

Titles as a Double-Edged Sword in Memory for Prose Passages

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This is Sample Paper 2: Using 2 x 2 Design

The experiment and data reported here were fabricated for teaching purposes only and are loosely based on work by Sulín and Dooling (1974)

Abstract

Although titles have been shown to improve overall memory for prose passages, they may also cause certain kinds of errors to occur. We tested the hypothesis that [knowledge of a title for an ambiguous passage may cause people to incorrectly think that the material brought to mind by title was part of the information they actually read], [especially when trying to remember the passage after a delay.] We presented college students with a short text about a girl's difficult childhood. Half of the participants read the paragraph by itself, and half read it with the title, *Helen Keller's Early Years*, above it. The memory test was given either immediately or one day later, and it included items about Helen Keller not actually present in the text. We predicted that [participants would make more errors on these items if they had seen the title than if they had not], and that [the effect of titles would be greater for the long test delay than the shorter one.] Consistent with our prediction, [participants made more errors if they had seen the title than if they had not], and [the difference in error rate was larger for those tested later than for those tested immediately.] Thematic knowledge may increase false memories as well as true memories, especially when recalling after a delay.

This part of the hypothesis is relevant to the main effect of Presentation Mode

This part is relevant to the interaction with Time of Test

Identify one independent variable

Identify the other independent variable

Prediction for main effect of Presentation Mode

Prediction for interaction of Presentation Mode with Time of Test

Result evaluating main effect of Presentation Mode

Result evaluating interaction

In the Abstract and Discussion, you may focus on whichever predictions and results are most central to the hypothesis.

(In the Intro and Results, you need to cover all of them.)

Please consult the first sample paper for reminders about the basic info that goes in each section and the order it goes in!

Titles as a Double-Edged Sword in Memory for Prose Passages

People often need to remember information they have acquired from prose passages – for instance, in order to answer questions on an exam from their reading assignments, in order to write reports at work based on sources they have collected, or simply for the pleasure of recalling a story they have read.

Although some people claim to have photographic memories that allow them to easily remember everything they read, most people are aware that their memory for what they have read is far from perfect.

Studies of memory for text have shown that performance is improved by the presence of informative titles. For instance, Bransford and Johnson (1972) presented people with passages containing vague and ambiguous descriptions of common activities. A sequence of sentences might go something like this, “The first step is to separate the objects into piles. It is important that the piles be made correctly; otherwise, unfortunate problems can arise. Then the piles must be taken to the appropriate location. Once there, the next step is to prepare the machines for the task.” Bransford and Johnson found that recall of the passage was poor for people given the passage alone, but it was much better when

participants received a title such as *How to do Your Laundry* that allowed them to use their general knowledge to help interpret the sentences. Studies such as this one suggest that knowing the theme or topic of a passage in advance can help people understand and later recall the text.

However, it is possible that knowing a theme or topic in advance might not always be helpful in improving memory for text. For instance, suppose that when people know that Bransford and Johnson's (1972) passage is about doing laundry, they assume that the phrase "the piles" refers to piles of clothing, and the phrase "the appropriate location" refers to a laundry room. As they read the passage, they may be picturing piles of clothing in a laundry room in their mind. Later on, when they remember what the passage said, it is possible that they will, wrongly, think that the passage actually talked about piles of clothing or a laundry room, or both. In other words, they may create some false memories because of the interpretations they made guided by the title. For material like this that is related to the title, memory performance may actually be worse as a result of the title instead of better.

Develop the main issue of interest.



Draw a conclusion that will lead to part of your hypothesis.

Note transition linking 2nd issue to first.

← The reasoning just given suggests that memory accuracy might always suffer from material that is suggested by a title but not actually present in a text. However, other research on memory → for texts (e.g., Jarvella, 1979; Sachs, 1974) has shown that people

Introduce second issue of interest.

are relatively accurate in remembering exact sentences of a passage immediately after they have read it, but their accuracy declines rapidly when a delay is introduced before the test. These findings suggest that titles might create only a minor problem if a person is trying to remember the text immediately after it, but might result in larger problems when a person tries to remember the passage later on.

Draw a conclusion that also contributes to the hypothesis.

