PSYC 5322: Psychometrics

Tarleton State University | Homework 5 | Spring 2020

1. Suppose you split a test into two parallel halves and observe a correlation of 0.8 between the two halves. What is the estimated reliability of your test?

2. What is the estimated reliability of a test if the variance of scores on the first half of the test is 20, the variance of the scores on the second half of the test is 25, and the variance of the total test scores is 60?

3. A test is split in half. The scores on the first half of the test have a variance of 10, and the scores on the second half have a variance of 15. The correlation between the scores on the two halves is 0.50. Calculate the estimated reliability of the test.

4. A test consists of three items:

subject	Q1	Q2	Q3
A	9	8	7
B	5	3	4
C	8	8	7
D	7	6	8
E	6	5	7

   Calculate Cronbach's α by hand, and verify your answer in JASP. Interpret this value in terms of *at least two* equivalent meanings of reliability.

5. Use the generalized Spearman-Brown formula to answer the following:

   (a) You have an 80-item test with an estimated reliability of 0.9. Estimate the reliability of a 40-item version of this test.

   (b) You have a 25-item test with an estimated reliability of 0.7. If you expanded it to a 100-item test by adding parallel items, what reliability would you expect to have?

   (c) You have a 50-item test with an estimated reliability of 0.75. How long would the test need to be in order to expect a reliability of 0.90?