Step & Rules for Effect Size and Sample Size problems (EDU & Exam#2)

Effect size estimations:

r → r IS the effect size estimate, there is nothing to compute!

X^2 → use the Effect Size Computator. Be sure to notice the df in the X^2 report (will all be "1" in this section). Be sure to click the "Compute r for df = 1" button

BG ANOVA → use the Effect Size Computator. Be sure to use the proper df-effect and df-error. Look at the values in parentheses following the F-value, they are always (df-effect, ef-error). For example, (1, 48) means to use df-effect = 1 and df-error = 48. Be sue to click the "compute for BG design" button.

WG ANOVA → use the Effect Size Computator. Be sure to use the proper df-effect and df-error. Look at the values in parentheses following the F-value, they are always (df-effect, ef-error). For example, (1, 48) means to use df-effect = 1 and df-error = 48. Be sue to click the "compute for WG design" button.

Using the Power Table

The power table has .5 increments for the effect size (r) values -- it is important to always round the r-value correctly!

- So …
  - Round down to if the effect size ends in 1, 2, or 3 (e.g., .21, .22 and .23 all round down to .20)
  - Round up if the effect size ends in 4 (e.g., .24 rounds up to .25)
- Also …
  - Round down to if the effect size ends in 6, 7, or 8 (e.g., .26, .27 and .28 all round down to .25)
  - Round up if the effect size ends in 9 (e.g., .29 rounds up to .30)
- But …
  - Any r < .10 will be rounded up to .10 when using the power table (but not to report the effect size!!)

For X^2 and BG ANOVA → always report an even-numbered total sample size (S)!

- For both of these you will be splitting the sample size into two groups, so you'll want an even-numbered sample.
- E.g., if the tables S = 109, you will report a desired sample size of 110 and 55 in each condition

For r → There are no "groups" or "conditions" S = the total sample size
For WG ANOVA → Each of the participants in the total sample size (S) is in each of the conditions.

Thinking about the adequacy of the sample size estimate

The "standard" for power is .80, allowing a 20% chance for a Type II error.

- If asked to determine the sample size for power = .80 or more (Type II error .20 or less), then you will have "adequate power:
- However, if asked to determine the sample size for power less than .80 (Type II error greater than .20) you should, if asked, note that this is not going to be adequate power by the usual "standards"

Statistical Decisions & Statistical Error Estimation

Statistical Decision	Type I Error (false alarm)	Type II error (miss)	Type III error (misspecification)
p < .05 Reject H0:	Type I risk = p-value	Not possible !	Possible, but not (easily) estimable
p > .05 Retain H0:	Not possible !	r & S → power Type II risk = 1 - power	Not possible !

When do we have a "Power problem"??

- if p < .05 → reject H0: we have "enough power"
- if p > .05 & r < .10 → retain H0: probably not a power problem; nonsig because the effect is "very small"
- if p > .05 & r > .10 → retain H0: **probably a power problem**; at least small effect, but not signif