, item-level information, while gist traces contain general, semantic information about events (Brainerd & Reyna, 1998, 2004). Verbatim traces decay faster than gist traces, and over time gist traces become stronger than verbatim traces, regardless of the strength of verbatim retrieval cues (Brainerd & Reyna, 1998, 2004). In other words, it becomes increasingly difficult to recall specific information about an event over time, although general information about the event may still be quite memorable. However, the ability to retrieve verbatim traces does improve with age; therefore older children are better than younger children at remembering verbatim information (Brainerd & Reyna, 1998, 2004). In terms of repeated-event memory, fuzzy-trace theory suggests that compared to children with novel event experience, children with repeated-event experience will be better at recalling general information about the events (i.e., information about

the meaning, or gist, of the events) but that they will find it more challenging to recall specific details about the events (i.e., verbatim information). However, this varies developmentally such that older children will be better overall at recalling specific details compared to younger children. Even after children successfully recall details about repeated events, they must then be able to make accurate decisions about the source of those details. Fuzzy-trace theory postulates that the source of information is also represented by a verbatim trace and therefore can (or cannot) be directly retrieved. Children can sometimes remember the sources of information and their content (e.g., Powell et al., 1999) but still be confused as to the instance of the repeated event in which the details were encountered.

Source Monitoring

In contrast to a verbatim memory of source, the source-monitoring framework considers children's ability to distinguish between similar occurrences to be reliant on their ability to make accurate source-monitoring decisions at retrieval, a task which is difficult for many children (see Roberts, 2002, for a review). Source monitoring is the ability to make determinations about where knowledge was obtained (Johnson, Hashtroudi, & Lindsay, 1993). In the context of repeated events, the source of a memory refers to the particular event session in which a specific detail occurred. For example, if children sat on cardboard the day they made a puzzle of a clown juggling, the source of the memory of sitting on cardboard would be the day the puzzle was of a clown juggling. Children may find it challenging to monitor the source of information they recall, making it difficult for them to distinguish which instantiations are tied to a specific occurrence of a repeated event (see Roberts, 2002). This is especially likely to be a challenge when memorial cues are alike due to similarity between events, increasing the possibility that children will make source-monitoring errors (Roberts & Blades, 1998). Nonetheless, source-

monitoring decisions are made at the time individuals are attempting to recall an event; therefore, reflecting on feelings and sensory information experienced at the time of an event may improve children's ability to recall an event (Johnson et al., 1993). Thus, according to source monitoring theory, we can expect that increasing the cues available to children at the time of retrieval should improve the quality of their memorial reports.

Similarly, reflecting on the temporal aspects of events can help children correctly attribute sources to their memories. For example, the time the children sat on cardboard may have been the last time a repeated event occurred; in that case memory of the temporal information ("the last time") can lead to an accurate source attribution. As with other types of source monitoring, children find temporal monitoring challenging. Powell and Thomson (1997) suggest that children's difficulty in reporting details about a specific occurrence may be the result of a loss of temporal-source-information, rather than a loss of memory for what happened during the events. Helping children access specific details about a single incident of a repeated event may therefore help children distinguish between events (Powell & Thomson, 2003).

While children remember events differently when they occur repeatedly compared to when they are novel, and children find it difficult to differentiate between episodes of repeated events, child victim-witnesses are nonetheless typically required to discuss specific instances of an event that may have happened many times (see Powell, Roberts & Guadagno, 2007, for a review). Understanding children's capacity to discuss a particular occurrence of a repeated event and how to facilitate their ability to do so has important practical implications for forensic and investigative interviews. Furthermore, given that children experience a wide variety of routine events in their daily lives, it is important for those who talk to children regularly, such as teachers and parents, to understand how children talk about these memories, as how children are

asked about their experiences affects how children report their memories. The Cognitive Interview, which is one technique used to talk to children about their experiences, and particularly the mental context reinstatement mnemonic of the Cognitive Interview, will now be reviewed.

The Cognitive Interview

Use of the *mental context reinstatement* (MCR) technique, which is a component of the Cognitive Interview (Fisher & Geiselman, 1992), may be one way to assist children in providing more complete, yet accurate, testimony. The Cognitive Interview was developed by Fisher and Geiselman in order to provide eyewitnesses with several mnemonic techniques to improve their memory for events (Fisher & Geiselman, 1992; Geiselman, 1988). These mnemonic techniques include reverse recall (recalling an event from the end to the beginning), recall from another's perspective (taking the perspective of another individual present at the event and reporting how they likely would have perceived the event), complete report (interviewee is encouraged to report every detail regardless of how irrelevant they think it is), and MCR (Fisher & Geiselman, 1992). Subsequent revisions to the Cognitive Interview (called the Enhanced or Revised Cognitive Interview in many studies, but referred to as the Cognitive Interview in Fisher & Geiselman, 1992) were designed to take the social aspects of the interview into consideration, for example, by giving the witness greater control over the interview, by giving structure to the interview, and incorporating rapport building, witness compatible questioning, and imagery into the interview. When used in interviews with adults, the Cognitive Interview has been found to increase the number of correct details reported by witnesses and, although the number of incorrect details reported in many cases also tends to increase, overall accuracy rates are typically just as high with the Cognitive Interview compared to other investigative interviews because more

information is reported in total (Brock, Fisher, & Cutler, 1999; see Köhnken, Milne, Memon & Bull, 1999, for a meta-analysis; but see Akehurst, et al., 2003 who found that reports of incorrect information did not increase).

There is also support for using the Cognitive Interview with children. See Table 1 for a summary of key findings from studies examining the use of the Cognitive Interview with children, particularly older children; research with young children will be focused on here. When young children experience a single event, such as watching a short video (Hayes & Delamothe, 1997; Holliday, 2003a; 2003b; Holliday & Albon, 2004; Milne & Bull, 2002) or participating in a short interactive session (e.g., playing Simon Says with a researcher; Bowen & Howie, 2002; McCauley & Fisher, 1995), use of mnemonics from the Cognitive Interview have been shown to increase the number of correct details that children provide. However, as has been found in adult research on the Cognitive Interview, children sometimes report a greater amount of incorrect information than those interviewed with a standard interview (Hayes & Delamothe, 1997); although overall accuracy rates are generally just as high given that children provide more information in total (e.g., Holliday, 2003a; McCauley & Fisher, 1995). Nonetheless, some research has found that use of the Cognitive Interview increases the amount of correct information reported without a corresponding increase in incorrect information (Akehurst, et al., 2003; Bowen & Howie, 2002; Hammond, Wagstaff, & Cole, 2006; Holliday, 2003a; Holliday, 2003b; Holliday & Albon, 2004) and sometimes leads to higher overall accuracy rates (Larsson, Granhag, & Spjut, 2003; Milne & Bull, 2003; see also Larsson & Lamb, 2009, and Pipe, Lamb, Orbach & Esplin, 2004, for reviews of the Cognitive Interview in addition to other interview techniques).

Not all of the techniques of the Cognitive Interview are appropriate for use with children (e.g., recalling an event from another's perspective would be difficult for a young child). However, MCR may be one aspect of the Cognitive Interview that could help children with event recall. The MCR technique is designed to encourage individuals to create a mental picture of a target event by thinking about, for example, their sensory experiences and emotions during the event, and by visualizing their surroundings and any actions they performed or saw others perform (Fisher & Geiselman, 1992). If MCR is effective in eliciting improved reports from children when used apart from other Cognitive Interview mnemonics, it would be especially beneficial in forensic settings because it would allow interviewers to use a simplified, less time-consuming technique compared to using the full Cognitive Interview.

There is evidence that young children may benefit from the use of the MCR technique specifically. For example, Milne and Bull (2002) found that 5-6-year old children who viewed a short video and were interviewed two days later provided more correct recall when interviewed with MCR alone or in combination with the Report All mnemonic compared to any of the other Cognitive Interview mnemonics on their own. Similarly, Hayes and Delamothe (1997) found that use of the MCR technique (in combination with the Report All mnemonic) led to an increase in 5-7-year olds reports of correct details when children watched a videotaped story and then were interviewed three days later. Furthermore, while both Hayes and Delamothe (1997) and Milne and Bull (2002) used short delays in their studies, Bowen and Howie (2002) found that MCR helped 4-6-year old children that had participated in a 15-minute activity (e.g., playing Simon Says with an experimenter) report more correct information even after a 7-9-day delay. Additionally, Dietze and Thomson (1993) found that 6-year old children who viewed a 5-minute film and were interviewed with MCR only one hour later performed similarly to children who

were interviewed with specific questions, in terms of correct information provided, and both groups performed better than a free-recall group.. By including 4-6-year olds (i.e., the group most in need of support given the typically short reports made by this age group in response to open-ended questions [e.g., Sternberg et al., 2001]), the current study sought to determine whether MCR is a useful interview technique specifically when interviewing young children about repeated events.

However, the existing body of research looking at the use of MCR with both adults and children should be interpreted with some caution as comparison control groups have varied from structured interview protocols (which in themselves vary from study to study; Dando, Wilcock, & Milne, 2009; Geiselman, Fisher, MacKinnon, & Holland, 1985; Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz, 2001; McCauley & Fisher, 1995), to generic free-recall prompts (i.e., interviewee is simply instructed to tell everything s/he remembers; Dietze & Thomson, 1993), to specific questions (Dietze & Thomson, 1993) to focused meditation (Hammond, et al., 2006) to hypnosis (Geiselman, et al., 1985); see also Memon and Higham (1999) for a review of the Cognitive Interview, including a comparison of control groups used in previous research. To test possible effects of MCR on children's reports about a repeated event in the current study, MCR-instructed reports were contrasted to those elicited with a control interview that is structured similarly to the National Institute for Child Health and Human Development (NICHD) Protocol (Lamb, et al., 2007). The NICHD protocol is a commonly used interview protocol in investigative interviews and one that is known to be effective in eliciting information from children (see Lamb et al., 2007, for a review of findings). This allowed for a direct comparison between the reports of children interviewed with MCR and the reports of children interviewed

using the most effective investigative interview technique at present. Thus, this gives a strong test of the possible effectiveness of MCR.

