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## No cost or benefit from frequent online quizzes compared to traditional exams

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# No Cost or Benefit from Frequent Online Quizzes Compared to Traditional Exams

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## Introduction

Students not only cram for examinations, they often report that cramming is an effective means for achieving good exam scores (Taraban, Maki & Rynearson, 1999). Unfortunately, results from empirical studies (e.g., Rohrer & Pashler, 2007) suggest that a single study session is not optimal for long-term retention. Although the benefits of spaced studying are clear, encouraging it in the classroom is difficult. We propose that by having exams more frequently, students will necessarily modify their studying behavior. For instance, students who only study once before the exam would be compelled to study twice as often if twice as many exams were given.

There is evidence that frequent quizzing may be an effective learning experience. For instance, Landrum (2007) administered weekly in-class quizzes in place of traditional unit exams and found that students scored higher on the cumulative final than on the individual quizzes, suggesting a benefit for frequent testing. In addition, this benefit was greatest for the bottom third of the students.

Although frequent testing may improve long-term retention, there are potential drawbacks. The results of a survey conducted by Bacdayan (2004) suggest that instructors see the increased time required to administer quizzes as a primary disadvantage in their use. Online administration of quizzes could moderate this cost. Interestingly, instructors expressed little concern over student backlash (e.g., poor evaluations) in response to quizzes (Bacdayan, 2004) and students have reported a preference for frequent quizzing over traditional unit exams (e.g., Grover, Becker, & Davis, 1989; Landrum, 2007).

## Method

Introductory psychology students ( $n = 139$ ) were tested using traditional in-class exams (e.g., four chapters of content) and using twice as many online quizzes (e.g., two chapters of content) for half of the semester each. The same test-taking time limit was enforced in both conditions. Testing manipulation order was counterbalanced across two course sections taught by the same instructor. Two dependent measures, participant study time and comprehensive exam score, were used to gauge the effects of the testing manipulation. Participants also completed a survey in which they reported the number of minutes spent studying for each exam or quiz and reported their testing preferences.

## Results

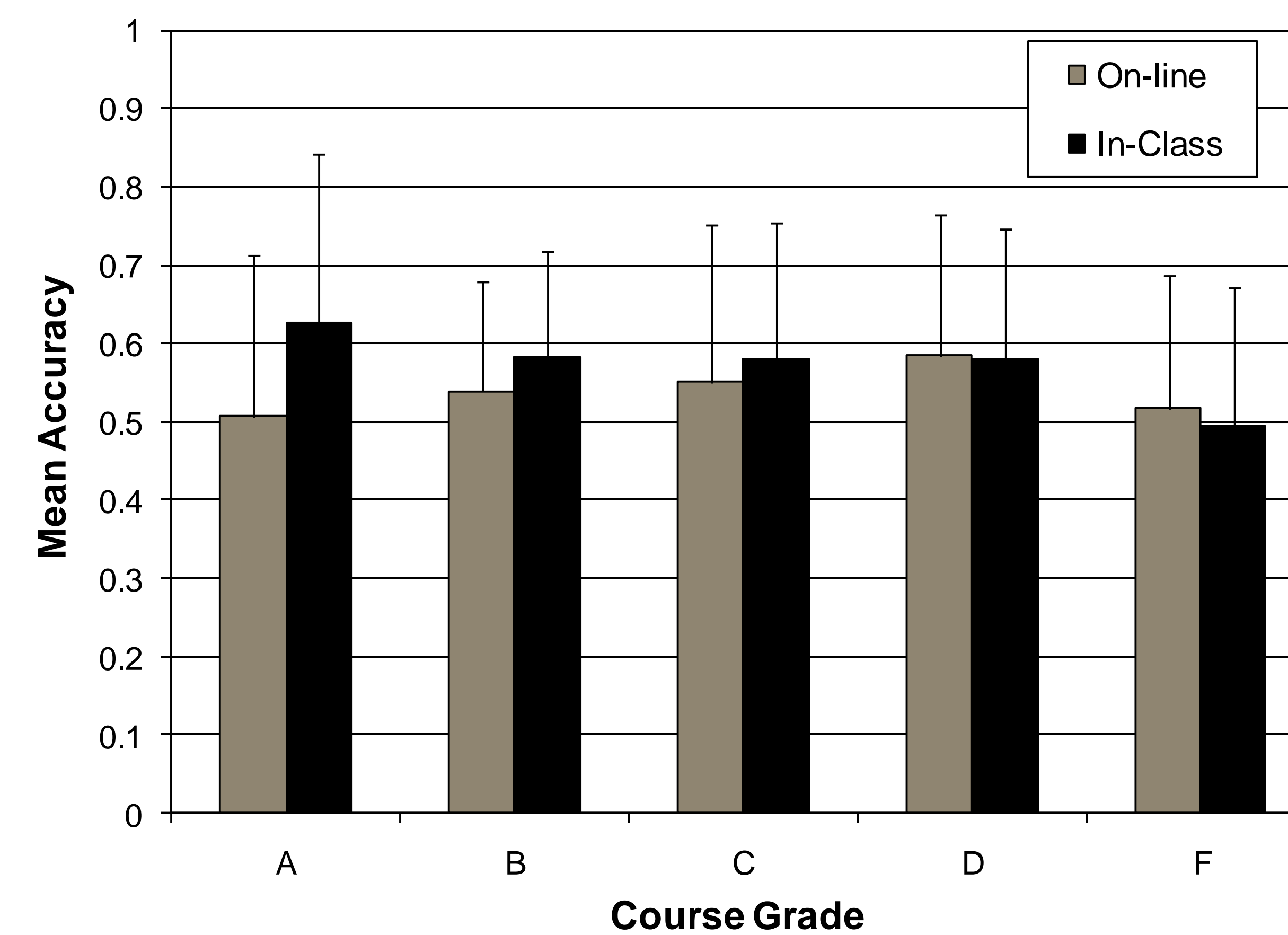
### Impact of the Testing Manipulation on Study Time

