

How is power and sample size achieved?

Fay Osman

March 28th, 2019

12:00 PM – 1:00 PM

What is Power?

- Power is the probability of correctly rejecting the null hypothesis that sample estimates does not statistically differ between study groups in the underlying population
- Power is not a guess!
- In fact, Power is predetermined except in difficult situations
- A weakly powered study can ruin the inferences of results

How do I calculate power?

- Many statistical software available (SAS, Stata, R)
- My choice (PASS, Power Analysis and Sample Size)



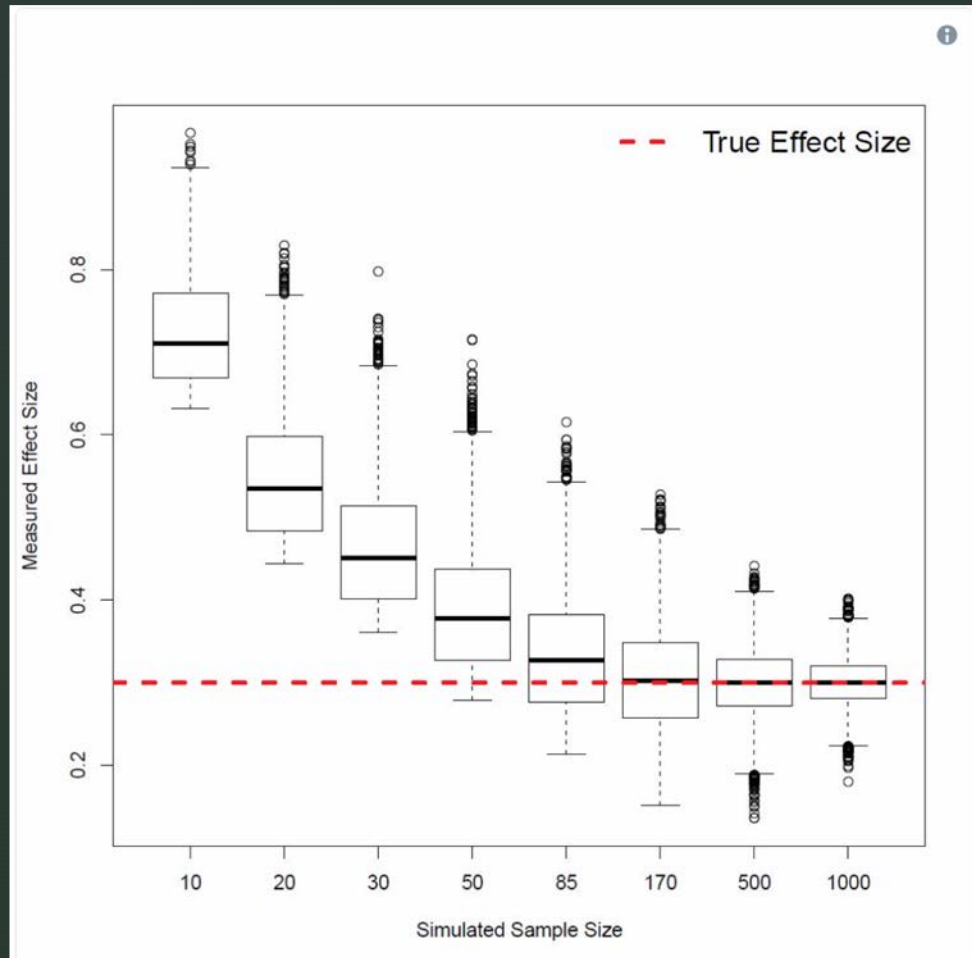
What do I need to calculate power

- Pre-determined sample (if you had pop already or data)
- Allocation Ratio (Usually $N1/N2$)
- Proportions of both arms
- Effect size (Difference, odds, risk)
- Significance level

What is considered optimal power?

- 95%
- Acceptable range: 80% – 99%
- Below 50% considered unusable

Why do I need optimal power for my sample?

