



NORTHWESTERN  
UNIVERSITY

SCHOOL OF  
CONTINUING  
STUDIES

Handout: Problem Set #1  
*PREDICT 401: Introduction to Statistical Analysis*

### Evaluating Clinical Trial Results

You are evaluating the therapeutic effect of two drugs and a placebo in the treatment of various forms of depression. Twenty-four patients were randomly assigned to one of three treatment groups. Variables available in this data set are presented below. Three outcomes are of interest here: the therapeutic effect, a psychologist's rating of improvement, and the patient's self-report of adverse effects.

<b>Patient</b> = Patient ID number	<b>Changed</b> = psychologist's report of how much patient has changed
<b>Treatment</b> ("treatmnt")	
1 = treatment group 1	1 = marked
2 = treatment group 2	2 = moderate
3 = placebo	3 = minimally improved
<b>Therapeutic effect</b> ("thereff")	4 = no change
1 = marked	5 = minimally worse
2 = moderate	6 = much worse
3 = minimal	7 = very much worse
4 = unchanged	<b>Adverse Effect</b> ("adveff")
5 = worse	1 = none
	2 = no significant interference with functioning
	3 = significant interference with functioning
	4 = nullifies therapeutic effect

The raw data:

patient	treatmnt	thereff	changed	adveff
1	1	1	2	2
2	2	4	4	3
3	1	1	2	2
4	1	2	3	1
5	3	3	3	1
6	2	4	3	2
7	1	3	2	2
8	3	2	2	1
9	1	2	2	2
10	2	3	3	1
11	1	2	2	2
12	3	1	2	2
13	2	2	2	1
14	1	2	4	1
15	3	1	3	3
16	2	2	4	2
17	3	3	3	1
18	2	2	2	1
19	1	2	2	1

20	3	2	4	2
21	2	3	2	3
22	3	3	3	1
23	3	4	3	2
24	2	2	3	1

**Task 1:** Manually enter data into SPSS.

- 1) After starting the program, select “*type in data*” and hit “OK.”
- 2) Select “*Variable view*” at the bottom of the spreadsheet.
- 3) For the first row, type in the variable name “patient” then make sure that the variable type is set at “Numeric.” Do the same for the other four variables, giving them the names “treatmnt,” “thereff,” “changed,” and “adveff,” respectively.
- 4) Now select “*Data view*” from the bottom of the spreadsheet, and enter the data for each patient. For instance, for person 1, type in “1” under the variable “patient,” then “1” under “treatmnt,” then “1” under “thereff,” then “2” under “changed,” and “2” under “adveff.”
- 5) Do this for the remaining 23 patients.

**Task 2:** Compute the mean and standard deviation for the three outcomes (“thereff,” “changed,” and “adveff”) for the group overall (all 24 patients) and for each treatment group.

- 1) To calculate the overall means and standard deviations, select “Analyze,” “Descriptive Statistics,” and “Descriptives.” Select the three outcome variables in the left-hand column and move them into the right-hand column called “variables.” Select “Options,” and make sure that at least “mean” and “standard deviation” are selected. Hit “Continue” and “OK.” The mean and standard deviation should be shown in a table in the Output window.
- 2) To calculate the means and standard deviations for Treatment Group 1, select “Data,” then “Select Cases,” then “If condition satisfied,” then “If.” Select the variable “Treatmnt,” and move it into the text box on the right. After the word “treatmnt,” type in “=1”. Hit “Continue” and “OK.” The dataset should now show lines “crossing out” the patients that are not in Group 1. With Group 1 selected, engage in the same process as above to calculate the mean and standard deviations.
- 3) To calculate the means and standard deviations for Treatment Groups 2 and 3, engage in the same process, but type in “=2” and “=3,” respectively.

Report your answers by creating and filling in a table that looks like the following. Round each answer to the hundredths place (two digits to the right of the decimal point).

Treatment Group	Mean thereff	S.D. thereff	Mean changed	S.D. changed	Mean adveff	S.D. adveff
1						
2						
3						
Overall						

**Task 3:** Create a histogram of “therapeutic effect” for each treatment group (you don’t need to do this for the overall group). Do this by selecting the appropriate group (via the data selection process described earlier), and then select “Graphs” and then “Histograms.” Move “thereff” into the variable box and hit “OK.” Cut and paste these graphs into your final homework draft. Make sure to label each graph appropriately (such as “Histogram of Therapeutic Effects for Treatment Group 1.”).

**Task 4:** What do you think about the relative effectiveness of the two treatments? Discuss the effectiveness of the treatments in relation to each other and to the placebo for a non-statistician audience. Are the treatments effective? How do you know? Which treatment is better? Why? If you had to recommend a drug, which would it be? What is your evidence for your recommendation? Don’t just repeat the numbers here. Make sure to interpret the analyses you’ve done.

*Create a brief report (approximately 2–4 pages) answering these four tasks.*