According to Fisher and Geiselman's (1992) description of the MCR mnemonic, interviewers should stress the importance of eyewitnesses' concentration, ask eyewitnesses to close their eyes and attempt to mentally recreate the context of the to-be-remembered event. They also emphasize that questions should be open-ended, should elicit detailed descriptions, and that the interviewer should use pauses as a means to allow the eyewitness adequate time to develop and report details from their mental image. However, there is wide variation in the actual instructions used in the existing body of research when administering the MCR technique. In some cases the instructions are extensive (e.g., Dando, Wilcock, & Milne, 2009; Hammond, Wagstaff, & Cole, 2006; McCauley & Fisher, 1995) and in others the instructions are shorter (e.g., Hershkowitz, et al., 2001, Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz, 2002). Some studies include a practice phase where the instructions are practiced while discussing events not related to the to-be-remembered event (Hershkowitz, et al., 2001, 2002), while other studies do not include a practice phase (e.g., Dando, Wilcock, & Milne, 2009). In McCauley and Fisher's (1995) study, MCR instructions were not administered until after participants had already provided a free narrative (so MCR instructions were used to determine whether any further details could be elicited). The current study is designed to closely follow the guidelines provided by Fisher and Geiselman (1992) in order to determine the effectiveness of the MCR technique when talking to children about repeated events.

MCR and repeated-event research. The MCR technique, which encourages individuals to mentally recreate the to-be-remembered event in order to enhance recall, may assist children in determining whether a particular detail was a part of a specific instance of a repeated event.

More specifically, MCR may help children recall more information about an episode of the events, which will provide children with more memorial cues with which to make decisions about whether a given detail was a part of that occurrence or not. However, there is a paucity of empirical evidence specific to the use of MCR when interviewing children about repeated events (we are aware of only one other empirical study, which was from our laboratory; Drohan-Jennings, Roberts & Powell, 2010). These data were part of a larger study on suggestibility (i.e., the extent to which questioning techniques suggesting false information to children influences their memories for repeated events; Roberts & Powell, 2006). After participating in repeated, laboratory events, children were exposed to false information during a biasing interview, and then interviewed later using specific, focused questions about details that were part of the target occurrence, such as “What did you sit on, the day you wore the badge?” (The target occurrence was identified for children with a detail unique to that occurrence, e.g., wearing a badge, and they sat on something in each occurrence although the specific item they sat on changed every time.) Drohan-Jennings and colleagues (2010) found that MCR reduced children’s suggestibility.

Despite the evidence showing positive effects of MCR on children’s suggestibility after experiencing repeated events, it is also important to study the possible effects of MCR on children’s responses to open-ended questions given that these are the preferred type of questions for eliciting complete and accurate testimony. A structured interview protocol that encourages the use of open-ended prompts (e.g., “Tell me what else happened.”), rather than option-posing (e.g., “Did you sit on cardboard or a garbage bag?”) or yes/no questions (e.g., “Did you sit on cardboard?”), enables children freely recall more information (Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007; Sternberg, Lamb, Orbach, Esplin & Mitchell, 2001). This is important as children tend to provide more accurate information when given open-ended prompts than they

do in response to forced-choice (i.e., option posing) or specific, focused questions (e.g., “What did you sit on?”; Hutcheson, Baxter, Telfer, & Warden, 1995). Thus, it is vital to develop interview procedures that both elicit information in response to open-ended prompts and help children distinguish between episodes of repeated events. The interview in the current study included a substantial open-ended recall section and therefore allowed us to examine the use of MCR instructions during a free-recall phase of the interview.

A handful of field studies (i.e., studies using actual investigative interviews rather than reports of staged laboratory events) looking at the use of MCR with children have been conducted (Hershkowitz, et al., 2001, 2002). These studies found that children provided more information during the free-recall portion of an interview when MCR prompts were used compared to reports gleaned with a standard investigative interview or physical context reinstatement (i.e., returning to the scene of the alleged crime). Some children in these studies alleged multiple incidents of abuse, which raises the possibility that MCR may assist children in discussing repeated events, although Hershkowitz and colleagues did not analyze this specifically. As it is not possible to determine accuracy in field interviews (because we can never know with certainty what really happened), the current study addressed this inevitable omission in Hershkowitz and colleagues’ research by staging and videotaping events for children so that accuracy could be measured. It is also important to note that Hershkowitz and colleagues’ findings suggest that the effectiveness of MCR may extend beyond empirical research to have more practical, applied usefulness. Thus if we can show that MCR does elicit a greater amount of freely-recalled information without reducing accuracy our results will shed light not just on the memory capabilities of young children, but may also be of benefit to investigative interviewers.

The Current Study

The goal of this study was to determine whether MCR is an appropriate and effective interview technique for use with 4-6-year old children that have experienced similar events multiple times. More specifically, this study examined whether MCR instructions during the free-recall phase of an interview would assist children in providing longer reports about a specific instance of a repeated experience without compromising accuracy. Furthermore, because we asked children specific questions after free recall was exhausted, this study was able to consider whether the use of MCR would also improve accuracy for such questions (which otherwise typically lead to less accurate responses).

If MCR indeed aids children in monitoring source information related to their memories, they should be able to provide more information overall and be at least as accurate when the MCR technique, as compared to a structured interview, is used to ask them about a single occurrence of a repeated event. Thus, children (aged 4-, 5- and 6-years) participated in four laboratory, repeated-event sessions consisting of 17 activities that were similar in theme (item) but varied in specific detail (instantiation) during each occurrence (item refers to the general theme of the activity, e.g., children *sat on* an object, while instantiation refers to the specific detail of the activity, e.g., children sat on a *garbage bag*). At a fifth session, which took place approximately one week after the final event session, children were asked to provide a free narrative about the last occurrence of the events, using either open-ended prompts (the control interview) or MCR instructions. The children were then asked 17 specific questions (one about each instantiation from the final session) and four temporal sequencing questions about the events.

It was hypothesized that, compared to children in the control condition, children in the MCR condition would provide more information overall (more items and more instantiations) during their free narrative than children in the control group. Note that previous research has typically found similar overall accuracy rates between MCR interviews and other types of interviews (see Köhnken, et al., 1999; Memon & Higham, 1999), although some research has found improved relative accuracy when children are interviewed with MCR (e.g., Larsson, Granhag, & Spjut, 2003; Milne & Bull, 2003). This study was intended to clarify whether MCR would lead to greater or equivalent accuracy rates, and provide greater insight into the conditions that allow MCR to affect accuracy. Thus, it was expected that children in the MCR condition would be at least as accurate as children in the control condition, regardless of age and question format (i.e., children in both conditions will be equally accurate during free recall and focused and temporal questions).

It was predicted that older children (6-year olds) would provide more information overall and provide more accurate instantiations than younger children (4-5-year olds), and be more accurate for focused and temporal questions. We also planned to examine the interaction between age and interview condition; however, this was exploratory. Given the lack of empirical evidence specifically related to MCR and children's repeated-event memory, and that previous research on interviewing children with MCR has failed to find interactions of age and interview, even when comparing children to adults (e.g., Dietze & Thomson, 1993), we did not make a specific prediction but rather only had a general expectation that there may be an interaction of age and interview condition. Older children may be more responsive to the MCR instructions (and therefore provide more information and be more accurate) than younger children, so that the

difference between MCR and controls would be greater for the older children than for the younger children.

On the other hand, because younger children tend to provide less information during interviews overall (Sternberg, et al., 2001), they may benefit more from the MCR instructions and thus the difference between MCR and controls would be greater for younger children than older children. Furthermore, some research suggests that source-monitoring training techniques are beneficial for young children (Thierry & Spence, 2002) while other research indicates that such techniques may only benefit older children (Poole & Lindsay, 2002). To the extent that MCR may aid with source monitoring, it is therefore difficult to make predictions about age differences in how MCR will affect children's source monitoring. On the other hand, MCR instructions may benefit older and younger children equally and there may only be simple main effects of both age and interview condition.

Method

Design

The design of this study comprised a 3(Age: 4-, 5- and 6-year olds) x 2(Interview Condition: Control or MCR) between-subjects experimental design. Children participated in four occurrences of a similar event on different days within a two-week period, and were interviewed 4-7-days later to see what they remembered about the last occurrence.

Participants

Originally, 68 participants were recruited to participate in this study. However, the final sample included a total of 46 4-, 5-, and 6-year old (M_{age} in months = 62.36, SD = 14.11; see Table 2 for the distribution of gender by age and condition), and were recruited from schools and daycares in the Kitchener-Waterloo and Cambridge, Ontario areas, and from participants in the

BrainWorx summer camp at Wilfrid Laurier University. Of the 22 children who were excluded from the study, 12 were absent during at least one session run in their schools (e.g., due to illness), two were absent from school during the interview sessions, six declined to participate in one of their sessions or to be interviewed, one dropped out of summer camp and one did not seem to remember participating in the Laurier Activities and thus could not be interviewed. Children only participated if their parents gave informed consent, and verbal assent was obtained from the children before each session. Principals and daycare directors that agreed to allow the study to be run in their facilities also signed informed consent forms. Schools and daycares received a donation of \$5 per child that participated to be used for the benefit of all children in the facility. Families who participated through the BrainWorx summer camp received a discounted camp registration fee and a free t-shirt.

Materials

Each event in the series consisted of 17 activities (items) that were of a similar theme during each occurrence; however, the specific detail (instantiation) varied each time. For example, the children engaged in a warm-up activity each day, but the actual activity they did to warm up was different each time. Thus, on one occasion they danced to warm up while on another occasion they touched their toes. A complete list of the items and their respective instantiations is included in Appendix A.

The possible sets of activities were divided into two groups of four sets, and the order in which the four sets were presented to each group was counterbalanced. Thus, all children in Group One participated in sets C, B, D and A respectively, while children in Group Two participated in D, A, B, and then C respectively (see Appendix A). Children were assigned to groups such that approximately half of the children in each interview condition were in Group

One, and half were in Group Two. Note that Group assignment was used for counterbalancing purposes only and was not analyzed.

During the final, target event session, a unique activity occurred (i.e., children wore a jellybean badge) that served to distinguish that session from the three previous sessions. In order to ensure that children did not confuse items in the events with items they have encountered elsewhere, the items used in the study were items that are not commercially available. However, they have been used in previous studies in the lab (children that have participated in previous studies using these items in our labs were therefore excluded from participating).

Procedure

Events. All participants took part in four 20-minute scripted, repeated-event sessions within a two week period (see Appendix B for a sample script). Trained research assistants (RAs) led the activities, and event sessions were referred to as the ‘Laurier Activities’ on each occasion. Note that the same RA(s) led a given group of children in all four of their event sessions. During the final session, a novel activity was included (children wore a jellybean badge) and pointed out to the children in order to differentiate the final, target session from the previous three sessions. Children participated in the activity sessions in groups of up to 10 children; however, they were interviewed individually.

