The Influence of Another’s Perspective on Children’s Recall of Previously Misconstrued Events

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Children’s abilities to reframe their memories of events after hearing another child’s perspective of the same events were examined, and links between memory reframing, cognitive ability, and social competence were explored. Nine- to 11-year-olds (N = 79) were told to imagine that the events in a narrated story happened to them. Next, they heard another story that described either the same events (experimental condition) or unrelated events (control condition) from another child’s perspective. The children in the experimental group reframed their memories in light of the alternative perspective, whereas the children in the control condition did not. Children with higher cognitive scores had higher memory reframing scores and received higher social competence ratings than children with lower cognitive scores.

Keywords: cognitive ability, constructive memory processes, perspective, children, social competence

Both children and adults are frequently exposed to points of view that conflict with their own interpretations and memories of events. For example, an individual might interpret a friend’s behavior as unfriendly if she or he called out to the friend across a crowd and the friend failed to respond. However, the individual might later learn that the friend had lost her contact lenses and was unable to see her or him. A socially competent person might reconstruct her or his existing memory of the event with the new information that the friend probably did not see her or him. In spite of the fact that this sort of social experience is quite common, very little is known about the development of children’s abilities to understand and integrate another person’s perspective in memory. Research on perspective taking (e.g., Selman, 1980), however, suggests that this ability might emerge during late childhood. The current study is an initial attempt to examine elementary-school-age children’s abilities to reconstruct their recall of a series of social events involving another person to accommodate new information about the events from the other person’s perspective.

This study is grounded in the literature on constructive memory processes, which illustrates that condensation, elaboration, and invention are common features of the remembering process. There is considerable evidence that the encoding, storage, and retrieval of episodic information are frequently guided and organized by prior knowledge, attitudes, and goals (e.g., Greenhoot, 2000; Kuhn, 2000; Ornstein et al., 1998; Paris & Lindauer, 1977; Schacter, Norman, & Koutstaal, 1998). Much of this research has focused on social knowledge, illustrating that both children’s and adults’ understanding of the social world influences the way they interpret and remember their experiences with other people (Averhart & Bigler, 1997; Corenblum, 2003; Greenhoot, 2000; Leichtman & Ceci, 1995; Signorella, Bigler, & Liben, 1997). Another important finding in the constructive memory literature is that memories are dynamic and change over time. As Paris and Lindauer (1977) have noted, people typically “retrieve, rehearse, reorganize and recomprehend experiences many times” (p. 57). Consistent with this argument, a considerable amount of research has shown that new details or changes in knowledge or perspective attained after an event occurs can affect how memories are reorganized, recompounded, and reported (e.g., Gabbert, Memon, & Allan, 2003; Greenhoot, 2000; Ross, 1997; Ross & Wilson, 2000; Stein & Albro, 2001). For instance, a large literature on suggestibility and misinformation effects shows that information that children and adults attain after an event is initially encoded can affect later recall (for a review, see Bruck & Ceci, 1999), although there is disagreement over whether postevent information leads to the actual reconstruction of the initial memory representation (e.g., Bruck, Ceci, Francoer, & Barr, 1995; Gabbert et al., 2003; Loftus & Loftus, 1980; McClusky & Zaragoza, 1985). Changes in general knowledge or attitudes can also prompt both children and adults to reconstruct their memory reports, and perhaps their underlying
memory representations, to be consistent with the newly acquired information (Greenhoot, 2000; Ross, 1997; Ross & Wilson, 2000).

Most relevant to the current study are a number of experiments demonstrating that changes in perspective that occur after encoding can influence later recall (e.g., R. C. Anderson & Pichert, 1978; R. C. Anderson, Pichert, & Shirey, 1983; Borland, Flammer, & Wearing, 1987; Tversky & Marsh, 2000). For example, in their classic research using perspective shift manipulations, Anderson and colleagues (R. C. Anderson & Pichert, 1978; R. C. Anderson et al., 1983) asked adults to read a story describing the contents of a house from the perspective of either a burglar or a homebuyer. After recalling the story once, participants were asked to recall the story again, this time from the alternative perspective. These shifts in perspective resulted in the recall of additional information that was consistent with the new perspective and the omission of information that was no longer relevant. The researchers concluded that the adoption of a particular perspective at recall activated a schema or a framework that guided retrieval processes independently of encoding processes.

To date, no studies have examined whether individuals reframe their recollections following the provision of a conflicting perspective that suggests they may have originally misconstrued the event. Research by Stein, Trabasso, and Liwag (1994) examined conflicting perspectives as sources of divergence between two people’s recollections of the same event and found that variations in what people remember about the same event are frequently the result of differences in the frames of reference used to guide the encoding of the event. One issue that was not addressed by Stein and her colleagues was whether the participants in their study might have altered their recollections after hearing the other person’s divergent perspective of what occurred. The constructive memory literature suggests that just as people reconstruct memories following a change in knowledge, attitudes, or beliefs, they might reconstruct their memories of an event following the provision of additional information about that event from another person’s perspective. Thus, a major goal of the current investigation was to examine whether children would revise their recollections of events in light of information provided from an alternative perspective.

Research on perspective-taking skills suggests that it is not until late childhood that children understand that people often have different perspectives that must be coordinated into an integrated and coherent representation of the event (Selman, 1980). Accordingly, for the present investigation we chose to examine children’s abilities to reframe a memory in response to another person’s perspective among 9- to 11-year-olds. Children listened to a story that described a series of target events involving several apparent social snubs by a fictional best friend. In the experimental condition, the children heard a second story that described the same series of events from the best friend’s perspective and were asked to recall the target events both before and after hearing the second story. To verify that changes in recall in the experimental condition reflected reframing of the memory in light of the friend’s perspective rather than changes due to the simple passage of time or retroactive interference from the second story, the recall of children in the experimental condition was compared with that of children in a control condition, in which Story 2 described a series of events unrelated to those described in Story 1. We expected that at the second interview, children in the experimental condition would show higher levels of integration of information from the two stories than children in the control condition. We also predicted that from Interview 1 to Interview 2, children in the experimental condition would have increased recall of positive behaviors by the friend and increased “constructive” recall (i.e., more elaborations) as they attempted to make sense of the events after hearing the best friend’s perspective.

