The Cognitive Interview Enhances Long-Term Free Recall of Older Adults

Courtney C. Dornburg
Sandia National Laboratories

Mark A. McDaniel
Washington University in St. Louis

The Cognitive Interview, a retrieval-based mnemonic technique, has received only limited attention in its application with older adults, and based on previous findings, its benefit to older adults is unclear. The authors found that the Cognitive Interview effectively increased older adults’ recall relative to standard recall instructions at a 3-week delay. These findings demonstrate the benefit of a standardized (rather than the prototypically interactive) Cognitive Interview as applied to perceptually impoverished, text-based stimuli. Both theoretical and practical implications of the findings are discussed.

Keywords: standardized Cognitive Interview, older adults, text-based stimuli

Although episodic memory impairment is one of the most common findings in older adults as compared with their younger counterparts (for reviews, see Kausler, 1994; Light, 1996), very little is known about how to increase older adults’ retrieval performance. While the aging literature has generally supported the use of external cues for bolstering memory performance, free-recall tasks may be less amenable to improvement in older adults (cf. Craik, 1986). We explore this issue in the present study by investigating a combination of retrieval strategies, or mnemonics, integrated into a technique termed the Cognitive Interview. The Cognitive Interview is an interview procedure consisting of instructions given by the interviewer to the witness/participant at the beginning of the interview, encouraging contextual reinstatement, use of multiple retrieval paths, and repeated recall (Geiselman, Fisher, MacKinnon, & Holland, 1985). Contextual reinstatement encourages participants to mentally reinstate the environment and personal context of the original event in order to exploit feature overlap between encoding and retrieval contexts. Second, participants are encouraged to use multiple retrieval paths by recounting events in a variety of orders and from a variety of perspectives. The use of multiple retrieval paths is also thought to be encouraged by the final mnemonic, repeated recall (McDaniel, Moore, & Whiteman, 1998).

The Cognitive Interview has been applied to a variety of content, as well as for improving children’s recall (Fisher & Quigley, 1992; McCauley & Fisher, 1995; Saywitz, Geiselman, & Bornstein, 1992), but the Cognitive Interview has not been widely tested with older adults. Both Mello and Fisher (1996) and McMahon (2000) tested older adults’ film memory for a robbery incident after a 30-min delay. In their study (with 30 older adults), Mello and Fisher compared the Cognitive Interview with a standardized police interview and found the expected advantage of the Cognitive Interview for correct recall, as well as a concomitant increase in incorrect responses. Thus, the Cognitive Interview slightly lowered accuracy rates, though the effect was not significant. Similarly, McMahon reported numeric increases for correct and incorrect recall within the Cognitive Interview condition; however, neither of McMahon’s findings reached statistical significance. The author speculated that her results may relate to “the unsuitability of some of the [Cognitive Interview’s] mnemonic strategies” (McMahon, 2000, p. 25) for older adults (cf. Hess & Flannagan, 1992). These preliminary experiments leave unclear whether the Cognitive Interview is effective at increasing older adults’ recall of correct information, increases incorrect recall as well, or both.

Because the Cognitive Interview’s impact on older adults has received so little attention, our experimental strategy was to explore the bounds of its possible benefits and penalties. One possible negative consequence of the Cognitive Interview for older adults is increased false memory. According to some views, older adults are deficient in encoding processes, especially those related to distinctive encoding (e.g., Rabinowitz, Craik, & Ackerman, 1982; Smith, Lozito, & Bayen, 2005). With reduced distinctive encoding, there is increased likelihood that nonpresented information constructed during the encoding session (with long retention intervals as in the present paradigm, construction might also occur in the interval between initial encoding and recall testing) can be confused with presented information, thereby increasing false memory for older adults (Smith et al., 2005; see also Butler, McDaniel, Dornburg, Price, & Roediger, 2004, for free-recall findings). For older adults, production of nonpresented information (which could be difficult to distinguish from modestly encoded presented information) may be further increased with the Cognitive Interview, in which participants are encouraged to try hard to generate information, assume different perspectives, and reverse recall orders. (For other examples of mnemonic techniques that reduce false memory for younger adults, but in some cases exaggerate false memory for older adults, see Roediger & McDaniel, in press.) To allow sensitivity to the Cognitive Interview’s

