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Sample Size Calculation

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QUIET ZONE

Sample Size Dilemma

- Too large a sample in a study
  - economic and ethical problems
- Too small a sample in a study
  - risk failing to find a large effect e.g. group difference
- need just enough to enable
- accurate detection (or power)

Type 1 Error (α)

- Wrongly reject the "no effect" hypothesis
- Usually α=0.05 or 0.01
- Size of Type 1 error specified before data collection

Type 2 Error (β)

- Wrongly conclude there is no effect (chance of a false negative result)

- Usually β=0.2 (or even 0.1)

Power (1-6)

- Ability to correctly detect real effects
- Probability of rejecting the Null Hypothesis when it is not true (1- β)
- Power usually 80%; ideally 90%

۱- تعیین میانگین

$$n = \frac{z^2 \sigma^2}{d^2}$$

۲- تعیین نسبت

$$n = \frac{z^2 p(1-p)}{d^2}$$

۳- مقایسه دو میانگین

$$n = \frac{\left(z_{1-\alpha/2} + z_{1-\beta}\right)^2 \left(\sigma_1^2 + \sigma_2^2\right)}{d^2}$$

٤- مقایسه دو نسبت

$$n = \frac{\left(z_{1-\alpha/2} + z_{1-\beta}\right)^2 \left[p_1(1-p_1) + p_2(1-p_z)\right]}{d^2}$$

هر گاه $\frac{n}{N} > ٪۵$:

$$n' = \frac{n}{1 + \frac{n-1}{N}}$$

How to get components ?

- σ
  - Pilot study
  - Other research
  - Range / 6
- P
  - Pilot study
  - Other research
  - P= 1/2

What is D in the formula

d (effect size)

- e.g. comparing two groups

Effect size= group difference

- What is the smallest interesting difference in your expert opinion?

- Obtain from previous work


Any questions?

Thank you

for your attention !