

## **Bias in Multiple-Choice Test Taking Strategies<sup>1</sup>**

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To what extent do built-in answer patterns on exams influence students' response decisions? Underlying test-taking strategies (heuristics) tend to be invoked when answers do not appear to be "random" (when random patterns are expected). This study will examine three basic conditions: (1) Random answers (2) Short-patterned answers, and (3) Long-pattern answers. If participants see too many of a certain answer coming up, they may be more likely to change their correct answer to an incorrect one in order to adhere to the "expected" (more representative) random pattern. In which case, scores are expected to be lower on "patterned" exams than on "non-patterned" exams.

### **Introduction**

We've designed a forty question test that I will be distributing to general psychology classes. The students will be a mix of males and females and their comprehension of the class will also be mixed up. That it will be totally random and we are not segregating the students with higher grades in the class, and the students with lower grades in the class. After the test is given we will be watching closely so that none of the students will have the option of cheating and they will have fifty minutes to complete the forty question test. After they are done I will then go back and hand grade all of these tests to see what score they have received. I will then hand out another survey to the students asking if they noticed a pattern and if and when they did notice it did they start to second guess themselves causing them to changed answers during the test. There will also be a question on the survey asking if they second guessed themselves if they changed their answers, and finally did they second guess themselves but stuck with the same answer on their test that was given.

I have chosen this because I feel that when students start to see a pattern on a test that they start to second guess themselves, and they do not think that there would be a pattern so then they will change their answers. There has been some research on standardized tests, but what I am testing has not been completed yet. Researchers have come up with studies showing that if the questions on a standardized test start off easier and

progressively get harder that students tend to do better on the test then if the questions start off harder and gradually get easier. This is called item ordering and it stats " Students who received the tests with items ordered in increasing cognitive order received higher scores on hard items than did students who received the test with items ordered in decreasing cognitive difficulty." Then they went on finding more information out about the test scores and came up with this conclusion " As was found for the subscore for all hard items, the means for the subscore for hard comprehension items indicated that the use of increasing cognitive difficulty ordering resulted in higher scores."

Another study has been conducting where it talks about how they believe giving students different test and mixing up the order can actually mess up their test scores since the theory that ordering of the question is a factor on tests. Many researchers are starting to believe that this is unfair to the students and the teachers or professors should be aware of this before mixing up the tests or having more then one copy distributed. Another study has been conducted which it had three sets of tests one was sequential meaning the items appeared in the same exact order as they were in the book, then there was contiguity order exam meaning items bases on the same chapter appeared together, and finally there was a totally random exam. The results of this experiment came back as scores for the sequential order exam were higher than for the other two. There were no significant

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differences in the completion times for any of the exams.

Finally the last study that was presented was the Multiple-Choice Testing: Question and Response Position. Taub and Bell (1975) considered the positioning of test questions and concluded that a truly random arrangement of questions results in lower exam scores than does ordering the questions to follow lectures and textbook assignments.

The idea of this experiment is to find out whether or not if the answers on a multiple choice test fall within a pattern will the student taking the test start to second guess themselves if they notice the pattern. This being said if there are forty questions on a multiple choice test and the first ten were all A's, the second then were all B's, the third set of ten were all C's and finally the last question were all D's would the student second guess themselves and maybe go back during the test and change some of their answers.

**Method**

**Participants**

There were 78 traditionally aged college students from Robert Morris University (RMU) located in Moon Township, Pennsylvania. All participants were recruited from upper-level psychology classes and some students earned extra credit for participating.

**Design**

The study used a simple one-way design in which Exam-Type had three levels (random-pattern, short-pattern, long-pattern) and was manipulated between subjects. The dependent variable was the percent correct score earned on the exam.

**Materials**

A 40-item general psychology exam was developed from the test-bank of a popular psychology text (Wood, Wood, & Boyd, 2006). There were four response options for each item, and the arrangement of correct answers was such that each option occurred ten times (i.e., ten "A" answers, ten "B" answers, etc.). There were three versions of the exam. The random-pattern version resulted in no obvious underlying correct response pattern (order was determined randomly). The

short-pattern version ensured that correct responses alternated as ABCD. For the long-pattern, correct responses resulted in the first ten items all having answer "A" while the second ten items used "B" as the correct answer, and so on. All items were presented in the same order for all participants. The only changes made were to the order of response alternatives.

**Procedure**

The forty question test was distributed to three upper-level psychology classes. All students were required to record their responses on a scantron sheet (included in the exam packet). The three exam-types were distributed randomly within each of the classes in which the study was conducted.

**Results**

A one-way analysis of variance was conducted on exam scores. The results indicated a significant main effect of Exam-Type,  $F(2, 75) = 3.65, p < 0.05$ .

As can be seen in Table 1, performance was best for the random pattern, followed by the short-pattern, and the worst performance occurred in the long-pattern exams.

**Table 1:** Data (participants [N], percent correct scores) for all conditions (standard deviations in parentheses).

Condition	N	Mean
Random	27	51.2 (10.4)
Short	26	49.4 (9.5)
Long	25	44.5 (7.1)

**Conclusions**

The present findings confirmed the prediction that underlying patterns in exams does affect student performance. Apparently, if students detect a pattern that seems to violate their expectancy for "randomness" they select alternative responses.

Typical "random" patterns are not likely to be perceived as having "non-random" components. When they do (which is possible even under truly random conditions), this violation of the representativeness heuristic results in students re-

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thinking their responses which will result in lowered exam scores.

### References

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