Memory Reframing and Basic Cognitive Abilities

A second goal of this investigation was to examine sources of individual differences in children’s abilities to reframe existing memories in order to provide information about the basic cognitive processes that might support the development of this type of reconstructive activity. Given that the production of a narrative that integrates two different views of the same event requires that the individual hold both perspectives in working memory, compare the two views, and construct a combined or integrated recollection of the event, one obvious source of individual differences is working memory capacity. Consistent with this argument, research on text comprehension indicates that working memory capacity is related to both children’s and adults’ abilities to integrate ideas within a text, regardless of whether they read the written text or simply listen to it (e.g., Daneman & Carpenter, 1980, 1983; Oakhill, 1993; Oakhill, Cain, & Bryant, 2003). It seems likely then that working memory may also support children’s abilities to integrate ideas across stories, as in the current investigation.

Updating a memory in response to another person’s perspective also involves switching attention from one’s original interpretation of an event to a new interpretation offered by the alternative point of view. When information in working memory is no longer relevant and the focus of attention must be switched to new information, inhibitory attentional mechanisms are thought to remove or suppress irrelevant information from working memory and prevent the return of attention to it (e.g., M. C. Anderson, 2003; Bjork, 1989; Zacks & Hasher, 1994). Accordingly, inhibitory skills might also support children’s abilities to update a memory with information from another person’s perspective. Compared with children with poorer inhibitory skills, children with better inhibitory abilities should be more likely to reconstruct their recollections to reflect the alternative viewpoint because they are more successful at ignoring or “forgetting” their original interpretations.

Finally, there are reasons to believe that children’s abilities to produce a coherent event narrative that integrates two perspectives might be related to their language skills. First, researchers have suggested that the acquisition of complex language skills supports developmental increases in children’s narrative abilities, which in turn lead to increases in the complexity and organization of children’s memory representations (e.g., Fivush, 2001; Nelson, 2001). In addition, it has been argued that language development indirectly promotes the development of perspective-taking abilities. According to Nelson (2001) and Fivush (2001), as children’s developing language and narrative skills enable them to increasingly participate in conversations with others about past experiences, they develop an understanding that different experiential perspectives exist. These arguments suggest that when faced with two versions of the same set of events, children with more advanced language skills should be better able to consider both
perspectives and to construct more organized and cohesive memory narratives of the events than children with less advanced skills.

Social Competence and Memory Reframing

The final goal of this research was to examine the link between social competence and the ability to reconstruct memories in light of another person’s perspective. We were particularly interested in the quality of children’s social relations with peers, given that the primary focus of this research was to examine children’s memory for another person’s perspective. The ability to attend to and understand another’s perspective has been thought by other researchers to be related to social competence. For example, Piaget (1932) theorized that the ability to understand another’s perspective is the foundation of the human capacity to be social. How we remember events that involve conflicting perspectives is likely to play a role in our social competence with peers because we rely on our memories for others’ actions daily to understand the meaning of events and to respond appropriately. Both the cognitive literature and research on social information processing have suggested that people respond to the world they perceive by using their existing memories as frames of reference that guide their actions toward the achievement of social goals (e.g., Burks, Dodge, Price, & Laird, 1999; Burks, Laird, & Dodge, 1999; Stein et al., 1994; Zelli, Dodge, Lochman, & Laird, 1999). Thus, in the current study, children who reconstruct their initial misinterpretations of the friend’s behavior to reflect new information from the friend’s perspective might be more socially skilled in their interactions with peers than children who do not reconstruct their initial interpretations.

To summarize, in the present investigation we had three major goals: (a) to examine whether 9- to 11-year-old children reframe their recall of a series of events to incorporate new information about the events from another child’s perspective; (b) to determine whether these reconstructive memory processes are related to measures of basic cognitive abilities, including working memory ability, inhibitory skills, and verbal ability; and (c) to examine whether the children who reframe their recollections to accommodate another person’s perspective are better adjusted socially than children who do not reframe their memories. We addressed the last two goals simultaneously in a path model specifying that cognitive abilities would predict memory reframing, which in turn would predict social competence. Specifically, we used a variant of structural equation modeling called partial least squares, which is ideally suited for path analyses with small sample sizes. This methodology also permitted us to test the possibility of a direct link between cognitive abilities and social competence.

Method

Participants

Children enrolled in the 4th and 5th grades in a midsized midwestern city and the surrounding area were recruited by distributing letters and consent forms through schools and community centers and by placing an ad in a local monthly parents’ magazine. Parental consent was obtained for 84 children. Five of these children were dropped from the final sample because of experimenter error (n = 1), because they were younger than the target age range (n = 2), or because they failed to complete all of the testing (n = 2). Thus, the final sample consisted of 79 children, 38 girls and 41 boys. Seventy-one percent of the children in the sample were Caucasian, 6% were African American, 6% were Hispanic, 4% were Asian American, and 13% were Native American. The children came from diverse socio-economic backgrounds. Family yearly income ranged from $5,000 to more than $200,000, with a mean yearly income of $61,740. Twenty-seven percent of the families reported receiving an Earned Income Tax Credit, and 14% reported receiving food stamps. Twenty-eight percent of the families were headed by mothers only, and 3% of the families were headed by fathers only. Fifty-three percent of the mothers had a bachelor’s degree or higher, and 44% of the fathers had a bachelor’s degree or higher.

Procedure

The children were randomly assigned to either the experimental or the control condition. In the final sample, the experimental group had 41 participants, and the control group had 38 participants. The children were assessed one time, either in their homes (n = 38) or in a lab (n = 41). Parents selected the testing location, and equal proportions of participants in the control and experimental groups were tested in the lab and home locations. In both locations, distractions were minimized by interviewing the child in a quiet room. A babysitter was present when needed to keep siblings from interrupting the testing session. All sessions were videotaped to provide a record of the children’s responses to the memory interviews and to ensure accuracy in scoring all of the individual difference measures. The children were asked for verbal assent before the session began.

At the beginning of the child assessment, to facilitate the child’s imagination and provide a visualization of the best friend character in the stories (Sara for girls or Eric for boys), the children were asked to select a “pretend” best friend from a series of ethnically diverse photographs reproduced from print ads for department stores that depicted either boys or girls in the same general age range as the participants. The children were told to pretend that Sara/Eric had been their best friend for a long time. Participants then heard an audiotape of Story 1, which described a number of events involving the fictional best friend that occurred before the participant’s birthday. The assessments of working memory were then conducted, followed by Memory Interview 1, in which the children were asked to recall the story. Next, the children had a 10-min break during which they received a drink and a snack. The children were only allowed 10 min to minimize the amount of time that we were in the home or that family members had to wait in the lab. After the break, participants listened to Story 2, which described either the best friend’s view of the same events from Story 1 (in the experimental condition) or a series of unrelated events (in the control condition). Assessments of the children’s verbal skills and inhibition were then conducted. Finally, children were again asked to recollect the events that occurred before the child’s birthday in Memory Interview 2.

