

# Test Anxiety and Performance on Open Book and Cheat Sheet Exams in Introductory Psychology

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**Abstract.** The differences between cheat sheet and open book exams were examined in introductory psychology classes. A total of 222 students enrolled in 5 sections of Introduction to Psychology participated in this study. Exam types were counterbalanced across sections. Students were given either cheat sheet or open book exams, and completed a pretest measure of test anxiety and study time. While students did slightly better on open book exams than on cheat sheet exams, exam scores were positively correlated, and students had lower levels of anxiety when taking open book exams compared to cheat sheet exams. Students also reported studying less for open book exams. The decision of what exam type to use depends on a trade-off of student performance, anxiety levels, and effort.

**Keywords:** Test Anxiety, Exam Type, Exam Performance.

## 1. Introduction

What is the best way for teachers to evaluate learning in their students? There is a relatively long history of trial-and-error efforts to improve testing procedures<sup>1,2</sup>. Increasingly, instructors are experimenting with alternatives to the traditional closed book exam. One alternative is to use a “cheat sheet” or crib sheet – a sheet of notes that students prepare ahead of time and bring with them to use on the exam. Another alternative is to allow students to have access to all their notes and the textbook in an open book and open note exam. In our psychology department, we have moved away from using closed book and note exams in our Introduction to Psychology class because we as instructors felt that traditional exams were unnecessarily stressful in an introductory level course, where many of the students are not psychology majors. The question we were faced with was which alternative to a closed book exam to turn to.

The evidence for the benefits of open-book tests is mixed. Some researchers have found higher grades on open-book tests, although the improvement is more modest than might be expected<sup>3</sup>. In addition, open book exams may encourage less studying, particularly among those students who need to study the most. Weaker students seem to rely more on their notes and texts than academically stronger students, and students that use their notes most end up doing more poorly on exams<sup>4</sup>. Many instructors in our department are hesitant to offer open book exams, based on the assumption that even students who do not prepare for the exam will do well with all their notes and their text available.

An alternative to either closed-book or open-book exams are cheat sheet or crib sheet exams, where the student is given the opportunity to prepare a sheet of notes ahead of time to use on the exam. Some studies find an improvement in performance when students use cheat-sheets<sup>5</sup>, while others find no effect<sup>6</sup>. One possible benefit of a cheat sheet exam is that unlike an open book exam, cheat sheet exams may encourage more time spent in preparing for the exam, since at the very least students need to review the course material in order to prepare their cheat sheets. On the other hand, some instructors may worry that crib sheets become a crutch, and students would only study the material they happen to have included on their sheet (usually the main topics and highlighted sections of the textbook) and spend less time on other material which none the less may appear on the exam.

One important benefit of alternatives to closed-book exams is that they may lower test anxiety. Test anxiety – worrying about the outcome of the test and experiencing negative emotions during the test – is associated with poor performance on exams<sup>7,8</sup>. While moderate levels of anxiety may be motivating for

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students and improve their studying, excess stress during an exam can result in students not being able to do their best on the test. Students prefer open-book and cheat sheet exams because they feel they would be less anxious during those types of exams and therefore perform better<sup>9</sup>. If students feel less anxious with these alternative exam types, then that alone may be reason enough to replace traditional closed book exams.

The current study examined the relationship between exam scores and test anxiety on open book and cheat sheet exams in introductory psychology courses. It was hypothesized that open book exams would lead to the highest exam scores and lowest levels of test anxiety.

## 2. Method

Two hundred and twenty five undergraduate students (176 females, 49 males) enrolled in 5 sections of introductory psychology in a small liberal arts University participated in this study. All five sections of the class were taught by the same instructor, had the same texts and assignments, and during a given term, identical exams (non-cumulative, 50 multiple choice questions on each exam, created by the instructor). The classes were taught over 3 terms (2 sections during two terms and one section the third term). During the first two terms, exam type was counterbalanced across sections (one section had an open book exam as the first exam, a cheat sheet as the second exam, and the conditions were reversed in the other section of the class), during the last term, the first exam was open book, the second was cheat sheet. On cheat sheet exams students were allowed to use a single page of notes (with as much information as they could include on both sides) during the exam.

Immediately prior to taking each exam, all students were asked to report how many hours they had spent studying for the test and completed a 10 item test anxiety measure – the Pre-Examination Worry-Emotionality Scale<sup>10</sup>. This scale measures both the levels of emotionality (with questions such as “I have an upset, uneasy feeling”) and worry (with questions such as “I feel I may not do as well on this test as I could”) prior to an exam (questions are answered on a 5 point Likert scale). For this study, the combined score (both worry and emotionality) was used.

## 3. Results

As shown in Figure 1, students scored slightly but significantly higher on open book compared to cheat sheet exams. A paired samples *t* test found  $t(220)=2.94, p < 0.05$ . The difference in scores between the two exam types was 2% - an average score of 80.75 (sd= 10.22) on open book exams and 78.55 (sd=12.34) on cheat sheet exams (one additional question answered correctly on a 50 item exam).