Interviews. Four to seven days after the final event session children were interviewed to see what they remembered about the target occurrence. Interviews were approximately 30 minutes in length (see Appendix D and E for the interview protocols; note that maximum time frames for the interviews are greater than 30 minutes in total, but interviews did not generally require the maximum time for all sections and thus did not usually exceed 30 minutes in length). Interviews were conducted one-on-one by RAs that did not lead the event sessions. Further, the

interviews were conducted in a room or space other than the one in which children participated in the Activities to ensure that results were not confounded by physical context reinstatement. At the end of the interview, children were thanked for their participation, and were told that they were very helpful and remembered a lot about the Laurier Activities. Further, throughout the interview, children received positive support (e.g., “I can tell you’re thinking really hard”), regardless of actual performance.

Children were randomly assigned to receive either a control or MCR interview, with the constraints that approximately half the children were interviewed in each interview condition, that children from each age group and gender were approximately equally divided between the two interview conditions, and that children from Group One and Group Two were equally represented in each interview condition and age group. Parents were asked to include a list of autobiographical, repeated-events their children experience on the informed consent forms they signed, and during the interview children were asked to provide a narrative of the last instance of one of these events in order to give them practice with the instructions typical of their interview condition (i.e., children in the control condition heard open-ended prompts similar to those used in the NICHD protocol [e.g., “Tell me what happened”], while children in the MCR condition were given instructions to help them mentally recreate the event [e.g., “Think about (the event) as if you were there again”]). Children then provided a free-recall narrative about the target session using the same instructions as with the practice narrative, depending on their interview condition and as described in more detail below (note that all children heard the same type of instructions for both the practice and target narratives; see Table 3 for a side-by-side comparison of the differences between the two interviews).

MCR Interview. The MCR interview began with a brief rapport-building phase (approximately 2 minutes in length) during which the interviewer introduced herself and the purpose of the interview, and then asked children about themselves and things they like to do in order to help children feel comfortable with the interviewer. Children were then asked about the last (i.e., most recent) instance of an autobiographical repeated event (as provided by the child's parent(s); e.g., the last time at swimming lessons). Children were given MCR instructions designed to help create a mental image of that specific event prior to verbally recalling the event. For example, children were asked to close their eyes and think about where they were, what they saw and heard, and how they felt during the event (see Appendix D for the complete MCR interview protocol). The interviewer paused between each instruction in order to allow children adequate time to develop a mental image of the event. Children were then asked to "Tell me everything you remember about the last time you [event provided by parent], from the very beginning to the very end." Further information was elicited using open-ended prompts such as, "Tell me what else happened" and "Tell me more about [something mentioned by child]" and the full MCR instructions were repeated one more time during this part of the interview. Additionally, interviewers were encouraged to use simplified MCR instructions throughout the practice narrative (e.g., "Think about what you saw while you were doing [activity mentioned by child], and tell me what else you remember"), if they felt the child was struggling to remember information. This portion of the interview was 8 minutes maximum, and served as a practice phase to allow the child to become familiar with the mental reinstatement instructions, and the type of questions that would be used to elicit recall about the Laurier Activities.

Children were then told it was time to talk about the Laurier Activities. The interviewer reminded children that she was not present during the Activities, and that it was important she

know what happened. The interviewer used the same MCR instructions as described for the practice phase, except that children were asked to talk about the time they wore the jellybean badge at the Laurier Activities. If children appeared to be struggling with recall, the MCR instructions were repeated in order to help children recall any details they may not have reported previously (note that as with the practice narrative simplified MCR instructions were repeated as necessary during the target narrative and all children heard the full MCR instructions repeated at least once). Additional details were probed with open-ended prompts (i.e., regardless of whether MCR instructions were repeated on any given prompt, details were not elicited using specific questions during this phase). The focused and temporal questions followed once free recall was exhausted or after a maximum of 15 minutes, as described below.

Control Interview. Similarly to the MCR interview, the control interview began with rapport building, followed by a practice phase and then free recall about the final occurrence of the Laurier Activities (see Appendix E for the complete Control interview protocol). However, during both the practice and target occurrence narratives, children were asked to think really hard about what happened, and to tell everything they remembered about the jellybean badge time, rather than receiving the MCR instructions. In order to control for differences in prompt length, and motivation to report what they remember, it was emphasized for children in the control interview condition throughout the free narratives that they should think really hard about everything that happened, and tell the interviewer everything they remember. Further details were elicited with open-ended prompts similar to those in the MCR interview; e.g., “Tell me what else happened” and “Tell me more about [something mentioned by the child].” Additionally, the full control instruction was repeated at least once during each of the narratives (see Appendix E). Focused and temporal questions followed once free recall was exhausted, or

after a maximum of 15 minutes, as in the MCR interview. Thus, the two Interview conditions were identical in length and question type except that the MCR group was instructed to first mentally recreate the event, while the Control group was given motivating instructions (see Table 3).

Focused and Temporal Questions. After providing free recall about the target session, all children were asked 17 focused questions about the final occurrence of the events, one question for each instantiation (e.g., “What did you sit on the time you wore a jellybean badge?”). They were also asked four temporal sequencing questions. One temporal question asked children to determine whether two events unrelated to the Laurier Activities, one that occurred before and one that occurred after, happened before or after the target occurrence (e.g., “Did Canada Day happen before or after the time you wore a jellybean badge?”). Events used for this question were typically provided by parents or were events known to us to have happened before or after the child’s last event session, e.g., a national holiday. Another temporal question asked whether the first and third instantiation of an item from the Activities happened before or after the target occurrence (e.g., “Did the time you sat on a garbage bag happen before or after the time you wore a jellybean badge?”). The remaining two temporal questions involved showing photographs of all four possible instantiations of an item to the children and asking them to indicate which came first, second, third and fourth in the Activities. In one of these questions, the interviewer laid out the photographs and asked the child to point to them and in the other question the interviewer handed the child the photographs and allowed the child to lay the photographs out in order. See Appendix C for the full list of focused and temporal questions.

The focused questions were asked before the temporal questions because the temporal questions included information about instantiations from the events and we did not want this

information to suggest options for responses to the focused questions. The order in which the questions were asked was counterbalanced within each of the blocks of focused and temporal questions. Because the focused and temporal questions may probe details already mentioned by children during the free narratives, children were told that they were going to be asked questions about things they may have already told the interviewer but that she had to make sure she understood everything about the Laurier Activities (see Appendices D and E for the full instructions that children were given in each interview condition).

Coding

Free recall. Interviews were audiotaped and transcribed verbatim. Children's responses during the Laurier Activities free-recall portion of the interview were then coded for the total number of items and total number of instantiations mentioned. Additionally, the number of accurate instantiations (i.e., instantiations reported that were actually a part of the target occurrence) and inaccurate instantiations (i.e., instantiations reported that were not part of the target occurrence) mentioned by children were coded. Inaccurate instantiations were further coded as internal intrusion errors (instantiations that were not part of the target occurrence but were part of the Laurier Activities) or external intrusion errors (instantiations that were not part of the Laurier Activities). Although overall free-recall accuracy was then assessed as a proportion of accurate instantiations reported to the total number of instantiations reported, the pattern of results did not differ from analyses using the raw numbers; the proportion of accurate instantiations reported will therefore not be discussed further.

When internal intrusion errors occurred, the distance from the target (i.e., fourth) occurrence was noted. Thus, if a child mentioned the winter story from the second occurrence, the distance was coded as 2 (as all children were asked about the fourth/final occurrence).

Distance scores were then summed and divided by the number of inaccurate instantiations reported in order to calculate a mean distance score.

Focused questions. Children's responses to focused questions were coded as accurate, internal intrusions, 'don't know', other or external intrusions. Accurate responses were those instantiations that were part of the target occurrence. When children did not provide the accurate instantiation, their responses were coded as internal intrusions (an instantiation of the correct item but not from the target occurrence, e.g., reporting the boat story when the accurate answer was the dog story), external intrusion (instantiations that were not part of the Activities), 'don't know' (child responds that they do not know or cannot remember the answer) or other (an instantiation from the Activities but not an instantiation from that item, e.g., reporting the dinosaur magnets in response to a question about the puzzle).

Similarly to free-recall coding, whenever internal intrusions were coded, the distance from the target occurrence was noted. Again, distance scores were summed and divided by the number of inaccurate instantiations reported in order to calculate a mean distance score.

Temporal questions. Temporal questions 1 and 2 were coded as accurate whenever children correctly sequenced autobiographical events and instantiations from other sessions of the Activities, respectively, around the target occurrence. Responses that were not accurate were coded as inaccurate when children were incorrect or 'don't know' if children said they did not know or did not remember whether the event or instantiation in question was before or after the target occurrence. For temporal questions 3 and 4, the number of times that children were accurate or inaccurate at sequencing photographs of instantiations from the Activities was summed; children rarely said they did not know which session a photograph occurred in and these responses were coded as 'don't know'.

Reliability. Intercoder reliability was calculated between the author and a trained research assistant on a random sample of 15% of the interviews. Cohen's Kappa was .64 (percent agreement, calculated as: the number of agreements / number of agreements + disagreements, was .75 and .90 for items and instantiations respectively). Intercoder reliability was not calculated for focused and temporal questions as the codes were straightforward and did not require subjective decisions.

Results

An alpha level of .05 was used to determine significance for all analyses, unless otherwise noted below.

Free Recall

The total number of items and instantiations (including both accurate instantiations and internal intrusion errors) reported in free recall was correlated ($r = .42, p = .004$); thus, these two variables were analyzed in a 3(Age: 4, 5, or 6 years-old) x 2(Condition: MCR or Control) multiple analysis of variance (MANOVA). Results revealed a marginal effect of age (Wilks' $\lambda = .82, F_{(4, 78)} = 2.07, p = .09, \eta_p^2 = .10$). Post-hoc Bonferroni tests showed that there were no age differences for the total number of items reported ($ps > .05$; see Table 4 for means); however, there were age differences for the total number of instantiations reported. Four-year olds ($M = 3.27, SD = 2.55$) reported significantly fewer instantiations than the 5-year olds ($M = 5.67, SD = 2.99; p = .05$) but only marginally fewer (in terms of statistical significance) than the 6 year olds ($M = 6.00, SD = 2.54; p = .06$). The 5- and 6-year olds did not differ ($p = 1.00$). The effect of condition (Wilks' $\lambda = 1.00, F_{(2,39)} = .07, p = .93, \eta_p^2 = .004$) and the interaction between age and condition (Wilks' $\lambda = .93, F_{(4, 78)} = .75, p = .56, \eta_p^2 = .04$) did not reach significance.

