Introduction to Psychology (PSYC 1101) Course Redesign at the University of North Georgia

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This case study describes an intervention to improve students' metacognition and mastery of course learning objectives. Introductory Psychology students (n = 261) were asked to predict their exam scores during each exam. The Experimental Group received a warning lecture about overconfidence. They also received exam wrappers including detailed feedback and prompts to encourage metacognitive reflection. Compared to controls, the Experimental Group showed greater improvement in metacognition; but there was no significant difference in terms of mastery of course learning outcomes. We conclude that the intervention shows promise for improving metacognition but does not automatically lead to improved learning.

STATEMENT OF THE PROBLEM

A near-universal challenge in classroom settings at every level is helping students develop effective study habits. One factor that appears necessary for effective studying is accurate metacognition. Specifically, students must distinguish when they know something "well enough" to pass an exam, so that they may confidently move on to spend more time on material that is not yet mastered. However, a large body of literature suggests that the students who struggle most are often overconfident prior to learning their grades (e.g., Kruger & Dunning, 1999). In a recent laboratory study that compared the effectiveness of different metacognitive interventions (Saenz et al., 2019), only salient feedback and a motivational warning lecture were found to improve participants ability to predict their own test scores. Our course redesign applied this research to our own classrooms. Thus, our intervention involved using a combination of salient feedback (an exam wrapper which also prompted metacognitive reflection) and a warning lecture in a quasi-experiment which aimed to improve students' metacognition. We hoped that this intervention would also indirectly improve students' mastery of foundational knowledge related to the course content, assuming the hypothesized improvements in metacognition led to improved study habits.

METHODS

Introductory Psychology students (n=261), spanning multiple course sections across five campuses, were asked to predict their exam scores during each exam. The Experimental Group received a warning

lecture about overconfidence at the beginning of the semester. They also received exam wrappers which prompted them to reflect on their over- or under-confidence when they received their exam scores with feedback. The Control Group also predicted their scores, but with no warning lecture or exam wrapper. The groups were compared on two outcomes: 1) improvement in metacognitive calibration from first to last exam; and 2) improvement in foundational knowledge from first to last exam. Improvements in metacognitive calibration were measured by comparing prediction errors on the first exam and last exams. Foundational knowledge was measured using an online quiz consisting of randomly selected questions representing each of our course learning objectives. This quiz was administered twice, once at the beginning and again at the end of the semester, to quantify students' improvement in foundational knowledge.

OUTCOMES

One question we investigated was whether our students tended to be under- or over-confident during exams. A one-sample t-test showed that students were not systematically under- or over-confident during the first exam, $t(245) = .49$, $p = .625$, but by the last exam they tended to be slightly under-confident, $t(219) = -2.797$, $p < .01$. A second question we investigated was whether students improved their metacognitive calibration (i.e. prediction accuracy) from the first to the last exam. A paired-samples t-test confirmed that students did become more accurate with their predictions from the first to the last exam, $t(219) = 2.001$, $p = .023$. The main purpose of the study however was to test the effectiveness of our intervention in terms of 1) improving metacognition and 2) improving gains in foundational knowledge. We used a simple linear regression model to control for instructor effects. Results indicated that students in the Experimental Group showed greater improvement in metacognition calibration compared to the Control Group, Beta = .151, $p = .024$; however there was no significant difference between the groups in terms of the foundational knowledge assessment, Beta = -.109, $p = .110$.

PLANS FOR CONTINUATION AND EXPANSION

Our results lead us to recommend that instructors in our department address metacognition and study skills early in their courses. This suggestion has been circulated through formal departmental meetings and informal faculty teaching circles. This would be the real-world translation of the "motivational warning lecture" that does not impinge on instructors' academic freedom. Some of the participating faculty from our study have indicated an interest in continuing to use, and perhaps elaborate on, their exam wrappers in order to promote deeper reflection, and better follow through from students with regards to actually changing study habits.

LESSONS LEARNED AND POTENTIAL IMPLICATIONS

The combination of an explicit warning lecture and exam wrappers shows promise as a way of improving students' ability to predict their grades. However, this does not automatically lead to improved learning, as we did not see any difference between the Experimental and Control group in terms of foundational knowledge gains. Students may need additional prompting/scaffolding to make the leap from understanding their level of competence, to actually improving their study habits. A second takeaway relates to the usefulness of standardized learning objectives and assessment tools. Although our metacognition intervention did not result in improvements in terms of foundational

knowledge, the assessment itself was a useful by-product of the study. When course learning objectives are standardized within a department, this presents an opportunity to develop assessments that are built from the ground up to align with those learning objectives. When all faculty teach to the same set of learning objectives, assessments can be shared by multiple faculty members, providing usefully generalizable data that can inform curriculum-related policies.

REFERENCES

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