As a manipulation check, the children were asked a brief series of questions about their views of the best friend character before the first story and again after hearing each story. Their responses to these questions confirmed that they perceived the best friend character and his or her behavior in expected ways. Specifically, before hearing the first story, the children had mostly positive views of Sara/Eric. After hearing Story 1, their views became predominately negative. Finally, after hearing Story 2, the children in the experimental group expressed highly positive views of Sara/Eric, whereas children in the control condition maintained mostly negative views of Sara/Eric.

During the child assessment, the mothers, fathers, or guardians were asked to complete a demographic questionnaire and two measures of the child’s social competence. The children received $10 and some small gifts (e.g., balls, stickers, teddy bears) for participating. Parents and siblings were given a small gift as well.

Stories

In both the experimental and the control conditions, the children heard two prerecorded stories. Each child was told to imagine that he or she and
the pretend best friend selected earlier (Sara/Eric) were central characters in the story. All stories were matched to the participant’s gender; the boy and girl versions of the stories differed only in the gender and names of the characters. Each story consisted of 11 events that were broadly defined by a place, time period, or central character. An event was defined as a self-contained set of actions or occurrences that revolve around a central character, time, or place that have independent coherence (Linton, 1986). In both conditions, Story 1 asked the participant to imagine what it would be like if one year her or his mom planned a special birthday and invited Sara/Eric to come to the celebration. This type of hypothetical scenario is widely used in research with children, particularly in the social information processing literature, and the procedure has been shown to generate results that were similar to children’s naturally occurring behavioral responses in comparable real-life contexts (e.g., Dodge, Laird, Lochman, & Zelli, 2002; Dodge, Pettit, McClaskey, & Brown, 1986). The story described a series of events taking place between the participant and the best friend over several days. The events were purposefully written to evoke a negative interpretation of the best friend’s behaviors as a series of intentional snubs. For example, in the mall event (Event 2), the participant went to the mall with her or his mother to purchase an outfit for her or his birthday. She or he saw Sara/Eric and called out her/his name; Sara/Eric turned around and looked at the participant but walked away without saying anything.

Two versions of Story 2 were constructed. In the experimental condition, Story 2 described the same events in Story 1, but this time the events are told from Sara’s/Eric’s perspective. Sara/Eric explains that she/he was asked by the participant’s mother to help plan a surprise birthday party for the participant, which led to a series of misunderstandings due to Sara’s/Eric’s attempts to keep the party a secret. In addition, Sara/Eric provides explanations for her/his seemingly rude behavior, which resulted from factors that were not previously known to the participating child. For example, in the mall event (Event 2), Sara/Eric visited the mall to see the optometrist and discovered that she/he needed glasses. When Sara/Eric heard her/his name and turned to see who was calling, she/he was unable to see anyone she/he knew. A side-by-side comparison of the events in Story 1 and 2 for the experimental condition is presented in the Appendix, which is available on the Web at http://dx.doi.org/10.1037/0012-1649.42.4.732.supp.

In the control condition, Story 2 described a series of events unrelated to those in Story 1, again from Sara’s/Eric’s perspective. Thus, in the control group Sara’s/Eric’s story did not provide any additional information about her/his seemingly unfriendly or rude behavior in Story 1. Rather, this story described a number of events that happened to Sara/Eric when she/he started a dog walking business to earn money to buy a cell phone. For example, in Event 2 Sara/Eric asked her/his mom for a cell phone but was informed that the only way she/he will get one is if she/he pays for the phone and bill herself/himself. Story 2 in the control condition was matched to Story 2 in the experimental condition in length and complexity, with each story containing 11 events with the same approximate word count and comprehension difficulty level.

Memory Interviews

The memory interviews consisted of a series of open-ended probes about the target events originally described in Story 1. Memory Interview 1 began with a general probe about the events described in Story 1. (“Earlier you heard a story about you and your friend Sara/Eric; now I want you to tell me everything you remember about the story even if it doesn’t seem important.”) This general probe was then followed by more specific, open-ended questions about all events that were not recalled in response to the first probe (e.g., “What happened at the mall?”). At Memory Interview 2, the participants in both conditions were prompted to tell what really happened between them and Sara/Eric before their birthday. (“Earlier you heard two stories that described several events that happened before your birthday. Now that you have heard both stories and have had time to think about them, tell me what really happened between you and Sara/Eric. Tell me everything you can remember even if it doesn’t seem important.”) As in Memory Interview 1, more focused, open-ended questions were used to prompt recall of any events that were not recalled in response to the first probe. Note that all questions focused on the target events originally described in Story 1 (also described in Story 2 for the experimental condition), and no questions were used to prompt recall of the control condition version of Story 2.

Cognitive Ability Measures

The cognitive ability measures provided information about the children’s working memory, inhibitory skills, and verbal ability. These cognitive tests were administered to all of the children in the order described in the Procedure section. The working memory tests were administered before the inhibition and verbal ability measures because they were likely to be the most challenging of the three types of assessments and the most easily affected by fatigue during the 1.25-hr procedure. Two tests of working memory capacity were administered to the child: the Sentence Completion and Recall Test (Towe, Hitch, & Hutton, 1998) and a Backward Digit Span Test. The Sentence Completion and Recall Test consists of a series of short sentences with the last word missing. The child is asked to generate the last word of each sentence in a series and then asked to recall all of the generated words after completion of the set of three. Test trials begin with two sentences and continue to add additional sentences until the child is unable to recall three correct trials. The final set size for which the child was able to correctly recall two of the three sets of sentences was used as the final score, which represented a measure of the child’s Reading Span.

The Backward Digit Span Test is a commonly used test of working memory for children and adults that requires the participant to repeat a sequence of digits backward (e.g., Alloway, Gathercole, Willis, & Adams, 2004; Gathercole, Pickering, Ambridge, & Wearing, 2004; Wechsler, 1981). The version of the Backward Digit Span Test used in this study consisted of seven levels with two sets of numbers for each digit length, beginning with two digits and increasing in difficulty by one digit at each level with a maximum of eight digits. Correctly reported numbers were scored 1 and incorrectly reported numbers were scored 0, with a total of 14 possible points reflecting the child’s Digit Span. The test was terminated when the child failed both sets of digits of the same length.

To measure inhibition, the Stroop Color and Word Test; Children’s Version was used (Golden, Freshwater, & Golden, 1978). This test is similar to the adult version of the Stroop test (Stroop, 1935), but it is normed and interpreted for children between the ages of 5 and 14 years. Participants must read words or name colors moving down five columns on each page as quickly as possible. The inhibition t score, which is calculated by taking the difference between the color-word score and color score, was used in the analyses.

