The Decline Of Reading Comprehension Among College Students

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AMATYC 2012
Grand Salon 6
S057
Honors Seminar 2010
Statistics & Psychology

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High Honors
Associate of Science 2011
Major – Psychology
Texas A&M University-Commerce
Mary’s Presentations

2010 American Psychology Association Conference Poster Session, San Diego

Undergraduate Statistics Project Competition (USPROC) sponsored by CAUSE, Spring 2011

Georgia Undergraduate Research in Psychology Conference, April 2011

Stanford Undergraduate Psychology Conference, May 2011
Semester Research Project
MATH 1342 – PSYC 2301

Data Collection & Report
1) Instrument  2) Participation  3) Organization

Statistical Analysis
1) Choice  2) Correctness  3) Completeness

Oral/Written Presentation of Findings
1) Clarity  2) Creativity  3) Presentation
1996-
Chall reported
- National decline in reading ability
- University of Michigan 1930’s to 1980’s
- Increase of remedial reading courses in colleges
- Great efforts to reform reading instruction
- Decline due to lack of difficulty in textbooks.

1980-
Gerow and Murphy found
- Significant relationship between NDRT and Introduction to Psychology Examination Grades
The Purpose of Research

Reading comprehension decrease

Students reading below college level increase

Final grade and reading comprehension relationship
Outline of Research

3,326 Participants

All students

- enrolled at NTCC
- tested a span of 2 decades
- in same professor’s Introduction to Psychology courses
Nelson-Denny Reading Test (Comprehension)
Grade Equivalency Calculated
Analysis spring 2010
Nelson-Denny Reading Test

- Form H
- 20-minute test
- Scored right/wrong
- Score range 3.6-18.9
Is there evidence of a decline in reading comprehension?

### Reading Equivalency Scores

<table>
<thead>
<tr>
<th>Period</th>
<th>Mean</th>
<th>St Dev</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988-1997</td>
<td>13.10</td>
<td>3.182</td>
<td>1890</td>
</tr>
<tr>
<td>1998-2007</td>
<td>12.69</td>
<td>3.379</td>
<td>1436</td>
</tr>
</tbody>
</table>

**Histogram of 1988-1997**

**Histogram of 1998-2007**
Hypothesis: 2-Sample F Test for Equal Variances

\[ H_0: \sigma_1^2 = \sigma_2^2 \]
\[ H_1: \sigma_1^2 \neq \sigma_2^2 \]

Level of Significance
\[ \alpha = 0.05 \]
There is sufficient evidence at the level $p = 0.015268 < \alpha = 0.05$ to conclude that the 1988-1997 variance is not equal to the 1998-2007 variance.
Hypothesis: 2-Sample t-Test

$H_0: \mu_1 = \mu_2$

$H_1: \mu_1 > \mu_2$

Level of Significance

$\alpha = 0.05$
There is sufficient evidence at the level \( p < 0.0002 < \alpha = 0.05 \) that there was a statistically significant decrease in the mean reading score for the second decade (1998-2007) from the mean reading score for the first decade (1988-1997).
Average Reading Equivalency Scores 1988-2007

\[ y = -0.051x + 114.56 \]
\[ R^2 = 0.4154 \]
Is there evidence of an increase in the percentage of students reading below college level?

Test for difference in the proportions of students with reading scores < 13.0 for the first decade (1988-1997) and for the second decade (1998-2007).
Percentage of Students’ Reading Equivalency Scores Below College Level (13.0)

Year 1988-1997: 42.7%
Year 1998-2007: 48.5%
Hypothesis: 2-Proportion z-Test

$H_0: \hat{p}_1 = \hat{p}_2$

$H_1: \hat{p}_1 < \hat{p}_2$

Level of Significance

$\alpha = 0.05$
There is sufficient evidence at the level $p < 0.0005 < \alpha = 0.05$ that the 1988-1997 proportion is significantly lower than the 1998-2007 proportion.
Is there evidence of a relationship between reading comprehension and final grades?

