Psychology 350: Special Topics
An introduction to R for psychological research
Final assignment!

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https://personality-project.org/courses/350

May, 2024

Outline

Final project: an overview

The goals of this course include:

1. Exposure to advanced statistical methods
2. Exposure to the use of R to help analyze your data
3. Basic concepts of programming in R
4. Getting you ready for advanced analysis of a real problem in your field

Final project

1. A written paper (about 10 pages of text with basic figures and tables)
2. This should be done as a a Rmd file (submitted as either a pdf or an HTML file)
3. Using standard APA format as taught (e.g.,) in Psych 205

Introduction About 2 pages describing what the actual research question is.

Methods How were the data collected. Who were the subjects, how were they selected?

Analysis The actual data analysis.

- Basic data description (including summary statistics, examining data for normality, outliers)
- Inferential statistics, if appropriate.

Discussion What does this all mean?

Introduction

1. What is the big problem?
2. What is already known
3. What is unknown?
4. What is the specific question?
5. Include a brief but thorough literature review.

Methods, including the subjects

1. Where did the data come from?
2. How were they collected?
3. Do they have any specific qualities

Analysis

Using the skills that you have acquired in using R

1. Basic descriptive statistics – outlier detection
2. Confidence intervals/statistical significance of any inferential significance
3. Graphical displays of your data

Discussion

1. What does this all mean?
2. What are the broader implications of the work?
3. Are there specific threats to the validity of your question?

Standard "Hourglass structure" of the paper

1. Introduction is broad overview
2. Methods are narrower and more thorough (Think about open science)
3. Analysis shows the actual code used so that the study can be replicated
4. Discussion broadens out again

Possible data sets to use for a final project

1. Ideally, your final project is based upon data that you (or your lab) has.
2. However, if you do not have any data, there are a number of data sets that are open source that you can use.
3. Some of these are already in the *psychTools* package, others are on https://dataverse.org.
4. Here I give a quick summary of possible data sets.
5. Simulating data is also an option (make sure that you say they were simulated).

Personality structure

1. The number of dimensions of personality that are useful has been suggested to be 2 (Eysenck & Eysenck, 1964), 5 (Digman, 1990; Goldberg, 1990; Costa, McCrae & Dye, 1991), 16 (Cattell, 1966), 27 (Condon, 2018) or unlimited (Mottus, Kandler, Bleidorn, Riemann & McCrae, 2017).
2. This question can be explored with a number of different data sets.
   - The "SAPA Personality Inventory" items available as `spi` in *psychTools* has 4000 participants, 135 items and 10 criteria variables.
   - 696 Items from the SAPA inventory (Condon, 2018) are available on https://dataverse.org see Condon (2017); Condon, Roney & Revelle (2017); Condon (2017) for 126,884 participants
   - `epi` has 57 personality items from the Eysenck Personality Inventory (Eysenck & Eysenck, 1968) to measure Extraversion, Neuroticism and Lie.

Personality scales and items correlate with real criteria

1. Correlations correlations with multiple criteria: Revelle, Dworak & Condon (2021) using the `spi` and https://dataverse.org samples.
2. 10 criteria in the `spi` data set
3. 19 criteria in the https://dataverse.org set.

What is the structure of emotion?

1. Several competing models:
   - Affect versus arousal (Barrett & Russell, 1998; Russell & Carroll, 1999)
   - 12 point circumplex? (Yik, Russell & Steiger, 2011)
   - Positive affect and negative affect as separate dimensions (Watson, Wiese, Vaidya & Tellegen, 1999; Watson & Tellegen, 1985)
   - Energetic and Tense arousal as the fundamental axes of mood (Thayer, 1970, 1978, 2000)
   - Consensual structure: not so fast (Rafaeli & Revelle, 2006)
2. Data set to examine structural questions; The Motivational State Questionnaire, (Revelle & Anderson, 1998) as `msqR` in *psychTools*.

Personality and emotion

1. Trait correlations with dimensions of affect
   - Positive Affect and Extraversion
   - Negative Affect and Neuroticism
2. `msqR` data set has 75 mood items and 5 personality dimensions (from the EPI)
3. Read the help file carefully, for the 75 items have a missing data structure of 69 + 3 and 69 + another 3.

Does personality mediate the effect of environment on mood?

1. `affect` data is a subset of `msqR` with manipulations of affect
   - Do extraverts differentially respond to positive affect inductions Larsen & Ketelaar (1989)
   - Happy (Parenthood), Fear (Halloween), Sadness (Concentration camp) and control (nature film)
   - Reported in Smillie, Cooper, Wilt & Revelle (2012) testing hypothesis derived from Larsen & Ketelaar (1989) showing null effect unless approach is involved.

State Mood and traits

1. Analyses of `sai`, `tai`, and `msqR` allow for an examination of short term stability and long term decay of state-state and state-trait correlations.
2. `epiR` allows for test-retest correlations of the `epi` data.
3. Discussed in detail in Revelle & Condon (2019)

International Cognitive Ability Resource (ICAR)

1. Open source ability test (Condon & Revelle, 2014)
2. An international consortium Condon, Doebler, Holling, Gühne, Rust, Stillwell, Sun, Chan, Loe & Revelle (2014)
3. Widely used (Dworak, Revelle, Doebler & Condon, 2021)
4. Scores for 16 sample items and 1525 participants are in the `ability` data set.
   - What is the factor structure (use `fa`)
   - Hierarchical factor structure using the `omega` function

Longitudinal correlates of ability

1. Longitudinal correlation matrix from the Project Talent data set `spengler`
   - Data from Project Talent was collected in 1960 on a representative sample of American high school students. Subsequent follow up 11 and 50 years later are reported by Spengler, Damian & Roberts (2018) and others Damian, Spengler, Sutu & Roberts (2019)
   - ability and parental background at age 15
   - subsequent education and occupational outcomes at 26 and 55.
   - Nice application of mediation analysis

A powerful tool for theory testing is simulation

1. Simulated data have known structure
2. This can be factor structure, or changes over time
3. Many functions in *psych* will create simulated data. (`?sim`)
4. An example simulation for testing dynamic theory is the `cta` function.

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