Because the total number of instantiations reported overlaps with the total number of accurate instantiations reported (i.e., an instantiation must be reported in order for it to be accurate), accurate instantiations were analyzed separately in a 3(Age) x 2(Condition) ANOVA. There was a significant effect of Age ($F_{(2, 40)} = 3.74, p = .03, \eta_p^2 = .16$), and post-hoc Bonferroni tests showed that 4-year olds ($M = 1.27, SD = 1.39$) differed from the 6-year olds ($M = 2.70, SD = 1.57$) in the number of accurate instantiations reported ($p = .05$), but not from the 5-year olds ($M = 1.81, SD = 1.29; p = .77$). Again, the 5- and 6-year olds did not differ ($p = .31$). There was no significant effect of condition ($F_{(1,40)} = 1.14, p = .29, \eta_p^2 = .03$) nor was there an interaction between age and condition ($F_{(2,40)} = .97, p = .39, \eta_p^2 = .05$). See Table 1 for means for items, instantiations and accurate instantiations reported in free recall. External intrusion errors were infrequent and did not differ as a function of age and condition; therefore, external intrusion errors will not be discussed further.

These results generally fit our hypotheses as we expected that younger children would report fewer items and instantiations, and fewer accurate instantiations, compared to older children. However, contrary to our hypotheses, there were no differences between the reports from children in the MCR and Control conditions.

Children's mean distance when internal intrusion errors were made was analyzed in a 3(Age) x 2(Condition) ANOVA. However, the mean distance (see Table 5) from the correct instantiation was the same regardless of age ($F_{(2,39)} = .98, p = .39, \eta_p^2 = .05$) or condition ($F_{(1,39)} = .13, p = .72, \eta_p^2 = .003$), and there was no interaction between them ($F_{(2,39)} = 1.02, p = .37, \eta_p^2 = .05$).

Focused Questions

There were correlations among the response types for focused questions (each variable was correlated with at least one other variable at $r \geq |.34|$, $p \leq .02$), thus responses to focused questions were analyzed in a 3(Age: 4, 5, 6 year-olds) by 2(Condition: MCR or Control) MANOVA. The dependent variables in this analysis were the number of accurate, internal intrusion, ‘don’t know’, Other and external intrusion responses. In contrast to free recall, children’s responses did not differ as a function of age (Wilks’ $\lambda = .81$, $F_{(10,72)} = .80$, $p = .63$, $\eta_p^2 = .10$). There was also no main effect of condition (Wilks’ $\lambda = .94$, $F_{(5,36)} = .46$, $p = .80$, $\eta_p^2 = .06$), and no interaction between age and condition (Wilks’ $\lambda = .84$, $F_{(10,72)} = .64$, $p = .77$, $\eta_p^2 = .08$). See Table 6 for a list of means for each response type.

As with free recall, the mean distance from the target instantiation when children provided an incorrect instantiation was analyzed in a 3(Age) x 2(Condition) ANOVA. Again there were no effects of age ($F_{(2,40)} = .85$, $p = .43$, $\eta_p^2 = .04$) or condition ($F_{(1,40)} = .71$, $p = .40$, $\eta_p^2 = .02$) and no interaction ($F_{(2,40)} = .20$, $p = .82$, $\eta_p^2 = .01$). See Table 7 for means.

Thus, contrary to our hypotheses, older children did not perform differently than younger children, and responses did not change based on condition when tested with focused questions.

Temporal Questions

‘Don’t know’ responses to the temporal questions were not included in the analyses as they were rare, and their occurrence did not differ by age or condition. Eliminating ‘don’t know’ responses left accurate and inaccurate as the only response types. Inaccurate responses were the inverse of accurate responses and children’s accuracy on one temporal question was not correlated with their accuracy on another (all $ps > .05$); thus separate 3(Age: 4, 5, or 6 years old) x 2(Condition: MCR or Control) ANOVAs were run for accurate responses to each of the four

temporal questions. However, there were no effects of age or condition and no interactions for any of the four questions (see Table 8 for results of these tests).

Thus my hypotheses that, compared to younger children and children in the Control condition, older children and children in the MCR condition respectively would be more accurate at sequencing the Activities between autobiographical events and at accurately sequencing instantiations from the Laurier Activities were not supported.

Discussion

Children's memories for routine events are qualitatively different from their memories for unique events (Powell & Thomson, 1996, 1997; Roberts & Blades, 1998; see also Roberts, 2002; and Roberts & Powell, 2001, for reviews). Because children who are abused or bullied often experience these events on a repeated basis, it is important to understand how we can assist children with providing more detailed and more accurate accounts of single instances of their repeated experiences. Although it is difficult for children to distinguish between occurrences of similar events (Powell & Thomson, 1997), the ability to do so takes on particular importance in the case of forensic investigations where children are typically called upon to accurately discuss particular episodes of repeated events (Powell, Roberts & Guadagno, 2007). If children are unable to discuss a single occurrence with an adequate level of specific detail, or if their reports do not appear to be accurate, their credibility as witnesses may be called into question and prosecution may not occur (*S v. R*, 1989, as cited in Powell & Thomson, 2003; Roberts, 2002).

Although there are currently a variety of interview practices used by investigators that are effective in eliciting information from child witnesses (e.g., Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007; Sternberg, Lamb, Orbach, Esplin & Mitchell, 2001), it is essential to examine any techniques that may improve children's reports even further given the importance placed on

children's testimony during investigations. The goal of this study was to determine whether MCR may improve the amount of information provided by children during interviews about repeated events. This study built on previous research on MCR by being one of the few to consider the effects of the technique specifically as it relates to repeated events (see Drohan-Jennings et al., 2010, for the only other published study).

The current study aimed to determine whether MCR, as compared to a 'best-practice' open-ended, structured interview, would help young children report more information overall without sacrificing accuracy when discussing a single episode of a repeated event. Children (aged 4, 5, and 6 years) participated in four laboratory, repeated-event sessions consisting of 17 activities that were similar in theme but varied in specific detail during each occurrence. Approximately one week later, children were asked to provide a free narrative about the last occurrence of the events, using either open-ended prompts with motivating instructions (the control interview) or open-ended prompts with MCR instructions. The children were also asked 17 specific questions and four temporal sequencing questions about the events. Although developmental differences were observed (see below), there was no evidence to show that MCR was more helpful in supporting young children's recall than an open-ended interview. Contrary to most of our hypotheses related to condition, there were no differences between the MCR and Control conditions (though a condition difference was not hypothesized for accuracy). There are a variety of possible reasons that our findings were not as expected.

It should first be noted, however, that the paradigm used in the current study is well established (e.g., Powell, Roberts, Ceci & Hembrooke, 1999, Powell & Thomson, 1996, 1997, Roberts & Powell, 2006). Thus although not all of our hypotheses were supported, it is not likely due to a problem with the methodology used for the events in the current study. Rather, our

hypotheses may not have been supported due to the young age of the children in the study, because the to-be-remembered event was interviewer-nominated, because the delay between the event and the interview was longer than the delay used in most previous MCR research, or because of the effectiveness of the control interview. Each of these possible reasons will now be discussed.

The children in the current study were quite young (4-6-years old). There is currently a paucity of research examining whether, and how, MCR might benefit children as young as 4-years old; however, the results of the current study suggest MCR may not be a useful technique when interviewing children this young about repeated events. Although Hershkowitz and colleagues (2001, 2002) found that children as young as 4-years benefitted from use of MCR instructions, one notable difference between the current study and Hershkowitz and colleagues' studies is that their studies were based on investigative interviews in cases of alleged abuse. Children in the current study are not known to have been abused, and the events used in the current study were not likely emotionally significant for participants. Children's memories of, and reports of, abusive situations may be qualitatively different from their memories and reports of contrived laboratory events (see Gordon, Baker-Ward, & Ornstein, 2001, for a review). Thus children may be more readily able to mentally recreate their memories during an investigative interview than they are in interviews such as in this study. Similarly, autobiographical memories not related to abuse are also likely to be richer in detail and salience compared to staged, repeated events. Future research could clarify whether this is the case by using more salient laboratory events that are rich in detail, or by using a laboratory study where MCR instructions are used when asking children to discuss parent-corroborated autobiographical events.

Younger children tend to report less information than older children (e.g., Baker-Ward, Gordon, Ornstein, Larus, & Clubb, 1993; Hershkowitz, et al., 2002; Powell & Thomson, 1996). As we hypothesized, older children in the current study reported a greater number of instantiations and a greater number of accurate instantiations than younger children. However, older children did not report more items than younger children (although overall reporting of details at the item-level was fairly low in this study given the episodic nature of the interview structure, see Table 4 for means). Additionally, we did not find the hypothesized age effects for focused or temporal questions. However, the age range of the current sample may have been too small to detect age differences on these variables. Many previous studies on children's memory for repeated events have included older children (7-8-year olds; e.g., Connolly & Lindsay, 2001, Powell, Roberts, Ceci, & Hembrooke, 1999; Powell & Thomson, 1996), and that may account for why we did not find the expected age differences on all of our variables.

Other laboratory studies that have found effects when MCR was included in interviews with children between 4- and 6-years old (e.g., Bowen, & Howie, 2002; Hayes, & Delamothe, 1997; Holliday, 2003a; 2003b; Holiday & Albon, 2004; Milne & Bull, 2002) differed importantly from the current study in terms of their methodology. For example, children in all of these studies (Bowen, & Howie, 2002; Hayes, & Delamothe, 1997; Holliday, 2003a; 2003b; Holiday & Albon, 2004; Milne & Bull, 2002) participated in only one event session. The event sessions ranged from short videos (e.g., 3- or 5-minutes; Holliday, 2003a; 2003b; Holiday & Albon, 2004; Milne & Bull, 2002) to a 12-minute clip from a television show (Hayes & Delamothe, 1997) to a 20-minute interactive session (e.g., playing Simon Says and making a craft with an adult dressed as a clown; Bowen & Howie, 2002). Additionally, only two of these studies had delays similar in length to the current study (3-day delay, Hayes & Delamothe, 1997;

7-9-day delay, Bowen & Howie, 2002). The other studies had only 1-2-day delays (Holliday, 2003a; 2003b; Holiday & Albon, 2004; Milne & Bull, 2002). Children remember repeated events differently than they remember novel events (see Roberts, 2002, Roberts & Powell, 2001), memories tend to decay over time (e.g., Brainerd & Reyna, 1998, 2004), and children may remember events differently when they are interactive versus non-interactive (e.g., Roberts & Blades, 1998); thus, these are vital factors to consider in experiments related to memory. Our study may not have found the same results as these previous studies because our methodology was so different (i.e., we used a repeated-event paradigm and a one-week delay, and children were interactively involved [e.g., they helped assemble the puzzle]).

