An Examination of Student Learning: Test Preparation and Test Anxiety

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In general, educators consider tests a valuable tool to evaluate student learning, motivate student achievement, assess teaching effectiveness, and reinforce student learning (Gross Davis, 2001).

Little research has examined neither the effect of student’s using reference aids such as notes on exam scores and course grades nor its effect on student study behaviors.
When teaching information systems to college students, Duncan (2007) found that exam score averages by course section did not differ based on the use of notes but individual exam scores were statistically significantly better for students who used notes.

When examining student preparation for exams, researchers found that testing increased stress levels among students (Wasylkiw, Tomes, & Smith, 2008).
Purpose

- Examine student learning in an undergraduate social science research methods course
- Specifically, relationships between student’s test preparation behaviors, test anxiety, test grades, cumulative course grades, and the use of notes during the exam were examined.
Sample

- Fall 2012
  - 56 students
- Spring 2013
  - 113 students
Pilot Study Design

- Received IRB approval
- Students were told about the study on the first day of class and received information in the syllabus
- Students were reminded about the study before each exam
- Three identical exams were given during the 2012 fall and 2013 spring semesters
  - 50 minutes
  - Each exam included approximately thirty multiple choice questions and three application questions.
  - Both groups were also provided the same study guide outlining important concepts.
Pilot Study Design

- An adaptation of the Test Anxiety Inventory (Taylor & Deane, 2002) was administered to students during the fall 2012 (two sections) semester (control group) and spring 2013 (two sections) semester (comparison group).
  - Students completed the survey in class immediately following the exam to increase the likelihood of accurate recollections.
- The comparison group was allowed to use one page of handwritten notes during each exam.
  - Both groups were allowed to use one page of notes on exam 3.
- A third party (faculty member) collected the surveys and kept the surveys until final grades were submitted.
Survey

- Overall, how much total time did you spend studying for this test? _______ hours
- How much time did you spend specifically memorizing information? _______ hours
- How many days before the exam did you begin studying? ____________ days
- For this test, I studied
  a) Mostly by myself
  b) Mostly with a partner or group
  c) Both
Survey (continued)

- **During this test, I felt very tense.**
  - Almost never
  - Sometimes
  - Often
  - Almost always

- **In general, I wish examinations did not bother me so much.**
  - Almost never
  - Sometimes
  - Often
  - Almost always

- **In general, I seem to defeat myself while working on important tests.**
  - Almost never
  - Sometimes
  - Often
  - Almost always
Survey (continued)

- In general, I feel very panicky when I take an important test.
  - Almost never
  - Sometimes
  - Often
  - Almost always

- In general, during examinations I get so nervous that I forget facts I really know.
  - Almost never
  - Sometimes
  - Often
  - Almost always
Hypothesis

- Students using notes will perform better than students who do not use notes during the exam
# Test Preparation Behaviors

<table>
<thead>
<tr>
<th></th>
<th>Exam 1</th>
<th></th>
<th>Exam 2</th>
<th></th>
<th>Exam 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall M</td>
<td>Notes Spring M</td>
<td>Fall M</td>
<td>Notes Spring M</td>
<td>Fall M</td>
<td>Notes Spring M</td>
</tr>
<tr>
<td>Hours spent studying</td>
<td>5.6</td>
<td>5.4</td>
<td>6.8</td>
<td>4.7</td>
<td>6.0</td>
<td>3.8</td>
</tr>
<tr>
<td>Hours spent memorizing</td>
<td>2.5</td>
<td>2.3</td>
<td>2.7</td>
<td>1.9</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Days</td>
<td>3.3</td>
<td>3.3</td>
<td>2.6</td>
<td>2.4</td>
<td>2.5</td>
<td>2.1</td>
</tr>
</tbody>
</table>

How many days before the exam did you begin studying?
For this test, I studied...

