Multiple-Choice Testing to Teach Scientific Reasoning and Prepare Psychology Students for MCAT2015

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SCIENTIFIC LITERACY IN INTRO PSYCHOLOGY

In 2015, the MCAT will for the first time include a section covering Introductory Psychology content and scientific literacy. How can we teach high level scientific literacy skills in large lectures? Well-designed multiple choice questions can be used not only for assessment, but to teach material through retrieval practice and elaboration (Carpenter, 2012; Glass & Sinha, 2013; Little, Bjork, Bjork, & Angello, 2012). In this pilot study, we address a basic question: Is it feasible to teach higher level research design and data-based reasoning in large sections of Introductory Psychology?

Could your Introductory Psychology Student Answer This MCAT2015-style Question?

Read this passage and answer the following questions.

…In a study designed to examine the impact of psychological stress on the immune system, participants completed two self-report measures in order to assess experienced stress versus perceived stress. One measure obtained the number of stressful life events the participant had experienced over the last year. The second measure assessed the extent to which the participant perceived life events as stressful. After the participants gave their informed consent and the stress-related information was collected, participants were quarantined and exposed to the common cold virus and their symptoms were monitored. ….

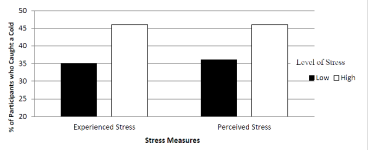


Figure 1. Rate of Developing Colds as a Function of Experienced and Perceived Stress

MCAT-STYLE QUESTIONS

RESEARCH DESIGN: Which of the following changes to the study would make it possible to investigate whether there is a causal link between stress, coping styles, and immune susceptibility? Randomly assigning participants to conditions in which they learn different coping styles prior to exposing them to a stressor.

ADD NEW CONCEPT: Which of the following results would you predict if this study were extended to examine learned helplessness? People who develop learned helplessness: have higher levels of cortisol.

GRAPH INTERPRETATION: Which of the following conclusions is NOT supported by Figure 1? Perceived stress levels are negatively associated with immune functioning

DIAGNOSTIC QUESTIONS ADDED TO THE MIDTERM FOR THIS STUDY

READING COMPREHENSION: In this study, "experienced stress" was measured by the number of stressful life events the participant experienced in the past year.

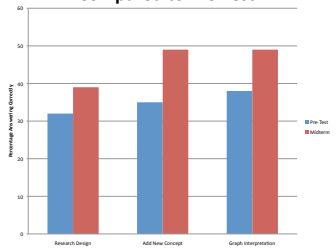
BASIC GRAPH READING: What percent of those who reported a low level of experienced stress remained healthy (that is, did not catch a cold)? 65%

METHOD

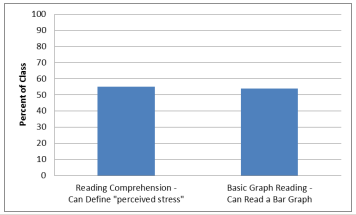
212 Introductory Psychology students participated . On the first day, students took a pre-test without feedback. They then took 3 practice midterms and 3 real midterms in the class. Each midterm included a MCAT-style passage describing a research study with related questions. The same MCAT-style question was on the pre-test and 3rd midterm. Additional questions were added to this study to diagnose basic difficulty with reading comprehension and graph reading. The instructor explained each answer verbally immediately after the practice test. An answer key was posted electronically immediately after each real midterm.

RESULTS

More Students Answered the MCAT-style Questions Correctly on the Midterm Compared to Pre-Test



Half of Students Lacked Basic Graph and Reading Comprehension Skills



IMPLICATIONS

This pilot study indicates that it is feasible to teach and assess high level research design and data reasoning in Introductory Psychology using multiple choice tests.

Preliminary results suggest that about half the class would benefit from remedial instruction in basic reading comprehension and graph reading, and this should be a target of more intensive interventions for selected students. All students will likely require more instruction and/or explicit feedback, and should be one target of a more intensive intervention for all students.

Additional research is needed to identify students' areas of difficulty and to develop teaching methods that target those areas.

FUTURE RESEARCH

REFERENCES

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