An independent samples  $t$ -test failed to reveal a significant difference between reported study time for online quizzed content ( $M = 129$  minutes,  $SD = 98$ ) and for in-class tested content ( $M = 108$  minutes,  $SD = 93$ ),  $t(91) = 1.078$ ,  $p = .284$ .

### Impact of the Testing Manipulation on Comprehension

At the end of the course, students completed a comprehensive exam; half of the questions tested online quizzed content, half tested in-class exam content. A paired samples  $t$ -test failed to reveal a significant difference between content assessed through online quizzes ( $M = .54$ ,  $SD = .18$ ) and in-class exams ( $M = .57$ ,  $SD = .17$ ),  $t(102) = -1.52$ ,  $p = .131$ .

Figure 1. Comprehension of Material Originally Tested Online or In-Class

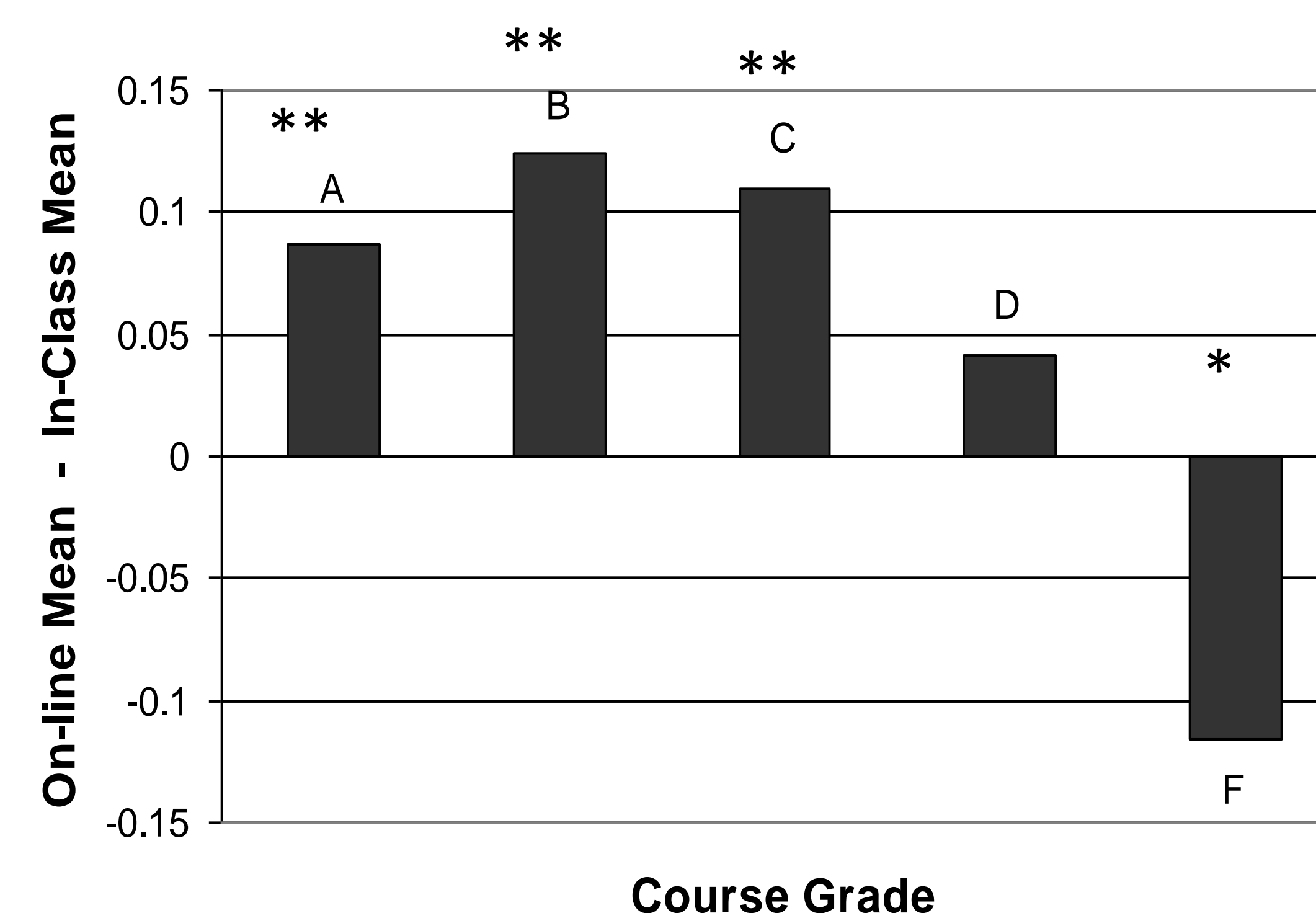


### Student Performance on Online Compared to In-Class Tests

Course Grade	Online Test Score		In-Class Test Score		Paired Samples $t$ -Test
	Mean	SE	Mean	SE	
A	.99	.01	.91	.02	$t(15) = 5.68$ , $p < .001$
B	.91	.01	.79	.02	$t(25) = 8.70$ , $p < .001$
C	.81	.02	.70	.01	$t(36) = 4.13$ , $p < .001$
D	.63	.02	.67	.02	$t(25) = 1.13$ , $p = .270$
F	.34	.03	.46	.03	$t(33) = -2.50$ , $p = .018$

Students earning an A, B, or C scored higher on the online quizzes than in-class exams. Students earning an F showed the opposite effect, in part because some of them simply did not take the online quizzes.

Figure 2. Mean Difference Between Online and In-Class Test Scores



## Student Preferences

74% of students preferred taking the online tests.

83% of students with self-reported, test anxiety preferred taking the online tests.

75% of students reported the in-class tests being more difficult than the online tests.

## Discussion

Laboratory-based studies suggest that increasing the number of study sessions improves long-term comprehension. We hoped that by testing more frequently, students would study more and benefit from increased comprehension. However, the use of more frequent assessments did not affect study time or comprehension. Importantly though, use of online quizzes did not harm student comprehension.

## Practical Implications

If online testing is as effective as in-class testing, instructors may be able to save time and resources, while making students happier, by replacing traditional in-class tests with online quizzes.

### Saves Time

- \* online examinations do not require class time
- \* grading may be automatic

### Saves Resources

- \* no paper and ink costs
- \* fewer administrative costs

### Students are Happier

- \* preferred testing method
- \* grade is based on more data points

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