

The Effects of Note Taking and Mental Rehearsal On Memory

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This study examined the effects of the use of two memory aids, note taking and mental rehearsal, on memory. Thirty-four undergraduate college students were assigned to either take notes on or think about words and ideas that would help them to remember a list of words that they were later asked to recall. Participants who used mental rehearsal recalled significantly more words than participants who used note taking. The results suggest that in certain conditions, mental rehearsal is a more effective memory aid than note taking. Mental rehearsal requires constant thinking, which may allow information to be processed more effectively.

Memory, the ability to retain and recall past experience, is something we depend on everyday. As life becomes more complex, people have taken on increasingly more responsibilities related to home, school, work, and recreation. With birthdays, tests, deadlines, and soccer practice, how can we remember it all? College students are constantly being presented with new information. With the demands of tests and retaining information for later use, it is important for them to know the most effective ways to remember the information needed. This study focused on the use of two memory aids, note taking and mental rehearsal, for retaining information in long-term memory. Note taking is an external memory aid that refers to writing a brief record of information to be remembered. Mental rehearsal is an internal memory aid for improving memory by mentally repeating the information to be remembered. Whereas maintenance rehearsal refers to simply repeating information in an attempt to keep it in short-term memory, this study focused on elaborative rehearsal. Elaborative rehearsal refers to making associations between information that is presented and one's prior knowledge in an attempt to retain the information in long-term memory (Kassin, 1998).

Research shows that mock jurors who took notes during a mock trial recalled significantly more information that was related to the case than mock jurors who did not take notes (ForsterLee, Kent, & Horowitz, 2005). Tigner (1999) suggests that engaging

in mental rehearsal followed by note taking is effective for enhancing students' memory of information taught to them during a class lecture. Thomas and Dieter (1987) found that writing foreign words, rather than repeating them aloud, significantly improves recall. Dyer, Riley, and Yekovich (1979) reported that note taking, an external memory aid, and rereading, an internal memory aid, are both effective for learning information. Intons-Peterson and Fournier (1986) found that the use of external memory aids resulted in a higher recall of words from a previously viewed list than the use of internal memory aids.

It was expected that note taking would allow for two methods of processing information in one memory aid, because participants who used note taking not only wrote words and ideas, they also had to think to be able to produce the words and ideas that they wrote. The combination of thinking and writing was expected to result in more effective processing of the information, which would make retrieval of the information more likely. Based on the consistent research findings that writing and note taking aid in memory (Dyer et al., 1979; ForsterLee et al., 2005; Intons-Peterson & Fournier, 1986; Thomas & Dieter, 1987; Tigner, 1999), it was hypothesized that the use of note taking as a memory aid would result in a greater number of recalled words than the use of mental rehearsal as a memory aid. In the present research, the independent variable was the type of memory aid used, either note taking or mental rehearsal. The dependent variable was the number of words recalled from a previously viewed list of words.

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Method

Participants

A convenience sample was used of 34 undergraduate students from a public northeastern university. Participants were psychology students, and were compensated with either partial course credit or extra credit.

Materials

A PowerPoint presentation was used to display the list of 20 common, unrelated words used by Roediger and McDermott (1995) as target words in their memory research (See Appendix). Words were displayed on a screen in the front of the classroom. The participants assigned to the note taking group were given a piece of lined paper and a pencil. Each participant was given a word search puzzle that was created on the Discovery School (2004) website, as a filler activity. Pencils were handed to those who had not been given one. The participants used the back of the word search puzzle sheet to write down the words recalled from the initial presentation.

Procedure

The experiment ran during several sessions at varying times on different days of the week in an effort to get a representative sample of students. The participants met in various rooms that were equipped with a projector. The two assigned conditions, note taking and mental rehearsal, were alternated among the sessions. This allowed each condition to be tested separately. Once participants were seated, they were each handed an informed consent, and were asked to sign it and return it at that time. Pencils and lined paper were then handed out to the note taking group. Participants were told that they would be viewing a list of words, one at a time, projected on the screen in the front of the room, and that each word would be displayed for 15 seconds. The note taking group was instructed to write down words and ideas that would help them to remember each word that they viewed. The mental rehearsal group was instructed to use elaborative rehearsal by think about words and ideas that would help them to remember each word that they viewed. Both groups were given a verbal example using the word 'cow,' which was not in the presentation. The examples that were given of words and ideas that may be helpful in remembering the word 'cow' were: cow, barnyard animal, has utters, produces milk, says moo. I asked participants if they understood their task and if they had any questions pertaining to what they were assigned to do.

