# *Empirical research in management and economics*
## Exercise

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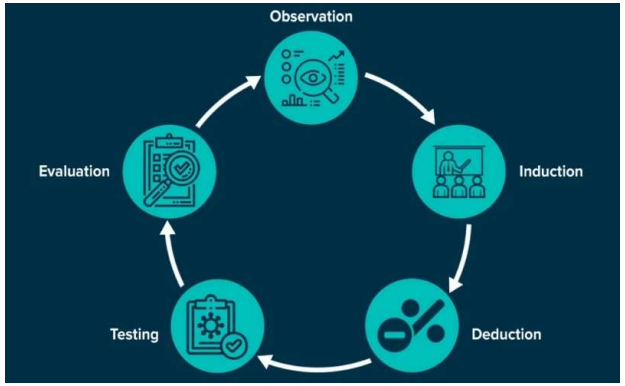


# *Exercise I: Sampling*

*In groups of 3-5*

1. Suppose you want to know the ages of moviegoers who watched the movie *Barbie*. What kind of sample is it if you …
   a) survey the first 20 persons to emerge from the movie theater convenience
   b) survey every tenth person to emerge from the movie theater ~~purposive~~ Probability / strategic
   c) survey four people from each row (chosen randomly) stratified

2. Suppose you want to study the number of different e-mail accounts that students in your research methods class have. What kind of sample is it if you …
   a) survey each student whose immatriculation number ends with an odd number strategic → Probability random? (✓)
   b) survey all the students sitting in the front row Convenience
   c) survey the same proportion of male and female students as are registered for the class (with males and females sampled by convenience) quota

# *Exercise II*

*In groups of 3-5*

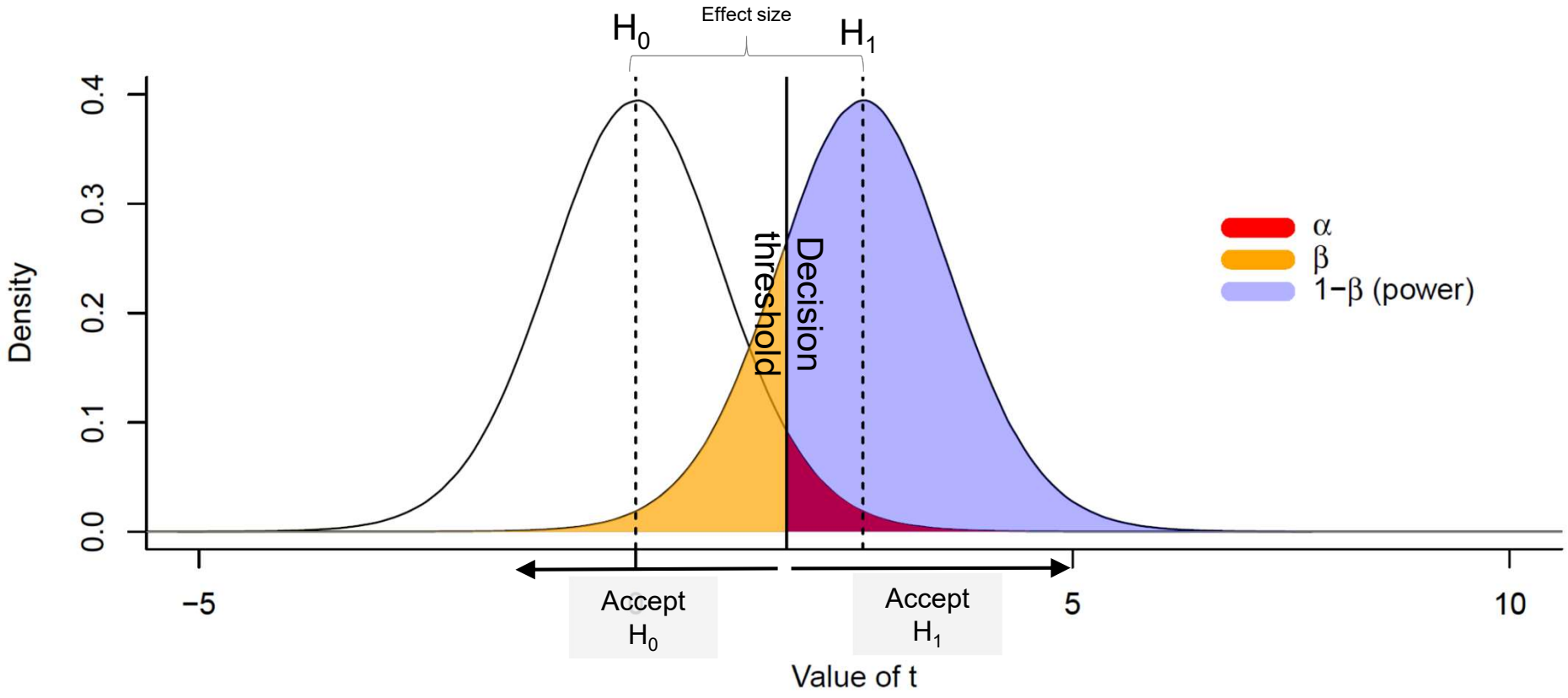
- Assume that you want to test the hypothesis that motorists are ruder to other drivers who drive low-status cars than to other drivers who drive high-status cars.
- What would the sampling distribution of your test statistic express?
- What would a *p*-value for relevant observations on traffic behavior tell you?