Test for a relationship between college-level grade equivalency scores and final grades in PSYC 2301.
Reading Comprehension
Final Grades

<table>
<thead>
<tr>
<th>Final Grades</th>
<th>Above</th>
<th>Below</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above A/B</td>
<td>46.5</td>
<td></td>
</tr>
<tr>
<td>Below</td>
<td></td>
<td>28.0</td>
</tr>
<tr>
<td>Above C</td>
<td></td>
<td>22.9</td>
</tr>
<tr>
<td>Below</td>
<td></td>
<td>27.9</td>
</tr>
<tr>
<td>Above D/F</td>
<td></td>
<td>30.6</td>
</tr>
<tr>
<td>Below</td>
<td></td>
<td>44.1</td>
</tr>
</tbody>
</table>
Average Achievement PSYC 2301
Reading Equivalency Scores

\( y = 0.0937x + 0.6611 \)
\( R^2 = 0.9053 \)
Hypothesis

$H_0$: Reading equivalency scores and final grades are independent.

$H_1$: Reading equivalency scores and final grades are not independent.

Level of Significance: $\alpha = 0.05$

Degrees of Freedom = $(3 - 1)(2 - 1) = 2$
### Chi-Square Test for Independence
Reading Comprehension and Final Grade

<table>
<thead>
<tr>
<th>Final Grade</th>
<th>College-level or above</th>
<th>Below College-Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A or B</strong></td>
<td>O = 848</td>
<td>O = 421</td>
</tr>
<tr>
<td></td>
<td>E = 695.5463</td>
<td>E = 573.4567</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>O = 417</td>
<td>O = 419</td>
</tr>
<tr>
<td></td>
<td>E = 458.2165</td>
<td>E = 377.7835</td>
</tr>
<tr>
<td><strong>D or F</strong></td>
<td>O = 558</td>
<td>O = 663</td>
</tr>
<tr>
<td></td>
<td>E = 669.2372</td>
<td>E = 551.7628</td>
</tr>
</tbody>
</table>

Results: $X^2 = 123.0649845 \quad p = 1.8914 \times 10^{-27}$

Reading comprehension and final grade are not independent at the $p < 0.0000 < \alpha = 0.05$ level of significance.
Conclusion

Evidence of a decrease of reading comprehension

Relationship found between reading comprehension and final grades
Impact of Research

- Students not prepared for college
- Educational goals may not be obtained
- Educators need to seek ways to increase reading
Where We Go From Here

Examine standardized testing for

- Accuracy of the tests
- Assess students’ benefit

Validity and reliability of the Nelson-Denny Reading Test

Explore possible reasons for the decline in reading equivalency numbers

- Assess technology impact
Grimm finds
- Third grade reading comprehension is a positive significant predictor of change in mathematics skills.
- Evidence that suggests that students with a greater level of reading comprehension progress more quickly in understanding and applying conceptual mathematics.
2008-

Grimm adds

- These findings do not rule out the reciprocal that early mathematics achievement may be associated with changes in reading comprehension.

- Mathematics achievement involves the use of a diverse collection of skills, such as reasoning, executive functioning, working memory, short-term memory, processing speed, and phonological processing.
Gallagher cites

- Less than 14% of low-income students are reading at grade level. Clearly, the reading odds are stacked heavily against our students with the most severe needs.

- By kindergarten, a gap of 32 million words already separates some children in linguistically impoverished homes from their more stimulated peers. (Wolf, 2007)

- Are we going to have an entire generation...who cannot reflect on abstract ideas? (Healy, 1990)
Gallagher warns

- Starving the part of the brain that needs to be developed before deeper reading can occur also has additional consequences.

- If we want our students to be complex thinkers, they need to be challenged to read long, complex texts.
Acknowledgements

Dr. Shirley Clay
Division Director for Social and Behavioral Science
Northeast Texas Community College

Mary Galloway
Principal Researcher
Honors Seminar 2010

Faith Clough
Statistics Project Rubric
AMATYC 2008


QUESTIONS?

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