On a broader scale, it is possible that children as young as those in this study may not yet possess the necessary executive functions (see Garon, Bryson & Smith, 2008, for a review) to adequately mentally recreate a single episode of a repeated event to the point that their recall improves. In particular, in order to effectively use MCR to make accurate decisions about details from a remembered event, children must have sufficient working memory capacity to simultaneously mentally recreate an event, consider all possible options from the series of repeated events, and then to make a decision about which instantiation is correct. Young children may be able to use the MCR technique more effectively when talking about novel events (as in previous research) because they likely have fewer options to consider when attempting to make decisions about the correct details. Because working memory capacity increases with age, young children may not have the capacity to hold and manipulate this much information in working memory; further, children may not be able to hold information in working memory for long enough (Garon, et al.) to create a rich mental image of the event. Although working memory develops throughout the preschool years, 7-year old children still have fewer chunks (i.e.,

individual items that are grouped together to increase the amount of information held in working memory) available in working memory than older children and adults (Gilchrist, Cowan, & Naveh-Benjamin, 2009). One possibility for future research would be to look at whether training young children on working memory tasks, which has been shown to improve children's working memory performance (e.g., Holmes, Gathercole, & Dunning, 2009, Thorell, Lindqvist, Nutley, Bohlin, & Klingberg, 2009), may help them use the MCR technique more effectively when being questioned about repeated events.

In addition to working memory, children as young as those in the current study are still developing their ability to inhibit some of their behaviours (see Garon, Bryson, & Smith, 2008 for a review). According to the guidelines outlined in Fisher and Geiselman (1992), interviewers should pause between the individual MCR instructions in order to allow interviewees adequate time to create a detailed mental image. However, some of the children in the MCR condition wanted to interrupt the interviewer during the pauses to provide information about what they remembered. It is possible that these children found it difficult to inhibit their desire to respond immediately with information they remembered, and thus were not completely focused on recreating the event, as was our intention. If that is the case, children in the MCR condition may not have actually been employing a different recall strategy than children in the control condition. Again, this could explain the lack of differences between the control and MCR conditions.

Although we followed Fisher and Geiselman's (1992) recommendations as closely as possible, there is still a possibility that our instructions could be improved. Perhaps we did not use long enough pauses (pauses were left to the discretion of the interviewer, and not timed) and the children may not have had enough time to adequately recreate the last occurrence before we

questioned them about it. Children may also benefit from more specific guidelines on how to mentally recreate a to-be-remembered event. Although children in the current study were given a brief opportunity to practice using the MCR instructions when discussing the last occurrence of an autobiographical, repeated event, children may not have understood the instructions given to them even during the practice phase and thus would not benefit from practice. Additionally, children may not have understood how to use their mental recreation in order to improve their reports. This could account for why performance was so similar between the MCR and control conditions. Future studies could incorporate more specific instructions during the practice phase in order to address this question. For example, during the practice phase children could be specifically told that sometimes it helps us remember more when we think about where we were when an event happened, and then be told to think about where they were, and so on.

Another consideration about the interview in the current study is that all children were asked to talk about the last occurrence (the time the jellybean badge was worn). Although many repeated-event memory studies have, similarly to this study, used an interviewer-nominated occurrence during the interview (e.g., Connolly & Lindsay, 2001; Powell, et al., 1999; Powell & Thomson, 1996; Roberts & Powell, 2006), this may not be the best practice for obtaining the maximal amount of, and most accurate, information from children. It is possible that the jellybean badge time may not have been the most memorable occurrence for all children in the study, that children did not remember the jellybean badge at all (which seemed to be the case in at least a small number of interviews), or that children may not have understood the instruction to talk about “the jellybean badge time” (e.g., one child’s response to this instruction was to report how it felt to be a jellybean). Although children in both conditions were asked to talk about the same occurrence using the jellybean badge label, if the jellybean badge time was not

the occurrence children remembered best it may have been especially difficult to mentally recreate the event and thus, children may not have been able to benefit from the MCR instructions. If that is the case, it is not surprising that the control and MCR conditions did not differ.

An interesting difference between the current study and past research was the inclusion of a one-week delay between the target occurrence and the interview. Most previous research using MCR has employed a very short delay (in some cases delays of only three hours; McCauley & Fisher, 1995). However, because there is often a long delay between when abuse is alleged to occur and when investigative interviews take place (see Roberts & Powell, 2001), and the strength of children's memories decreases over time (e.g., Brainerd & Reyna, 1998, 2004), we expanded the delay to improve ecological validity.

Children may have been unable to fully take advantage of the MCR technique if their memory for the event had decayed too much due to the delay. If children's memory for a given event lacks enough detail for them to create a mental image of that event, using the MCR technique will not provide any advantage over a structured interview protocol. However, Drohan-Jennings et al. (2010) found a within-subjects effect such that, even after a one-week delay, MCR improved children's resistance to false, theme-consistent suggestions compared to false, theme-inconsistent suggestions (although not compared to their control condition). These results indicate that MCR may be beneficial in at least some cases after a week-long delay. Further research is needed to clarify in exactly what contexts MCR is helpful after long delays. Perhaps MCR is more helpful after long delays when the demands of the interview are more challenging than a non-suggestive, open-ended interview, such as when children have been provided with suggestive misinformation and then must make decisions about the original

details. Nevertheless, a one-week delay is still somewhat shorter than many delays in abuse investigations and, therefore, it is especially important to identify interview techniques that help children overcome this challenge. Children may have a particularly difficult time recalling specific information about individual instances of repeated events as the delay between the event and the interview occurs (Brainerd & Reyna, 1998, 2004) and further research could investigate the importance of delay when testing the effects of MCR.

Another possible consideration is that because the interviews in the current study were modeled after the principles of a well-established interview technique (i.e., both interviews contained rapport building and practice phases and elicited free narratives prior to more specific questioning, as suggested in the NICHD protocol; Lamb et al., 2007), the control interview was so effective in eliciting what children remembered about the target occurrence that the MCR instructions did not provide any additional benefit. It should be noted however that other studies using the NICHD protocol as a basis for control interviews have still found effects of MCR (e.g., Hershkowitz et al., 2001, 2002).

Finally, although our sample size was quite small in general the p-values were quite large and the effect sizes small; thus the sample size was not likely an issue. The variance was quite large for most of our variables and thus there may be some 4-5-year olds that benefit from MCR; however, the results of the current study do not allow us to make conclusions about who those children are. Further, this study should be replicated with an older age group (e.g., 7-8-year olds) as this older age group still stands to benefit from improved interviewing techniques and may be more readily able to take advantage of the use of MCR.

The current study aimed to determine whether MCR would enable children to provide a greater amount of information when asked to describe a specific instance of a repeated event, and

is one of the few studies to consider the effects of the technique specifically as it relates to repeated events (see Drohan-Jennings et al., 2010, for the only other published study). However, the results of this study suggest that MCR does not provide an advantage over the use of a structured interview (modeled after the NICHD protocol, Lamb et al., 2007) when interviewing young children; however, it remains to be seen whether MCR helps older children when they are interviewed about repeated events. It should also be noted that the use of MCR did not have deleterious effects on children's reports, and thus this technique appears to be equally as effective as structured interview protocols when interviewing children about a specific instance of a repeated event.

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Table 1

Summary of Key Results from Studies Examining the Effects of the Cognitive Interview or MCR when Interviewing Children

	Age & Comparison Groups	Results
Akehurst, L., Milne, R., & Köhnken, G. (2003). The effects of children's age and delay on recall in a cognitive or structured interview. <i>Psychology, Crime & Law</i> , 9, 97-107.	<ul style="list-style-type: none"> • 32 8-9-year olds • 32 11-12-year olds Enhanced Cognitive Interview (ECI; called by others the Revised Cognitive Interview) and Structured Interview, at a four hour or six day delay.	ECI led to reporting more correct details, without increasing reports of incorrect information, regardless of age or delay (however, overall accuracy rates, as a proportion of accurate details to total details, were very similar between the two interview conditions [73% and 70%], though statistical comparisons were not made for accuracy rate).
Bowen, C. J., & Howie, P. M. (2002). Context and cue cards in young children's testimony: A comparison of brief narrative elaboration and context reinstatement. <i>Journal of Applied Psychology</i> , 87, 1077-1085.	<ul style="list-style-type: none"> • 72 4-6-year olds MCR, narrative elaboration, combined MCR and narrative elaboration, and a control condition, at a 7-9 day delay.	In the control condition, participants played a memory game, then were given standard free recall instructions (two open-ended prompts given in all interview conditions). MCR and narrative elaboration led to similar numbers of correct details reported in free recall, both greater than combined MCR and narrative elaboration and control (which did not differ from each other); errors were so few in all conditions that they precluded statistical analyses.
Dietze, P. M., & Thomson, D. M. (1993). Mental reinstatement of context: A technique for interviewing child witnesses. <i>Applied Cognitive Psychology</i> , 7, 97-108.	<ul style="list-style-type: none"> • 6-year olds • 11-year olds • Adults Participants were interviewed with free recall (told to report everything they could remember about the film), MCR, or specific questions	MCR and specific questions led to reporting of more correct information than free recall (adults reported more than 11-year olds, who reported more than 6-year olds; there was no interaction of age and interview). Specific questions led to more errors of commission (although there was no effect of interview for the 6-year olds on this variable). However, 6-year olds and adults had higher relative accuracy rates than 11-year olds, and relative accuracy rates were higher in free recall and context reinstatement (which did not differ) than for specific questions.

- Hammond, L., Wagstaff, G. F., & Cole, J. (2006). Facilitating eyewitness memory in adults and children with context reinstatement and focused meditation. *Journal of Investigative Psychology and Offender Profiling*, 3, 117-130.
- Hayes, B. K., & Delamothe, K. (1997). Cognitive interviewing procedures and suggestibility in children's recall. *Journal of Applied Psychology*, 82, 562-577.
- 64 11-12-year olds
 - 62 adults
- Compared MCR with *Focused Meditation* and a control group, on responses to a questionnaire including 5 open-ended questions and 10 closed questions.
- 64 5-7-year olds
 - 64 9-11-year olds
- Children watched a videotaped story and were then given misleading or neutral information about the story. Children were interviewed 3-days later with free- and cued-recall instructions in either a standard interview (consisting of a prompt to report what the child remembered, followed by clarification questions) or a cognitive interview (consisting of MCR and report all instructions) condition.
- Participants interviewed with MCR recalled a greater number of correct details in free recall compared to Focused Meditation and both these groups recalled more correct details than controls. There were no differences for any of the groups on incorrect details in response to open-ended questions. Participants in the MCR condition provided more correct responses to closed questions than participants in the Meditation condition, and both groups again provided more correct responses than controls. Adults differed from children only on correct responses in free recall.
- Children interviewed with the Cognitive Interview reported a greater number of correct items than children in the standard interview; there was an interaction of age and interview condition such that the difference between the two interview conditions was greater for the older children than the younger children. There was no difference between the two interview conditions in terms of suggestibility (i.e., reporting of incorrect information was greater for misled children, regardless of interview condition). However, children interviewed with the CI had a greater number of confabulations than children in the standard interview condition. There were no effects of interview for specific questions.