range & frequency when tried many times.
$H_0$ true: mean ≈ 0
→ needs baseline

?

The chance of the observation being at least this extreme

# Statistical power



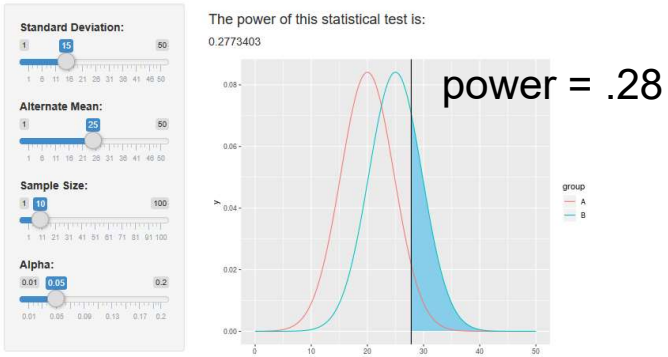
# *What affects power?*

## Effect size

$n = 10$

$d = \frac{25 - 20}{15} = .\mathbf{33}$

$\alpha = .05$

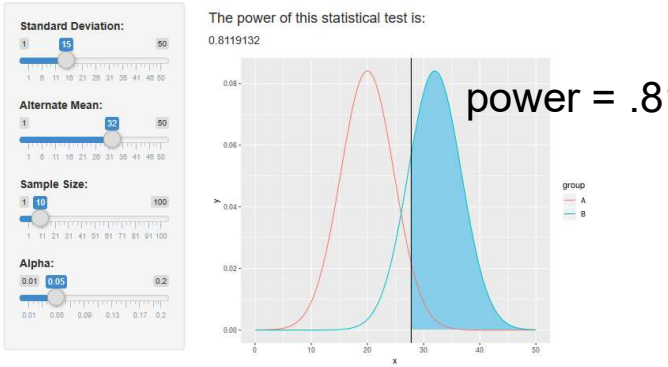



power = .28

$n = 10$

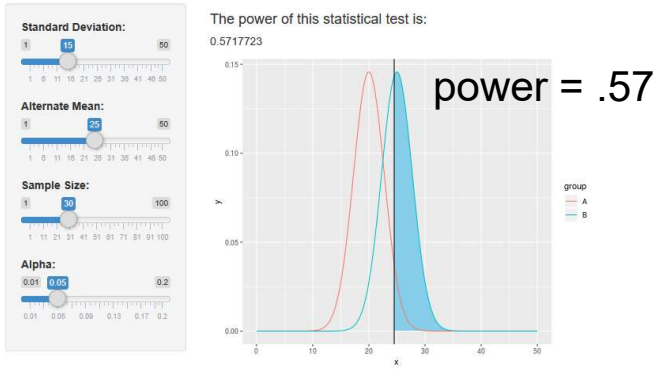
$d = \frac{32 - 20}{15} = .\mathbf{8}$

$\alpha = .05$




power = .81

## Sample size

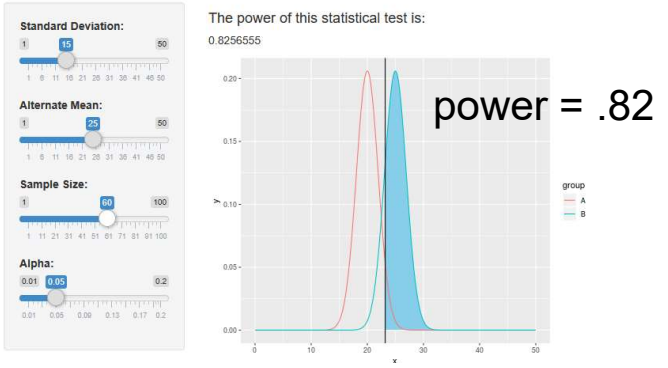



power = .57

$n = \mathbf{30}$

$d = \frac{25 - 20}{15} = .33$

