

What happens after the math is done?

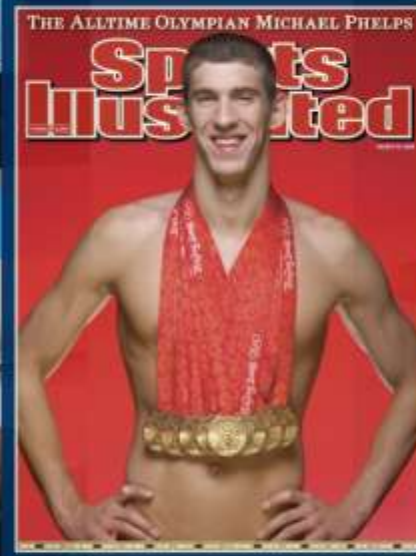
Admiration



Bonus



X Prize



Press Coverage



Promotion



Kaiser Fung . INFORMS NYC Luncheon . 10-13-10

Summary of Talk

* Life begins after the math is done

- Gladwell and *Freakonomics* are credited for bringing analytics to the public's attention; they focus on the "first half ": how to get insights from the data
- We need to turn attention to the "second half": what to do with those insights?

* Examples of no life after the math was done:

- Mammograms: revised guidelines summarily rejected
- Columbia shuttle disaster: engineers failed to postpone launch

* The importance of packaging, and lobbying

* Example from *Numbers Rule Your World* (my book):

- Screening tests such as mammograms are often used to illustrate Bayes's Theorem in textbooks. When applied to steroids testing, it would predict a false positive problem, suggesting that anti-doping labs are overly aggressive.
- A reality check shows the opposite conclusion to be true, that anti-doping suffers from excessive false negatives. Also, examining the consequences of false positive v. false negative errors leads one to believe that testers are more likely to be timid than aggressive.
- The erroneous conclusions did not result from doing the math wrong.

JUNK CHARTS

Recycling chartjunk as junk art

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Reader's indignation

Reader Chris K. pointed us to this article from *Wired*, based on a newspaper poll conducted by Readers Digest.

The data is highly unrepresentative, with each survey respondent identified as male or female, we asked about their favorite method for discipline. Each time I look through the "male" and "female" mean what methods they would apply to their own (unborn) child based on the respective paragraph. I know full well what the majority of the respondents did.

Checked out summary in extremely well-written, and respectfully points to the most relevant information by titles and headings.

Given the real journal, that's what parents across the globe told us when we asked how they discipline their children. Expectations in all of our countries in this month's global survey yielded a great talking to as the first reaction, earning a spanking, by a wide margin. Spanking was a popular physical reward. For other traditional forms of discipline, sending kids to their rooms and spanking were the least favored choice in all but two countries. Among respondents who did favor physical punishment, more administered whacks in every country except Canada, France, and India. *Not a single woman in the United States expressed a preference for spanking.*

Unfortunately, the graphical necessity is a complete failure.

The feature plotting system the designer is that the general profiles of the responses are very similar between countries, and so the differences are not hidden inside the small individual display.

It also takes an unimagined time, making it almost impossible to compare the top two countries with the bottom two countries.

When data has such strong structure, it's a blessing to the chart designer. In the first chart, I made a set of [grouped bars](#), in small multiple. On average, parents everywhere are very similar. There are some subtle differences: one country fathers, according to the poll system, like spank, like spank, India, France, Brazil, etc., as the preference for spanking over all other methods, another parents applying to kindergarten Spain, Australia, Canada, etc. is talking to, followed by talking over privileges with spanking as the alternative method.

RECENT POSTS

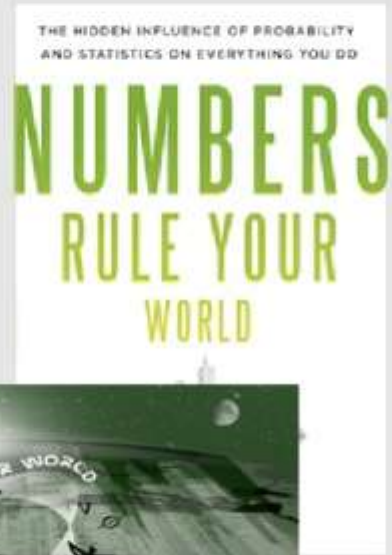
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- So many of the message
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RECENT COMMENTS

Comments on Junk Charts or Indignation

← VISUAL

WRITTEN →



NUMBERS RULE YOUR WORLD

THE HIDDEN INFLUENCE OF PROBABILITY AND STATISTICS ON EVERYTHING YOU DO

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Tip #2 for reading business trends: filter out the noise

Another month, another employment report, another set of purchasing reports from the business press. The August numbers apparently depicted quite a few scary headlines: "U.S. Starts Reversing After Employment Report Shows Continued" (Associated Business Press); "Treasury Lays Out August, maybe being again 'revised'" (CNBC); "House Voting Surprises with 87-130 New Jobs" (Bloomberg).

The key reported results are: employment drop (-34,000) lower than expected, government jobs also dropped 8.6 to end at 6.9 million, private sector jobs increased (+47,000), GDP rose 0.4% for both June (+0.600%) and July (+0.77,000).

In [Tip #1](#), I already discussed the folly of including unnecessary 10-year trends plots in any of these numbers.

In the past, we must help our party to see through the "noise".

Just notice that the numbers from the last couple of months are in the same order of magnitude (size of movement) as the reported changes for the current month. This is a very strong sign that the reported changes for the current month are just noise. When the number of the August numbers comes out in September, what would the -34,000 become? It could be comfortably above zero, indicating an overall gain in employment, or it could be quite a bit more negative than reported today.