Correspondence concerning this article should be addressed to Courtney C. Dornburg, Sandia National Laboratories, P.O. Box 5800, Mail Stop 0830, Albuquerque, NM 87185-0830. E-mail: ccdornb@sandia.gov
possible augmentation of false memory, we chose a text-based paradigm reported to encourage false memory effects (Spiro, 1980). We used a standardized version of the Cognitive Interview for half of the participants (following Dornburg & McDaniel, 2005) and Spiro’s more general retrieval instructions for the other half (the control condition). The standardized Cognitive Interview maintained the multiple retrieval paths and encoding–retrieval feature overlap integral to the theoretical underpinnings of the Cognitive Interview while introducing the advantage of standardization.

If a standardized Cognitive Interview is effective for older adults with text-based target material, then correct recall should increase in the Cognitive Interview condition relative to the control condition. Furthermore, if the Cognitive Interview’s mnemonics provide a real gain in accuracy, then correct recall should increase to a greater extent than incorrect recall. Alternatively, if the Cognitive Interview is counterproductive relative to the presumed (distinctive) encoding deficits of older adults, then incorrect recall should increase relative to the control condition, perhaps even to the point where accuracy declines.

Requiring both groups to recall a story three times provides a significant extension over the limited available research on the Cognitive Interview with older adults. Group differences on each recall would offer evidence of the effectiveness of this standardized version of the Cognitive Interview for older adults. On the other hand, if the two conditions do not differ in correct recall, but correct recall generally increases with retrieval attempt, for older adults the functional component of this standardized Cognitive Interview would be that of repeated recall.

Method

Participants and Design

Participants were 40 community-dwelling adults aged 65 to 87 (M = 75 years old), who were recruited from newspaper advertisement, and from the New Mexico Aging Processes Study.1 Twenty participants were randomly assigned to each of the two recall instruction groups (control and Cognitive Interview).

Procedure

The instructions followed those of Spiro (1980). Participants were given a brief overview of the story and told that they would later be questioned regarding their reactions. The true nature of the story was emphasized, and participants were asked to read for the full 3-min provided. The story mirrored Spiro except that it was presented via a computer rather than on paper (see the Appendix). Finally, participants completed a brief demographic questionnaire (approximately 8 min). While collecting the questionnaire, the experimenter told each participant information that was discordant with relationship schemas. For example, she said, “As it turns out, they did get married. The engagement went smoothly, and they are still happily married.”

Upon returning for the second session (following the 3-week delay), participants were told that the experiment was actually a study of memory rather than an examination of reactions to interpersonal relations. The experimenter (orally and in writing) instructed the control participants to recall the story as best they could without including their reactions to or personal feelings about the story. Instructions were repeated, and then participants were allowed 10 min in which to recall the story. Participants recalled stories a total of three times with the same directions, and follow-

1 Many of these participants were included in the results discussed by Butler et al. (2004).

Results

To test the contribution of each component of the Cognitive Interview to any overall effects, we computed analyses of variance (ANOVAs) for each dependent variable including correct recall, incorrect recall, and accuracy rates. Because we were interested in the total amount recalled over the three attempts, recall was scored cumulatively across retrieval attempts. Correct recall was assessed by the division of the story into 27 idea units. Cumulative correct recall indicates item gains across tests (i.e., information added to what was previously recalled and previously recalled information that was forgotten and then subsequently recovered was not a gain); for convenience, mean item gains are provided as well (see Table 1). Cumulative recall, especially in an eyewitness testimony situation, is of central importance in that it represents the total amount remembered rather than solely how much is remembered in any one attempt. Incorrect recall was scored when an idea expressed as part of the retrieval protocol was not explicit to the story; this was also measured cumulatively. Accuracy rates, or the proportion of correct responses to total amount recalled, were also examined in order to gauge whether increases in incorrect recall countered possible gains in correct recall produced by the Cognitive Interview. Cognitive Interview participants were allowed to review and amend their recalls; however, all changes were grammatical, and none substantively changed these analyses.

