

STATISTICS AND SOUND BITES

Statistical Literacy in the Age of the Internet

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- **COMMUNICATING**
- **THE ENVIRONMENT**
- **THE NEW LITERACY**

AN EXPERT SPEAKS

There is literally no such thing as an idea that cannot be expressed well and articulately to today's voters in 30 seconds.

Dick Morris

A PRINCIPLE: SOCO!

- **Bill Nye on dinosaurs:**

⇒ They didn't live at the same time as humans.

⇒ We know they're real because we've found their bones.

- **ASA on sampling in the Census:**

⇒ Sampling is a valid scientific method.

⇒ Government statistical offices must not be politicized.

**A PRINCIPLE:
FIGHT DATA WITH DATA
but
SOUND BITES WITH SOUND BITES**

- **SOCO!**
- **Alan Greenspan:** The U.S. gross domestic product weighs no more now than 100 years ago.
- **Richard Feynman:** Odds of 1 in 100,000 ... a rocket a day for 300 years with one failure.

SOME BAD NEWS

- In the face of complexity, trust substitutes for knowledge.
- Trust ain't what it used to be. Gallup says
 - ⇒ Trust federal government:
1972 70% 1998 61%.
 - ⇒ Trust state government:
1972 63% 1998 80%.
 - ⇒ Trust mass media:
1972 68% 1998 55%.
- More press coverage of technical controversies
⇒ more negative public attitudes.

An AMATEUR'S CONCLUSION

- **Emergency treatment rarely works.**
- **Innoculation is our only hope.**
- ... but politics destroys the immune system.

THE ENVIRONMENT

- **The intellectualizing of work**

- ⇒ Need analytical, quantitative, computing skills

- ⇒ Need interpretive, communication skills

- ⇒ Multiple jobs, multiple careers

- **The democritization of education**

- ⇒ More in college

- ⇒ Often employed, career focus

- **Result: Statistics is in demand**

WE WANT STATISTICS

Elementary Statistics Enrollments

- Fall 1995: 236,000 students
- In math and stat depts alone
- Up 38% from 1990
- First calculus: 290,000 and declining

Source: Fall 1995 CBMS Survey, MAA 1997.

THE ENVIRONMENT

- **A changing discipline**

- ⇒ Back to data, back to science

- ⇒ Interdisciplinary emphasis

- **Technology**

- ⇒ Drives changing discipline

- ⇒ Drives demand for quantitative skills

- ⇒ The young are fluent

- ⇒ New learning tools: The next big change?

- ⇒ The information flood

Something momentous is happening, something far more consequential than a mere technological innovation. The last time we experienced such an innovation was the invention of the printing press almost half a millennium ago.

Gertrude Himmelfarb

The tie between information and human purpose has been severed. Information appears indiscriminately, directed at no one in particular, in enormous volume and at high speeds, and disconnected from theory, meaning, or purpose.

Neal Postman

THE NEW STATISTICAL LITERACY

- Filters for nonsense: Triage on the information flood
- Data beat anecdotes
- Think broadly: Is this the right question?
- Think broadly: Does the answer make sense?
- Communication: Can you read a graph?

- **Only big ideas need apply (details automated). One cluster:**

⇒ Beware the lurking variable

⇒ Association is not causation

⇒ Where did the data come from?

⇒ Observation versus experiment

- **Big ideas: Another cluster:**

⇒ The omnipresence of variation

⇒ Conclusions are uncertain

⇒ Avoid inference from short-run irregularity

⇒ Avoid inference from coincidence

⇒ Assess very small probabilities

CHALLENGES

- Our teaching is too narrow.
- Statistics is too important to be left to statisticians.
- If the rocket goes up, I don't care where it comes down.
- It's easy to lie with statistics.
But it is easier to lie without them.