The measure of verbal ability was obtained from the Kaufman Brief Intelligence Test Verbal Subtest (Kaufman, 1990), which took 10–15 min to complete. The verbal subtest consists of 82 items that measure verbal ability by requiring the respondent to respond orally. Expressive vocabulary is measured by having the participant name pictured objects such as a lamp or a calendar. The Definitions part consists of items that require the participant to provide the word that best fits two clues: a phrase description and a partial spelling of the word. Raw scores were converted to a standardized score of verbal ability using the appropriate age group conversion tables provided with the test.

Social Competence Measures

Parents completed two social competence measures to provide information about the quality of their children’s social relations with peers. The My Child’s Behavior With Other Children (MCB) questionnaire was adapted
The remaining two measures of memory reframing (valence change and constructive change) involved conducting event-by-event comparisons of the child’s two memory reports to examine change from Memory Interview 1 to Memory Interview 2. For valence change, target events that were remembered at both interviews were coded for changes in the way that the best friend’s behaviors were interpreted from Interview 1 to Interview 2. Changes in the recall of an event in which the friend’s behavior became more positive from Interview 1 to Interview 2 were scored a 1. For example, if at Interview 1 the child reported that Sara had ignored her at the mall and at Interview 2 the child reported that Sara had actually seen her, a 1 was scored. A score of 0 was coded if there was no change in the valence of the event from Interview 1 to Interview 2. An average valence change score across events was calculated for each child, with more positive scores reflecting greater positive change and more negative scores indicating more negative change.

The coding of constructive change involved within-event examinations of changes in recall accuracy from Interview 1 to Interview 2. We were especially interested in the degree to which children’s reports of individual events took on more constructive elements such as elaborations or distortions over time. Changes in which an event was initially recalled accurately (i.e., scored as accurate recall) and was at Interview 2 recalled constructively (i.e., coded as an elaboration or distortion) received a constructive change score of 1. Events for which the children’s reports changed in the opposite direction (i.e., from elaborations or distortions to accurate recall) were scored a −1, whereas events for which there were no changes were scored 0 (i.e., a score of 0 was given if recall was coded as accurate recall at Interviews 1 and 2 or was coded as constructive recall at Interviews 1 and 2; thus, changes from elaborations to distortions or vice versa were scored as no change, as both are examples of constructive recall). For each child, an average constructive change score was calculated such that positive scores indicated more increases in constructive, as opposed to accurate, recall over time, whereas more negative scores indicated relatively greater increases in accurate recall over time.

Reliability. One coder scored all of the interviews, and a reliability coder scored 20% of the first coder’s work. Interrater agreement was quite good. The kappa coefficients for the coding of story recall (i.e., accurate recall, elaboration, and distortion), valence change, and constructive change by event were all .97. The kappa coefficient for integration was .90.

Results

Preliminary Analyses

In the preliminary analysis phase, the data were screened for univariate and multivariate outliers as well as for other violations of assumptions, such as extreme deviations from normality. One child’s inhibition score was deleted because he was color blind. Univariate (n = 3) and multivariate (n = 1) outliers were left in the sample owing to minimal influence on the relationships of interest. The potential effects of interviewer, interview location (home or lab), ethnicity, gender, and age on the memory variables of interest were prescreened, using a multivariate general linear model. No significant effects of these variables were discovered; therefore, they were not included in further analyses. A multivariate general linear model also confirmed that there were no significant condition differences on the measures of cognitive ability and social competence (means and standard deviations are listed in Table 1).

Story Recall

Recall accuracy and completeness. To first provide information about the accuracy and completeness of the children’s story
recall, the mean proportions of story events (out of 11 total) that were scored as accurate recall, elaborations, and distortions are presented in Table 2 as a function of experimental condition and interview. Examination of the means for accurate recall indicates that at Memory Interview 1, children in both groups recalled the basic gist of a majority of the story events accurately, whereas at Memory Interview 2, rates of accurate recall decreased in the experimental group and remained stable in the control group. Consistent with these patterns, a repeated measures analysis of variance (ANOVA), with interview as the repeated measure and experimental condition as a between-subjects factor, revealed a significant interaction between interview and condition, $F(1, 77) = 42.28, p < .0001$, partial $\eta^2 = .35$, indicating that changes in accurate recall from Interview 1 to Interview 2 varied across conditions. The experimental group showed a significant decrease (mean difference = .33) in accurate recall from Interview 1 to Interview 2, $t(40) = 11.68, p < .0001$, whereas there was very little change (mean difference = .05) in accurate recall from Interview 1 to Interview 2 for the control group. As a result, at the second interview the experimental group accurately recalled fewer story events than the control group (mean difference = .22), $t(77) = 5.62, p < .0001$.

A repeated measures ANOVA on elaborations also revealed an interaction between interview and condition, $F(1, 77) = 28.70, p = .0001$, partial $\eta^2 = .27$, such that recall in the experimental group became more elaborative from Interview 1 to Interview 2 (mean difference = .29), $t(40) = 8.10, p < .0001$. The control group showed no significant change in the mean number of elaborations (mean difference = .04) and made significantly fewer elaborations than the experimental group at Interview 2 (mean difference = .23), $t(77) = 5.00, p < .0001$. Finally, a repeated measures ANOVA indicated that there were no effects of interview or experimental condition on the mean number of memory distortions.

The mean narrative length per story event is also shown in Table 2 by condition and interview. These means reflect only those events about which some information was recalled and thus provide information about how detailed or verbose the children’s narratives were when they recalled an event. Examination of the group means on this variable suggests that overall the participants were not highly detailed or verbose in their recall, as their memory narratives included 35 words per event on average, whereas the events in the stories themselves averaged 123 words per event. It is also apparent that narrative length increased over time for the experimental group (mean difference = 7.21) and slightly decreased over time for the control group (mean difference = 2.71). A repeated measures ANOVA confirmed this apparent Interview x Condition interaction, $F(1, 77) = 12.87, p = .001$, partial $\eta^2 = .14$. At Memory Interview 2, children in the experimental group used more words in their event recall on average than they had at Memory Interview 1, $t(40) = 4.18, p < .0001$, and used more words than did the control group at Memory Interview 2 (mean difference = 6.67), $t(77) = 2.28, p = .03$. There was no significant interview difference for the control group.1

Taken together, these findings show that there were no differences in recall performance between the experimental group and the control group at Memory Interview 1, but following the presentation of the second story, the two groups showed significantly different patterns of performance. In the experimental group, children’s story recall increasingly went beyond the specific information provided in the story narratives from Interview 1 to Interview 2, as reflected by decreased accurate recall and increased elaborations, whereas no significant changes were observed in the recollections of the control group. These patterns suggest that Story 2 in the experimental group prompted more reframing of the information from Story 1 than did Story 2 in the control group. Further analyses were designed to examine children’s memory reframing in greater detail.