To assess scoring reliability, another judge (unaware of the current study’s hypotheses) randomly selected two protocols (including all three retrieval attempts) from each of the two retrieval conditions so that 10% of total protocols were rescored. Reliability scores were calculated for each recall, then averaged over the three recalls. Scoring was comparable among raters, with reliability
ratings of 96.4% and 88.9% for correct and incorrect recall, respectively.

Correct Recall

Cumulative correct recall was first analyzed using a two-factor mixed ANOVA examining the between-subjects effect of recall instruction (control and Cognitive Interview) and the within-subject effect of retrieval attempt (1, 2, and 3). The analysis yielded a marginally significant effect of recall instruction, \( F(1, 38) = 2.93, \text{MSE} = 81.33, p < .10, \eta^2 = .07 \), such that the Cognitive Interview elicited more cumulative correct recall than the control condition (see Table 1). Recall significantly increased with each successive retrieval attempt, \( F(2, 76) = 49.11, \text{MSE} = 0.77, p < .01, \eta^2 = .56 \). Follow-up tests revealed that each retrieval attempt produced significant increases over the previous attempt—Attempts 1 and 2: \( F(1, 38) = 85.76, \text{MSE} = 0.77, p < .01, \eta^2 = .69 \); Attempts 2 and 3: \( F(1, 38) = 25.45, \text{MSE} = 0.77, p < .01, \eta^2 = .40 \). Of importance, there was an interaction between recall instruction and attempt, \( F(2, 76) = 6.87, \text{MSE} = 0.77, p < .01, \eta^2 = .15 \), such that the benefit of successive retrieval attempts was significantly amplified in the Cognitive Interview group. Follow-up comparisons indicated that the Cognitive Interview conferred an advantage over the control condition for each of the three attempts, \( F(1, 38) = 54.37, \text{MSE} = 0.77, p < .01, \eta^2 = .59 \); \( F(1, 38) = 108.80, \text{MSE} = 0.77, p < .01, \eta^2 = .74 \); and \( F(1, 38) = 158.47, \text{MSE} = 0.77, p < .01, \eta^2 = .81 \), respectively.\(^4\)

Incorrect Recall

An ANOVA paralleling the one previously described was conducted to evaluate incorrect recall (Table 1 gives means). While there was no main effect for recall instruction, \( F(1, 38) = 1.56, \text{MSE} = 9.41, p = .22, \eta^2 = .04 \), incorrect recall generally increased with each retrieval attempt, \( F(2, 76) = 16.51, \text{MSE} = 0.20, p < .01, \eta^2 = .67 \). Follow-up tests examining this main effect yielded significant increases for each successive attempt—Attempts 1 and 2: \( F(1, 38) = 15.15, \text{MSE} = 0.20, p < .01, \eta^2 = .28 \); Attempts 2 and 3: \( F(1, 38) = 18.00, \text{MSE} = 0.20, p < .01, \eta^2 = .32 \). An interaction between recall instruction and retrieval attempt, \( F(2, 76) = 5.36, \text{MSE} = 0.20, p = .01, \eta^2 = .12 \), further revealed a significant amplification in incorrect recall with successive retrieval attempts for the Cognitive Interview group relative to the control. Follow-up comparisons indicated that the Cognitive Interview increased incorrect recall beyond that of the control condition for each of the three attempts: \( F(1, 38) = 8.00, \text{MSE} = 0.20, p = .01, \eta^2 = .17 \); \( F(1, 38) = 21.13, \text{MSE} = 0.20, p < .01, \eta^2 = .36 \); and \( F(1, 38) = 55.13, \text{MSE} = 0.20, p < .01, \eta^2 = .59 \), respectively.\(^5\)

