Reality Versus Beliefs About the Effects of the Preview Learning Method

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Abstract

This study is mainly designed to evaluate a popular learning method: previewing material before classes and to answer two research questions on the learning method. The research questions are "Does previewing have benefits in promoting future learning?" and "Do people have correct metacognitive judgements on the effects of previewing?" The hypothesis states that previewing is beneficial in ways other than directly pre-stating answers (e.g., providing context information or keywords) and that, in general, individuals' judgements on the effects of previewing are correct. This experiment found that participants who read preview materials before watching a brief lecture do not perform significantly better on post-tests than participants who have not read the preview. At the same time, most people who read preview materials see the preview as beneficial to their understanding of the topic, which is an incorrect metacognitive judgement. This study indicates that the importance of preview for learning performance may be a myth and reveals how people misjudge the benefits of previewing. These findings can lead to an improved understanding of better ways to conduct self-cognitive study.

Keywords: memory, metacognitive judgements, preview

1. Introduction

1.1 Introduction to the Preview Method and Its Potential Benefits

Providing students with pre-class preview material has become a popular pedagogical tool in many schools, and this preview method has been receiving increasingly more attention from educators. Educators expect that preview materials will introduce students to new information earlier and better prepare students for further learning in classes (Songrong, 2014; Wang, 2008; Oi, Okubo, Shimada, Yin, & Ogata, 2015).

Guoping Wang (2008) included previewing when he presented his educational method at the 38th Annual Frontiers in Education Conference. According to him, warm-up exercises before class—including a preview—can maximize students' interactions with teachers in a class by familiarizing them with new information. In a 2015 investigation with 98 college students, Misato Oi et al. (2015) found that students who have the habit of previewing showed higher achievement than those who do not do preview, further suggesting that previewing may be positively related to students' academic performance.

Previewing can improve the efficacy of studying in two primary ways: 1) strengthening retention of the given material by directly pre-stating the information and 2) promoting further learning on a given topic in ways including but not limited to stimulating interest in the topic and increasing concentration in class. To experimentally confirm the first benefit of previewing, we aim to test how much people learn from the preview by offering preview materials that mention information that is included in the post-test or post-assessment. To experimentally confirm the second benefit, we aim to test how much previewing helps people learn in a formal studying format, such as before a lecture, and whether it promotes future learning on the topic. In this case, the preview material should help students achieve better results without providing information that can be directly used to answer the post-test.

1.2 Relevant Scholarship

Many teachers encourage previewing in classrooms, and other similar pedagogical tools—such as pre-tests—are often used before the formal learning process. Pre-testing is a learning method that is similar to, but distinct from, previewing.

Unlike previews, pre-tests often do not directly offer standard answers and information for students; instead, they require that students look for the information in the formal studying process, which usually consists of lectures. Studies show that pre-tests enhance educational learning for students, even when pre-tests do not provide correct answers to the post-tests (Richland, Kornell, & Kao, 2009). This effect could indicate that preview materials before classes may similarly benefit students by promoting future learning (Bjork, 1994; Carrier & Pashler, 1992).

If, in our review study, preview is only shown to be beneficial in that it reinforces learners' memories of certain information mentioned in the preview text, it doesn't differ much from standard revision, in which people review the same information learned in classes. However, if preview is shown to promote people's future learning, our study would then prove preview's unique value to the learning process, especially for self-regulated study.

On the other hand, Minsu Kim (2016) investigated the effect of previewing on mathematics self-efficacy. The results show a direct relationship between the two variables, which means that previewing increases students' confidence in their academic abilities (Bandura, 2010). However, increased confidence is not necessarily a guarantee of concrete improvements in learning performance.

This potential difference between the actual effects of preview and people's beliefs about their performance due to preview leads to the second research question in this paper: are people's metacognitive judgements on the effects of previewing correct? It is also important to note that self-efficacy is a distinct concept from metacognitive judgements; however, they are related concepts that discuss people's or metacognition.

Metacognition is people's knowledge of their own knowledge, and metacognitive judgements about one's own learning experience consist of individuals' assessment of their own knowledge on certain topics they are learning. Such subjective judgements may or may not be accurate (Dunlosky & Lipko, 2007).

Metacognitive judgements are important to study because, when they are accurate, people can take more effective ownership over their own learning and become "fully self-regulating learners" (Metcalfe, 2009). Investigating people's metacognitive judgements on the effect of previewing helps to further indicate the potential benefits or harm of previewing, as metacognition influences people's understanding and control of their learning experience.