### Table 2

**Means and Standard Deviations for Story Recall Measures by Condition and Memory Interview**

<table>
<thead>
<tr>
<th>Measures</th>
<th>Experimental group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Memory Interview 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% accurate recall</td>
<td>.55</td>
<td>.17</td>
</tr>
<tr>
<td>% elaboration</td>
<td>.25</td>
<td>.14</td>
</tr>
<tr>
<td>% distortion</td>
<td>.08</td>
<td>.10</td>
</tr>
<tr>
<td>Narrative length</td>
<td>31.97</td>
<td>11.60</td>
</tr>
<tr>
<td>Memory Interview 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% accurate recall</td>
<td>.22</td>
<td>.16</td>
</tr>
<tr>
<td>% elaboration</td>
<td>.54</td>
<td>.23</td>
</tr>
<tr>
<td>% distortion</td>
<td>.12</td>
<td>.16</td>
</tr>
<tr>
<td>Narrative length</td>
<td>39.18</td>
<td>14.52</td>
</tr>
</tbody>
</table>

Table 1

**Descriptive Statistics for the Measures of Cognitive Ability and Social Competence**

<table>
<thead>
<tr>
<th>Measures</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Span</td>
<td>2.84</td>
<td>0.80</td>
<td>2–5</td>
</tr>
<tr>
<td>Digit Span</td>
<td>5.80</td>
<td>1.98</td>
<td>2–11</td>
</tr>
<tr>
<td>Inhibition</td>
<td>50.94</td>
<td>6.95</td>
<td>33–76</td>
</tr>
<tr>
<td>Verbal ability</td>
<td>109.46</td>
<td>12.86</td>
<td>65–134</td>
</tr>
<tr>
<td>MCB</td>
<td>1.71</td>
<td>0.21</td>
<td>1.02–1.95</td>
</tr>
<tr>
<td>SSRS</td>
<td>1.46</td>
<td>0.27</td>
<td>0.71–1.89</td>
</tr>
</tbody>
</table>

Note. MCB = My Child’s Behavior social competence rating scale; SSRS = Social Skills Rating System.

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1 All analyses using the mean raw word count by event for narrative length were also conducted using the total word count by story as the measure of narrative length. Results were highly similar, leading to a difference of .02 in the test statistic (e.g., $t$ or $\beta$) at most. Thus, the mean narrative length by event was used rather than total narrative length by story in keeping with the coding by event method used for all other calculations.
score in the experimental group confirms the patterns observed in the analyses of recall accuracy; in this group, recall became increasingly constructive from Interview 1 to 2. In contrast, the control group’s score indicates little systematic change in either direction. Similarly, the positive valence change score in the experimental group indicates that this group made relatively more valence changes in the positive direction than in the negative direction. The valence change score in the control group was close to 0, which is indicative of little systematic change in either the positive or the negative direction. Finally, inspection of the mean integration scores indicates that participants in the experimental condition integrated more of the information provided in the two stories at Memory Interview 2 than did participants in the control condition. It is worth noting, however, that even in the experimental group integration scores were somewhat low, as a score of 2 would indicate full integration of all 11 events. The experimental group mean score of .63 (range = 0–1.20) indicates that on average the children attained well under half of the total points possible. Children in the experimental group completely integrated only 6% of the events they reported. They partially integrated 50% of the reported events. A multivariate analysis of variance confirmed the group differences across all three reframing measures, \( F(3, 75) = 70.97, p < .0001 \), partial \( \eta^2 = .74 \). Thus, these findings indicate that in the experimental group, the provision of the friend’s perspective in Story 2 prompted children to update their recollections of the target events. Children in the control group showed little evidence of memory reframing.

### Links Between Memory Reframing, Cognitive Ability, and Social Competence

The final phase of data analysis explored the links between memory reframing, cognitive ability, and social competence. Because evidence of memory reframing was quite rare in the control group, these analyses were conducted only on the experimental group. To provide an initial look at the structure of the relationships between the measures of memory reframing, cognitive ability, and social competence and to provide information about which paths were reasonable to include in our path model, we first examined the intercorrelations between these variables, as well as age and gender. These correlations are presented in Table 4. We also included in the correlational analyses two basic measures of story recall from Interview 2—the total number of events reported as accurate recall, elaborations, and distortions (total recall) and narrative length—to provide information about how memory reframing is linked to more general memory abilities. The memory reframing measures were moderately associated with one another, indicating that they tapped overlapping but nonredundant measures of memory function. Measures of memory reframing were also somewhat correlated with narrative length at Interview 2.

### Table 3

<table>
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<tr>
<th>Memory reframing measures</th>
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<th>Control group</th>
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<tbody>
<tr>
<td></td>
<td>( M )</td>
<td>( SD )</td>
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<tr>
<td>Integration</td>
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<td>Valence change</td>
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<td>Constructive change</td>
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### Table 4

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<td>.37*</td>
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<td>Social competence</td>
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<td>10. MCB</td>
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<td>.28†</td>
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<td>.33*</td>
<td>.08</td>
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<td>-.02</td>
<td>.03</td>
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<td>-.05</td>
<td>-.22</td>
<td>-.38*</td>
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<td>.03</td>
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<td>.29†</td>
<td>.07</td>
<td>.16</td>
<td>.11</td>
<td>-.18</td>
<td></td>
</tr>
</tbody>
</table>

**Note.** MCB = My Child’s Behavior social competence rating scale; SSRS = Social Skills Rating System. For gender, 1 = male. Age was calculated in years.

† \( p \leq .10 \). * \( p < .05 \). ** \( p < .01 \). *** \( p < .001 \).
although they were unrelated to total recall at Interview 2, suggesting that the measures of memory reframing captured aspects of recall that were independent of the completeness of story recall. Age and gender were significantly correlated with total recall (i.e., older children recalled more events and boys recalled fewer events than girls), but age and gender were not significantly correlated with any of the measures of memory reframing. There were also some significant relationships among the cognitive ability measures. Verbal ability was the cognitive ability that was most consistently linked to the memory reframing measures. The social competence measures were also highly intercorrelated. There was no clear evidence of links between social competence and memory reframing; the only association among these two sets of variables was a marginally significant positive correlation between SSRS scores and constructive change scores.² Scores on the MCB, however, were directly related to Digit Span, suggesting that a direct path between cognitive ability and social competence should be investigated. Moreover, boys had lower ratings on the SSRS than girls, suggesting that the path analysis should control for gender.