Accuracy Rate

A mixed-design ANOVA with the same factors of retrieval attempt and recall instruction was performed on the dependent variable of accuracy rate. Accuracy rate was computed by dividing the number of correct responses by the total number of correct and incorrect responses. Thus, accuracy rate reflects the degree to which the proportion of correct recall in the protocol is paralleled by changes in incorrect recall, with lower rates indicating that any increases in correct recall were more than offset by increases in incorrect recall. Of importance, our analysis revealed no main effect for recall instruction (\( F < 1 \)), thus implying that the increase in correct recall associated with the Cognitive Interview was not at the expense of lower accuracy (see Table 1). Accuracy rate slightly decreased with each retrieval attempt, \( F(2, 76) = 2.64, \text{MSE} < .01, p = .08, \eta^2 = .06 \), though this result did not meet significance. Finally, instruction and retrieval attempt did not significantly interact, \( F(2, 76) = 1.12, \text{MSE} = 0.00, p = .33, \eta^2 = .03 \).

Recall Confidence

Confidence for correct and incorrect recall was analyzed separately using two-way ANOVAs examining the between-subjects factor of recall instruction (control and Cognitive Interview) and the within-subject factor of retrieval attempt (1, 2, and 3). There were no significant effects (all \( F_s < 1 \)).

Discussion

The current study significantly expands upon the findings from two previous studies using the Cognitive Interview with older adults (McMahon, 2000; Mello & Fisher, 1996) by demonstrating that the Cognitive Interview effectively increases correct recall following a 3-week delay (rather than 30-min delay) and with text materials. Given the well-documented, age-related difficulties in

\(^2\) The slight decrease in reliability for incorrect recall, as compared with correct recall, reflects a scoring difference of only one item (1 participant’s second recall) between the two raters.

\(^3\) Using the Bonferroni approach to control for Type I error across the three comparisons, a \( p \) value of less than .017 was required for significance.

\(^4\) There was only a marginally significant main effect of recall instruction using the between-subjects error term; however, the significance of the condition difference emerges in the pairwise comparisons because of the reduced within-subject error term involved in the contrasts.

\(^5\) As with correct recall, the significance of the pairwise comparisons emerges because of the reduced within-subject error term that is involved in the contrasts relative to the error term used in the recall instruction main effect.
immediate recall, our findings of positive effects at a more challenging delayed recall are provocative and possibly relate to the interesting, personal nature of the stimulus. As evidenced by nonsignificant effects of recall instruction (Cognitive Interview vs. control) on accuracy rates, this increase in correct recall is not undercut by increases in incorrect recall. Furthermore, it is interesting that this benefit is not limited to contextually rich robbery scenes, but extends to less perceptually rich, text-based stimuli as well. Finally, we obtained positive effects even through the use of a standardized form of the Cognitive Interview, rather than a prototypical interactive version used by McMahon and by Mello and Fisher.

Thus (comparable to young adults, Dornburg & McDaniel, 2005), the Cognitive Interview is not completely reliant upon its dynamic respondent-centered approach. Using similar stimuli with younger adults, Dornburg and McDaniel’s correct recall results paralleled current findings with older adults such that the Cognitive Interview’s benefit was significantly better than a control instruction across successive retrieval attempts (Gain 1: Cognitive Interview = 2.25, control = 1.35; Gain 2: Cognitive Interview = 1.15, control = .90), and without adversely influencing recall accuracy.

