Psychology 202a
Advanced Psychological Statistics

Midterm Examination

October 13, 2016

Grading:
<= 21 is a C
  22 is a B-
  23 to 25 is a B
  26 to 27 is a B+
  28 is an A-
> 28 is an A

Name:____________ Protocol ___ (39 points)

Please read all questions carefully, and answer them to the best of your ability. You may use books, notes and calculators. If you need clarification at any point during the exam, ask Jack.
1. Based on the information available, compare the distributions of TIME in the two groups. Your answer should refer both to descriptive statistics and to graphical information, but should not consider hypothesis testing.

Total: 9 points

1: discuss central tendency
1: discuss variability
1: discuss symmetry
1: appropriate descriptive statistic(s) for central tendency
1: appropriate descriptive statistic(s) for variability
1: order of mean and median for symmetry
1: any measure of central tendency is higher for NV than for VV
1: any measure of variability is higher for NV than for VV
1: both groups have evidence of positive skew
2. State the null hypothesis that is being tested, and interpret the test results using an alpha level of .05. Your interpretation should relate specifically to the research question at hand: Say what the conclusion implies about the effect of the experimental manipulation on TIME.

11 points total

1  State null hypothesis as $\mu_1 - \mu_2 = 0$ or $\mu_1 = \mu_2$.
1  Don’t confuse with one-sample or repeated measures test.
1  Point out the irony of completely different conclusions for a .0109 difference in $p$ values.

Path 1 (8 points):
1  Raise issue of which test to use
1  Interpret Satterthwaite test because of apparent difference in sds
1  Cite folded F test as evidence
1  Conclude that we reject the null hypothesis
1  Cite $p$ value
1  We have evidence that
1  Time is different
1  When visual information is presented

Path 2 (8 points):
1  Raise issue of which test to use
1  Interpret pooled test because the difference in sd seems trivial
1  Explain away folded F as detecting an unimportant difference
1  Conclude that we fail to reject the null hypothesis
1  Cite $p$ value
1  We have no evidence that (0 points if null confirmation)
1  Time is different
1  When visual information is presented
3. What are the assumptions of the test? Explain any concerns you have about those assumptions. (Don’t just say “I’m worried about the assumption of heplodiocity.” Not a real assumption.) Rather, explain WHY you are (or are not) concerned.

Total: 10 points

1 Identify independence between groups as an assumption.
1 Identify independence within groups as an assumption.
1 Identify homoscedasticity as an assumption.
1 Identify normality for each population as an assumption.
1 Identify independence between groups as a possible problem (no information about how groups were formed, so cannot assume randomization; some overlap in available information for part of the NV group and the VV group).
1 Identify independence within groups as a definite problem (two different forms of information within the NV group).
1 State a conclusion about homoscedasticity that is consistent with your choice of test.
1 Identify normality as a problem.
1 Because of positive skew in both groups.
1 Reference robustness to that violation.
Part Two

4. A researcher working with the 1970s child data we have been using in class produced the histogram that appears on the following page. Critique the figure: list its flaws and explain how they could be improved.

Total: 8 points

1 point: Aspect ratio is wrong.

1 point: Title is horrible.

1 point: Bad grouping decision (not 7 to 15 intervals).

1 point: Bad break decision; edges of histobars are at location that exist in the data set.

1 point: X-axis label is horrible.

1 point: The histogram labels edges of bars, not midpoints.

1 point: The histogram is suspended in mid-air (no base).

1 point: Address the “how it could be improved” question for at least two of the identified flaws. For example, “move to an aspect ratio such that the figure is wider compared to its height,” “use a title without cryptic variable names,” “group in 7 to 15 intervals”, etc.