Data analytic strategy. Partial least squares analysis (PLS; Chin & Newsted, 1999; Falk & Miller, 1992) was used to simultaneously test the direct and indirect associations between the cognitive ability, memory reframing, and social competence variables. PLS is a variant of structural equation modeling that has the advantage of not requiring the strict measurement and distributional properties of other structural equation modeling procedures. Consequently, even with small data sets PLS can be used to form latent constructs that best represent a set of manifest (observed or measured) variables and test a system of relationships between those constructs. PLS parameter estimation involves two steps. First, the measurement model, which specifies the construction of latent variables from combinations of the observed variables, is estimated and examined for goodness of fit. Using a method similar to principal components analysis, for each hypothesized construct or latent variable the factor loadings corresponding to each observed variable from the first principal component are used to form a weighted composite (i.e., a latent variable) that maximizes the amount of shared variance between the manifest variables. In PLS analysis, single indicators of a latent variable should only be used when the measurement is simple and direct, as in age or gender (Lavee, 1988). The discriminant validity of the measurement model is evaluated by an examination of the loading of each manifest variable on its corresponding latent variable, as well as the cross loadings between each manifest variable and the other latent variables in the model. According to Chin (1998), factor loadings above .707 are ideal, although loadings as low as .50 are acceptable if other manifest variables load at .707 or higher and if each loading is highest for the intended latent construct. In addition, bootstrap or jackknife resampling techniques should be used to establish the stability of the estimates. Manifest variables that do not load highly on any single latent variable should be removed from the model.

The second step involves the estimation of the hypothesized relationships between the latent variables by means of ordinary least squares regression. The resulting path weights (pw) can be interpreted similarly to path coefficients that are estimated in other path-analytic approaches. Because PLS makes no distributional assumptions, traditional parametric techniques for testing the significance of the paths are not generated. According to Chin (1998), adequate model fit is demonstrated by high squared multiple correlations and standardized path weights of at least .20 and ideally above .30. Paths that do not meet these criteria should be dropped and the fit of the model retested. The general guideline for sample size for PLS is 10 times the largest number of pathways leading to a single latent variable.

Estimation of the measurement model. Three latent variables were specified in the measurement model: (a) cognitive ability, indicated by the measures of verbal ability, Reading Span, Digit Span, and inhibition; (b) memory reframing, indicated by integration, valence change, and constructive change scores; and (c) social competence, indicated by the MCB and SSRS scores. Initial inspection of the loadings revealed that inhibition had a very low loading (−.09), indicating that it had very little in common with the other indicators of cognitive ability. Consequently, inhibition was removed from the model, and the measurement model was refit. The resulting factor loadings are listed in Table 5. As can be seen, all of the loadings were at acceptable levels, suggesting that this measurement model fit the data well. As a secondary test of the model’s discriminant validity, we used the bootstrap resampling technique to estimate the precision of the PLS estimates. Through bootstrapping, 499 sample sets were created by sampling with replacement from the original data set and computing the average variance extracted (AVE) scores for each latent variable. The AVE measures the amount of variance that a latent variable component captures from its indicators relative to the amount due to measurement error and can be interpreted as a measure of reliability of the latent variable component score (Chin, 1998). AVE scores should be higher than .50, indicating that 50% or more of the indicators’ variance is accounted for. In this model, the AVE scores were .52 for cognitive ability, .65 for memory reframing, and .76 for social competence, verifying that the measurement model had adequate discriminant validity.

Estimation of the path model. The predictive model evaluated the hypotheses that cognitive ability would predict memory reframing and that memory reframing would predict social competence by specifying a path from cognitive ability to memory reframing and a path from memory reframing to social competence. We also examined the possibility that cognitive ability might be directly predictive of social competence by including in the model a path from cognitive ability to social competence. In addition, narrative length at Memory Interview 2 was included as a covariate of memory reframing to rule out the possibility that verbosity or memory detail alone predicted memory reframing rather than cognitive ability. Because narrative length involved a simple, direct measurement of the number of words in a recollection, this variable was used as a single indicator. Because gender was related to SSRS scores, the association between gender and social competence was controlled for by including a path between these two variables. PLS Graph Version 3.0 was used to analyze the data.

² An analysis of the results using the total number of actual changes (e.g., positive to negative for valence change and accurate to constructive for constructive change) made by each participant by event revealed that the overall results were consistent with the findings reported using the average change scores for these two variables.
Examination of the direct and indirect paths between memory reframing, cognitive ability, and social competence revealed that the only substantial paths were between cognitive ability and memory reframing and between cognitive ability and social competence. In addition, narrative length had a substantial influence on memory reframing, and gender had a substantial influence on social competence. The model was refit with the pathway between memory reframing and social competence (\(pw = 0.07\) in the initial model) deleted, and the resulting model is illustrated in Figure 1. This final model accounted for 26% of the variance in both memory reframing and social competence. As indicated by the path weights on Figure 1, higher cognitive ability scores were linked directly to higher levels of memory reframing, after controlling for the influence of narrative length. The amount of variance in memory reframing explained by cognitive ability and narrative length was 28%. Cognitive ability accounted for 19.5% of the variance in memory reframing, whereas narrative length accounted for 8.5% of the variance. Higher cognitive ability scores were also directly linked to higher levels of social competence, after controlling for gender. Together, cognitive ability and gender accounted for 24% of the variance in social competence, with cognitive ability alone accounting for 9% of the variance.

Table 5  
Loadings and Cross-Loadings for the Cognitive Ability, Memory Reconstruction, and Social Competence Model

<table>
<thead>
<tr>
<th>Manifest variable</th>
<th>Cognitive ability</th>
<th>Memory reframing</th>
<th>Social competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive ability</td>
<td>.53</td>
<td>.17</td>
<td>.01</td>
</tr>
<tr>
<td>Digit Span</td>
<td>.77</td>
<td>.26</td>
<td>.32</td>
</tr>
<tr>
<td>Verbal ability</td>
<td>.84</td>
<td>.50</td>
<td>.17</td>
</tr>
<tr>
<td>Memory reframing</td>
<td>Integration</td>
<td>.33</td>
<td>.85</td>
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<td></td>
<td>Valence change</td>
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<td>Constructive change</td>
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<tr>
<td></td>
<td>SSRS</td>
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<td>.26</td>
</tr>
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</table>

Note. MCB = My Child’s Behavior social competence rating scale; SSRS = Social Skills Rating System.

