Hello all,

I'm Dr. Robert Ryan of Kutztown University. Previously, you received an email from one of my research assistants to ask if you would be willing to participate in a collaborative effort to examine whether "practicing retrieval" of to-be-learned material in Statistics classes would result in better retention a semester later than just being presented with the material. Some of you had said that you would have to hear more about the details of the study. Others have not responded yet, but perhaps that's because you also need more information.

We're still developing the study, but here's what we have so far. Students would be randomly assigned to two groups, just called A and B. There would be two modules that we would use for the to-be-learned material. Each would cover several learning objectives. Module one would be on the logic of hypothesis testing, errors of inference, power, interpretation of statistical significance, and confidence intervals. Module two would be on selecting the appropriate procedure based on the research question, the design, and the scale of measurement of the variables. For the first module, the groups would be randomly assigned to an experimental or control condition, and they would switch for the second module.

The subjects' tasks would be to go on an website during class (perhaps PsyToolkit, or Moodle), and read a short review passage that illustrated a learning objective or a small number of learning objectives. Then the review passage would disappear and would be followed by an example involving those learning objectives. For the experimental condition, the example would contain blanks. The task for the experimental participants would be to retrieve the information they just reviewed and fill in the blanks. Then, as immediate feedback, the example with the blanks filled in correctly would appear and the participant would be instructed to check their work and correct it if necessary. For the control condition, the first example would have no blanks. The control participants would be instructed to read it. Then, the example with the blanks would appear, and the participants would be instructed to use the example above to fill in the blanks in order to focus them on the key concepts. Doing those tasks would probably take only 2 or 3 minutes. There could be more than one instance of the task in each session, in order to give them repeated practice.

For each module, there could be several such sessions, each one on a different learning objective. How many sessions, and how many instances of the task per session will depend on how much time you feel you can devote to the modules.

I've attached an example of one instance of a session on one learning objective. It shows the review, and the example tasks for the two conditions. All participants could either be offered a little extra credit for just doing the sessions or could receive points towards their grade. That would be up to you. The correctness of the words filled in by the experimental participants would not necessarily be graded. Previous research shows that they benefit from such tasks even when their answers are wrong (Kornell et al., 2015 - attached). I also attached the manuscript of the paper describing the previous study that led to this one. It is in press at Teaching of Psychology (Ryan & Koppenhofer, in press - attached)

Before the first module, there would be a pre-test on the material from both modules. After the second module there would be a posttest. If the experiment were run in a Spring semester, we could then recruit the participants to take a retention test right at the beginning of the next academic year's Fall semester. I'd have to look into grant funding in order to offer the participants $30 to return for the retention test.

If you haven't responded to this collaboration invitation before, please consider joining us, now that I've provided more information.

And in any case, I'd appreciate your feedback on our plans as we develop them. Also, I’m learning to write code in PsyToolkit ( https://www.psytoolkit.org/ ) so if anyone already is familiar with it, I’d appreciate any help you could give.

Please respond to all so that my research assistants are kept in the loop.

Thanks,

--- Bob Ryan

Kornell, N., Klein, P. J., & Rawson, K. A. (2015). Retrieval attempts enhance learning, but retrieval success (versus failure) does not matter. Journal of Experimental Psychology: Learning, Memory, and Cognition, 41(1), 283–294. https://doi.org/10.1037/a0037850

Ryan, R. S. & Koppenhofer, J. A. (in press). Prompted self-explanations improve learning in statistics but not retention. Teaching of Psychology