$\alpha = .05$




power = .82

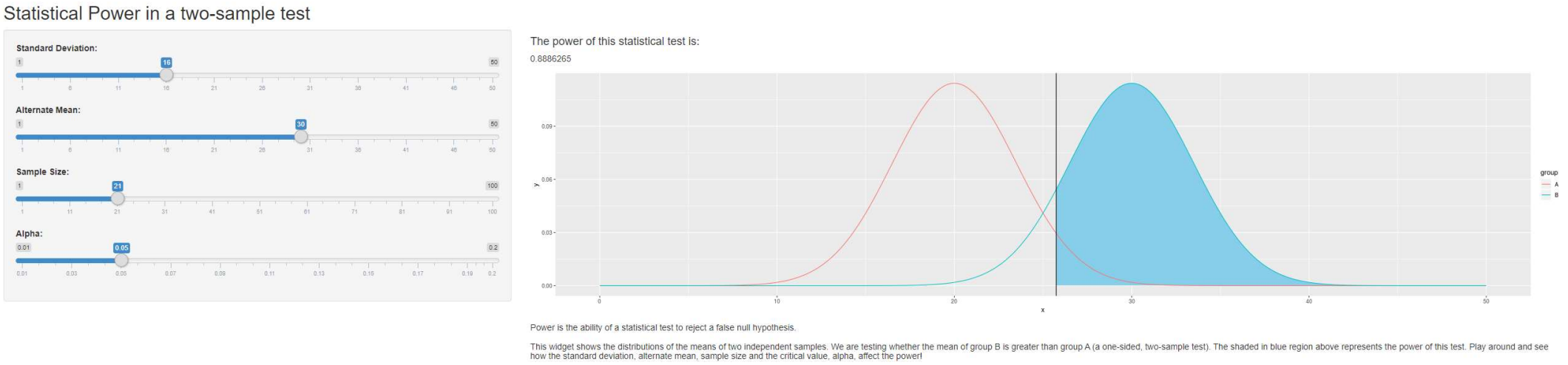
$n = \mathbf{60}$

$d = \frac{25 - 20}{15} = .33$

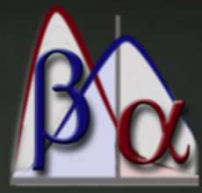
$\alpha = .05$

# *Statistical power*

https://andrewlau.shinyapps.io/Power/



# *Exercise III: Power*



G*Power

## Start G*Power

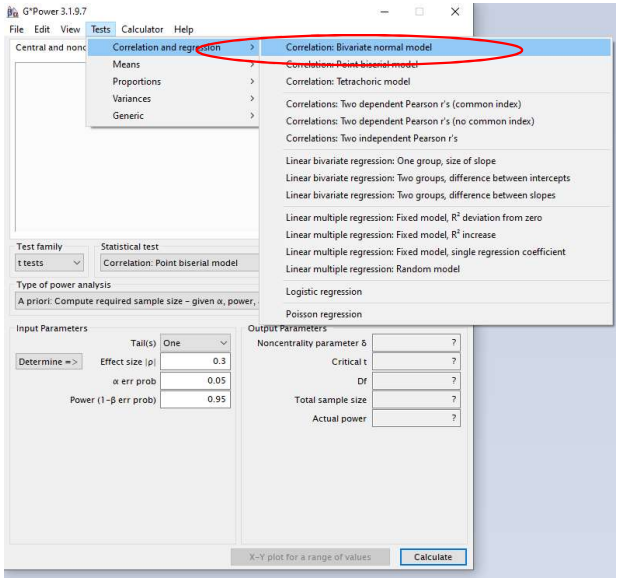
*Correlation*

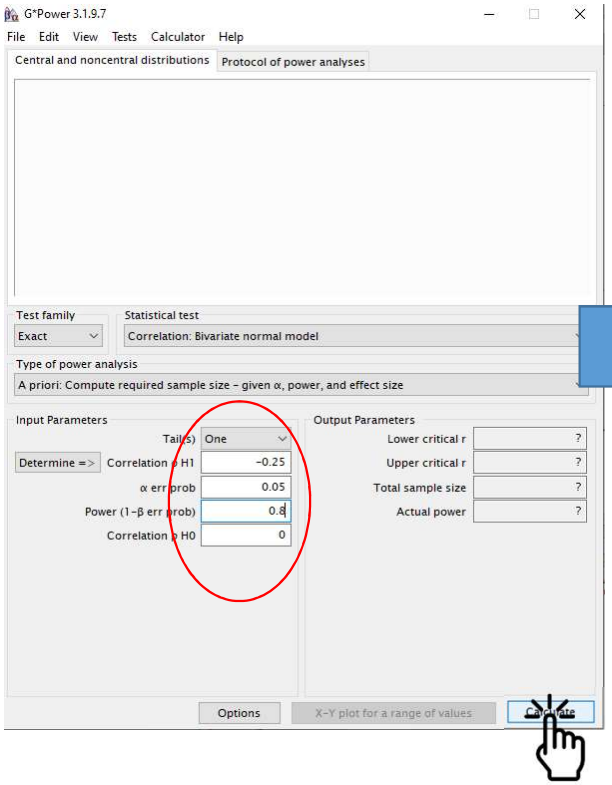
You want to test the hypothesis that employees with lower wages have more sick days than employees with higher wages, with $r$ = -.25. Determine the required sample sizes to detect an effect of the hypothesized size (one-tailed) with a power of .80 (with $\alpha$ = .05).

