

Sample News Headlines that raise Questions

Teacher's gender affects learning

Unfair boss could shorten your life

Marriage is great equalizer for blacks

Study says skin tone affects earnings

Older dads may have kids with autism

Smoking can lessen IQ, thinking ability

Weightlifting may cut teen diabetes risk

Smoker's kids have more attention deficit

Fish during pregnancy may boost kids' IQ

Women Get Paternal Clues in Men's Faces

Kids with High IQs Grow Up to be Vegetarians

Drinking a little wine linked to men's longer life

Secondhand Smoke Boosts Alzheimer's Risk

For a review of the numbers found in the news, see
www.StatLit.org/pdf/2007SchieldASA.pdf

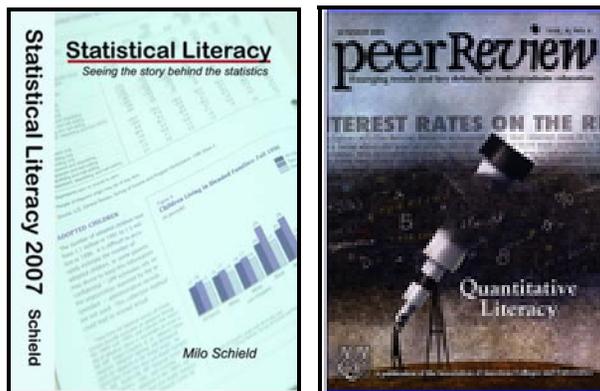
The source document is 2007SchieldGST200.doc

W. M. Keck Statistical Literacy Project

Goal: To develop statistical literacy as an interdisciplinary curriculum in the liberal arts

Based on a national competition in 2001, Augsburg College received a major grant from the W. M. Keck Foundation to develop a Statistical Literacy course and textbook that focuses on evaluating numbers in the news.

For more on the project, see www.Augsburg.edu/statlit.
For more on the text, see www.StatLit.org/Schield.htm.



Statistical Literacy and Liberal Education at Augsburg College was featured in the Quantitative Literacy issue of *Peer Review* – published by the AACU. See www.StatLit.org/pdf/2005SchieldAACU.pdf.

The textbook author, Milo Schield, PhD, has taught critical thinking at Augsburg at both the undergraduate and graduate levels. He is Vice President of the National Numeracy Network (NNN) – an organization dedicated to numeracy across the curriculum.

In *More Damned Lies and Statistics*, Joel Best said "A small educational movement advocating statistical literacy has emerged. Professor Milo Schield, Director of the W. M. Keck Statistical Literacy Project, at Augsburg College in Minneapolis, is the movement's leading voice."

A copy of this brochure is available on the web at www.StatLit.org/pdf/2007SchieldGST200.pdf



Augsburg College GST 200

Statistical Literacy Seeing the Story Behind the Statistics

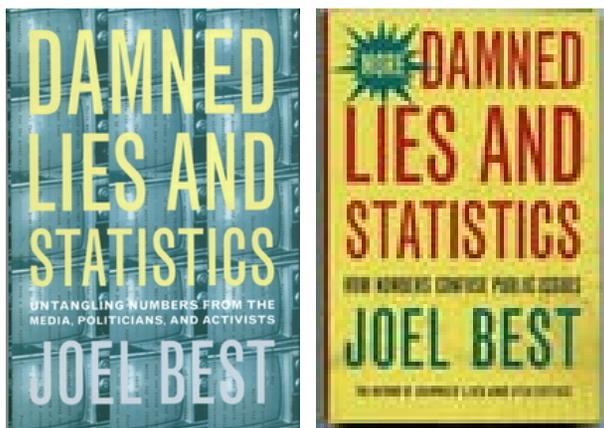
An English and graph based quantitative literacy course designed for students in non-quantitative majors.

Complete with textbook, syllabus, exams, articles and tested Moodle exercises

- Satisfies Augsburg's Quantitative Reasoning (QR) graduation skill requirement.
- Satisfies the new "little-q" requirement.
- Submitted for a "Big-Q" designation.

Hypothetical Thinking Required

Students study excerpts from Joel Best's books:



Students learn that “all statistics are socially constructed” in the sense that people with motives select the factors, define the terms, categories and measures, select the samples, select the questions, ask the questions, record the responses, classify the results into groups, form the comparisons, select the results to be presented in tables, graphs and words.

Since most of this information is not given in news stories, students must learn to *think hypothetically* about how certain choices could have influenced the numbers in the news.

Students comment that this type of thinking – *hypothetical thinking about what isn't presented and what could have been done* – is much more challenging than a traditional math course where all the information to solve the problem is given in the problem.

Exercises with Non-Numeric Answers

Which definition gives the larger count?

- teens: ‘those ages 13-16’ or ‘those ages 13-19.’
- heat-wave deaths: ‘deaths caused by the heat wave’ or ‘deaths occurring during a heat-wave.’

Which has a higher average credit-card balance?

- All cardholders or just those who carry a balance?

Which description gives the larger percentage?

- The percentage of school-age teens who are unemployed dropouts or the percentage of school-age teen dropouts who are unemployed.

Instructors can choose from 10 such Moodle exercises plus 30 Moodle right-wrong exercises with numeric answers. Each Moodle exercise has 5 to 20 different problems. For more on their design and classification, see www.StatLit.org/pdf/2007SchieldIASE.pdf.

Redefine the concept shown to change the quantity:

- Bullying: threat of physical harm vs. physical or social pressure
- Overweight: Above average vs. top 10th percentile.
- Species: biological vs. geographic sub-species.

For more on the importance of hypothetical thinking, see www.StatLit.org/pdf/2007SchieldMSS.pdf

Use ordinary English to describe and compare percentages and rates presented in tables and graphs.

Students use a state-of-the-art web program that decodes their ordinary English statements and tutors them on their errors. Students who learned English as a second language say this program is extremely useful in helping them master some intricacies of the English language. See www.StatLit.org/pdf/2005BurnhamSchieldASA.pdf

Analyze Numbers in the News

CRITICAL THINKING:

- Identify the point of the story
- Determine whether the point involves a quantitative association or a causal connection.
- Give a plausible mechanism for the association

STATISTICAL LITERACY:

Students study the “TAKE C.A.R.E” methodology to analyze these four influences:

Context (Confounding):

- Identify the study design: Experiment vs. observational study, cross-sectional vs. longitudinal.
- Identify relevant factors (plausible confounders).
- Evaluate the influence of the study design and of plausible confounders on the observed numbers.

The American Statistical Association featured Dr. Schield's article on confounding on the cover of STATS magazine. www.StatLit.org/pdf/2006SchieldSTATS.pdf

Assembly (Joel Best's “Damned Lies & Statistics”)

- Identify sources of ambiguity or equivocation.
- Evaluate the influence of different choices in the definition of groups or the presentation of numbers.

Randomness or Chance

- Calculate probabilities, the size of confidence intervals and the presence of statistical significance.
- Evaluate influence of plausible randomness on the numbers in the news using chance, confidence intervals and statistical significance.

Error or Bias

- Evaluate influence of plausible bias in sample selection, in measurement or in subject response.

For more on the template used to evaluate news stories, see www.StatLit.org/pdf/2005IssacsonASA.pdf

Students design a survey, summarize the data and analyze the results using the “Take CARE” methodology.