**PSY 653 Module 11: Testing the hypothesis that something important happened**

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*Description of the datasets for the demo activity:*

This dataset has 1910 observations with 3 variables

* Occupation: 1 = Professor, 2 = Manager, 3 = non manual worker, 4 = Skilled worker, 5 = Semi-Skilled worker, 6 = Unskilled worker
* Gender: 1=Female, 2=Male
* Mental: Continuous outcome variable indicating mental health (1-5)

**Demo Activity**

*Part 1: Practice identifying minimum effects*

1. Create a new R notebook and load the following libraries: tidyverse, BayesFactor (Note: You will likely need to install the BayesFactor package)
2. Using the paper “Right Wing Authoritarianism”: The authors used Right Wing Authoritarianism (RWA) to predict differences in response time to in-group and out-group faces, and found a squared correlation of .07, which was significant, with F(1,161) = 4.81 (see highlighted material on p. 3)
   1. Determine the critical *F* value for testing the hypothesis that RWA accounts for 1% or less of the variance in responses for the analysis that is highlighted
      1. This will require you to enter the appropriate values in the R script for df, F and execute the script
   2. Using Appendix B from Murphy, Myors & Wolach (2014), what can you say about the power of this study for rejecting
      1. The traditional null hypothesis
      2. The hypothesis that RWA accounts for 1% or less of the variance in responses
   3. Use Appendix C from Murphy, Myors & Wolach (2014). Assuming that the effect size reported here is an accurate reflection of the population, approximately what sample size would you need to have power of .80 for rejecting
      1. The traditional null hypothesis
      2. The hypothesis that RWA accounts for 1% or less of the variance in responses

*Part 2: Practice bayesian analyses*

1. Read in the datafile “retirement.csv”.
   1. Factor gender and occupation, to code all levels of these variables (see dataset description above)
   2. Use ANOVA to determine whether gender and occupational level (occupation) are related to mental health
   3. Use the BayesFactor package to do a comparable analysis (Use the anovaBF function)
   4. Interpret and compare the results

**Try it Yourself Activity**

*Part 1: Practice identifying minimum effects*

1. A study that predicted differences in GPA from number of hours spent studying, and found a squared correlation of .103, which was significant, with F(1,230) = 3.26.
   1. Determine the critical *F* value for testing the hypothesis that RWA accounts for 1% or less of the variance in responses for the analysis that is highlighted
      1. This will require you to enter the appropriate values in the R script for df, F and execute the script

b. Using Appendix B from Murphy, Myors & Wolach (2014), what can you say about the power of this study for rejecting

* + 1. The traditional null hypothesis
    2. The hypothesis that studying time accounts for 1% or less of the variance in responses

c. Use Appendix C from Murphy, Myors & Wolach (2014). Assuming that the effect size reported here is an accurate reflection of the population, approximately what sample size would you need to have power of .80 for rejecting

* + 1. The traditional null hypothesis
    2. The hypothesis that studying time accounts for 1% or less of the variance in responses

*Part 2: Practice bayesian analyses*

We will use the following data for part 2 of this activity.

*Description of the datasets for the demo activity:*

***“slpdata.csv”***

A team of sleep researchers sought to study the effects of a 6-week sleep intervention aimed to improve participant’s sleep hygiene. Sleep hygiene encompasses a variety of practices and habits that are necessary to have good nighttime sleep quality and full daytime alertness. The team formulated three different versions of the intervention. The first version (condition 1) provided participants with a self-help book on the topic of sleep hygiene. The second version (condition 2) brought participants together once per week in groups of 10-12 to teach the principles of sleep hygiene in a classroom setting. The final version (condition 3) also used the group-based classroom setting of condition 2, but in addition, each participant’s partner was invited to also take part in the group sessions. Six-hundred male and female adults living with an intimate partner and suffering from a sleep disorder were recruited to take part in the study, the participants were randomly assigned to one of the three conditions. The data set includes the following variables:

* **sex:** 1=male, 2=female
* **age:** Participant’s age in years
* **anxiety:** Participant’s level of general anxiety measured at the start of the study via a multi-item scale. The scale (average of all items) ranges from 1 to 7, where a higher score indicates a higher level of anxiety.
* **prior:** An indicator of whether or not the participant had previously participated in some type of sleep intervention, 1 = yes, 0 = no.
* hygiene: Participant’s sleep hygiene at week 6. It ranges from 0 to 10, and higher means better sleep practices.
* **support:** Participant’s perception that their partner is supportive of their struggles with sleep and their efforts to improve sleep. It is a multi-item scale that ranges from 1 to 5, where higher indicates more support.
* **sleep:** Participant’s average sleep efficiency during the month following the intervention, calculated as time spent in bed asleep (minus all the awakenings), divided by the total time spent in bed. It is expressed as a percentage.
* **lifesat:** Participant’s sense of life satisfaction measured 30 days after the completion of the intervention. It is a multi-item scale that ranges from 1 to 7, where a higher score indicates more satisfaction.
* **cond:** Treatment condition, 1 = self-help, 2 = group-based intervention, 3 = group-based plus partner participation.

2. Read in the datafile “slpdata.csv”.

1. Factor sex identity and treatment condition, to code all levels of these variables (see dataset description above)
2. Use ANOVA to determine whether sex identity and condition (cond) are related to sleep
3. Use the BayesFactor package to do a comparable analysis (Use the anovaBF function)
4. Interpret and compare the results