<table>
<thead>
<tr>
<th>Method</th>
<th>Exam 1 Fall</th>
<th>Exam 1 Notes Spring</th>
<th>Exam 2 Fall</th>
<th>Exam 2 Notes Spring</th>
<th>Exam 3 Fall</th>
<th>Exam 3 Notes Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostly by myself</td>
<td>90.9</td>
<td>78.6</td>
<td>90.2</td>
<td>83.0</td>
<td>92.6</td>
<td>85.1</td>
</tr>
<tr>
<td>Mostly with a partner or group</td>
<td>1.8</td>
<td>7.8</td>
<td>2.0</td>
<td>6.00</td>
<td>1.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Both</td>
<td>7.3</td>
<td>13.6</td>
<td>5.9</td>
<td>11.0</td>
<td>5.6</td>
<td>7.9</td>
</tr>
<tr>
<td>Did not study</td>
<td>0.0</td>
<td>0.0</td>
<td>2.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Scale of Test Anxiety

• Summed, the five questions create a scale of test anxiety
  1. During this test, I felt very tense.
  2. In general, I wish examinations did not bother me so much.
  3. In general, I seem to defeat myself while working on important tests.
  4. In general, I feel very panicky when I take an important test.
  5. In general, during examinations I get so nervous that I forget facts I really know.
    - Almost never
    - Sometimes
    - Often
    - Almost always

• Minimum = 5 and Maximum = 20
  - Lower score indicated less anxiety
# Scale of Test Anxiety

**Independent Samples t-test**

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th></th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall 2012 (n=56) M (SD)</td>
<td>Spring 2013 (n=113) M (SD)</td>
<td></td>
</tr>
<tr>
<td>Exam 1</td>
<td>11.7 (3.9)</td>
<td>10.3 (3.6)</td>
<td>2.22*</td>
</tr>
<tr>
<td>Exam 2</td>
<td>11.3 (3.6)</td>
<td>10.4 (3.6)</td>
<td>1.51</td>
</tr>
<tr>
<td>Exam 3</td>
<td>10.8 (3.5)</td>
<td>9.9 (3.4)</td>
<td>1.59</td>
</tr>
</tbody>
</table>

*p < 0.05*
## Grades

Independent Samples t-test

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th></th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall 2012</td>
<td>Spring 2013</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n=56)</td>
<td>(n=113)</td>
<td></td>
</tr>
<tr>
<td>Exam 1</td>
<td>84.4 (9.5)</td>
<td>86.1 (9.4)</td>
<td>-1.08</td>
</tr>
<tr>
<td>Exam 2</td>
<td>85.5 (8.2)</td>
<td>85.2 (10.4)</td>
<td>0.11</td>
</tr>
<tr>
<td>Exam 3 - Notes</td>
<td>88.8 (8.2)</td>
<td>85.5 (10.0)</td>
<td>2.18*</td>
</tr>
<tr>
<td>Overall Course</td>
<td>88.5 (8.7)</td>
<td>89.1 (8.3)</td>
<td>-4.41</td>
</tr>
</tbody>
</table>

*<br>**p < 0.05**
Anxiety and Exam Grades

Bivariate Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Anxiety</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall 2012</td>
<td>Spring 2013</td>
<td></td>
</tr>
<tr>
<td>Exam 1</td>
<td>-.398**</td>
<td>-.174</td>
<td></td>
</tr>
<tr>
<td>Exam 2</td>
<td>-.139</td>
<td>-.025</td>
<td></td>
</tr>
<tr>
<td>Exam 3</td>
<td>-.018</td>
<td>-.274**</td>
<td></td>
</tr>
</tbody>
</table>

Negative relationship between anxiety and exam scores.

As anxiety increased exam scores decreased.

**p < 0.01
## Hours Spent Studying and Anxiety

### Bivariate Correlation Matrix

<table>
<thead>
<tr>
<th>Hours spent studying for...</th>
<th>Anxiety</th>
<th>Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall 2012</td>
<td>Spring 2013</td>
</tr>
<tr>
<td>Exam 1</td>
<td>.184</td>
<td>.221*</td>
</tr>
<tr>
<td>Exam 2</td>
<td>.295*</td>
<td>.211*</td>
</tr>
<tr>
<td>Exam 3</td>
<td>.162</td>
<td>.169</td>
</tr>
</tbody>
</table>

Positive relationship between number of hours spent studying and anxiety.

As hours spent studying increased anxiety increased.

**p < 0.01**
Other factors that may have influenced the results...

- Allowing notes may instill a false sense of confidence such that students may procrastinate and not prepare thoroughly for the exam.
- The opportunity to use notes may provide an incentive for some students to prepare thoroughly for the exam.
- The quality of student prepared notes can vary considerably.
Questions or Comments

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References