Discussion

The findings of this study demonstrate that 9- to 11-year-olds revise their recall of hypothetical social situations when exposed to a point of view about the events that conflicts with what they heard earlier. Although children in the experimental group did not differ from those in the control group in their initial recall of the events described in the first story, the alternate versions of the second story led to significant differences between the groups at the second memory interview. For children in the experimental group, hearing another person’s perspective of the same set of events led to substantial changes in their recall of previously reported events, such that they recalled more positive behaviors by the best friend, attempted to integrate details from both sides of the story, and even went beyond the information provided in the two narratives to explain what really happened. In contrast, children in the control condition generally did not alter their reports of Story 1 after hearing Story 2, as demonstrated by the low integration scores, the lower levels of constructive recall, and the lack of consistent change in their recall of the best friend’s behaviors. Thus, these findings suggest that 9- to 11-year-olds do attempt to resolve their apparent misconstruals of events in their recollections when provided additional information about the events from another person’s perspective. Nevertheless, the relatively low integration scores observed in the experimental group, and the variability in these scores, suggest that the ability to construct a coherent memory narrative that integrates two different perspectives may be an emerging skill. The distributions of complete versus partial inte-
The results of this study extend the literature on constructive memory processes (e.g., Greenhoot, 2000; Kuhn, 2000; Ornstein et al., 1998; Paris & Lindauer, 1977; Schacter et al., 1998) by demonstrating that the provision of new information about an event from another person’s perspective may prompt individuals to revise their recollections, and perhaps their underlying memory representations, of the event. Although different individuals frequently form different interpretations and memories of the same events, and adults and children are often presented with other people’s recollections, this is the first study to investigate how previously encoded memories might be updated following the provision of additional information from another person’s perspective. Of course, given that children’s memory reports are only imprecise indicators of their underlying memory representations (Baker-Ward, Ornstein, & Principe, 1997), it is impossible to know whether the modifications to children’s recollections reflect changes to the actual memory representation. Moreover, it is unclear whether children revised their original understanding of the events at the time Story 2 was presented, or whether the changes occurred at the time of recall, through the construction of a coherent and integrated story retelling that included elaborations and interpretation of the facts. It could be that modifications occurred at both of these temporal loci in the processing stream. Consistent with this argument, Graesser, Singer, and Trabasso (1994) proposed that constructive processes during narrative text comprehension occur both online or during encoding (i.e., in the current study, as Story 2 was presented) and “offline” or after encoding, and there is undoubtedly a continuum between online and offline processing.

Our findings provide some insight into the basic cognitive abilities that might support the development of this type of reconstructive memory process. The results of the PLS analysis showed that the measures of verbal ability, Digit Span, and Reading Span had shared variance that reliably defined the latent measure of cognitive ability, which in turn predicted memory reframing, as indicated by integration, constructive change, and valence change scores. The patterns of pairwise correlations between the cognitive abilities and the reframing measures could be interpreted as suggesting that verbal ability alone was responsible for the explained variance in memory reframing, as verbal ability was the cognitive ability measure most consistently associated with the memory reframing measures. However, it is important to note that the PLS analysis examined the relationships between cognitive ability, memory reframing, and social competence on the basis of the shared variance of the manifest variables given the predicted relationships between the latent variables in the model. The comparably high loadings of both verbal ability and Digit Span and the acceptable loading of Reading Span on cognitive ability suggest that higher levels of verbal ability and working memory capacity together contributed to children’s ability to integrate both sides of the story. In support of this argument, it has also been demonstrated that verbal ability does not completely account for the relations between working memory and the ability to integrate and make inferences in text comprehension (Cain, Oakhill, & Bryant, 2004). Admittedly, however, it is difficult to completely separate language abilities from measures of working memory skill, as verbally mediated assessments of working memory such as Reading Span and Digit Span are heavily dependent on vocabulary and verbal ability (Nation, Adams, Bowyer-Crane, & Snowling, 1999; Stothard & Hulme, 1992).

The activity of memory reframing most likely required substantial processing resources such that children with better working memory abilities were able to keep more information from both sides of the story active in working memory, and therefore were more successful at comparing and combining the incoming information provided by the other person’s perspective with their prior understanding of the events than were children with poorer working memory skills. Language skills might contribute to memory reframing because they support the establishment of coherent memory representations and facilitate the construction of a coherent narrative about the events from both perspectives (Fivush, 2001; Nelson, 2001). Verbal ability might also indirectly support memory reframing through enhanced perspective-taking abilities, as some researchers have argued that language development promotes perspective taking by enabling children to converse with others about their past experiences (Fivush, 2001; Nelson, 2001).

It was somewhat surprising that our measure of inhibition (the Stroop task) was unrelated to memory reframing and also seemed to have very little in common with the other cognitive ability measures; the inhibition scores had very little shared variance with the other measures according to the PLS analysis. One interpretation is that inhibition might not contribute to these reconstructive memory abilities; however, it could also be that the Stroop task did not adequately measure the inhibitory mechanism of selective retrieval cited in this study (e.g., M. C. Anderson, 2003; Bjork, 1989; Zacks & Hasher, 1994). For example, prior research by Anderson and colleagues (e.g., M. C. Anderson, 2003; M. C. Anderson & Green, 2001; Levy & Anderson, 2002) has used the think–no-think task in which participants are trained to remember 40 unrelated word pairs and then instructed to recall and say the associated response word when the think cue is present, but keep the associated response word out of awareness when the no-think cue is present. The think–no-think task has not been used with children and would require some stimulus redesign, researcher training, and extensive piloting to ensure that the procedure was understandable to children and administered correctly (M. C. Anderson, personal communication, August 9, 2004). Research using other task-switching paradigms (e.g., antisaccade task, directed-forgetting paradigm, directional Stroop task, Wisconsin Card Sorting Task) has demonstrated that the ability to maintain selected information in active memory while blocking or inhibiting other information from becoming active continues to develop into early adulthood (Diamond, 2002). Given that these tasks have been used successfully with children, future research can easily include an alternative measure of inhibition such as the directed-forgetting paradigm in which participants are told to forget some of the words they are shown and to remember others. Research using the directed-forgetting paradigm has shown that 11-year-old children make more intrusions of the to-be-forgotten words in comparison to adults (Diamond, 2002). Clearly, additional research is necessary to more thoroughly evaluate the role of inhibition in reconstructive memory processes.
Interestingly, age was not significantly related to any of the memory reframing variables, despite the fact that the abilities that seem to support memory reframing (i.e., verbal ability and working memory) have been shown to improve with age (e.g., Fry & Hale, 2000; Gathercole et al., 2004; Harms & Bjorklund, 1993; Nelson, 2001). It would not, however, be appropriate to conclude from the current results that the ability to reframe a memory and the other variables measured do not change with age, because the age range in this sample was somewhat restricted. Indeed, as mentioned above, the fact that children in the experimental group on average scored .63 on integration and fully integrated 6% of the story events reported suggests that this sort of memory process may undergo significant developmental improvements among older children. Moreover, the individual difference findings suggest that age-related change in children’s verbal and working memory abilities may well contribute to developmental change in memory reframing ability in a broader age range.

