

The uses and abuses of statistics and numbers


## Statistical Literacy

<http://kingofdremes.wordpress.com/2012/04/14/statistical-literacy-powerpoint-presentation/>  
[www.slideshare.net/kingofdremes/statistical-literacy-12537472](http://www.slideshare.net/kingofdremes/statistical-literacy-12537472)  
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## Sample Random Statistics

- 4 out of 5 dentists recommend sugar-free gum
- The odds of winning Lotto 6/49 are 1 in 13,983,816
- 79% of people don't trust social networking sites
  - margin of error of 4%, 19 times out of 20
- 8% of people suffer from coulrophobia

facebook




## Statistical Literacy Defined

A person's statistical literacy is their ability to interpret and critically evaluate statistical information, and to communicate and discuss their reactions to this information.

## Statistical Literacy Model

Knowledge elements	Dispositional elements
Literacy skills	Beliefs and Attitudes
Statistical knowledge	Critical Stance
Mathematical knowledge	
Context knowledge	
Critical Questions	
Statistical Literacy	

You can use statistics to prove anything!  
14% of people know that.




Iddo Gal, "The Challenge of Developing Statistical Literacy, Reasoning and Thinking", 2007, University of Haifa, Israel

## Manipulating Statistics

- Missing Numbers
  - incalculable, uncounted, forgotten, etc.
- Confusing Numbers
  - Averages, %'s, correlation, poor graphs etc.

Contentious numbers




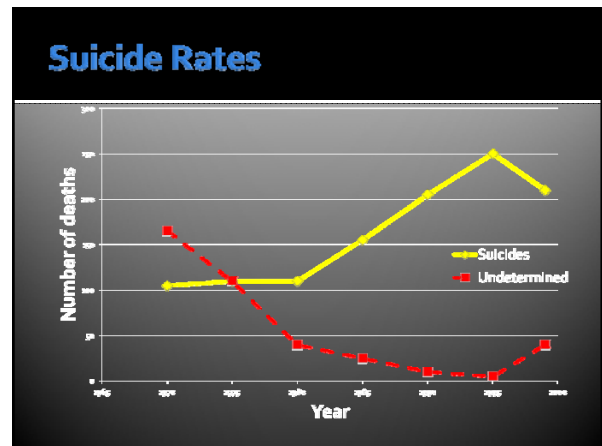
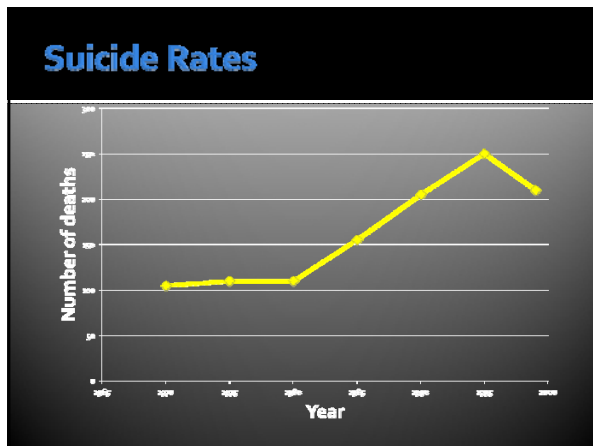
## Manipulating Statistics

- Scary Numbers
  - Scale, trends, risks
- Authoritative Numbers
  - Results highlighted, ambiguities, authority?

Magical Numbers

Numbers Games





- ### The Usefulness of Statistics
- Library at the British House of Commons
    - Statistical Literacy guide
  - Most important questions to ask:
    - Compared to what?
    - Since when?
    - Says who?
  - Many more questions...


- ### Communicating Useful Stats
- Verbal Labels versus Numbers
  - “The odds of something are: ...”
    - High
    - Quite certain
    - Small
    - Possible
    - Somewhat likely
    - Very low ...

- ### The Problems with Verbal Labels
- What is a “high” risk? 90%? 1%?
  - 1% may be “high” for test results you don’t want to see
  - 10% may be a “small possibility” for test results you’re hoping to see
  - Verbal labels are as confusing as numbers to most patrons

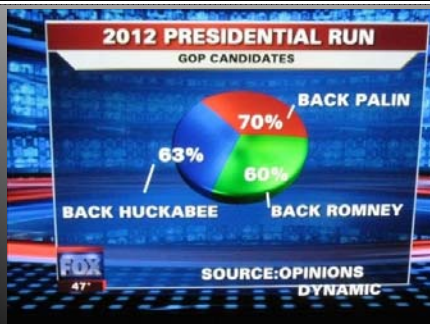
### Numerical Representation

- 90% vs 0.9 vs “9 in 10”
- Always compare numbers with the same denominator (“9/10” ← “10” is denominator)
- Avoid probabilities, percentages
- Use frequency representation

The probability of successfully navigating an asteroid field is approximately 0.0002688!



## The Logic of Fox News



## References

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