UCB W203 - Lab 1: Hypothesis Testing

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Part 1: Foundational Exercises

1.1 Professional Magic

1.1.1 Type I Error of the test

The type I error rate (i.e. false positive) is the probability of rejecting the null hypothesis whe it is correct. The type I error would be the probability of getting 0 or 6, with the assumption that p = 0.5 (null).

This will be the alpha

1.1.2 Power of test given p = 0.75

1.2 Wrong Test, Right Data

In the likert scale the "distance" between the different options is not consistent, thus violating the metric scale assumption needed to run a paired t-test. We could suggest a paired sign test where the only only assumptions needed are: ordinal variables and i.i.d.

1.3 Test Assumptions

1.3.1 World Happiness

Scenario: We have two variables: Life.Ladder and Log.GDP.per.Capita, and we want to see whether countries in high GDP per capita are more or less happy than people in countries with low GDP per capita.

Assumptions for two-sample t-test 1. Normal - CHECK! 2. i.d.d. - yes (assuming same data collection and data transformation procuedures) 3. Metric variables - yes

```
wh_data <- read.csv('datasets/happiness_WHR.csv')

# Calculate the mean GDP per capita

# Split the data into low and high gdp per capita countries

# Check out histograms of both variables

# Can do a Shapiro test as an extra source of evidence to test for normalcy
```

1.3.2 Legislators

1.3.3 Wine and Health

1.3.4 Attitudes Toward the Religious

Part 2: Statistical Analysis