- Holliday, R. E. (2003a). The effect of a prior cognitive interview on children's acceptance of misinformation. *Applied Cognitive Psychology, 17*, 443-457.
- 4-5-year olds
 - 9-10-year olds
- Children participated in an event and were interviewed the next day with a Cognitive (including MCR, report all and change order mnemonics) or Memorandum Interview; the interview was followed with an event summary containing misleading information. Children were interviewed again the subsequent day and asked forced-choice cued-recall tests (about correct, suggested or novel details).
- 4-year olds
 - 8-year olds
- Similar methodology to Holliday (2003a); control interview was a Structured interview (open-ended, specific and closed questions asked in response to free-recall information provided by children).
- 104 4-5-year olds
- Several variations of a Cognitive Interview, including MCR but in combination with other mnemonics only, and a structured control interview.
- Holliday, R. E., & Albon, A. J. (2004). Minimising misinformation effects in young children with cognitive interview mnemonics. *Applied Cognitive Psychology, 18*, 263-281.
- The free recall phase of the Cognitive Interview led to the greatest number of correct details, and more correct information about people, actions and objects. The Cognitive Interview did not provide an advantage in terms of reducing reports of suggested misinformation. Children were equally accurate for recall in both interview conditions, although recall was more complete in the Cognitive Interview.
- The Cognitive Interview led to more complete reports, greater number of correct details, more object, person, location and action details, reduced reporting of self-generated misinformation and led to greater correct rejection of self-generated misinformation. Cognitive Interview largely provided an advantage in free recall. There was no increase in incorrect details with the Cognitive Interview.
- The Cognitive Interview led to more correct details and reduced reporting of misinformation, including in the MCR in combination with *report all* instruction condition.

- Larsson, A. S., Granhag, P. A., & Spjut, E. (2003). Children's recall and the cognitive interview: Do the positive effects hold over time? *Applied Cognitive Psychology, 17*, 203-214.
- McCauley, M. R., & Fisher, R. P. (1995). Facilitating children's eyewitness recall with the revised cognitive interview. *Journal of Applied Psychology, 80*, 510-516.
- Milne, R., & Bull, R. (2002). Back to basics: A componential analysis of the original cognitive interview mnemonics with three age groups. *Applied Cognitive Psychology, 16*, 743-753.
- 49 10-11-year olds
 - Children were interviewed with the CI or a structured interview, at either a 7-day or 6-month delay. The difference between the CI and the SI in this study was that the CI included MCR and report all instructions, while the SI did not.
 - 86 2nd Grade children
 - Children were interviewed twice with a standard interview or the revised Cognitive Interview. One interview occurred 3 hours after the event and the second interview took place after a 2-week delay.
 - 47 5-6-year olds
 - 44 8-9-year olds
 - 34 1st-year Undergraduates
 - Compared CI mnemonics individually, report all and MCR in combination, and a control interview.
- Children interviewed with the CI recalled more correct information at both delays; there was no difference between the two interview conditions for incorrect information. Children interviewed with the CI provided more complete reports (as a proportion of correct details to total details found in the to-be-remembered event) and more accurate reports (accuracy calculated as a proportion of correct information to total information reported) than children interviewed with the SI.
- In the standard interview, participants were asked to report what they remembered about the event, and were prompted for further information with open-ended questions. Participants who received a Cognitive Interview at the second interview recalled more correct details than those who received a standard interview, regardless of the interview type at the first interview. At the second interview, the CI did lead to a greater number of errors than the SI; however accuracy rates were similar between the two interview conditions. Children who were interviewed with the Cognitive Interview both times reported more unique accurate facts than children who were interviewed with a standard interview on both occasions.
- Participants had an initial free-recall attempt; the second free-recall phase introduced the manipulation; thus, the control was to ask the participants to "try again" to recall what they can. Each mnemonic was equally effective (in terms of correct, incorrect or confabulated details and accuracy rates) and not better in terms of amount of recall than the control interview. The combination of report all and MCR led to more correct recall relative to all the individual mnemonics except MCR, which was similar. Additionally, the mnemonics were similarly effective for all age groups.

Milne, R., & Bull, R. (2003). Does the cognitive interview help children to resist the effects of suggestive questioning? *Legal and Criminological Psychology, 8*, 21-38.

84 8-10-year olds
Children were interviewed with a Cognitive Interview or a structured interview (taken from the *Memorandum of Good Practice* guidelines). Suggestive questions were included either before or after the interview.

Cognitive Interview led to reporting of more correct details about people and actions; reporting of incorrect information did not increase (accuracy rates were similar in both interview conditions). The advantage of the Cognitive Interview occurred during the questioning phase of the interview (there was no difference between interviews in the free-recall or second retrieval phases). The Cognitive Interview also enabled children to resist suggestive questions, especially for script-consistent suggestive questions.

Table 2

Distribution of Participants by Gender, Age and Condition.

Age in Years	Condition	Gender		Total
		Female	Male	
4	MCR	4	3	$n = 7$
	Control	4	4	$n = 8$
5	MCR	6	4	$n = 10$
	Control	6	5	$n = 11$
6	MCR	2	4	$n = 6$
	Control	1	3	$n = 4$

Table 3

A Side-by-Side Comparison of the Differences in Prompts Between the MCR and Control Interviews.

	MCR Interview *	Control Interview *
Rapport Building	Same in both conditions.	
Practice (Free-recall about a specific instance of an autobiographical repeated event, in order to provide children with practice with the prompts to be used in the Specific Narrative phase of the interview.)	<p>“Your parents told me that you _____, so in a minute I’m going to ask you to tell me what you remember about when you _____. I wasn’t there when you _____, and I’d really like to hear all about it. Think really hard about everything that happened when you _____. I’d like to hear every little detail, so don’t leave anything out. Think about where you were there again. Think about picture in your mind, and [pause]...Now keep that picture in your mind, and tell me everything you remember about when you _____, from the very beginning to the very end.”</p>	<p>“Your parents told me that you _____, so in a minute, I’d like you to tell me what you remember about when you _____. I wasn’t there when you _____, and I’d really like to hear all about it. Think really hard about everything that happened when you _____. I’d like to hear every little detail, so don’t leave anything out. Tell me everything you remember about when you _____, from the very beginning to the very end.”</p>
Specific Narrative (Free-recall about the last occurrence of the Laurier Activities.)	<p>“Now it’s time to talk about the Laurier Activities. Remember, I wasn’t there when you did the Laurier Activities and it’s really important that I know what happened. There are no right or wrong answers, I’d just like to know what you remember. So in a minute I’m going to ask you to tell me what you remember, but first I’d like you to close your eyes and think about the time you wore a _____ badge at the Laurier Activities, as if you were there again. Think about where you were the time you wore a _____ badge at the Laurier Activities [pause]...”</p>	<p>“Now it’s time to talk about the Laurier Activities. I’d like you to think really hard about everything that happened when you wore a _____ badge at the Laurier Activities. Remember, I wasn’t there when you did the Laurier Activities and it’s really important that I know what happened. There are no right or wrong answers, I’d just like to know what you remember. I’d like to hear every little detail, so don’t leave anything out. Tell me everything you remember about the _____ badge time at the Laurier Activities, from the very beginning to the very end.”</p>
Focused/Temporal Questions; Closure	Same in both conditions.	

* See Appendices D (MCR) and E (Control) for the complete Interview Protocols.

Table 4

Total Number of Items, Instantiations and Accurate Instantiations Reported in Free Recall by Age and Condition.

Age in Years	Condition	Items	Instantiations	Accurate Instantiations
	MCR, $n = 7$	1.00 (1.00)	2.29 (2.29)	1.14 (1.46)
4	Control, $n = 8$	1.25 (.71)	4.13 (2.59)	1.38 (1.41)
	Total, $n = 15$	1.13 (.83)	3.27 (2.55)	1.27 (1.39)
	MCR, $n = 10$	1.50 (1.08)	5.70 (2.36)	1.90 (.99)
5	Control, $n = 11$	1.82 (1.47)	5.64 (3.56)	1.73 (1.56)
	Total, $n = 21$	1.67 (1.28)	5.67 (2.99)	1.81 (1.29)
	MCR, $n = 6$	2.33 (1.37)	6.50 (2.66)	2.17 (1.17)
6	Control, $n = 4$	1.50 (1.91)	5.25 (2.50)	3.50 (1.91)
	Total, $n = 10$	2.00 (1.56)	6.00 (2.54)	2.70 (1.57)

Note: standard deviations are in parentheses.

Table 5

Mean distance from Target Instantiation when Internal Intrusion Errors Made in Free Recall by Age and Condition.

Age in Years	Condition	Mean Distance
	MCR, $n = 6$	1.33 (1.21)
4	Control, $n = 8$	1.79 (.46)
	Total, $n = 14$	1.59 (.86)
5	MCR, $n = 10$	2.11 (.39)
	Control, $n = 11$	1.79 (.85)
	Total, $n = 21$	1.94 (.67)
6	MCR, $n = 6$	1.74 (.44)
	Control, $n = 4$	1.88 (1.44)
	Total, $n = 10$	1.70 (.89)

Note: standard deviations are in parentheses.

Table 6

Total number of Accurate, Internal Intrusions, Don't Know, Other and External Intrusion Responses to Focused Questions by Age and Condition.

