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Statistical Literacy Course

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Project Kaleidoscope (PKAL)
Carleton College: QUIRK Project
Quantitative Inquiry, Reasoning & Knowledge
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Slides at www.StatLit.org/pdf/2008SchildQuIRK6up.pdf

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NNN: Numeracy Across the Curriculum

In quantitative majors: 60% of college grads

- Majors that require statistics or calculus.
- Embed numeracy into existing quantitative courses.

In non-quantitative majors: 40% of grads

- Majors that don't require a math course (e.g., Art)
- Hard to embed numeracy into existing courses.
- Need English-graph literacy, not algebra/math/stats.
- Need to read, write and reason with tables and graphs.

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W. M. Keck Statistical Literacy Course

A complete package:

For students:

- a student-tested, critical-thinking textbook,
- thousands of field-tested Moodle exercises
- cutting-edge web programs

For teachers,

- a template to evaluate numbers in the news
- a web-based instructor-training program
- over 30 scholarly papers on this course

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StatLit studies numbers in the news everyday

Statistical Literacy studies numbers found in experiments, *observational studies*, surveys, *models* and medical tests.

- Magnet Reduces Severe Pain
- Smoking can lessen IQ, thinking ability
- *Weightlifting may cut teen diabetes risk*
- *Kids with High IQs Become Vegetarians*
- Evolution Pro & Con: A survey
- *Global Warming Projects a "Hot Planet"*
- Cancer Diagnostic Test has High Error Rate

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Structured Approach

Students need a structured approach to analyze news stories that use numbers as evidence.

This course uses a critical thinking approach.

- What is the point of the story?
- Is there association or causation?
- How could association be causal?
- How well do numbers support the point?

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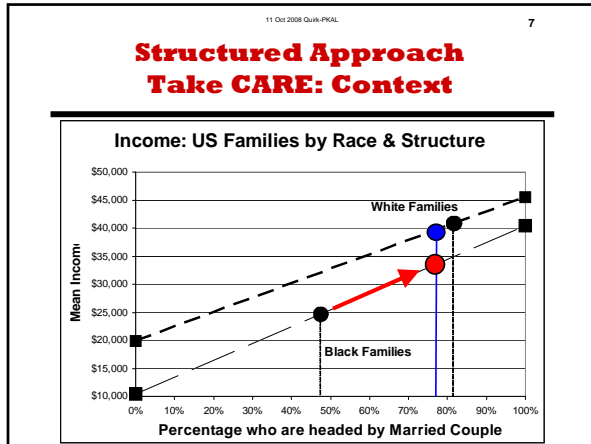
Structured Approach Take CARE

Context:
What factors are controlled for by study design, ratios, etc.? What are plausible confounders?

Assembly:
Could numbers be influenced by the choice of definitions, comparisons or mode of presentation?

Randomness:
Could a statistic be due to chance? Is the association statistically significant? Can significance change?

Error:
What are plausible sources of error or bias?



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Assembly: Definition and Counts: #1

Which definition gives the larger number?
 A “dividend-paying stock” is any stock that has paid a dividend

- during the past year.
- during ANY of the past three years
- during EACH of the past five years

ANSWER: B (80%)

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Assembly: Definition and Counts: #2

Who has more children: Rich or Poor moms?
 Poor < 35K < Rich.
 ANSWER: Rich moms

<10K	10-20K	20-25K	25-30K	30-35K	35-50K	50-75K	>75K
4.2M	6.2M	3.4M	3.8M	3.6M	8.9M	10.6M	12.5

Poor < 25K; Middle-class: 25-50K. Rich > 50K
 ANSWER: Poor Moms

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Assembly: Definition and Ratios

Which definition of “children” gives the higher percentage of children who are bullies?

- Any person who is between 6 and 18
- Any person who is between 13 and 18

ANSWER: B (71%) More restrictive ‘whole’

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W. M. Keck Statistical Literacy Course

Statistical Literacy has been taught online at Capella Univ.

When ranked on critical thinking with all other general education courses, Statistical Literacy ranked 2nd.
 Philosophy was #1 while traditional statistics ranked last (15 out of 15).

When asked if they would recommend the course to other students, Statistical Literacy ranked #6.
 Traditional statistics ranked #15..

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Course Overview Brochure:
 See www.StatLit.org/pdf/2008StatLit2A.pdf

Analyzing Cases using ‘Take CARE’
 Draft at www.StatLit.org/pdf/2008SchieldViSA.pdf

Quantitative Reasoning component:
www.StatLit.org/pdf/2008AugsburgGradSkillGST200QA.pdf