

STATISTICAL METHODS

Assignment 4

Directions: Please answer all of the questions thoroughly, but succinctly. Write your answers in the boxes provided below. For questions that ask you to report on numerical statistics, write your answers in narrative form (e.g., “The mean value of the x variable is 10.4”) – do not just write the number. For questions that ask you to create a graph, copy and paste the graph that you produced from the SPSS output window into the document. When you are finished, upload your answers file to Blackboard by the due date specified on the syllabus. Note that all non-graph operations you would need to do for this homework are covered in the online SPSS cheat sheet. Also note that for this assignment, all categorical variables are in the data as words, not as numbers that are codes for words.

Situation: You are the superintendent of a moderately-sized school district. Your district, like all other districts in the state, participates in a teacher evaluation system in which teachers receive annual scores ranging from 0 to 20 points, where higher values indicate higher effectiveness (this score is derived from a combination of value-added data, which accounts for student and school characteristics and prior achievement, as well as a rubric that principals use to score teachers). There are several things going on at once in the district related to teacher quality, as listed below.

- A. A local newspaper has published an article claiming that the struggles your district is facing in terms of raising student achievement are because of your inability to recruit highly effective teachers to the district.
- B. In the summer following teachers’ first year in your district, some participated in a weekend retreat where they came together to discuss their performance, experiences, and challenges from the last year. This program gave teachers the opportunity to debrief with their peers and learn about what others are doing. The reason for this program is to produce enhancements in teachers’ performance from their first year to their second year.
- C. Also over the course of the last year (the teachers’ first year), you piloted an online mentoring program, where 49 randomly-selected teachers were assigned a mentor. These mentors are veteran teachers who met with these 49 teachers, one-on-one via an online space, once a week to discuss their challenges and help them think about how they might improve their practice.
- D. You are reviewing your recruiting and screening strategies in the district, and you wonder whether the practice of using Praxis (standard teacher licensure exam) scores is useful. In particular, you are concerned that the use of the Praxis exam might not an effective way to identify who will be a good teacher. Whether you use the Praxis as a part of the applicant evaluation process depends on whether Praxis scores (which range between 100 and 200) are actually associated with teacher performance.

You have data related to the various items above for 152 now second year teachers, included in the file “teachereval_data.sav.” The variables in that dataset are listed below.

- Teacher.ID: The teacher identification number.
- Eval.Y1: The teacher’s evaluation score in the first year of teaching.
- Eval.Y2: The teacher’s evaluation score in the second year of teaching.
- Praxis: The teacher’s Praxis score.
- Mentor: A binary variable, 1 if the teacher was in the online mentoring program, 0 if not.
- School.Type: The level of the school (1 = elementary, 2 = middle, 3 = high)

PART 1 QUESTIONS

1. You would first like to look at bit into the last point, Question E, above. Estimate a simple regression model with the year 1 evaluation score as the dependent variable and the Praxis score as the independent variable. Interpret the regression coefficient in a sentence.

2. Generate a scatter plot for the relationship between the Praxis score and the year 1 evaluation score, and include a line of best fit on the graph.

3. What have we learned thus far about the answer to Part D of the situation?

PART 2 QUESTIONS

4. In Part 1, you looked at the relationship between Praxis scores and year 1 evaluation scores. If we were to evaluate whether that relationship is *statistically significant*, explain what additional information would be added by that analysis. What is the goal of testing for statistical significance? Explain, thoroughly, as you would to someone who does not know what statistical significance is.

5. The p-value for the relationship between Praxis scores and year 1 evaluation scores from the simple regression above is 0.03. Using a p-value threshold of 0.05, explain whether the relationship is statistically significant and what the conclusion about statistical significance means.

6. Consider regression coefficient you found above. In your own opinion, do you think the coefficient seems practically large enough to be important?

NOTE: We have not answered all of the questions – this situation continues into Assignment 5.