The hypothesis we will test, then, is that [prior knowledge of a theme or title for an ambiguous passage may cause people to incorrectly think that the material brought to mind by the theme or title was part of the information that they actually read in the passage], and [this problem will be greater if time has passed before the person has tried to remember the passage than if recalling immediately] To test this idea, we presented college students with a short text about a girl who had a difficult childhood. The text contained sentences such as “She was wild, stubborn, and violent” and “She could not learn to read or speak.” Half of the participants read the paragraph by itself, and half of them read it with the title *Helen Keller’s Early Years* above it. All of the participants then read a list of sentences and indicated which ones they believed actually appeared in the passage. Half of the participants took this test immediately after reading the passage, and half took it a day later. Some of the test sentences included information about Helen

State the hypothesis, indicating both parts clearly. You can break it into two or more separate hypotheses, in separate sentences, if that is easier.

Identify the first independent variable.

Identify the second independent variable.

Keller, such as “She could not hear or see”, that were not in the actual text but that might have been brought to mind by those who

State your prediction for the main effect of the first variable.

had the title. If our hypothesis is correct, there should be a main effect of presentation mode: Participants should be more likely to think they read these sentences if they read the passage with the title than if they read it without the title. There should also be an interaction, with the effect of presentation mode depending on the time of test. Specifically, the effect of presentation mode will be relatively small for the immediate test, but it will be much larger for the delayed test. Although not of primary interest, we also predicted a main effect of time of test, with better accuracy overall for immediate tests than for delayed tests.

Note: The order of the three predictions may vary depending on which is/are of primary interest.

But always address both main effects and the interaction.

State your prediction for the interaction of the two variables, making clear the nature of the interaction expected.

State your prediction for the main effect of the second variable.

Method

Participants

Sixty Lehigh University undergraduates participated for course credit. Approximately half were male and half were female.

Design

← The first independent variable was Presentation Mode, with two levels: With Title and Without Title. The second independent variable was Time of Test, also with two levels: Immediate and Delayed. The dependent variable was the number of sentences

Identify the first independent variable and its levels.

→ Identify the second independent variable and its levels.

↘ Identify the dependent var.

related to the title that the participants incorrectly reported as having been present in the passage.

The experiment used a completely between-subjects design, with 15 participants randomly assigned to the With Title-Immediate Test condition, 15 to the With Title-Delayed Test condition, 15 to the Without Title-Immediate Test condition, and 15 to the Without Title-Delayed Test condition.

Note that in a 2 x 2 design, there are always four separate conditions.

Materials

The passage presented to participants was taken from previous research on memory for text by Sulin and Dooling (1974). As already described, it concerned a girl whose childhood was difficult. It was 12 sentences long, and each sentence described some aspect of her behavior, abilities, or family life. The complete text of the passage can be found in Appendix A. The passage was presented in typed form on a sheet of paper. Above the passage on half the copies was the title *Helen Keller's Early Years*. The other half had no title.

Indicate how the first independent variable was operationalized.

In this case, the second independent var. is not in Materials because it is a time factor. If another var is manipulated in the stimuli, be sure to describe it here.

The memory test was devised by the experimenters. It contained 15 items that the participants were to identify as either having occurred in the passage or not having occurred. Eight of these consisted of sentences that actually did appear in the passage. For example, one was "She was wild, stubborn, and violent." Three of them consisted of sentences that did not appear in the

passage and were not closely related to information that might be brought to mind by the title. For example, one was “She spent many happy summers in Kentucky.” The purpose of these questions was to make sure participants had paid enough attention to the passage to distinguish completely false information from information related to the text. Finally, the critical questions were four that contained information that might have been called to mind by the title, but that did not actually appear in the text. These were, “She had suffered from scarlet fever”, “She could not hear or see”, “She could not speak”, and “Her parents despaired about her condition.” The complete memory test can be found in Appendix B.

Procedure

Participants completed the experiment in groups of three to five. The experimenter told them that they were participating in an experiment on story understanding. They were further told that they would be reading a short passage and then tested for their understanding of it. Participants assigned to the Delayed Test conditions were also told that although they would read the passage at this time, they would need to return at the same time the following day for the test. The experimenter asked them to read at their normal speed, and to just try to understand the story. No

Note “conditions”, plural. There are two different Delayed Test conditions (see the Design statement). “Delayed Test” by itself isn’t a condition.

Be sure to identify any aspects of the Procedure that differ for the different conditions.

mention was made of a memory test, so that they would not adopt any special strategies to try to memorize the passage.

After any questions had been answered, the passages were distributed and participants were asked to begin reading. Participants were asked to turn the paper over when they had finished reading it.

After all participants had turned over their papers, those assigned to the Delayed Test conditions were thanked and reminded that they should come back at the same time the next day for the test. For those in the Immediate Test conditions, the experimenter handed out the “comprehension test” (actually the memory test). Participants were asked to put a check mark next to each sentence that they thought they had read in the passage, and to put an X next to each one they thought they had not read. Participants were asked to work at their own pace, not to look at anyone else’s paper, and to turn over the test when they were done. When all participants had turned over their tests, the tests were collected and the participants were thanked, debriefed, and dismissed.

