

External Retrieval Cues Facilitate Prospective Remembering in Children

JOHN A. MEACHAM

JOHN A. COLOMBO

State University of New York at Buffalo

ABSTRACT The purpose of this study was to determine whether external retrieval cues are effective in facilitating the prospective remembering of young children. Seventy-six six- to eight-year-old children were instructed individually to remind the experimenter to open a surprise box at the conclusion of a seven-minute interval. Remembering was more frequent ($p < .05$) in an elaboration condition, in which a toy clown was used as a cue, than in a control condition. This finding is consistent with children's interview data, and with data for college students showing the effects of external retrieval cues. It is argued that children's attempts at prospective remembering may be an important precursor to the development of strategies for retrospective remembering.

The remembering of information from the past frequently has implications for actions to be performed in the future (5:253, 12). Such remembering has been termed prospective remembering, and can be distinguished from retrospective remembering, which is concerned solely with the recall of information about the past (11). For example, in order to deliver a message one must remember not only the message (retrospective), but also the appropriate time to deliver it (prospective). Similarly, remembering whether or not one has locked the front door at night, and remembering to lock the front door, are distinguishable acts of remembering.

Prospective remembering is an essential aspect of those behaviors we refer to as planned. Forgetting to perform planned actions can have important consequences, as in the operation of machinery in industry or in the administration of medicines. The ability to remember to engage in planned actions ought to bear on a child's self-concept as a reliable and well-organized person. Munsat (12:18) notes that when a person is incorrect in his or her memory about the past, we say that his or her memory is unreliable; but when a person forgets to do something, we blame the person as unreliable. Parents often are concerned more with children's forgetting to carry out actions

than with their forgetting of information about the past.

Unfortunately, there has been little investigation of how we are able to remember to carry out planned actions and how such remembering might be made more efficient. Speaking in general terms, Bandura notes that "there exist countless demonstrations of how behavior varies under different schedules of reinforcement, but one looks in vain for studies of how people . . . succeed in fashioning reinforcement schedules to their own liking" (2:866).

One can imagine various means for facilitating prospective remembering, for example, through the construction of lists of actions to be carried out, or by various cognitive strategies, such as forming associations between actions and times or places. A third strategy for prospective remembering is to construct an external retrieval cue that can prompt remembering of the action. Azrin and Powell (1), for example, showed that outpatients would take a greater proportion of prescribed medication when using a portable operant apparatus that provided response priming and escape reinforcement. Meacham and Singer (11), in a study in which college students were asked to mail post cards on specified dates, found that 80 percent made use of external retrieval cues, whereas only 20 percent relied on cognitive strategies.

The major purpose of the present study was to determine the effectiveness of external retrieval cues in young children. A preliminary answer was provided by Kreutzer, Leonard, and Flavell (6), who asked children how they could be certain to bring their skates to school in the morning. The majority of the responses involved creating external retrieval cues, such as placing the skates in a particular location or leaving a written note, rather than cognitive processes. Hagen (4), however, has commented on the need to establish the relationship between such interview data and actual performance.

In a study by Meacham and Dumitru (9), eighty-two six- and eight-year-old children were asked to remember to place a drawing in a contest box when returning to the classroom. There were three experimental conditions: a control condition; a cue condition, in which the child was

provided with an external retrieval cue; and an elaboration condition, in which the child was coached in how the cue could facilitate his or her remembering. Thus, the conditions provided either no prompt, an explicit prompt, or an augmented explicit prompt (13). These conditions were designed to provide information bearing on possible mediation or production deficiencies in the use of cues (3). The eight-year-olds remembered significantly more often than the six-year-olds. Remembering for six-year-olds was more frequent in the elaboration condition (57 percent) than in the cue condition (31 percent) and the control condition (21 percent). This trend was not significant, however. The lack of differences between these experimental conditions would be consistent with the conclusion that external retrieval cues do *not* facilitate prospective remembering for young children, and would contrast with (although not necessarily contradict) Kreutzer et al.'s (6) finding that children can readily suggest the use of such cues.

