

# In Their Own Best Interest: Data-based Decisions in the Classroom

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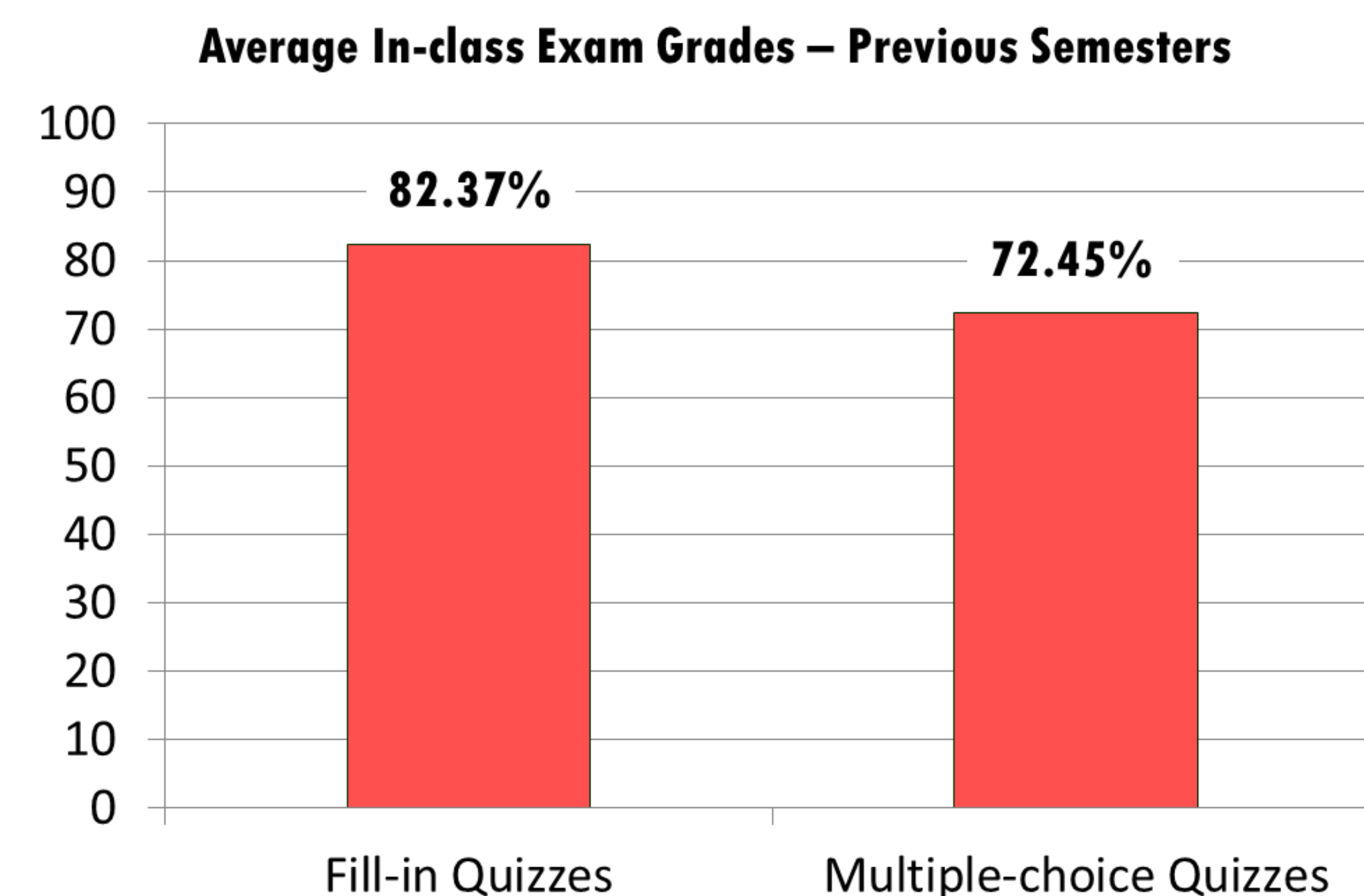
## ABSTRACT

In psychology, we stress the importance of scientific investigation. For example, in Research Methods, students learn how to construct and evaluate research studies. In Statistics, they learn how to analyze results. Many other courses emphasize applying what we learn through experimentation in ways that advance the theory and practice of psychology.