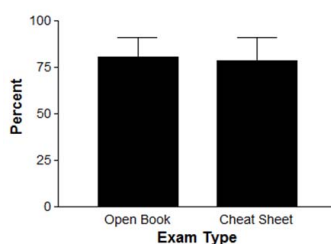


Fig. 1: Exam Scores

Scores on the two exams were positively correlated (Figure 2). A Pearson correlation found  $r(219)=0.51, p < 0.05$ . Those students who scored high on one type of exam tended to score well on the other exam type as well.

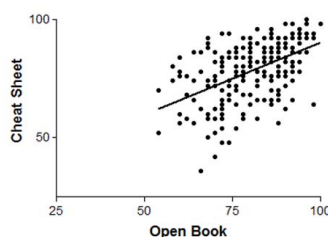


Fig. 2: Correlation between Exam Scores

Figure 3 shows the difference in anxiety scores between open book and closed book exams. Again, the difference is small but significant. A paired samples  $t$  test found  $t(209)=1.98, p < 0.05$ . The mean anxiety score was 22.92 (sd=7.39) on open book and 23.98 (sd=8.13) on cheat sheet exams. Anxiety scores were negatively correlated with exam scores on the cheat sheet exam ( $r(215)=-0.16, p < 0.05$ ), but not on the open book exam.

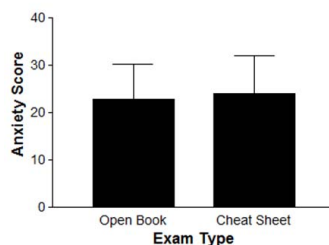


Fig. 3: Anxiety Scores

Figure 4 shows the number of hours students reported having studied for each type of exam. A paired samples  $t$  test found  $t(164)=2.00, p < 0.05$ . Students reported spending more time studying for the cheat sheet exam (Mean hours=4.37, sd=3.55) compared to the open book exam (Mean hours=3.73, sd=4.35).

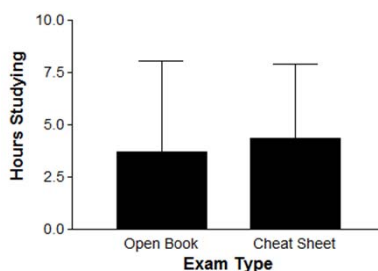


Fig. 4: Time Spent Studying

## 4. Discussion

While students did slightly better on open book exams compared to cheat sheet tests (getting about one additional question right on open book exams), they reported studying more for and feeling higher levels of anxiety on cheat sheet exams.

One interesting finding was that exam scores on the two types of tests were strongly correlated – good students tend to do well and poor students tend to underperform regardless of exam type. One way to interpret this finding is that the instructors ultimate decision of what sort of exam to use depends mostly on what the instructor considers most important – if it is desirable to decrease anxiety levels, then open book exams may be the best choice. In introductory level classes for example, the goal is to introduce the discipline to students from various backgrounds, many of whom are not planning to major in psychology. Open book exams create a stress free environment that allows the student to really explore and engage with the subject matter without having to worry about memorizing details for the exam. On the other hand, cheat sheet exams lead to students spending more time studying the course material. In upper division courses, cheat sheets may be a more desirable alternative. Since students who do well on one exam do well on the other, both exam types seem equally well suited to discriminate good students from poor ones.

What surprised us most was the modest improvement in grades on an open book exam compared to a cheat sheet test. Given that students had all the course material at their disposal during the exam, it might have been expected that scores would have been much higher on open book tests. In fact, in our department this is the primary reason many instructors have been hesitant to try open book exams – they were concerned that on an open book and note test, everyone would get close to perfect scores. Clearly, this was not the case. There are several factors that could have contributed to the very modest improvement in grades on open

book tests. One factor suggested by our results is that students studied less for open book tests. Given that exams had a time limit (70 minutes regardless of exam type), if students were less familiar with the material, they may not have had the time to look up all the answers they did not know in the material at their disposal. This interpretation conforms to previous research showing that students do not generally improve on open book exams<sup>3</sup> and that they study less for these exams<sup>4</sup>. An additional factor could have been that this was an introductory course, and the class covered a lot of information. Given only 50 questions on the exam, the questions focused on the major topics and main ideas discussed in the class and the text. The most important material, and the material most likely to appear on the exams, may have been obvious to the students, who would then include that material in their cheat sheets. As a result, the material included on a single sheet of paper may have been enough to answer most of the questions on the exam.

This study focused on exam performance in introductory psychology classes. In the future, we plan to extend this research to include upper division courses, where levels of exam anxiety may be higher, and exam items are more specific and detailed, as well as other disciplines. It would be particularly interesting to see if there are differences between more demanding and competitive disciplines compared to less competitive ones, where we would expect lower levels of exam anxiety.

It would also be interesting to consider other alternative exam types. Given the structure of our introductory courses, open book and cheat sheet exams seemed like the best alternatives to the traditional closed book exam. In other courses, on-line or even collaborative exams may be worth considering. In addition, the current study compared only one format of testing (multiple choice questions) in other courses (particularly upper division courses) it may be valuable to compare other types of questions. It would be particularly interesting to compare anxiety levels and performance on essay questions with different types of exams.

## 5. Acknowledgements

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