The finding that children with more advanced cognitive abilities made more memory reconstructions following Story 2 (in the process of reframing) than children with less advanced abilities might seem counterintuitive given that the suggestibility literature has shown that older children are less likely than young children to incorporate postevent information into their recall, presumably because of their superior cognitive abilities (Bruck & Ceci, 1999; Ceci & Bruck, 1993). Accordingly, it is important to distinguish between the phenomenon of suggestibility and the process of memory reframing examined in this study. Suggestibility involves exposure to misleading or incorrect postevent information and the incorrect recall or recognition of the misinformation rather than the original, correct information. In contrast, in our examination of memory reframing, we provided not misleading postevent information but instead another perspective of the same events that was meant to be equally valid; two people can experience the same event and have very different interpretations of what occurred. Memory reframing involves remembering information from both stories and integrating or combining that information rather than replacing accurate information with inaccurate information. In fact, children who simply replaced information from Story 1 with information from Story 2 were given the lowest possible score on the measure of integration. Successful reframing required comprehending the connections between Story 1 and Story 2 and making inferences about what really occurred given the information from the two sources. Thus, whereas in a suggestibility paradigm weaker memories for the original information should be associated with greater suggestibility, in our memory reframing paradigm weaker memories for the original information (i.e., Story 1) should be associated with less integration of the two sides.

Given that surprisingly little is known about the cognitive abilities that contribute to constructive memory processes in general, the individual difference findings represent another substantial contribution of this study to the constructive memory literature. Of course, even though we identified some basic cognitive components associated with reconstructive memory processes, much of the variance in memory reframing was unexplained. Additional research is clearly necessary to identify other factors that contribute to the development of constructive memory processes in general and memory reframing in particular. For instance, children’s perspective-taking skills are highly likely to support their abilities to integrate an alternative perspective into their own memory of an event.

The final goal of this study was to examine whether the children who reframed their memories were more socially competent with peers than children who did not integrate the other perspective and reframe the initial memory. Although it makes intuitive sense that the ability to update a memory of another person’s behaviors with a “truer” understanding given that person’s perspective of the event should be related to social competence, no support was found for a relationship between memory reframing and social competence. The reasons for this null finding are unclear, but one potential explanation is that our measurements of social competence reflect socially desirable behavior, which is not necessarily equivalent to social understanding or sophistication (Sutton, 2003; Symons, 2004). For example, Symons has noted that understanding another’s mental states could lead to enhanced prosocial behavior but could also lead to the exploitation of others. Indeed, Hawley (2003) has argued that children who use both coercive and prosocial strategies with their peers, and therefore would possess both negative and positive indicators of social competence, are highly socially sophisticated, as they tend to be socially central and well adjusted. Thus, it may be that the memory reframing processes examined in this study are related to the sophistication of children’s understanding of the social world, but social sophistication does not necessarily translate into socially desirable behavior.

In contrast to memory reframing, cognitive ability was a significant predictor of social competence, and this relationship offers another explanation for the lack of a significant relationship between memory reframing and social competence. Specifically, basic cognitive abilities might underlie both reconstructive memory processes and the ability to be socially competent. Other studies have found that basic cognitive abilities such as verbal ability, working memory, and attention underlie both social competence and the ability to understand the mental states of others (e.g., Fahie & Symons, 2003; Hughes, Dunn, & White, 1998). The social information processing literature offers additional support for the links between cognitive abilities, understanding the mental states of others, and social competence (Crick & Dodge, 1994; Crick & Ladd, 1990). According to Crick and Dodge, basic cognitive abilities, such as attentional control and speed of processing, contribute to the development of social information processing skills, with children with more advanced cognitive abilities able to process social information more accurately, efficiently, and with more complexity than children with less advanced abilities. In turn, more accurate, efficient, and complex social information processing results in more socially competent behavior. For example, Crick and Ladd found that socially deviant children had social information processing patterns that resembled those of younger children in similar situations.

The findings of this study provide information about memory skills that are likely to be used quite frequently in real-life, everyday interactions with other people. Of course, additional work is necessary to generalize the current findings to memories of real-life experiences. Different emotions and goals may be activated by personally experienced events, and these emotions and goals might have implications for how these different types of stimuli are remembered. For example, greater activation of emotions and personal goals associated with personally experienced events
might increase individuals’ resistance to accepting another person’s interpretation of a misconstrued social event. Nonetheless, attempts were made to simulate real-life situations in which the children in this study were told to pretend that the stories happened to them and involved their best friend. The use of the hypothetical situation appeared to be effective, as some of the children became visibly distressed after hearing Story 1. In fact, children in the control condition were allowed to hear the experimental condition version of Story 2 after the interview was completed to ensure that no child left the experiment with negative feelings. Thus, it seems reasonable to conclude that the current findings would be replicated in real-life situations.

Conclusion

The current study demonstrates that remembering is a dynamic process. Indeed, it is likely that memories are recomprehended and reconstructed on a daily basis as new knowledge is acquired, goals change, or another person’s perspective is presented. As illustrated by the results of the current study, hearing another’s perspective of a fictional social situation that involved conflict led to changes in the children’s subsequent recall of the original report. Thus, this study makes an important contribution to our understanding of the constructive nature of memory. One important implication of this work is that the ability to reframe a memory of conflict after hearing the offender’s point of view appears to be a difficult task even at the “advanced” ages of 9 to 11 years. This conclusion is consistent with recent research illustrating that despite the ubiquitous presence of diversity in perspectives in children’s everyday lives, when it comes to situations that involve conflict, understanding diversity in belief or point of view is not a simple task and continues to develop into adulthood (Wainryb, Shaw, Langley, Cottam, & Lewis, 2004; Wainryb, Shaw, Laupa, & Smith, 2001; Wainryb, Shaw, & Maianu, 1998). Consequently, teachers, parents, and adults in general should be aware that remembering another’s perspective is a developing skill in the middle to late childhood years.

References


Children’s and adolescents’ judgments of dissenting beliefs, speech, persons, and conduct. *Child Development, 69,* 1541–1555.

Received July 15, 2005
Revision received February 3, 2006
Accepted February 9, 2006