



Contents lists available at ScienceDirect

Journal of Applied Research in Memory and Cognition

journal homepage: www.elsevier.com/locate/jarmac

The Limited Effects of Prequestions on Learning from Authentic Lecture Videos

Alexander R. Toftness, Shana K. Carpenter*, and Sierra Lauber
Iowa State University, United StatesLaura Mickes
Royal Holloway, University of London, United Kingdom

Asking questions prior to learning enhances memory. Although this *prequestion effect* typically applies only to information that was prequestioned and not to other, non-prequestioned information, recent research using short videos found benefits to both prequestioned and non-prequestioned information. In the current study, students viewed authentic video-recorded lectures, each over 20 min, prepared for actual courses on signal detection theory (Experiment 1) and autobiographical memory (Experiment 2). Some students answered prequestions before viewing the videos (prequestion group) and some did not (control group). At final test the prequestion group outperformed the control group overall, as well as specifically for prequestioned information, but performance on non-prequestioned information was either not different from (Experiment 1) or only marginally better than (Experiment 2) the control group. The benefit of prequestions did not interact with subjective interest in the material. These results suggest positive but limited benefits of prequestions for educationally realistic lecture videos.

General Audience Summary

A powerful way to enhance students' memory for material they are trying to learn is to ask them questions about it. Asking questions prior to reading some to-be-learned information—i.e., prequestions—can significantly boost students' learning of that information. However, this effect tends to be specific to the information from the reading material that was relevant to the prequestions (i.e., prequestioned information), and does not usually occur for other portions of the material that were not relevant to the prequestions (i.e., non-prequestioned information). An important but neglected question is whether prequestions enhance learning from lectures and presentations. Preliminary data suggest that prequestions confer general benefits on learning of information from brief video presentations—enhancing both prequestioned and non-prequestioned information—but their effects on more authentic (longer and more complex) lecture-based learning are unclear. Students in the current study viewed lecture videos that had been prepared for actual classes on signal detection theory (Experiment 1) and autobiographical memory (Experiment 2). Some students answered prequestions before viewing the videos (prequestion group) and some did not (control group). On a later test over the lectures, the prequestion group scored higher than the control group. In Experiment 1, this advantage only occurred for the prequestioned information and not for the non-prequestioned information, whereas in Experiment 2 a marginal advantage

Author Note

Alexander R. Toftness and Sierra Lauber, Department of Psychology, Iowa State University, United States; Laura Mickes, Department of Psychology, Royal Holloway, University of London, United Kingdom.

This material is based upon work supported by the James S. McDonnell Foundation 21st Century Science Initiative in Understanding Human

Cognition, Collaborative Grant No. 220020483. We thank Madeline Johnson for her assistance with data collection.

* Correspondence concerning this article should be addressed to Shana K. Carpenter, Department of Psychology, Iowa State University, W112 Lagomarcino Hall, Ames, IA 50011, United States. Contact: shacarp@iastate.edu

occurred for the non-prequestioned information as well. These results suggest that under realistic lecture conditions, prequestions can enhance learning of upcoming information that is relevant to those questions, but do not consistently enhance learning of other, non-prequestioned information. Pquestions thus have positive, but limited, effects on authentic lecture-based learning.

Keywords: Pquestions, Testing, Retrieval, Learning, Memory

Research on student learning has revealed a number of techniques that can significantly enhance memory. One of the simplest yet most effective techniques is to provide students with questions over what they are trying to learn. Research on retrieval practice shows that answering questions about material that has just been presented, as opposed to restudying the same material, produces significant benefits on later memory for material such as new vocabulary (e.g., Finn & Roediger, 2011; Pyc & Rawson, 2010), reading passages (e.g., Butler, 2010; Hinze, Wiley, & Pellegrino, 2013), and lectures (Butler & Roediger, 2007).

Though comparatively less research has examined the effects of asking students questions *before* they learn something, such prequestions can also enhance memory. In one study (Rickards, 1976a), participants read a short passage about a fictitious African country called Mala. Some participants (the prequestion group) answered questions over the passage before reading it (e.g., “How many inches of rain fall per year in southern Mala?”), and others did not (the control group). On a later test requiring recall of the passage, the prequestion group outperformed the control group. Other studies have shown similar benefits (Little & Bjork, 2016; Peeck, 1970; Pressley, Tanenbaum, McDaniel, & Wood, 1990; Richland, Kornell, & Kao, 2009; Rickards, 1976b; Rickards, Anderson, & McCormick, 1976), suggesting that the opportunity to preview questions—even though participants often got them wrong and were not told the correct answers at the time—enhances learning of reading passages.

One explanation for the benefits of prequestions is enhanced attentional processing. Pquestions provide an idea of what information the to-be-learned material will contain, making that information more familiar and noticeable when it occurs (e.g., Hannafin & Hughes, 1986). Pquestions might also give students an impression that the prequestioned information is important to learn, or could make explicit to them the fact that the information is not already known, serving to arouse curiosity and stimulate efforts to read the passage more carefully (e.g., Berlyne, 1954, 1962). One or all of these possibilities increase the likelihood that students who receive prequestions will attend more to the reading passage—most likely the information relevant to the prequestions—than students who do not receive prequestions.

Consistent with this notion, prequestions usually produce greater benefits on memory for prequestioned information compared to non-prequestioned information. For example, in learning about Mala (Rickards, 1976a), students who were asked prequestions about the annual rainfall in Mala later remembered this information better than other information from the passage that was not prequestioned, such as information about Mala’s social conditions. Other studies have shown this same effect,

along with the tendency for the prequestion group to remember the non-prequestioned information no better than the control group (e.g., Bull & Dizney, 1973; Frase, 1968; Pressley et al., 1990; Richland et al., 2009).

However, there are circumstances under which prequestions might have both specific and general benefits. Whereas research on prequestions typically uses reading passages as stimuli, Carpenter and Toftness (2017) recently explored these effects on memory for video presentations. The prequestion group answered questions prior to viewing a brief video on the history of Easter Island (e.g., “How many families originally settled on the island of Rapa Nui?”), and the control group did not. On a test over the material from the video, the prequestion group outperformed the control group on both prequestioned and non-prequestioned information. The authors posited that video presentations or lectures (compared to reading passages) may be more likely to show these general benefits because students’ attention may be more uniformly distributed. Unlike self-paced reading materials that allow learners to selectively focus their attention on prequestioned information and possibly ignore non-prequestioned information, videos provide instructor-paced information that would seem less likely to be subject to this selective processing.

These findings might offer a promising way to enhance students’ learning from lectures and presentations. However, more research is needed to understand the role that prequestions play in learning from lectures. The study by Carpenter and Toftness (2017) is not highly representative of a real classroom lecture, as students were asked two fairly simple prequestions prior to viewing a brief 2-min video segment. Real classroom lectures are much longer and usually contain more complex information. If prequestions enhance learning because they encourage participants to devote more attentional processing to the video, then such processing would seem fairly easy to maintain over the course of a short video. When the lecture is longer or more complex, however, attentional resources may be limited and devoted more selectively to only some of the information. Under these conditions, priority may be given to the prequestioned information (relative to the non-prequestioned information) because it is more familiar. There are reasons to expect, therefore, that the effects of prequestions on lecture-based learning may be limited when the lectures are more educationally realistic. This has not yet been empirically tested within the known research on prequestions.

The purpose of the current study was to explore the effects of prequestions on memory for educationally realistic lecture videos. These videos were prepared for actual courses on signal detection theory (Experiment 1) and autobiographical memory

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