Problem Set #6: One-sample and Independent Sample t-tests

1. Williamson (2008) conducted a study to examine psychological adjustment among children of parents with depression. Williamson expected that children with at least one parent with depression would show unusually high levels of behavior problems. To examine this, a sample of 166 children with at least one parent with depression was recruited. They were given the Youth Self-Report Inventory, which is a nationally normed measure with a population mean of 50 and a standard deviation of 10; higher scores on this measure indicate greater behavior problems. Williamson obtained a sample mean of 55.71. Conduct a one-sample hypothesis test to determine if children of parents with depression have greater behavior problems than typical children (Steps 1 to 8). Set alpha to .05.

Step 1: Decide whether you are conducting a one- or a two-tailed test.

Step 2: Specify the ***NULL*** hypothesis (HO)

Step 3: Specify the ***ALTERNATIVE*** hypothesis (HA)

Step 4: Designate the rejection region by selecting α.

Step 5: Determine the critical value of your test statistic

Step 6: Use sample statistics to calculate test statistic.

Step 7: Compare *observed* value with *critical* value

Step 8: Interpret your decision regarding the null

1. You get a job as a traveling salesperson for Callahan Brake pads.  You try to sell your first client on the idea that Callahan Brake pads are superior in quality.  The client is concerned about price.  So, you conduct a study to convince him that Callahan brake pads do not cost any more or less than the average brake pad.  Callahan Brake pads cost $15 per pair.  The average cost of your 5 leading competitors $13.62 with s = 1.09.  Conduct a one-sample hypothesis test (alpha = .05) to determine if the cost of Callahan Brake pads are in fact different from average (Steps 1 through 8). Be sure to interpret your results and to report the test statistics appropriately.

Step 1: Decide whether you are conducting a one- or a two-tailed test.

Step 2: Specify the ***NULL*** hypothesis (HO)

Step 3: Specify the ***ALTERNATIVE*** hypothesis (HA)

Step 4: Designate the rejection region by selecting α.

Step 5: Determine the critical value of your test statistic

Step 6: Use sample statistics to calculate test statistic.

Step 7: Compare *observed* value with *critical* value

Step 8: Interpret your decision regarding the null

1. Research suggests that people are more likely to gamble if they are in a good mood. Professor Keno and Professor Roulette want to replicate this finding. They agree to manipulate mood by showing their subjects hilarious cat videos on youtube. They also agree to assess willingness to gamble using a standard measure in the field. However, Professor Keno uses two groups of subjects: one group watches a hilarious cat video before completing the gambling measure; the other does not. Professor Roulette has her subjects complete the gambling measure twice: once after watching a hilarious cat video and once after watching an emotionally neutral do-it-yourself video about home composting. Which professor – Keno or Roulette – constructed an experiment that should be analyzed as an independent samples t-test? Explain.
2. You and Biff are playing a heated game of Jacks, when the conversation invariably turns to who is the superior player.  You both know enough statistics to know that one game won't settle the matter completely.  So, you each play six games, you pick up 5, 4, 8, 4, 5, and 6 jacks.  Biff picks up 4, 4, 5, 3, 4, and 5 jacks.
   1. Conduct a hypothesis test (alpha = .05) to determine who is the better jackster (Steps 1 through 8).  Be sure to interpret your results and to report the test statistic correctly. Set alpha to .05

Step 1: Decide whether you are conducting a one- or a two-tailed test.

Step 2: Specify the ***NULL*** hypothesis (HO)

Step 3: Specify the ***ALTERNATIVE*** hypothesis (HA)

Step 4: Designate the rejection region by selecting α.

Step 5: Determine the critical value of your test statistic

Step 6: Use sample statistics to calculate test statistic.

Step 7: Compare *observed* value with *critical* value

Step 8: Interpret your decision regarding the null including an appropriate measure of effect size.