Now imagine that the numbers here of a different magnitude. Let's say instead of 400 and 770, they were 5,000 and 8,000. Then, we could believe that the August numbers would be adequately correct over after 1,000 seasons, and we would have more confidence in those numbers.

What we have here here is to use historical fluctuations to get a mental picture of how accurate these estimates are, and then use that margin of error to judge how good the current estimates are. This is a very important skill to have when looking at numbers, especially when looking for trends.

In [Chapter 3](#), I pointed out how important it is to know the volatility around average rates. Here, the reports also gave us average values. But by looking back in historical reviews, we can get a good sense of how volatile the numbers are, and get the information needed to...

A more relevant way to do this is to look at the historical tests for the margin of error. The width of the confidence interval is given as 100,000 at 20% confidence. What this means is that

THE READ

NUMBERS RULE YOUR WORLD

Next Events

Why 27 Been Days, NYC Aug 1-5, 2018, Vancouver Sep 13-17 and Discovery Science, 12th, BC

JUNK CHARTS BLOG

Dr. Strogatz Considers Mammography Math

The probability that one of these women has breast cancer is 0.8 percent. If a woman has breast cancer, the probability is 90 percent that she will have a positive mammogram. If a woman does not have breast cancer, the probability is 7 percent that she will still have a positive mammogram. *Imagine a woman who has a positive mammogram. What is*

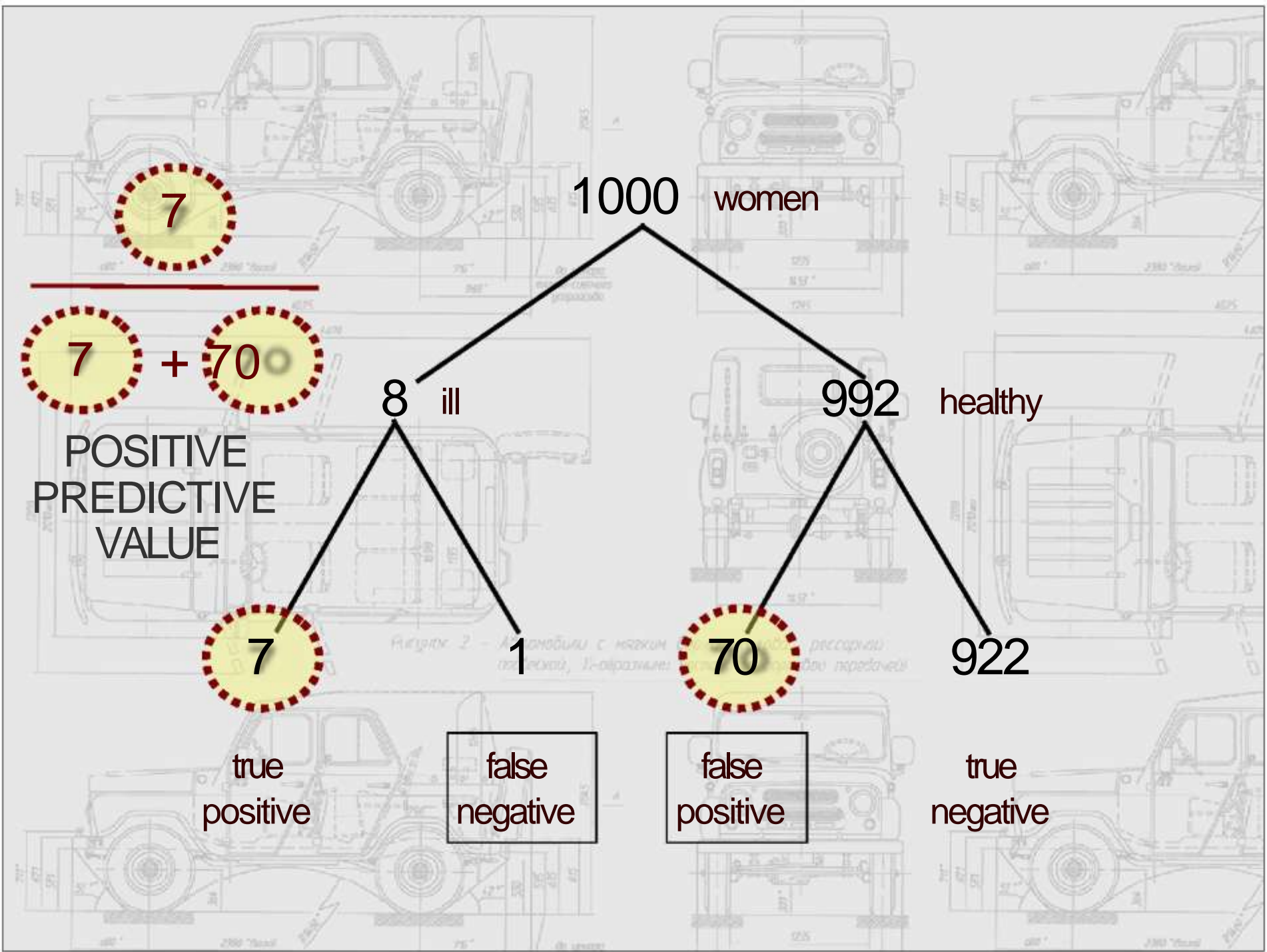
the probability that she actually has breast cancer?

9%

AGE
40-50

TRUE
POSITIVE
RATE

FALSE
POSITIVE
RATE



1000 women

8 ill

992 healthy

7
true positive

1
false negative

70
false positive

922
true negative

7 + 70

POSITIVE PREDICTIVE VALUE

7

70

7

Siegfried Looks at Steroid Testing