Again - explain how the conditions differ.

Participants in the Delayed Test conditions were telephoned in the evening to remind them to return for the second part of the experiment the next day. When those participants arrived for their test, it was administered following the same

Ditto.

procedure used for participants who received it immediately after reading.

Results

The questions containing information not included in the text, but unrelated to Helen Keller, were examined first to make sure that participants had been paying attention to the text when they read it. No participant made more than one error on these questions, indicating that all of them had been paying attention.

The memory tests were scored based on the four questions that had material not included in the passage but closely related to the title. Each test received a score of 0 to 4 indicating how many of these questions the participant incorrectly marked as having been read in the text. Then we calculated the mean number of questions incorrectly marked for each of the four conditions.

These means are presented in Table 1 and Figure 1.

Now, evaluate the data **one prediction at a time!**

[If our hypothesis is correct, then there should be a main effect of Presentation Mode: More errors should have been made by participants who received titles than by those who did not.] [The pattern of means is consistent with this prediction, as shown in Table 1 and Figure 1.] [The difference between these means is significant, $F(1, 58) = 6.02, p < .01$.] [The outcome therefore supports our hypothesis that knowing a theme or title for a piece of

For data involving more than two means, it is best to present the data in a figure or table, not in the text.

Normally you would use just one or the other, but for this class, please include both a table and a figure.

Give stat analysis for **this effect only.**

Remind the reader of the **first** prediction.

Describe relevant pattern of means

Draw a conclusion about this effect.

← text may sometimes cause people to mistakenly believe that information brought to mind by that theme or title was actually part of the text.]

Remind the reader of the **second** prediction.

← [We also predicted an interaction between Presentation Mode and Time of Test, with the effect of Presentation Mode being larger for Delayed than Immediate Time of Test.] The pattern of means is also consistent with this prediction. As Table 1 and Figure 1 show, participants who took immediate tests made only slightly more errors with titles than without. In contrast, participants who took delayed tests made many more errors with titles than without.] [The interaction between Presentation Mode and Time of Test was significant, $F(3, 56) = 3.56, p < .01$] [This

Describe the relevant pattern of means.

Give stat analysis for **this effect**.

Draw a conclusion about this effect.

← outcome indicates that errors in memory introduced by knowing a theme or title for a piece of text mainly occur after some time has elapsed since reading the text.]

Finally, we also predicted a main effect of Time of Test, with performance expected to be poorer overall when testing is delayed than when it is immediate. The pattern of means is also consistent with this prediction. As Table 1 and Figure 1 show, more errors were made on delayed tests than on immediate tests. The difference between these means was significant, $F(1, 58) = 2.66, p < .05$, confirming that accuracy decreases with delayed testing.

Follow the same format for the third effect.

Discussion

[We found that people who saw a title for a piece of text later falsely recognized more sentences related to the text than people who did not see the title], and [this effect was greater when memory testing was delayed by a day than when it was immediate.]

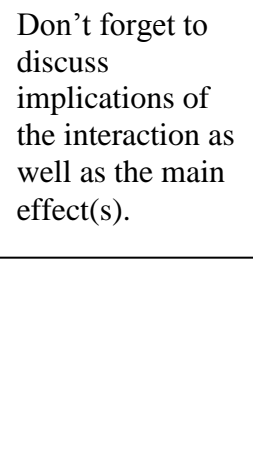
Mention both of the findings relevant to the hypothesis.

Our results suggest that when people read a piece of text, sometimes they may think that a certain thing was said in the text that actually was not. They may incorrectly “remember” this material because it was brought to mind by the title or other source of information, and the material brought to mind becomes part of their memory of what they read. They may be especially likely to make this sort of mistake when some time has elapsed between when they read the passage and when they try to remember it because memory for exact sentences in a passage is retained for a short time but then fades rapidly (e.g., Jarvella, 1979; Sachs, 1974).

This result raises the question of whether it would be better not to give people titles or other sorts of information about what they are about to read before they read the material. We think that it would be wrong to draw this conclusion. Although some errors of the sort we found may be made, previous research (e.g., Bransford & Johnson, 1972) does suggest that titles also benefit people by increasing their overall recall of information. Although

we did not examine our participants' performance on the questions referring to correct material in our experiment, if we had done so, we might have found that people who received titles performed better than people who did not have titles. The effect of titles, then, may be a double-edged sword – on the one hand, it may improve memory performance overall, but on the other hand, it may contain some risk of also increasing errors of a certain type. In general, the benefits of titles may outweigh the costs, so we do not suggest removing titles from passages despite the possible disadvantages.