Age in Years	Condition	Accurate	Inaccurate	Don't Know	Other	External
4	MCR, <i>n</i> = 7	4.43 (2.94)	5.29 (1.98)	3.43 (3.82)	2.29 (2.22)	1.57 (2.88)
	Control, <i>n</i> = 8	3.63 (1.30)	6.50 (2.33)	2.75 (3.11)	3.00 (2.07)	1.13 (1.73)
	Total, <i>n</i> = 15	4.00 (2.17)	5.29 (1.98)	3.43 (3.82)	2.29 (2.21)	1.33 (2.26)
	MCR, <i>n</i> = 10	3.10 (1.73)	6.50 (2.68)	2.50 (3.98)	3.90 (3.14)	.90 (.99)
5	Control, <i>n</i> = 11	3.82 (1.99)	6.27 (2.53)	1.64 (2.11)	3.82 (2.18)	1.46 (1.37)
	Total, <i>n</i> = 21	3.48 (1.86)	6.38 (2.54)	2.05 (3.09)	3.86 (2.61)	1.19 (1.21)
	MCR, <i>n</i> = 6	4.00 (1.79)	6.33 (4.41)	3.83 (5.19)	1.67 (1.75)	1.17 (1.60)
6	Control, <i>n</i> = 4	5.25 (3.40)	4.75 (2.87)	2.25 (1.26)	3.00 (.82)	1.75 (2.22)
	Total, <i>n</i> = 10	4.50 (2.46)	5.70 (3.77)	3.20 (4.02)	2.20 (1.55)	1.40 (1.78)

Note: standard deviations are in parentheses.

Table 7

Mean Distance from Target Instantiation when Internal Intrusion Errors Made in Focused Questions, by Age and Condition.

Age in Years	Condition	Mean Distance
	MCR, $n = 7$	1.86 (.44)
4	Control, $n = 8$	1.70 (.43)
	Total, $n = 15$	1.77 (.43)
	MCR, $n = 10$	1.96 (.29)
5	Control, $n = 11$	1.95 (.39)
	Total, $n = 21$	1.95 (.34)
	MCR, $n = 6$	1.92 (.38)
6	Control, $n = 4$	1.78 (.57)
	Total, $n = 10$	1.86 (.44)

Note: standard deviations are in parentheses.

Table 8

Results of ANOVAs for Accurate Responses to Temporal Questions.

Temporal Question	Source	Results
Question 1	Age	$F_{(2,25)} = .03, p = .97, \eta_p^2 = .002$
	Condition	$F_{(1,25)} = .00, p = 1.00, \eta_p^2 = .00$
	Age x Condition	$F_{(2,25)} = .09, p = .92, \eta_p^2 = .007$
Question 2	Age	$F_{(2,27)} = .09, p = .92, \eta_p^2 = .006$
	Condition	$F_{(1,27)} = 1.87, p = .18, \eta_p^2 = .07$
	Age x Condition	$F_{(2,27)} = .33, p = .72, \eta_p^2 = .02$
Question 3	Age	$F_{(2,40)} = 1.21, p = .31, \eta_p^2 = .06$
	Condition	$F_{(1,40)} = .01, p = .91, \eta_p^2 = .00$
	Age x Condition	$F_{(2,40)} = .67, p = .52, \eta_p^2 = .03$
Question 4	Age	$F_{(2,40)} = .27, p = .76, \eta_p^2 = .01$
	Condition	$F_{(1,40)} = .09, p = .76, \eta_p^2 = .002$
	Age x Condition	$F_{(2,40)} = 2.45, p = .10^*, \eta_p^2 = .11$

* Note: Because this is the only test approaching significance for temporal questions, it is most likely Type II error.

Appendix A

A list of all items included in the Laurier Activities and their possible instantiations.

No.	Item	Set A	Set B	Set C	Set D
1	Children sit on	Number square	Blue mat	Garbage bag	cardboard
2	Cloak of leader	Red	Yellow	Blue	Green
3	Noisy animal	Polar Bear	Penguin	Walrus	Seal
4	Warm-up activity	Wiggle fingers	Touch toes	jump	Dance
5	Source of story	Leader wrote	Cupboard	Internet	Library
6	Content of story	Dog in City	Winter	Party	Boat
7	Bookmark	Pink heart	Black triangles	Orange circles	Purple squares
8	Clown Puzzle	Tightrope	Unicycle	Juggling	Car
9	Music for relaxing	Ocean	Rain	Birds	Heartbeat
10	Body part relaxed	Legs	Nose	Stomach	Arms
11	Refresh with	Paper fans	Baby wipes	Water	Hand sanitizer
12	Theme of Magnets	Airport	Dinosaur	Farm	Construction
13	Magnets in	Box	Purse	Envelope	Jar
14	Objects Hidden	Flowers	Frogs	Cars	Tambourines
15	Put Objects Under	Blanket	Umbrella	Pillow Case	T-shirt
16	Put Objects Away	Hat	Cookie tin	Lunchbox	Egg Carton
17	Leader's Next stop	Movie	Walking a dog	Birthday party	Visit friend
18	Badge				Jellybean *

** Note that the jellybean badge will only be included in the last occurrence of the Laurier Activities, regardless of set counterbalancing order.*

Appendix B

Script of the Laurier Activities for Group One, Session One (Set C). Unique instantiations indicated in bold, italicized font.

1. Preparing the children for the Laurier Activities

- Say “Hi my name is [RA name]. Who knows the first letter of my name? “That’s right. My name is _____ and the first letter of my name is ‘___.’”
- Tell them the following: “I’ve brought you together to do something special with me now. We’re going to do the Laurier Activities. Can you say that word for me again?”..... (Children repeat “Laurier Activities”). Put up the ‘L for Laurier’ Poster on the wall just behind you so that the children can see it during the activities.
- Say “The first thing we’re going to do today is sit down on garbage bags. Hand out the **garbage bags** and instruct children to sit on them (one bag per child). Say “When you get your garbage bag, put it on the floor in front of me and sit on it.”
- Put on the **blue** cloak. Tell children “There’s only one Laurier cloak and I get to wear it because I’m the leader of the Laurier Activities. I get to tell you what to do”.
- Tell the children that **Jo’s** feeling very tired today. “I was hoping that Jo the Fox would join us today in the Laurier activities but he just wants to say hello. He says he’s tired because **Mrs. Walrus** kept him up all night. Have you seen a walrus before?”
- Put the walrus next to the ‘L for Laurier’ poster. “I’ll put the walrus here next to the ‘L for Laurier’ poster. Well the walrus stayed over last night and he kept Jo up all night. Guess what he was doing? **Laughing**. Can you make the sound of a walrus laughing? Very annoying when you’re trying to sleep. So you better say a quick hello to Jo cause he’s going to go back to sleep. Say goodbye Jo.”

2. Pre-story

- Give the following instructions: “Before we do the story we are going to get warmed-up. I’d like you to stand up and **jump up and down on the spot** while I count to 10. When I’ve said 10, I want you to sit down and make sure your mouths are closed tightly, ready for the story.”

3. Introduce story

- Say “Today’s story is about **a twins’ birthday party!** I got this story from the **internet!** I really like using bookmarks, so I’m going to use this bookmark with big **orange circles.**”

4. Puzzle time

- Say “Now it’s time to do a puzzle. There’s only one puzzle and you all get to help me put it together. We’ve got to try to put the puzzle together so that it makes a funny clown. See if you can tell me what the clown is doing.” RA helps children put puzzle together. Clown is **juggling**.

5. Relaxation activity

- “It’s now time to do the resting part of the Laurier Activities. I’d like you all to lie down on your backs (legs stretched out straight) and close your eyes and keep them closed and just listen to me.”
- Turn on the tape labelled **birds**.
- Read the following very slowly and calmly making sure that the children have their eyes closed and are quiet:
“I’d like you to keep your eyes closed and remain very calm and quiet now while we all rest. While we rest I’d like you all to think about being in a big bird house. Think about how beautiful the songs of the **birds** sound..... As you are resting, think about what it would be like to be a bird

making peaceful beautiful songs all day... and as you think about the beautiful songs of the birds, I want you to try to relax your *stomachs*... think about how relaxed your stomachs feel when you hear about how peaceful those birds sound...As you breath calmly and slowly, think about how relaxed your stomachs feel...as the birds sing their songs.... Think about how warm and restful your stomachs feel as I come round and gently touch your stomachs to see if they're soft and warm."

- RA walks around to one child at a time touching their stomach's saying "Does your stomach feel soft and warm _____ (child's name)?" Encourage children to respond with 'Yes'.
- Finish by saying "Now keep your eyes closed while I count slowly to three. When I get to three, open your eyes and sit up. One....Two.....Three....."

6. Getting refreshed

- Say "The next thing to do during the Laurier activities is to make sure that you're all refreshed. It's important to feel refreshed after you've had a rest. Today you all get to refresh yourselves with some *water*." Give glass of water to each child and then throw them away.

7. Magnetic Scene

- Bring out *envelope* containing *farm* magnets. Say "Now it's time for us to make a picture with some magnets." Hold *envelope* and choose each child at a time to come and get a magnet.
- Once everyone has their magnet say: "I brought this book with me today to help us make a picture with our magnets. So let's work together and make a nice picture." Picture is a *farm*.

8. Counting Objects

- Bring out *cars*. Say "I brought some toy cars with me today, but I am not sure how many I brought. Can you please help me count how many cars I brought with me? (*count the cars*)"
- Say "Okay, great job. Now I'm going to put the cars under this *pillowcase* that I brought. Then I am going to take some away and I want each of you to guess how many cars are left under my *pillowcase*. (*Let the children guess*).
- Once everyone has had a chance to guess, count the cars again and say: "Okay, well the Laurier Activities are almost over, so I am going to need your help putting the cars away in this *lunchbox* that I brought."

9. Packing up time and going back to classroom area

- Say "Who can remember what my name is?" Let children answer. "That's right, you remembered that my name is _____."
- Say "Well that's the end of the Laurier Activities for today. Time to pack up. We have to pack up very quickly because I have to go to a *friend's birthday party*! She invited me to her birthday party, so it should be fun!"
- Say "Can you please give me your *garbage bags*?"
- Say "Well, we are all finished for today. I had a lot of fun. I hope you had fun too. Thank you very much for doing the Laurier activities with me today."

Appendix C

Focused and Temporal questions that all children will be asked.

Specific, Focused Questions

1. What did you sit on the time you had the jellybean badge?
2. What colour was the leader's cloak the time jellybean badge?
3. What noisy animal woke the fox up the time jellybean badge?
4. What activity did you do to warm-up the time jellybean badge?
5. I heard that the leader talked about where she got the story from. Where did she get the story from the time jellybean badge?
6. What was the story about the time jellybean badge?
7. What did the bookmark look like the time jellybean badge?
8. What was the puzzle about the time jellybean badge?
9. What did you listen to when you relaxed in the time jellybean badge?
10. What part of your body did the teacher tell you to relax in the time jellybean badge?
11. What did you use to get refreshed with in the time jellybean badge?
12. What picture did you make with the magnets in the time jellybean badge?
13. What did you pick the magnets out of the time jellybean badge?
14. Where was the leader going after the LA in the time jellybean badge?
15. What toys did you count in the time jellybean badge?
16. What did the leader hide the toys under the time jellybean badge?
17. What did the leader put the toys away in the time jellybean badge?