1.3 Hypotheses

My first research question is whether previewing is effective for promoting future learning. My hypothesis is positive—that preview is valuable in ways other than strengthening retention. My second research question is whether people have correct metacognitive judgements on the effectiveness of previewing. My hypothesis is that both preview's actual effects and people's beliefs about its effects are positive and significant, and therefore, most people have correct metacognitive judgements about previewing.

2. Method

2.1 Participants

A total of 95 participants participated in the experiment, among which 38 were in the experimental group and 57 were in the control group. The average age of the participants was 38 years-old, and the range of their ages was 21−69 years old. 36 of the participants were female, and 59 were male.

All participants were native English speakers above the age of 18 and were currently living in the United States. The participants were recruited on the website Amazon Mechanical Turk (MTurk) Worker with a participation fee of $1.50 each. No response from any participant was excluded.

2.2 Materials

In the experiment, participants read a brief 200-word written preview text providing information about Yellowstone National Park in the United States. After this, participants listened to a five-minute lecture that introduced the same key information included in the preview, such as an overview of Yellowstone's wildlife, mountains, and geothermal features. The lecture consisted of five one-minute videos that showed pictures of Yellowstone National Park. A voiceover narrator read a detailed description of the same aspects of the park discussed in the preview text.

2.3 Measures

2.3.1 Memory Recall

The post-test at the end of the experiment consisted of eleven multiple-choice questions, the answers to which could be found in the lecture but not in the preview text. For example, one of the questions asked, "What is the

tallest geyser in Yellowstone National Park?" The four choices were "Old Faithful," "Steamboat Geyser," "Castle Geyser" and "Daisy Geyser," and the only correct answer was "Steamboat Geyser." The fact that the preview did not include the answers for the post-test ensured that the experiment tested whether previewing promotes learning about the topic instead of only strengthening a student's memory of specific answers.

2.3.2 Metacognition

After the post-test, participants who read the preview material answered a survey question: "Did you expect the preview to be useful in your performance on the test?" Whether participants' answers in this session matched the result of their post-test performance indicated the accuracy of their metacognitive judgements.

2.4 Design

In this experiment, I investigated the effect of preview on participants' learning performances shown in the post-test and the effect of preview on participants' confidence in their performance. Participants were sorted into two groups, the experimental group and the control group, based on their birth months. Participants with odd birth months were put into the experimental group, in which they read a preview text on a certain topic, listened to a five-minute lecture on the same topic, and took a post-test at the end to examine their understanding of the topic. Meanwhile, participants with even birth months were put into the control group in which they were not shown the preview text, and they took the post-test only based on the five-minute lecture. After the post-test, participants in the experimental group filled out a survey to predict the effect of the preview text on their post-test scores. At the end of the experiment, all participants also answered several questions on their basic information.

2.5 Procedure

After the participants read and agreed to informed consent for this experiment, they indicated whether their birth month was even or odd. Participants with an odd birth month were placed in the experimental group. These participants were able to see the preview text and the survey questions that asked for their predictions on the effect of the preview. These participants went through five sessions in total: sessions 1, 2, 3, 4 and 5. The participants with even birth months were placed in the control group. These participants were not able to see the preview text or the prediction questions, and they participated in only three sessions: sessions 2, 3 and 5. The sessions ran as follows:

Session 1: The preview session. In this session, participants in the experimental group read a 200-word written text in two minutes, as a preview on the topic of Yellowstone National Park, before watching the lecture. They could choose to take notes or not.

Session 2: All participants, both in the experimental group and control group, listened to five successive lecture videos that were each about one-minute long. (They had to click "Next" after each video finished to go to the next video.)

Session 3: This session included eleven post-test questions for all participants. All of the questions were multiple-choice questions on Yellowstone National Park. Participants had unlimited time to answer the questions.

Session 4: This was a survey session only for the experimental group to predict the effect of previewing on their test performance. They were asked questions including whether they use previews in real life, whether they believe the preview text in the experiment had benefitted their test performance and why the preview may have benefitted them. Participants had unlimited time to answer the questions.

Session 5: All participants answered several questions on their basic information, including their age, gender and English language level. They were also asked whether they benefited from their previous knowledge about Yellowstone National Park in the post-test. Participants had unlimited time to answer the questions.

3. Results

In this experiment, the results from the 38 participants in the experimental group and 57 participants in the control group showed that participants who read the preview material and watched the lecture performed slightly better in the post-test than participants who only watched the lecture. (All the 95 participants denied that they have benefitted from their prior knowledge about Yellowstone National Park.) Participants in the experimental group obtained better scores, with 11 as the full score ($M = 6.34$, $SD = 2.69$), than participants in the control group ($M = 5.93$, $SD = 2.47$). However, though the statistical result demonstrates a small difference indicating that preview may have positively impacted participants' post-test performance, this difference is not significant, $t(93) = -0.768$, $p = 0.444$, d = -0.161. This lack of significance means that the stated hypothesis was incorrect.

