Practice Problems
T-Tests

Example

2016 ANES Pilot Data

Variables: gender & cognitionscore

Gender: Gender of respondent (male = 1; female = 2)
Cognitionscore: An additive interval-ratio index that indicates the respondent's
                   cognitive skills and ability (on a scale of 1 to 20)

Hypothesis: There is a difference between males and females on their cognition score.

1. What is the independent variable? **Gender**
2. What is the level of measurement for the independent variable? **Nomina**l
3. What is the dependent variable? **cognitionscore**
4. What is the level of measurement for the dependent variable? **Interval-ratio**
5. Discuss a possible causal mechanism for this hypothesis. **Males have a lower cranial ability, thus they do not think through their decisions as much, whereas we would expect them to have a lower cognition score.**
6. State the null hypothesis. **There is no difference between males and females on their cognition ability.**
7. For both your independent and dependent variables, calculate and then write about your descriptive statistics. You should use the appropriate measure of central tendency and variability. **My independent variable, gender, is a nominal variable. Thus I will report the mode, which is 0 (or male. The range is 1. My dependent variable, cognition score, is an interval-ratio variable, thus I will also report the mean (because there is no outlier on the histogram) which is 11.9483. The standard deviation is 2.072 and the range is 16.**
8. What is the appropriate test statistic you should calculate for this hypothesis? **T-Test**
9. What is the value of that test statistic? **-1.436**
10. What are the degrees of freedom for this test? **1198**
11. What is this test's significance value? **.151**
12. How do you interpret this significance value in evaluating the hypothesis? **There is a 15.1% probability that the difference between males and females on cognitive score is due to random chance. This means we are confident that there is a difference between these two groups. Our relationship is significant.**

Hypothesis: There is a difference between male and females and their relative knowledge about politics.

1. What is the independent variablet? (variable: info_gender)

2. What is the dependent variable? (variable: knowledgescore)
3. What is the null hypothesis? (There is no relationship between gender and knowledge)
4. What test statistic do you use? (Answer: t-test)
5. What is the t-statistic? (Answer: -7.549)
6. How many degrees of freedom for this test? (Answer: 1198)
7. What is the level of significance? (Answer: .000)
8. Do you accept the hypothesis? Do you confirm the null hypothesis? (Accept the hypothesis, reject the null)