

GROUP EXAMS IMPROVE STUDENT LEARNING

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Abstract

We present a new approach to assessment in lower-division psychology classes. Traditionally, instructors evaluate students' accumulated knowledge with an individual exam. However, we suggest that learning can occur in many forms, even during the test. We gave our students the same multiple-choice test twice: first alone, second in small groups. Across 276 students, we found significantly higher performance on the group exam. Moreover, this improvement was not due solely to high-performing students providing the answers: almost every student's performance improved, students reported that almost everyone in their groups contributed equally to the discussion, and qualitative analyses of student comments suggested several ways in which groups aided learning, such as by presenting the material in a new way or by encouraging students to think more deeply about the material. We conclude that group exams are a beneficial way to not only assess but also promote learning.

Introduction

- Previous research has shown many learning benefits for students who work together in discussions and on projects: see, e.g., cooperative learning (Johnson, Johnson, & Smith, 1991), team-based learning (Michaelsen & Sweet, 2011), reciprocal teaching strategies (Shadiev et al., 2014), and focused interactive learning (Harton et al., 2002).
- All these strategies have been used in the context of initial learning of concepts. However, assessment has traditionally remained individually focused. We suggest that the benefits of collaborative learning can apply to testing, and that learning can continue to occur even during assessment.
- We hypothesized that reciprocal, collaborative testing can result in both enhanced performance and increased active learning.

Method

Participants:

- We studied a total of 276 students (57.6% female) across winter and spring 2014.
 - Perceived student ethnicities: 53% Caucasian, 20% Asian, 10% African-American, 10% Latino/a, 5% Middle Eastern, and 2% mixed-race.
 - Students were divided among two instructors (TKT: $n=122$; DGK: $n=154$) and 10 sections of three class topics ($n=187$ general psychology, $n=78$ developmental psychology, and $n=11$ cross-cultural psychology) for a total of 23 exams.

Materials:

- Instructors gave two (DGK) or three (TKT) multiple-choice exams throughout the quarter. Exams consisted of 50 questions and were administered in 50-minute sessions. Questions were a mix of factual, conceptual, and application types.

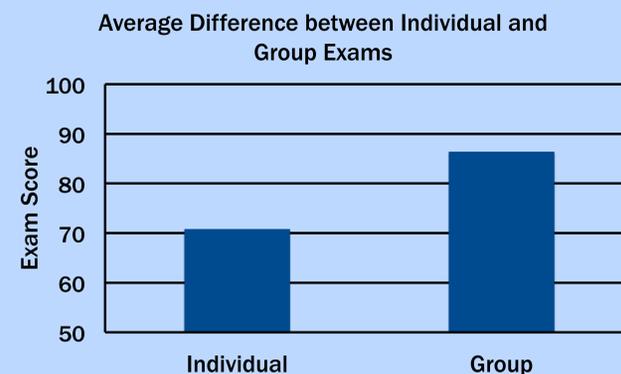
Procedure:

- Students took the same exam twice: first, individually, and second, in assigned groups of 3-5. Students completed individual response forms during the group portion, such that they were still responsible for their own scores and were not required to agree with the group.
- In a follow-up survey conducted only in the spring quarter ($n=94$), students responded to several questions about their experience with the group exams.

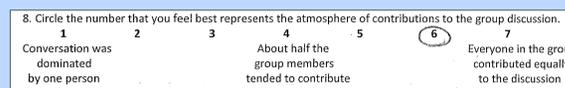
Quantitative analyses speak to the performance improvement on group exams relative to individual exams, and qualitative analyses speak to the power of the group exams for not only improving performance, but for aiding learning and encouraging deep processing.

Quantitative Results

1. Students performed much better on group relative to individual exams.
 - Average scores were fairly consistent across the three exams: individual (1: 71.3%, 2: 69.1%, 3: 72.1%) and group (1: 88.4%, 2: 82.3%, 3: 88.5%). The slight drop in scores for Exam 2 likely reflects the more difficult content covered on that exam in general psychology.
 - The average improvement was 19.62%, from 70.82 to 86.39, $t(1266) = 14$, $p < .0001$, with some students improving by as much as 40%.



2. This pattern persisted regardless of instructor, class topic, number of exams, or instruction quarter.
 - All $ps > .05$.
3. Importantly, this improvement in learning did not seem to be due to one high-performing student dominating the group conversation.
 - In a follow-up survey, students responded that almost everyone tended to contribute equally to discussion, $M(94) = 6$ (on scale below).



Qualitative Results

What aspects of the group exam worked well for you?

Students enjoyed the opportunity to discuss each answer choice. They found the process of talking, debating, and bouncing ideas off each other to be useful, and they were able to see different ways of reasoning through these conversations. They also shared that they learned more through teaching others and being taught, and sharing these answers boosted their confidence in their own knowledge. Some students mentioned the stress relief provided by the group testing environment.

Sample comments:

- *I didn't know the answers for a couple of questions about parts of the brain and my group was able to explain it so I understood and remembered it.*
- *I liked that I got to hear different reasonings for things which helped me to better understand the concepts.*
- *People had different strengths that we played off of ... they were both my scores, but even just talking out loud to myself helped.*
- *It forces us to discuss the info more, which is beneficial toward memory.*

Qualitative Results (continued)

How did you handle situations where group members had different answers to the same question?

Students discussed using a process of elimination, reasoning out each answer choice. Some groups reported that they listened to everyone and some explained why a particular answer may have been incorrect. To arrive at a conclusion, some groups voted and went with the majority, while others discussed until a consensus was reached. Still others chose their own answers after discussion.

Sample comments:

- *We explained the reasoning behind the answer and then explained why the other answer could be wrong.*
- *The majority would try to convince. Evidence was key.*
- *We all shared what we thought, then just individually put what we believed was the correct answer. There was no arguing or anything that made choosing your own answer uncomfortable.*

Did you learn new information on the group exam?

Many students learned new information (65%), and some who didn't report learning new information suggested that the group atmosphere had helped in other ways, such as by clarifying their understanding of a concept or confirming their knowledge (12%).

Sample comments:

- *I learned a lot more on the group exam.*
- *I didn't learn much of anything new ..., but for the same data I learned different ways to look at it.*

Discussion

- Students performed significantly better on exams taken in small group relative to exams taken individually.
- This improvement in performance was due to a number of factors, including the opportunity to think carefully about the concepts being tested and the ability to teach and learn from one's peers.
- In addition to the performance benefit, students reported that the group learning atmosphere helped to relieve stress and to solidify their understanding of course material.
- This effect holds across a variety of class topics and between two female instructors (with differences in course structure, teaching styles, and ethnic backgrounds).
- Both instructors were young females, so future research is needed to clarify whether the gender and/or age of the instructor matters.
- Future work might also investigate the extent to which this method may help students under other conditions, such as other exam formats (e.g., short answer) and in other course subjects (e.g., history, math, biology).

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