One area in which we may fall short is in helping students to meaningfully connect science with their daily lives, and learn to make data-based decisions.

The current study is a preliminary investigation of student behavior in a situation that involved a choice between two quiz formats demonstrated to differentially affect long-term course achievement.

**Figure 1**



## INTRODUCTION

In laboratory and classroom settings, it has been demonstrated that regular quizzing results in better retention and, consequently, higher exam scores, than simple review of the same material. Called the testing effect, this phenomenon has proven to be extremely robust and consistent across a variety of conditions (Roediger & Karpicke, 2006).

The effect of quizzing on multiple-choice exam scores has been particularly well studied, and it is known that students who take fill-in quizzes outperform students who take multiple-choice quizzes on later multiple-choice exams. This has been demonstrated in earlier versions of the same course, Principles of Learning, that was the target of the current study (Davis, 2015).

## METHOD and RESULTS

Undergraduate Psychology and Neuroscience majors enrolled in Psyc304, Principles of Learning, served as subjects. The study was conducted in three course sections, taught over two semesters (Fall 2014 and Spring 2015).

In each section, every three low-value quizzes were followed by a high-value exam. There were twelve quizzes and four non-cumulative exams each semester.

### Initial Decision

During the first class, the testing effect was explained and students were presented with data from previous semesters of Principles of Learning illustrating the testing effect. Specifically, that students who took fill-in quizzes performed significantly better than students who took multiple-choice quizzes on the same in-class, multiple-choice exams ( $t(44) = 4.14, p < .001$ ) (Figure 1).

Students were asked to decide, by the next class, if they wanted their first three quizzes - leading up to the first in-class exam - to be fill-in or multiple-choice. It was emphasized that they would then be able to change their choice of quiz format, if desired, after reviewing their grade on the first exam and section averages.

Of 89 students who completed the three sections of the course, 60 (67.4%) chose to take multiple-choice quizzes, in spite of evidence that students taking this type of quiz earned lower average exam grades in earlier semesters of the same course, compared to students taking fill-in quizzes.

