



TEACHING STUDENTS TO IDENTIFY **DECEPTIVE** USE OF NUMBERS IN POLITICAL CLAIMS

NCTM, 2018, Washington D.C

Marcus Jorgensen, Utah Valley University,
Orem, Utah



HELLO!

I'm Marcus Jorgensen

Assoc. Professor, Developmental Mathematics

Utah Valley University

You can contact me at
jorgenma@uvu.edu

Introduction

context,
principles,
research

Application

question,
lessons learned

TEACHING STUDENTS TO
IDENTIFY DECEPTIVE USE OF
NUMBERS IN POLITICAL CLAIMS

Research Results

categories of deception

Teaching

lectures,
project,
exams





INTRODUCTION

Context
Principles
Research



CONTEXT

MAT 1030, Quantitative Reasoning

[General education QL course for non-STEM majors]

- X Interpreting Quantitative Information
- X Decision-making
- X Problem Solving
- X Modeling Growth
- X Financial Literacy



PRINCIPLES

- X Use controversial, authentic topics without being controversial
- X Be evenhanded
- X Be critical not cynical
- X Warn that the knowledge should not be used for evil purposes



RESEARCH

- X 2015: Presidential campaign year. Political statements, using numbers, that were judged to be false to some degree.
- X FactCheck.org (95 statements) – initial coding
- X Politifact (97 statements) – verify and refine coding



RESULTS

Categories of numerical deception



CHERRY-PICKING

Picking convenient information: a particular study, time-frame, data set, methodology, poll.

Cues:

- X Study/poll authors or sponsors with potential bias
- X “One study ...”
- X Time frames



EXCESSIVE ROUNDING

Using exaggerated claims that are “rounded” to suit the cause.

Cues:

- X Sweeping statements
- X Attention-getting sound bites
- X Round numbers
- X If it sounds too good to be true ...



SPECULATING

Speculating on what is the data by using other data that is not current or applicable to the location.

Cues:

- X No specific data to support claim
- X Vague references to the existence of data
- X Data stated as current without sufficient time to have collected the data



IGNORING PERSPECTIVE

Presenting accurate data but without disclosing the full picture (no context or comparison with other numbers).

Cues:

- X Use of absolute numbers where a rate or percentage would be more appropriate
- X Number presented as unusual but no comparisons are given



USING IMPRECISE LANGUAGE

Making a claim with terms not defined and/or not being clear about what is being counted.

Cues:

- X Use of terms that could have a variety of definitions or are not entirely clear
- X Beware of economic-related terms



MANIPULATING DENOMINATORS

Inflating or deflating a denominator (or numerator) to change the relative size of the fraction used in a percentage.

Cues:

X Use of a fraction or percentage



PRESUMING CAUSATION

Presuming a cause-and-effect relationship when there is only a correlation.

Cues:

- X Stating or implying a causal relationship between two variables

SUMMARY & EXAMPLES

- x Cherry-picking
- x Excessive rounding
- x Speculating
- x Ignoring perspective
- x Using imprecise language
- x Manipulating denominators
- x Presuming causation

“We spend almost twice as much per capita on health care as do the people of any other country.”
[more but not twice]

Under ACA, “American families have seen an increase in premiums of \$5,000.”
[actual \$3,612]

SUMMARY & EXAMPLES

- x Cherry-picking
- x Excessive rounding
- x Speculating
- x Ignoring perspective
- x Using imprecise language
- x Manipulating denominators
- x Presuming causation

"We have record numbers of people living in poverty today."
[true but ...]



Under Common Core standards, it takes "more than a minute" to teach a student "how to add nine plus six."
[true but ...]



SUMMARY & EXAMPLES

- x Cherry-picking
- x Excessive rounding
- x Speculating
- x Ignoring perspective
- x Using imprecise language
- x Manipulating denominators
- x Presuming causation

“88 percent growth in green jobs, year over year, over the past year.”

[green? jobs or openings?]



SUMMARY & EXAMPLES

- x Cherry-picking
- x Excessive rounding
- x Speculating
- x Ignoring perspective
- x Using imprecise language
- x Manipulating denominators
- x Presuming causation



"The 'tax plan' rolled out by @realDonaldTrump would have cut his taxes by \$30 million in 2005 (the only year we have returns for)."

[reasonable estimate but ...]

SUMMARY & EXAMPLES

- x Cherry-picking
- x Excessive rounding
- x Speculating
- x Ignoring perspective
- x Using imprecise language
- x Manipulating denominators
- x Presuming causation

Bernie Sanders

Mike Pence

Carly Fiorina

Greg Abbott

Al Gore

Nancy Pelosi



TEACHING

Lecture, Projects, Exams



LECTURE

Attention-getter:

Planned Parenthood

- X Susan B. Anthony List: abortions make up 94% of Planned Parenthood's pregnancy services
- X Planned Parenthood: 3% of health services are abortion services
- X Both received three Pinocchios from the Washington Post fact checker



LECTURE

Importance:

“The old saying is that ‘figures will not lie,’ but a new saying is ‘liars will figure.’ It is our duty, as practical statisticians, to prevent the liar from figuring; in other words, to prevent him from perverting the truth, in the interest of some theory he wishes to establish.”

Carroll D. Wright, US Commissioner of Labor
opening remarks at a Convention of
Commissioners of Bureaus of Statistics of Labor, 1889



LECTURE

- X Lies versus deception
- X Definitions of categories with cues and with examples
- X Show Factcheck.org and Politifact.com

PROJECT

- a. The url for a fact-checker post about the deceptive claim
- b. What is the level of deception, if stated (e.g., 3 Pinocchios, mostly false, etc.).
- c. Explain the mathematics of the deception.
- d. In which deception category (or categories) would you classify this deception? If none, can you suggest a new potential category?
- e. Is there a cue in the claim that might have alerted you to a potential deception? If so, what is the cue?

Must do two: Republican and Democrat



EXAM QUESTIONS

- X Matching categories to definitions
- X “For each quote below (with additional information from Politifact.com), indicate a category of deception and provide a brief justification.”



EXAM QUESTIONS

A politician recently claimed that under the Affordable Care Act, “some states have over a hundred percent increase” in premiums. Here’s the data below. ...

This claim would be an example of what type of deception? Briefly justify your answer AND write a statement that would make a similar point without being deceptive .



EXAM QUESTIONS

This question is about critically looking at political quotes and identifying logical fallacies or potential numerical deception. All of the quotes are related to gun control issues in the wake of the recent Las Vegas shooting. The quotes, and a place for your responses are on the next page. Follow the directions!

[see next slide]



EXAM QUESTIONS

[from previous slide]

- A. Read each quote. Democrat quotes are on the left and Republican quotes are on the right.
- B. Pick four (only four) to comment on.
- C. Identify a logical fallacy OR a potential category of numerical deception. It is not necessary to name the fallacy or deception type/category, ... You must however briefly describe the fallacy or potential deception, whether you know the name or not.



APPLICATION

A Question
Lessons Learned

? QUESTION

Do you think this is important to teach students? Which students?

Do you teach something like this already?

Is it feasible in your course or at your institution? Obstacles?



LESSONS LEARNED

- ✓ No practice problems in online homework systems
- ✓ But, easy to add module with Lumen OHM
- ✓ Time consuming to update with current examples and keep political balance
- ✓ Time consuming to grade when requiring justification
- ✓ Students enjoy seeing some “real world” math
- ✓ Sadly, some students do not care about politics



THANKS!

Any questions? suggestions?

You can contact me at
jorgenma@uvu.edu

Presentation template by [SlidesCarnival](#)

Lying face emoticon by [emojidex](#)