As was expected given the aging literature (Rabinowitz & Craik, 1986; Widner, Otani, & Smith, 2000), the significant main effect of retrieval attempt indicated that repeated testing conferred at least some benefit for older adults in both recall instruction groups. Of note, however, is the finding that accuracy rate slightly, but not significantly, decreased with each retrieval attempt. Therefore, although part of the Cognitive Interview’s effect rests on its multiple retrieval attempts, the slight decrease in accuracy rate might hint that repeated recall alone is not as useful a component for older adults as when implemented in concert with the other techniques. Although this point will need further exploration, the use of repeated recall with older adults might be monitored in settings in which false recall is of concern.

The Cognitive Interview and control conditions were distinguished by a collection of differences in recall instructions, including contextual reinstatement, use of multiple retrieval paths, repeated retrieval, and various other instructions (e.g., “Don’t worry about consistency of recollection” or “The retrieval techniques have been proven to increase recall”). Although this constellation of instructions does not allow for isolation of the contributions of these individual components, the significant interaction in correct recall between attempt and recall instruction may suggest that the Cognitive Interview’s amplified repeated testing benefits were caused at least in part by the use of multiple retrieval paths instructed in the second and third recall attempts. Additionally, perhaps repeated recall allowed continually increased reinstatement of contextual details that benefited retrieval. With the present correct recall findings establishing the usefulness of the Cognitive Interview with older adults, further work can begin more detailed analyses of the role of its various instructional components.

Another issue regarding the Cognitive Interview is whether the increase in recall is accompanied by increased confidence, particularly for incorrectly recalled material (see also Allwood, Ask, & Granhag, 2005). We did not find evidence for such an association. Increases in recall did not increase confidence in incorrect recall or in correct recall.

The Cognitive Interview did produce a significant increase in cumulative incorrect recall. The little work that has been published regarding the Cognitive Interview’s effectiveness with an aging population also suggests that the Cognitive Interview increases incorrect recall with older adults (Mello & Fisher, 1996). A similar trend was evident in McMahon’s (2000) data, although significant differences were not obtained. Because memory error in older adults has been related to frontal functioning (Butler et al., 2004), we calculated the frontal functioning of our participants based on a battery of neuropsychological tests (Gisky, Rubin, & Davidson, 2001). For participants in the Cognitive Interview group (but not the control), decreased frontal scores were significantly associated with increases in incorrect memory. Thus, our preliminary evidence suggests that the Cognitive Interview produces increased incorrect recall primarily for low-frontal older adults.

In summary, our results reveal that the Cognitive Interview may effectively increase correct recall for older adults even with contextually impoverished stimuli following a long delay. Thus, a nontrained respondent may use this standardized Cognitive Interview to bolster memory for older adults beyond what is otherwise possible through spontaneous retrieval.

References


Appendix

**Story of Bob and Margie (Spiro, 1980)**

This is a story about Bob and Margie. When they met, they were both twenty years old and beginning their senior year in college. Bob was majoring in political science and Margie in history. They didn’t know each other until they were introduced at a party in a mutual acquaintance’s apartment. Since neither of them was particularly extroverted, and they knew very few people at the party, they seemed glad to have each other to talk to. They found some interests they had in common, and hit it off fairly well. They soon began to see each other regularly.

After several months, Bob began to think he would like to marry Margie. He felt he loved her, and he believed the feeling was reciprocated. Still, he was not sure how she would react. Finally, he asked her to marry him. She agreed and they happily began making plans for their marriage and life together.

However, Bob’s happiness was clouded by his awareness that here was something important he had to discuss with Margie—his strong feeling that he did not want to have children. He avoided bringing the subject up because he didn’t want anything to ruin their relationship. However, he soon realized that he could not put off the discussion forever. Filled with apprehension, he told Margie he had a very important matter to discuss with her. He anxiously related to her his strong feelings against having children and awaited her response. Margie was horrified. She had always wanted to be a mother and had her heart set on having many children. They argued bitterly over what had become a very serious problem for them. A long discussion of the status of their relationship followed.

Received January 26, 2004
Revision received August 29, 2005
Accepted September 6, 2005