The present study was carried out in order to resolve more clearly the question remaining from the earlier study—that is, are external retrieval cues effective for young children? Several changes were introduced. First, the age-related differences in the earlier study may have resulted from the younger children's failure to understand the remembering task (to enter one's drawing in a contest). In the present study, each child was asked merely to remind the experimenter to open a surprise box. It was thought this task would offer greater motivation and be more readily understood by both age groups than the task in the previous study. Second, in the earlier study the activity intervening between presentation of the remembering task and opportunity for recall, a Reinforcement Contingency Interview (14), may have been more demanding for the younger children, leading to a decrement in their prospective remembering performance. In the present study, an alternative, easier intervening activity was employed. Third, the number of children per cell was increased in the present study. The control and elaboration conditions were carried over from the earlier study.

Method

The subjects were thirty-eight kindergarten children (mean age five years, ten months) and thirty-eight second grade children (seven years, eight months), attending a middle-class, suburban elementary school. Each child was tested individually in an empty classroom.

The materials included a small, colorful box that, when opened, played a familiar tune. The box was not immediately recognizable as a music box. In the elaboration condition, a clown doll was placed on the table as a cue. In addition, the experimenter was prepared to administer the Reinforcement Contingency Interview (14) or to play a simple game of comparing playing cards with the person holding the high card being the winner on each

trial. The deck was stacked so that the child would have the higher score at the conclusion.

After establishing rapport, the experimenter said, "See this box? This box is a surprise box—a surprise happens when the lid opens. When we finish, will you remind me to open the box?" The experimenter waited for an answer and then repeated, "Good. You remind me when we're finished." This procedure was intended to establish that all the children understood the remembering task. The box was then set out of the child's sight. In the elaboration condition only, the experimenter then placed the clown on the table and said, "Here, this clown, will help you remind me to open the box. What will you think of when you see the clown?" The experimenter waited for an answer, and if necessary, repeated these instructions.

For half the children, the Reinforcement Contingency Interview was administered; for the other half, the experimenter and child played the card game together. After seven minutes of the intervening activity, the experimenter said, "Now we're finished. It's time to start back." The experimenter remained seated and silent for the following five seconds, giving ample time for the child to remind the experimenter, and then quietly followed the child to the door. The child was scored as having remembered if he reminded the experimenter before reaching the door.

Results and Discussion

Remembering was more frequent in the elaboration condition (75 percent) than in the control condition (52 percent). A 2 (age) \times 2 (condition) \times 2 (intervening task) \times 2 (sex) \times 2 (forget/remember) multiple-classification chi-square analysis (15) revealed this association between the elaboration condition and remembering to be significant, $\chi^2(1) = 4.16, p < .05$. There were no other trends or significant associations.

Thus six- and eight-year-old children can use external retrieval cues to facilitate prospective remembering (6) and can also benefit from the availability of and instruction in the use of such cues. This conclusion ought to increase the confidence with which such cues are used in home and school settings to facilitate children's remembering to carry out planned or assigned actions. The finding is also consistent with a study by Meacham and Leiman (10), in which an external retrieval cue—a tag fastened to college students' key chains—facilitated remembering to mail post cards on specified dates (especially when the intervals between the dates were long).

The lack of an age effect in the present study may be explained by the use of a remembering task that was better understood and more motivating at both ages than in the earlier study (9). Other data are consistent with the view that there is little or no developmental change, from the early elementary years to adulthood, in the

general types of strategies used to facilitate prospective (in contrast to retrospective) remembering. For example, the proportion (20 percent) of college students choosing a cognitive strategy in the Meacham and Singer (11) study is not markedly different from the proportion of children (about 16 percent) in Kreutzer et al.'s (6) study who suggested they would rely upon cognitive efforts to facilitate prospective remembering rather than an external retrieval cue. Nevertheless, there remains considerable room for improvement in performance on the task used in the present study; it is likely that a more marked age effect would be found with older children. No effect of varying difficulty of intervening activity was found in the present study, although it seems a reasonable hypothesis that intervening activities involving greater stress would lead to decrements in prospective remembering. The nature of both the remembering task itself and the intervening activity ought to be included as important parameters in future research.

There were no significant interactions between age and condition in either the present study or the earlier one (9), at least for this age range of six to eight years. Thus no evidence is provided for explaining the development of prospective remembering abilities in terms of a production deficiency, as has been the case with retrospective remembering.