Temporal Questions

- Yes Bias Question: “Did you [instantiation that never occurred in the event sessions; e.g., “sit on a beanbag chair”] at the Laurier Activities?” (Not analyzed.)
- 1. Landmark Questions:
 - Before Event:* “A little while ago it was [event/holiday that happened before target occurrence of the Laurier Activities]. Do you remember [before event]? Tell me a little bit about what you did for [before event]. Was [before event] before or after the time you wore a jellybean badge at the Laurier Activities?”
 - After Event:* “A little while ago it was [event/holiday that happened after target occurrence of the Laurier Activities]. Do you remember [after event]? Tell me a little bit about what you did for [after event]. Was [after event] before or after the time you wore a jellybean badge at the Laurier Activities?”
- 2. Series Questions:
 - First Instantiation:* “Do you remember [first instantiation of an item; e.g., sitting on cardboard] at the Laurier Activities? Did the time you wore a jellybean badge happen before or after the time you [sat on cardboard]?”
 - Last Instantiation:* “Do you remember [last instantiation of an item; e.g., sitting on a garbage bag] at the Laurier Activities? Did the time you wore a jellybean badge happen before or after the time you [sat on a garbage bag]?”
- Block Task: Children are given four blocks of different colours, and asked to put them in a row indicating which comes first, second, third and fourth in the row. (Not analyzed.)

3. Position Judgments: Children are shown photos of all four instantiations of one of the items in a random order. The child is then asked in random order “which one came first/second/third/last in the Laurier Activities?”
4. Temporal Order: Children are shown photos of all four instantiations of one of the items in a random order. The child is then asked to put the pictures in a row with “the first one that happened at the Laurier Activities here, the second one that happened here, the third one that happened here, and the last one that happened here.” (RA points to a spot on the table corresponding with where s/he would like each photo placed.)

** Note that the order in which the specific questions and the order in which the temporal questions are asked will both be counterbalanced. Further, within the temporal questions, the order in which before/after and first/last instantiations are asked will also be counterbalanced.*

Appendix D

MCR Interview Protocol.

The interview is divided into 5 sections:

- PT1: Rapport Building (2 minutes approximate)
- PT2: Practice/MCR Instructions (8 minutes maximum)
- PT3: Target Narrative about final occurrence (15 minutes maximum)
- PT4: Specific and Temporal questions (5 minutes approx)
- PT5: Closure

These times are recommended only, except that the times for the narratives cannot exceed the maximum time-frames.

PT 1 (Rapport Building; 2 minutes approximate):

Hi! My name is _____, and it's my job is to find out what children remember about things. I heard that you did the Laurier Activities. I wasn't there when you did the Laurier Activities and so I don't know what happened and I'd really like to hear what happened when you did the Laurier Activities. But first I'd like to get to know you a little better. Tell me some things about yourself.

Sample Prompts:

- Tell me what kinds of things you like to do.
- Tell me about your friends/family.

PT 2 (Practice; 8 minutes maximum):

Your parents told me that you _____ [last occurrence of repeated event provided by parent], so in a minute I'm going to ask you to tell me what you remember about the last time you _____. I wasn't there the last time you _____, and I'd really like to hear all about it. But first I'd like you to close your eyes, and think about the last time you _____ as if you were there again. Think about where you were [pause]. Sometimes we see things when we _____; think about whether you saw anything [pause]. Sometimes we hear things when we _____; think about whether you heard anything [pause]. Think about how you felt when you _____ [pause]. Now keep that picture in your mind, and tell me everything you remember about when you _____, from the very beginning to the very end.

The pauses between phrases are very important! Take your time going through the instructions so that the child has adequate time to mentally recreate the event.

Prompt children for further information with open-ended prompts such as:

- Tell me what else happened.
- Tell me more about _____ (something mentioned by child).
- What happened next / after that?

You should also encourage children to stop and mentally recreate the event again throughout the interview, particularly if they aren't providing very much information, or after they say they don't remember anything else:

- Ok, close your eyes again and think about when you _____ (something mentioned by the child). Think about what was happening when you [_____ **important – be sure to use the *same* wording as the child **]. Think about how you felt when you [_____].
Ensure that each child hears the full MCR instructions repeated at least once: Ok, close your eyes again and think about the time you _____. Think about whether you saw anything that time [pause]. Think about whether you heard anything that time [pause]. Think about how you felt. Now keep that picture in your mind, and tell me everything else you remember about when you _____.

PT 3 (Target Narrative; 15 minutes maximum):

Initial Prompt: “Now it’s time to talk about the Laurier Activities. Remember, I wasn’t there when you did the Laurier Activities and it’s really important that I know what happened. There are no right or wrong answers, I’d just like to know what you remember. So in a minute I’m going to ask you to tell me what you remember, but first I’d like you to close your eyes and think about the time you wore a jellybean badge at the Laurier Activities, as if you were there again.

Think about where you were the time you wore a jellybean badge at the Laurier Activities [pause]. Sometimes we see things; think about whether you saw anything that time [pause]. Sometimes we hear things; think about whether you heard anything [pause]. Think about whether there was anybody else there with you [pause]. Think about how you felt that time [pause]. Now keep that picture in your mind, and tell me everything you remember about the jellybean badge time, from the very beginning to the very end.

The pauses between phrases are very important! Take your time going through the instructions so that the child has adequate time to mentally recreate the event.

Prompt children for further information with open-ended prompts such as:

- Tell me what else happened.
- Tell me more about _____ (something mentioned by child).
- What happened next / after that?

You may also encourage children to stop and mentally recreate the event again if they aren't providing you with much information, or if they say they don't remember anything else.

- Ok, close your eyes again and think about when you _____ (something mentioned by the child; e.g., the puzzle). Think about what was happening when you [saw the puzzle, made the puzzle, etc. **important – be sure to use the *same* wording as the child **]. Think about how you felt when you [saw / made...the puzzle].

Ensure that each child hears the full MCR instructions repeated at least once: Ok, close your eyes again and think about the time you wore a jellybean badge at the Laurier Activities. Think about whether you saw anything that time [pause]. Think about whether you heard anything that time [pause]. Think about how you felt. Now keep that picture in your mind, and tell me everything else you remember about the jellybean badge time.

Providing Encouragement

Note that this narrative section can be tiring for the child so give the child some reinforcement for the process where needed: “You’ve told me a lot about the Laurier Activities and I understand it much better now”, “You’re being very helpful”, “I can see that you’ve been thinking hard”.

PT 4 (specific and temporal questions)

“You’ve sure told me a lot about the Laurier Activities. Now I have a few more questions to ask you, and you may have already told me some of these things, but I just need to make sure I understand everything about the Laurier Activities.”

PT 5 (closure):

“You’ve really told me an awful lot about what happened when you did the Laurier Activities. Thank you for talking to me. You were very helpful.”

Appendix E

Control Interview Protocol.

The interview is divided into 5 sections:

- PT1: Rapport Building (2 minutes approximate)
- PT2: Practice (Control; 8 minutes maximum)
- PT3: Specific Narrative about one of the occurrences (15 minutes maximum)
- PT4: Focused and Temporal questions. (5 minutes approx)
- PT5: Closure

These times are recommended only, except that the times for the narratives cannot exceed the maximum time-frames. Note that you should ensure that each section is approximately as long as the recommended times, in order to keep the control interviews similar in length to the other interviews.

PT 1 (Rapport Building; 2 minutes approximate):

Hi! My name is _____, and it's my job is to find out what children remember about things. I heard that you did the Laurier Activities. I wasn't there when you did the Laurier Activities and so I don't know what happened and I'd really like to hear what happened when you did the Laurier Activities. But first I'd like to get to know you a little better. Tell me some things about yourself.

Sample Prompts:

Tell me what kinds of things you like to do.

Tell me about your friends/family.

PT 2 (Practice; 8 minutes maximum)

Your parents told me that you _____ [last occurrence of repeated event provided by parent], so in a minute, I'd like you to tell me what you remember about the last time you _____. I wasn't there the last time you _____, and I'd really like to hear all about it. Think really hard about everything that happened the last time you _____. I'd like to hear every little detail, so don't leave anything out. Tell me what you remember about the last time you _____, from the very beginning to the very end.

Be sure to provide children with encouragement throughout the narrative, and ask them to think hard so that they are motivated to provide you with lots of information. Prompt children for further information with open-ended prompts such as:

- Tell me what else happened.
- Tell me more about _____ (something mentioned by child).
- What happened next / after that?

Repeat the instructions at least once during the narrative: "Think really hard about everything that happened the last time you _____, I'd like to hear every little detail so don't leave anything out. Tell me what else you remember about the last time you _____, from the very beginning to the very end.

PT 3 (Specific Narrative):

“Now it’s time to talk about the Laurier Activities. I’d like you to think really hard about everything that happened when you wore a jellybean badge at the Laurier Activities. Remember, I wasn’t there when you did the Laurier Activities and it’s really important that I know what happened. There are no right or wrong answers, I’d just like to know what you remember. I’d like to hear every little detail, so don’t leave anything out. Tell me everything you remember about the jellybean badge time at the Laurier Activities, from the very beginning to the very end.”

Be sure to provide children with encouragement throughout the narrative, and ask them to think hard so that they are motivated to provide you with lots of information. Prompt children for further information with open-ended prompts such as:

- Tell me what else happened.
- Tell me more about _____ (something mentioned by child).
- What happened next / after that?

Repeat the instructions at least once during the narrative: “Think really hard about everything that happened the time you wore a jellybean badge at the Laurier Activities, I’d like to hear every little detail so don’t leave anything out. Tell me what else you remember about the jellybean badge time, from the very beginning to the very end.”

Providing Encouragement

Note that this narrative section can be tiring for the child so give the child some reinforcement for the process where needed: “You’ve told me a lot about the Laurier Activities and I understand it much better now”, “You’re being very helpful”, “I can see that you’ve been thinking hard”.

PT 4 (specific and temporal questions)

“You’ve sure told me a lot about the Laurier Activities. Now I have a few more questions to ask you, and you may have already told me some of these things, but I just need to make sure I understand everything about the Laurier Activities.”

PT 5 (closure):

“You’ve really told me an awful lot about what happened when you did the Laurier Activities. Thank you for talking to me. You were very helpful.”