It is also noteworthy that the negative effects of titles we found seem to occur mainly when memory is probed after some delay, rather than immediately. Immediately after reading a passage, our participants were relatively accurate at knowing what sentences the passage actually contained, consistent with past studies along these lines (e.g., Jarvella, 1979; Sachs, 1974). This interaction might suggest that to maximize accuracy, people should use their memory for passages immediately after reading them. However, doing so is often not possible. People acquiring information from texts will often need to recall it long after they have read it. A more practical implication of the interaction we found might be that people drawing on information acquired in the past should be aware of the decline in memory performance over



Don't forget to discuss implications of the interaction as well as the main effect(s).

time and should be careful about re-checking the original source of information in situations where accuracy is important.

In sum, our findings indicate that simply viewing titles as devices that increase recall and improve comprehension is too simplistic. The situation seems to be more complicated, in that there may be negative consequences of titles as well as positive, especially when time has passed between reading a passage and remembering it. People do not seem to be aware of the negative consequence, or at least they are not able to recognize when it has occurred, because if they were aware, they would not have made the errors on the memory test. Therefore, it may be helpful in improving memory accuracy, especially at long delays, for people to become more aware that they need to distinguish between what they actually read and what they may have thought about as they read.

References

- Bransford, J. D. & Johnson, M. K. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. *Journal of Verbal Learning and Verbal Behavior, 11*, 717-726.
- Jarvella, R. J. (1979). Immediate memory and discourse processing. In G. H. Bower (Ed.), *The psychology of learning and motivation, Vol. 13* (pp. 379-421). New York: Academic Press.
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- Sulin, R. A. & Dooling, D. J. (1974). Intrusion of a thematic idea in retention of prose. *Journal of Experimental Psychology, 103*, 255-262.

Appendix A

Put materials here, if needed

Appendix B

Put more materials here, if needed

Table 1

Mean Number of Errors on Critical Test Items as a Function of Presentation Mode and Time of Test

			Presentation Mode	
			With Title	Without Title
Time of Test				
	Immediate	0.01 (0.10)	1.1 (0.40)	
	Delayed	0.50 (0.10)	3.25 (0.50)	

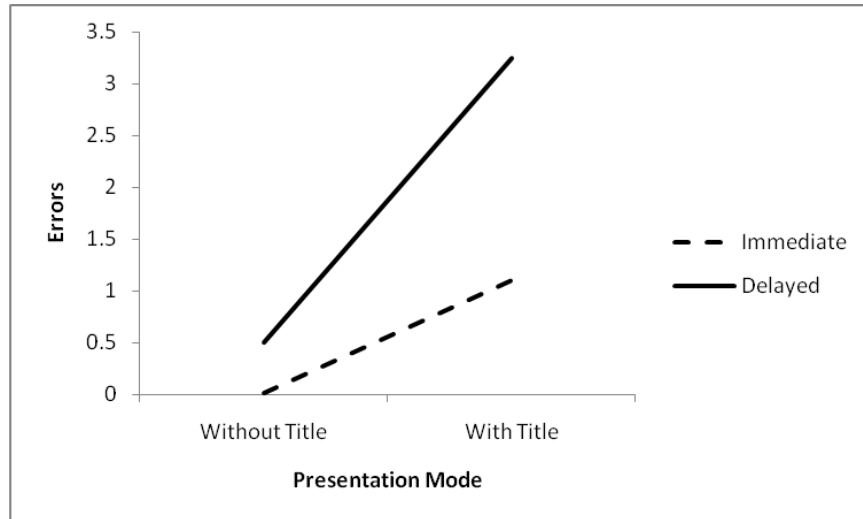
Separate labels from data with horizontal lines.

This number is the condition mean.

The one in parentheses is the standard deviation.

If Word is causing your lines to turn into dark bars you cannot control, you need to turn off this feature.

For Office 2007: From the Office button, choose Word Options at the bottom right corner, then Proofing tab, then AutoCorrect Options button, then Autoformat as You Type, then clear the checkmark on Borderlines.



See separate handout on how to make an APA-style graph in Excel.

Figure 1. *Mean number of errors on critical test items as a function of presentation mode and time of test.*

Figure caption can be the same as your table title. The figure is showing exactly the same thing except in graphical form.

APA format has recently changed to allow figure captions on the same page as the figure, as shown here. Your textbook or other sources may say the caption belongs on a separate page – that is the older style.