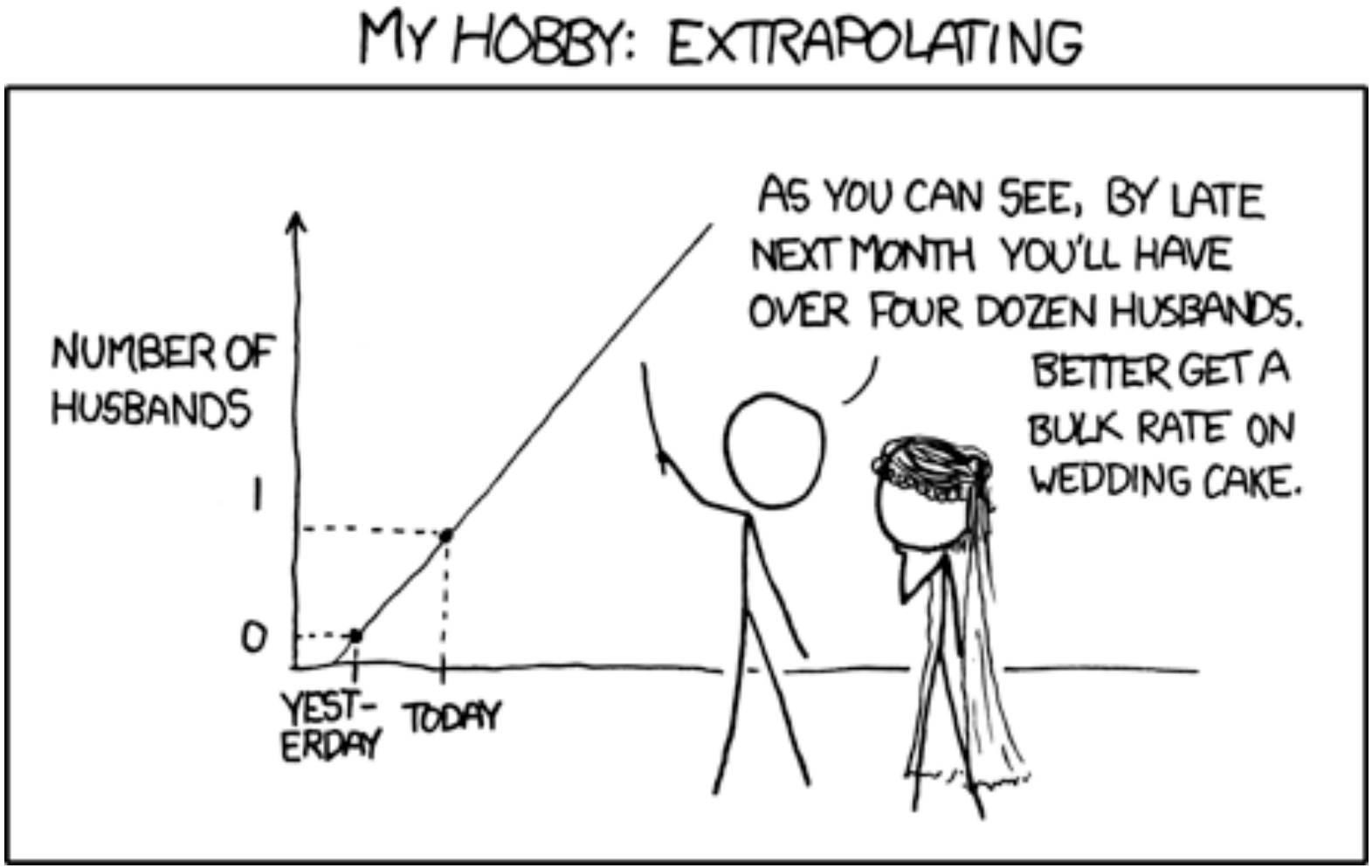
Tips we just covered

2. No measurement is exact
3. Bias is rife (intentional and unintentional)
4. Bigger is usually better for sample size
5. Correlation does not imply causation
9. Controls are important
12. Scientists are human – COI
19. Data can be dredged or cherry picked

7. Extrapolation beyond the data is risky



http://anthonymasters.wordpress.com/2013/10/14/statistics-and-lampposts-iii-extrapolation-limitations/

8. Beware of base-rate fallacy

A group of policemen have breathalysers displaying false drunkenness in 5% of the cases. However, the breathalyzers never fail to detect a truly drunk person. 1/1000 of drivers are driving drunk. Suppose the policemen then stop a driver at random, and force them to take a breathalyzer test. It indicates that he or she is drunk. We assume you don't know anything else about him or her. How high is the probability he or she really is drunk?

.02

See http://en.wikipedia.org/wiki/Base_rate_fallacy for a full explanation and other examples

Think about a medical test with a 1% false positive rate and a 1 % false negative rate. What would this suggest for a disease present in 1/100 individuals vs one present in 1/10,000?

10. Randomization avoids bias

13. Significance is significant

What does p<.05 mean? Why .05?

14. Separate no effect from non-significance

A non-significant result could result from

- No effect
- Small effect
- Small sample size
- Noisy data

15. Effect size matters

Statistical significance is not necessarily practical significance

- Small effect but large sample size

e.g. A genotype may significantly increase the likelihood of some disease, but the effect size might be much smaller than some environmental determinate .

Absolute vs. relative risks