# Psychology 202a

## Advanced Psychological Statistics

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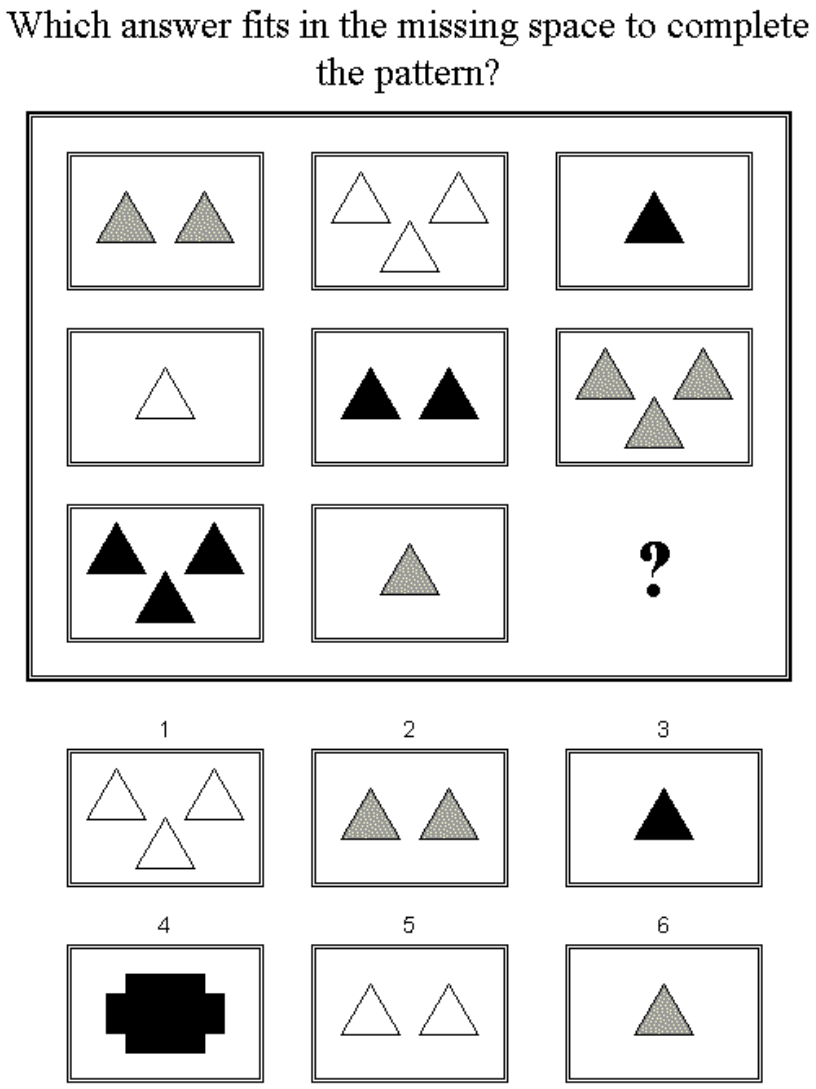
## First homework assignment, 9/10/2020 (due 9/17/2020).

### Part One

In our early classes, we have reviewed some simple ideas about variables and their shapes. Specifically, we discussed the idea of a *distribution*, and saw how some aspects of the shape of a distribution can be revealed by descriptive statistics and graphics. In addition, we saw how to use *R* to calculate descriptive statistics and perform some graphical procedures.

We have seen how to take a sample from the Statlab data set. Your first step for this assignment is to take your own sample of 50 cases from the Statlab data and save it in a csv (comma separated values) format using the function write.csv(). When you submit your homework, also submit a copy of that spreadsheet through Assignments in Cat Courses so that Sonja has access to your data.

One of the variables in the Statlab data set is "CTRA," which consists of Raven's Progressive Matrices scores. This test is an instrument that purports to measure non-verbal intelligence. A typical item looks something like this:




(If you are interested in more information, you can actually take the test here: https://psycho-tests.com/test/raven-matrixes-test. Given the misspelling in the URL and the fact that the Raven's is proprietary, this may or may not be the real test.)

The reported scores are number correct out of 60 items. In a 1995 norming of the test, the median score for typical 10-year-olds was 36, and the first and third quartiles were 28 and 41.

Discuss the distribution of the Raven scores in your sample. Use *R* to calculate any descriptive statistics you think are relevant and to produce graphs. Include your code so that we can help figure out what went wrong if you are unsuccessful at any stage.

Begin by including your best effort at a perfect histogram of your sample. Here are eight things to keep in mind: aspect ratio, appropriate grouping, breakpoints that match the grouping, placing

value labels at the midpoints of the histobars, axes that do not float in midair, a base line for the histogram to sit on, a reasonable title, and axis labels ("CTRA" is not very informative).

Once you have produced the histogram, comment on what you see, focusing on the four basic aspects of shape: central tendency, variability, symmetry, and modality. Then support your observation with appropriate descriptive statistics. It should take no more than one page to discuss the distribution, not including your software code and output.

How does your sample compare with the 1995 normative sample?

A common error in this sort of assignment is to focus too much on successfully getting output. Granted, it is important that you demonstrate an ability to use the software. However, the most important step in investigating a distribution is the *interpretation* of such output. Concentrate on deciding what statistics help you understand important aspects of the shape of the distribution and on communicating that understanding.

## Part Two

Repeat the tasks in Part One, this time using all 1,296 Raven's scores. Are there any descriptive statistics that can appropriately be used here that were not appropriate for the smaller sample? If so, report them and use them in your discussion. Comment on any differences in the impression you form of the distribution on the basis of this larger sample.