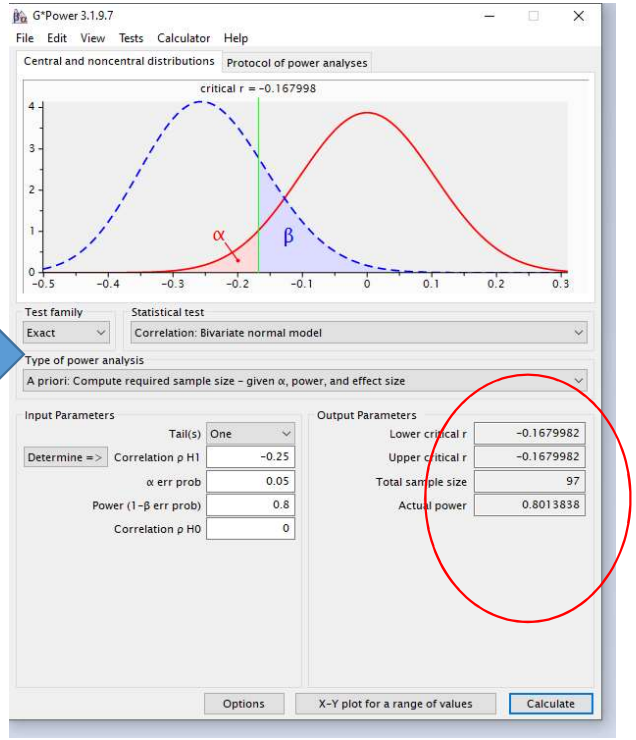
*Differences between means*

You plan to conduct a study to assess the numeric abilities of the employees of a company. You have the hypothesis that younger employees (ages 25-35 years) have higher numeric abilities than older employees (ages 45-60 years), with Cohen's $d$ = .2. Determine the required sample sizes (assuming that both groups are equally large) to detect an effect of the hypothesized size (one-tailed) with a power of .80 (with $\alpha$ = .05).

# A-priori power analysis with G*Power



# A-priori power analysis with G*Power