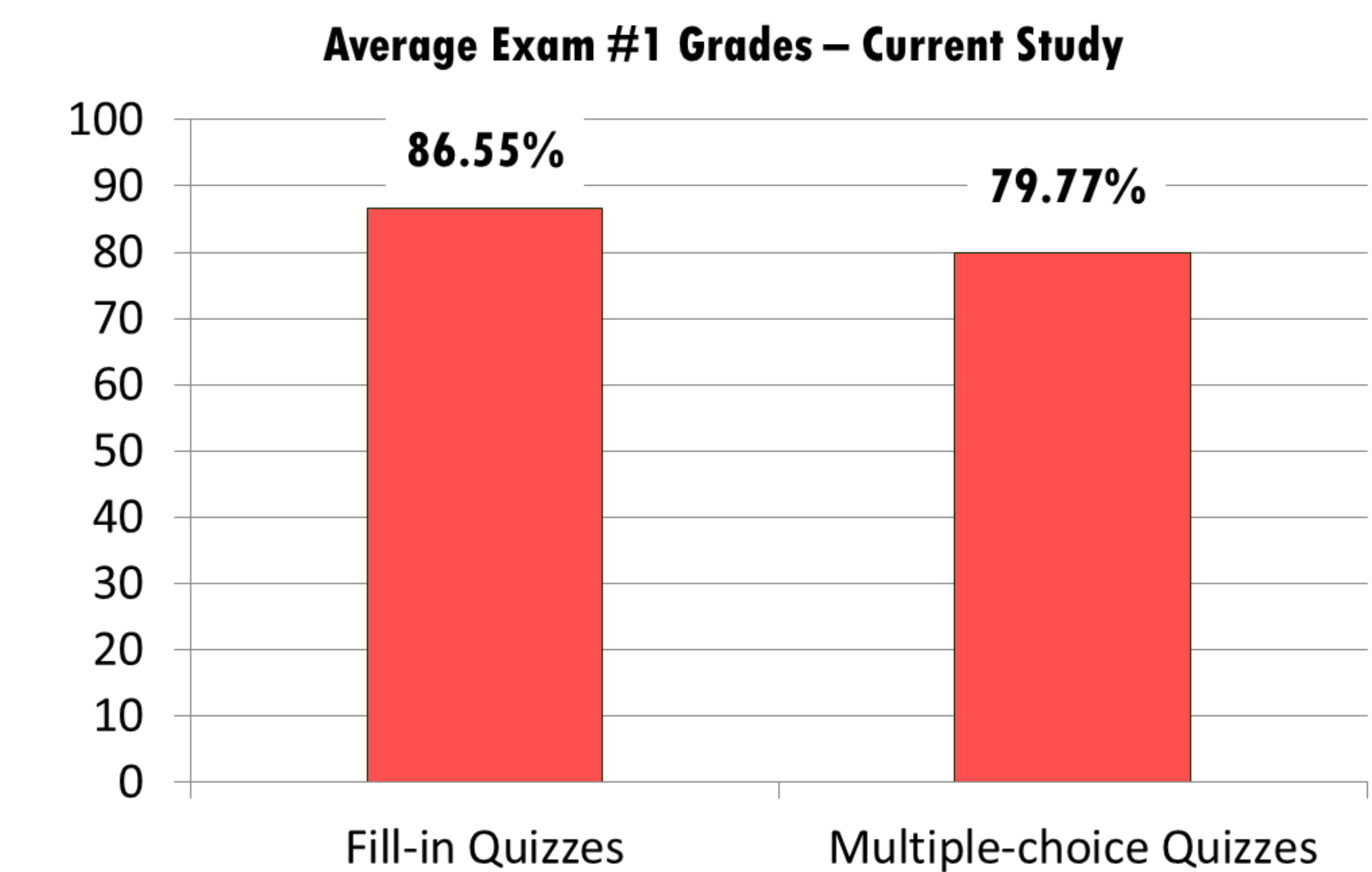
### Stick or Switch

After reviewing their individual grades on the first exam, and seeing a graphic summary of grades for their section, students were asked to choose the quiz format they wanted to take for the remainder of the semester (comprised of nine quizzes and three in-class exams).

Figure 2 represents composite data for all three sections, illustrating that, on average, students who took fill-in quizzes earned significantly higher grades on the first exam than students who took multiple-choice quizzes ( $t(84) = 2.64, p < .01$ ). In all three sections included in this study, average exam grades for students who took fill-in quizzes were higher than those for their classmates who took multiple-choice quizzes.

In the three course sections under consideration here, 22 students chose to switch from fill-in to multiple-choice quizzes after the first exam. Six students chose to change from multiple-choice to fill-in quizzes. In total, 76 students (85.4%) completed the course taking multiple-choice quizzes.

**Figure 2**



## DISCUSSION

Despite clear and convincing evidence from earlier sections of the same course that taking fill-in quizzes results in higher average grades on the multiple-choice exams, approximately two thirds of students initially chose to take multiple-choice quizzes. This seems to indicate a preference for short-term satisfaction (multiple-choice quizzes are often perceived as easier, since they primarily rely on recognition, rather than recall) over long-term achievement.

Even though data from their own sections, in the form of scores on Exam #1, supported the testing effect, many students chose to switch from fill-in to multiple-choice quizzes when the opportunity was resented.

Although very preliminary, the results of this study indicate that students - even those quite familiar with the scientific method - do not consistently use experimental evidence to inform their personal decisions. Further research in this area is encouraged, since it had implications for ensuring that educated individuals can not only understand, but effectively apply, scientific findings to their daily lives.

## REFERENCES

- Davis, D. B. (2015). The effects of quiz format on exam grades. Presented at the annual meeting of the Eastern Psychological Association, Philadelphia, PA.
- Roediger, H. L., & Karpicke, J. D. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1(3), 181-210.