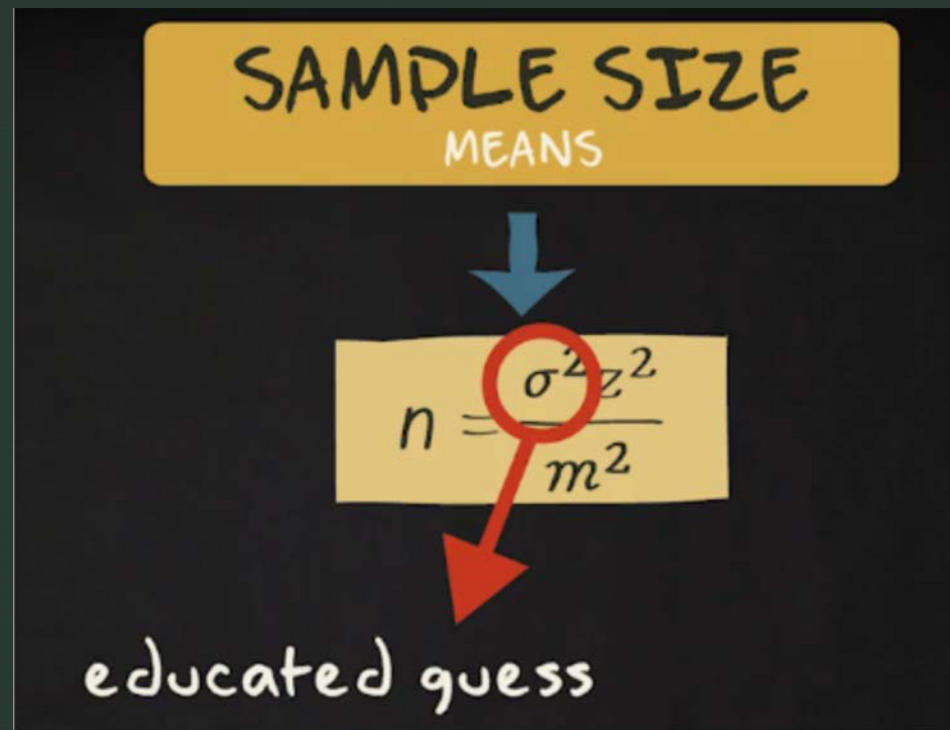


- Outcome differences are based on having a good sample for group differences
- Low powered study produces inaccurate effect estimates
- Reliability of results will be poor
- Reproductivity problems

What is a sample Size?

Number of subjects needed to conduct a study

Often computed together with power/used to compute power



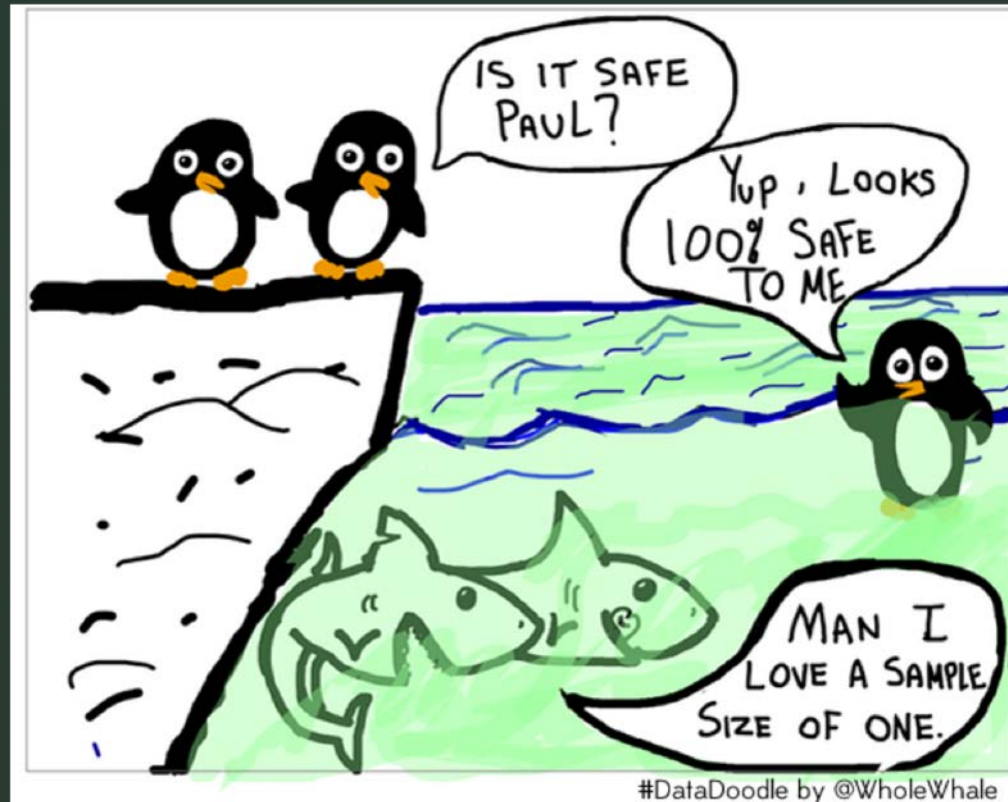
What do I need to know to calculate sample size?

- (Feasibility Parameters)
 - Your study population (calculating sample size for a study in Madison-255,000 is different than a study at UW Madison)
 - Your study design (E.g. RCT, Cohort, case-control, mixed methods, cross-sectional, meta analysis, reliability)

What do I need to know to calculate sample size?

- (Statistical Parameters)
 - Power, usually 95% and above
 - Proportion/percent of diseased group, .5/50%
 - Proportion/percent of control group, .2/20%
 - Allocation ratio, 1:1 usually but RCTs differ
 - Sig and Confidence Interval, usually 5% and 95%
 - Precision, 5%
 - Dropout rate, 10 – 15%

Watch out for the statistician sharks





What about pilot studies?

- Is there a standard sample size for pilot studies?
 - NO!!!! NO!!!!!! NO!!!!!!!!!!
 - Sample sizes for pilot studies must be calculated using the same feasibility and statistical parameters just like any other study

Sample Size DEMO

