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Differential Effects of the Discrete-option Multiple-choice Format on Test Takers’ Assessment Preparation and Scores

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Method
• Hypothesis: Participants will prepare differently for assessments administered in the DOMC format.
• Research Design
  - Within-subjects design
  - Dependent variables: Amount of recorded study time, quiz score, and responses to the survey items.
  - Independent variable: Test format
• Participants
  - Experiment 1: 4 males, 4 females; psychology majors were not excluded
  - Experiment 2: 3 males, 4 females; psychology majors were excluded
  - No participants were currently enrolled in introductory psychology or had taken it the previous semester
• Materials
  - Study material and quiz items were selected from 10 chapters of an introductory psychology textbook (Carlson et al., 2007)
  - Each study packet included 8–10 textbook pages and a study log
  - Survey items included “What did you think the purpose of this study is?” and “How did you study for this quiz?”
• Similarities
  - Briefing about the new DOMC format
    • Informed consent
    • Option to take a practice quiz with the new format
    • 10 quizzes in 3 weeks, randomly assigned
  - Half in the DOMC format
  - Half in the Traditional format
• Differences
  - Informed in advance of the format
  - Participants took the untimed quizzes alone and were not permitted access to notes or the material
  - A proctor was available to provide assistance if needed

Background and Significance
• Multiple-choice tests have not sufficiently evolved to counter test-wise individuals. By offering the discrete-option multiple-choice format (DOMC) as an alternative to the traditional format, educators can counter “extra-test” competency. That is, the DOMC format may be fairer.
• The new format may encourage more thorough study of assigned material.
• The DOMC format only displays one answer option on the screen at a time.

Discussion
• Some of the differences in the two studies were a result of the change in study location
  - Experiment 1 demonstrated that the DOMC was significantly harder than the traditional format
  - In experiment 2 the participants may not have felt as much need to accommodate their studies to the proctor
• Individual study styles were less restrained experiment 2
  - One of the confounds experiment 2 was the increased student workload at the end of the semester
  - We retained the null hypothesis: Participants, on average, did not study differently in preparation for the two test formats.
  - There was no statistically-significant difference between study times for the two formats.
  - The use of the DOMC format increased participants’ focus on understanding the content of the material instead of merely memorizing facts.
• Participants reported that they had to be more prepared (study harder) to take the quizzes with the DOMC format.
• Scores from the DOMC format were significantly lower than those for the traditional format.

Results
Survey Data

• Experiment 1
  - The DOMC format: Encouraged a focus on memorization
    - Limited one’s ability to choose the “best” answer

• Experiment 2
  - Participants strongly preferred the Traditional format over the DOMC format.
  - Participants reported that they had to know the material more in-depth in order to do well on the DOMC quizzes.
  - Participants reported that the DOMC was harder than the traditional MC because it required more memorization and comprehension of the material.

Test Data

• Experiment 1:
  - Score/Study time correlation
    • DOMC: $r = -0.41$, NS
    • Traditional MC: $r = -0.21$, NS
  - Paired samples t-test
    * Study time for different formats: $t = -0.188$, NS
    * Test score for different formats: $t = -0.90$, $p = 0.008$

• Experiment 2:
  - Score/Study time correlation
    • DOMC: $r = -0.10$, NS
    • Traditional MC: $r = -0.64$, NS
  - Paired samples t-test
    * Study time for different formats: $t = -0.772$, NS
    * Test score for different formats: $t = 2.43$, NS