Instead, this study shows that previewing does not have a significant benefit in promoting learning.

Table 1. Mean correlations of the effect of preview and post-test scores

Descriptives

Descriptives	Is your birth month even or odd?	Scores
N	Even	57
	Odd	38
Mean	Even	5.93
	Odd	6.34
Standard deviation	Even	2.47
	Odd	2.69

Independent Samples T-Test

Independent Samples T-Test		statistic	df	p	Cohen's d
Score	Student's t	-0.768	93.0	0.444	-0.161

Furthermore, according to a statistical analysis of the answers from the survey questions, many more participants in the experimental group believed that the preview experience in the experiment benefitted their performance in the post-test (*Proportion* = 0.887) than those who believed that the preview experience did not help them (*Proportion* = 0.113). This difference is significant, $p < 0.001$. At the same time, since some of the participants in the control group also answered this question by mistake, there were 19 responses from the control group answering this same question, which showed that more participants in the control group believed that having preview material would have benefitted their performance on the post-test (*Proportion* = 0.947) than those who believed otherwise (*Proportion* = 0.053).

Table 2. Proportion test of the belief about the effect of preview from participants in the experimental group

Proportion Test (2 Outcomes)

Binomial Test	Level	Count	Total	Proportion	p
Do you expect this preview to be useful to your performance	No	5	34	0.147	< .001
in the test?	Yes	29	34	0.853	< .001

Note. H_a is proportion $\neq$ 0.5.

Table 3. Proportion test of the belief about the effect of preview from participants in the control group

Proportion Test (2 Outcomes)

Binomial Test	Level	Count	Total	Proportion	p
Do you expect this preview to be useful to your performance	No	1	19	0.053	< .001
in the test?	Yes	18	19	0.947	< .001

Note. H_a is proportion $\neq$ 0.5.

4. Discussion and Conclusions

The two research questions are answered by the experiment. For the first research question, the results do not support the hypothesis that previewing promotes future learning. Instead, this study shows that preview does not provide significant benefits for participants' further learning on a given topic, which means that it does not prove that previewing can promote people's future learning.

There could be various reasons for this result, including that the sample size was not large enough to obtain accurate results; the lecture and the preview were not long enough to imitate real-life lectures; and the preview method may not actually be effective in promoting students' learning in lectures. (All the participants denied that they have benefited from their prior knowledge about Yellowstone National Park in Session Five.) The insignificance in the difference between the learning of the two groups of participants suggests that previewing may not be as useful a method as people would expect. However, this does not necessarily mean that preview

has no benefits for academic performance in real life. In this study, as I was investigating the ability of preview to promote future learning benefits, I did not include information on the answers to the post-test questions in the preview material. In real life, when people are previewing material before lessons, it is possible that they may read information important and useful to their tests or other academic experiences that could also improve their learning. As familiarity has direct positive influences on memory retrieval (Holden & Vanhuele, 1999), reading valuable information multiple times could result in a better understanding of the subject and therefore benefit study performance.

For the second research question, the results show that, despite preview's actual effects, most people who preview materials perceive that preview benefits their study performance. Many participants had incorrect metacognitive judgements on the effects of preview; they falsely believed that preview benefitted their learning of the topic. This conclusion does not support my hypothesis and indicates that most people have incorrect assumptions about the benefits of the preview method for promoting future learning.

This study does not investigate the source of participants' mistaken beliefs about previewing. One possible reason for participants' demonstrated incorrect beliefs is that the diction included in the post-test questions was more familiar to participants in the experimental group because they had been exposed to the same diction in the preview. This familiarity may have increased their fluency when retrieving retained information, and this fluency during the processing of information may have influenced and misled participants' metacognitive judgements when deciding on the value of the preview material (Bjork, Dunlosky, & Kornell, 2013).

Another possible reason is that participants may be aware of the generally positive reputation of the preview method. The results in Table 3 from people in the control group show that people believe previewing to be valuable to their academic performance on a given task even when they have not previewed material for that specific task. However, to explain this phenomenon more conclusively would require further investigation on the influence preview has on metacognition.

A potential limitation of this study is that conclusions are drawn according to data collected from less than a hundred participants. Another possible limitation is that the post-test focused on answering trivia questions about Yellowstone National Park, which is not typically the type of material for which the preview method is used, because, in real life, tests are more often designed for skill learning, instead of memorization of details. In the future, the results of this study could be supported further if more people were included in the sample groups and the purpose of previewing in the study included questions on other topics, including science and math.

This study concludes that the preview learning method does not benefit people's future learning, while most people tend to believe the opposite.

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