Homework 10: Attitude Measurement

36-313, Fall 2022

Due at 6 pm on Thursday, 17 November 2022

Agenda: Measuring attitudes; reducing multiple observations to a single estimate; more practice with reading scientific reports.

On Canvas, you will find a PDF which contains scans from a classic work of social psychology, *The Nature of Prejudice*. We will be using this to examine some of the statistical issues relating to how to measure attitudes and prejudices. The excerpt contains the title page and publication information, the table of contents, and the full text of one chapter.

1. (5) Who's the author of the book? *Hint*: look early in the excerpt.

2. (5) What year was the book published? *Hint*: look early in the excerpt.

3. (5) What chapter is the excerpt from? What are the immediately preceding and following chapters? Why do you think this chapter goes between those chapters? *Hint*: read the table of contents.

4. (8) Read statement B.4 on p. 69. This was *not* the opinion of the author. Whose opinion was it?

5. (10) Pages 68–70 contain a series of numbered statements. How are these used to measure attitudes? Is this a Likert scale, a feeling thermometer, or something else?

6. (9) Explain why desirability bias would be make it hard to use this test to measure attitudes today.

7. Table I on p. 70 of the excerpt gives a table of correlations between variables. Ignore the last column of the table, which gives the correlation of the sub-scores with the sum of all scores.

   a. (5) How many correlations are shown in the table? (Again, ignore the right-most column.)

   b. (4) What is the most correlated pair of variables? The least correlated pair?

   c. (10) Suppose there was one underlying variable, say F, and scores on test j were a linear function of that underlying variable, so $S_j = w_j F + \epsilon$ where ϵ is mean-zero noise. In this model, it can be shown that the correlation between two tests j and k should be $w_j w_k$. How many weights or loadings w_j would be needed if we applied this one-factor model to this data? Should it be possible to find the weights from the correlations in the table? *Hint*: The number of weights needed is smaller than the number of correlations in the table.

   d. (10) The table below shows the estimates of the weights or loadings w_j when I try to fit the one-factor model from part (d) to the data. Find the correlations implied by these weights. How well do they match the data? (If you need to know more to assess the match, what more do you need to know?)

   e. (8) Does it seem likely that the different parts of the test were all measuring the same underlying variable F?

8. (10) On p. 73, the author reports four different estimates of the percentage of Americans willing (in 1946) to express anti-Semitic attitudes. What are the estimates? How does the author explain getting such different estimates? Does that seem plausible? *Hint*: read pages 73 *and* 74 carefully.

9. *Timing* (1) How long, roughly, did you spend on this assignment?

Presentation rubric (10): The text is laid out cleanly, with clear divisions between problems and sub-problems. The writing itself is well-organized, free of grammatical and other mechanical errors, and easy to follow. Plots are carefully labeled, with informative and legible titles, axis labels, and (if called for) sub-titles and legends; they are placed near the text of the corresponding problem. All quantitative and mathematical claims are supported by appropriate derivations, included in the text, or calculations in code. Numerical results are reported to appropriate precision.

	coefficient
Jews	0.83
Negroes	0.85
Other minorities	0.91
Patriotism	0.88