Perhaps our efforts to understand the development of remembering abilities in children may suffer from focusing too much on the remembering of information about the past, as opposed to remembering to carry out planned actions. Early remembering abilities may originate in the child's efforts to prepare for future actions, that is, to remember what he or she plans to do and to remember to do it. The sequence of the development of remembering thus implied has been described by de Laguna (7): "The distinct living over of past experience, memory proper, becomes only gradually freed from the control of the particular act and the particular occasion, and at the same time distinguished, as the *recall* of the past from the imagination of the possible future" (p. 179). Similarly, Kantor and Smith (5) have emphasized that remembering behavior ought to be considered a "forward-looking action" rather than "having a backward reference" (p. 253).

Empirical efforts along these lines include a study by Wellman, Ritter, and Flavell (16), in which it was necessary for children to remember the goal of a future action, and a study by Meacham (8), in which verbal activity facilitated the remembering of anticipated goals. It seems likely that prospective remembering abilities are required and thus develop as children begin to make choices regarding alternative actions. Initially, children's actions are structured around daily events in which they always participate—getting up, mealtime, a working parent's arrival home, going to bed, and so forth. Prospective remembering becomes a

necessity when children have the freedom and the responsibility to choose between various actions—delivering a message from home to school, or vice versa, feeding the cat, stopping at the store, and so on. In short, what is needed is a closer consideration of the contexts within which young children first attempt to remember.

NOTES

The cooperation of Robert A. Grieser, principal, Betty Bruish, Dorothy Little, and Nancy Schwender of the Brighton Elementary School is gratefully acknowledged.

Requests for reprints should be sent to John A. Meacham, Department of Psychology, State University of New York at Buffalo, 4230 Ridge Lea Road, Buffalo, New York 14226.

REFERENCES

1. Azrin, N. H., and Powell, I. "The Use of Response Priming to Improve Prescribed Self-Medication." *Journal of Applied Behavior Analysis* 2 (1969): 39-42.
2. Bandura, A. "Behavior Theory and the Models of Man." *American Psychologist* 29 (1974): 859-69.
3. Flavell, J. H. "Developmental Studies of Mediated Memory." In *Advances in Child Development and Behavior*, Vol. 5, edited by H. W. Reese and L. P. Lipsitt, New York: Academic Press, 1970.
4. Hagen, J. W. "Commentary." In M. A. Kreutzer, C. Leonard, and J. H. Flavell. "An Interview Study of Children's Knowledge about Memory." *Monographs of the Society for Research in Child Development* 40, 1975, (1, Serial No. 159).
5. Kantor, J. R., and Smith, N. W. *The Science of Psychology: An Interbehavioral Survey*. Chicago: Principia Press, 1975.
6. Kreutzer, M. A.; Leonard, C.; and Flavell, J. H. "An Interview Study of Children's Knowledge about Memory." *Monographs of the Society for Research in Child Development* 40, 1975, (1, Serial No. 159).
7. de Laguna, G. A. *Speech: Its Function and Development*. Bloomington: Indiana University Press, 1963.
8. Meacham, J. A. Verbal Guidance through Remembering the Goals of Actions. *Child Development* 49 (1978): 188-93.
9. Meacham, J. A., and Dumitru, J. "Prospective Remembering and External Retrieval Cues." *JSAS Catalog of Selected Documents in Psychology* 6, no. 65 (1976). (Also ERIC Document Reproduction Service No. 119 859.)
10. Meacham, J. A., and Leiman, B. "Remembering to Perform Future Actions." In *Memory in its Natural Context*, edited by U. Neisser, San Francisco: Freeman, in press.
11. Meacham, J. A., and Singer, J. Incentive Effects in Prospective Remembering." *Journal of Psychology* 97 (1977): 191-97.
12. Munsat, S. *The Concept of Memory*. New York: Random House, 1966.
13. Rohwer, W. D., Jr. "Elaboration and Learning in Childhood and Adolescence." In *Advances in Child Development and Behavior*, Vol. 8, edited by H.W. Reese, New York: Academic Press, 1973.
14. Stephens, M.W., and Delys, P. "A Locus of Control Measure for Preschool Children." *Developmental Psychology* 9 (1973): 55-65.
15. Sutcliffe, J. P. "A General Method of Analysis of Frequency Data for Multiple Classification Designs." *Psychological Bulletin* 54 (1957): 134-37.
16. Wellman, H. M.; Ritter, K.; and Flavell, J. H. "Deliberate Memory Behavior in the Delayed Reactions of Very Young Children." *Developmental Psychology* 11 (1975): 780-87.