The participants then viewed 20 words that were projected on a screen in the front of the room. After the five-minute presentation was completed, the notes from the note-taking group were collected. The word search puzzle was then handed out to all participants and a pencil was given to those who did not already have one. As a filler task, participants were instructed to try to complete the word search puzzle in 10 minutes. The word search puzzle was designed to take more than 10 minutes to complete to

help ensure that participants would actively be searching for words for the whole 10 minutes. After 10 minutes, participants were asked to turn the word search puzzle face down, so that the blank side of the paper was facing up. Next, the participants were instructed to write down, on the blank side of the paper, as many words as they could recall from the previously viewed list of words. Participants were encouraged to remember as many words as possible and were allowed a maximum of 10 minutes for the recall of words. The participants were told that after the task was completed they were to return the pencil and paper with the word search puzzle and list of recalled words on it. At that point, they were thanked for their participation and were welcome to leave.

Results

An independent-samples *t*-test was used to test for differences in group means and to see if the type of memory aid used had an effect on the number of words recalled. The mean number of recalled words for participants who used mental rehearsal as a memory aid ($M = 13.56$, $SD = 2.92$) was significantly greater than the mean number of recalled words for participants who used note taking as a memory aid ($M = 10.28$, $SD = 2.22$), indicating a significant difference in group means, $t(32) = -3.718$, $p < .001$.

Discussion

The results of this experiment are inconsistent with the hypothesis and the findings of previous research, which suggest that note taking is a more effective memory aid than mental rehearsal (ForsterLee et al., 2005; Intons-Peterson and Fournier, 1986; Thomas and Dieter, 1987). The results show that participants who used mental rehearsal as a memory aid recalled significantly more words than the participants who used note taking as a memory aid, which suggests that mental rehearsal is a more effective memory aid than note taking. This finding is consistent with the research of Dyer et al. (1979) who found internal memory aids to be more effective in remembering information. The results of the current study may have occurred because of the short amount of time provided for the participants to engage in mental rehearsal and note taking.

Previous research studies, with findings that are inconsistent with the results of the present research, allowed participants considerably more time to engage in the use of memory aids (ForsterLee et al., 2005; Thomas & Dieter, 1987).

The participants in the mental rehearsal condition were required to constantly think about words and ideas that would help them to remember the words viewed, which may have allowed for more effective information processing. Participants in the note taking condition were required to write words and ideas that would help them to remember the words viewed, which may have allowed less time for thinking and interfered with the processing of information. These results support Tigner's (1999) research that suggests memory is enhanced when mental rehearsal is used prior to taking notes, which may allow information to be effectively processed and understood before engaging in the task of writing.

Note taking may increase the effectiveness of information processing after initially engaging in mental rehearsal.

Another interesting finding in this research is that participants in both groups remembered more words than expected. Miller (1956) found in his research on memory that the average capacity of short-term memory ranges from five to nine words, so the number of words participants transferred to their long-term memory was not expected to exceed nine. This was probably due to participants thinking about and taking notes on words and ideas that would help them to remember the words that they viewed. This may have allowed them to make meaningful associations for the words that were presented, which may have aided in memory.

It is recognized that this study had limitations. First, a small convenience sample was used that was not representative of the population. Second, participants in the note taking group were not told that their notes would be collected, which may have resulted in participants being dependent on their notes for recall. Had participants been notified that their notes would be taken from them, they may have thought more about what they were writing. Third, a set amount of time was not given for word recall. Although a maximum of ten minutes was given for recall, participants were allowed to leave when they felt that they had recalled as many words as possible. It was observed that once one participant got up to leave, the other participants followed. During each session, either everyone left before ten minutes was up or everyone stayed for the entire ten minutes. This could have resulted in participants leaving before allowing themselves enough time for recall. This means that some participants allowed more time for recall than others. A suggestion for future research would be to replicate the study, but display each word for longer than 15 seconds to allow more time for note taking and mental rehearsal, tell participants that notes will be collected after the presentation, and require all participants to remain seated for the duration of the recall period.

Participants in the mental rehearsal group were instructed to use elaborative rehearsal. However, after the experiment, participants were not asked to write or describe what they thought about for each word that was viewed. In addition, the notes for the note taking group were not inspected to see if these participants followed the instructions. Another suggestion for future research would be to have participants describe what they thought about for each word that was viewed, to check the depth of their processing and if they used elaborative rehearsal. It may also be useful to check the quality of the notes that were taken.

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Appendix

Words displayed using PowerPoint:

Chair
 Rough
 High
 Doctor
 Foot
 Thief
 Cold
 Girl
 King
 Slow
 Mountain
 Anger

Spider	Needle
Bread	Man
Soft	River
Window	Sleep