Statistics 101 – Laboratory 10

The last two labs looked at the distribution of the sample proportion \( \hat{p} \) and confidence intervals for the proportion of a population of statistics students who have blue eyes. This week we will look at testing hypotheses about proportions for this population.

1. Four random samples of size 25 are combined to form a random sample of size 100. Because we are sampling with replacement, we do not have to worry about the 10% condition. This combined sample contains 28 students with blue eyes. Use this information to test the hypothesis that the population proportion of blue eyes is 0.312 against an alternative that the population proportion of blue eyes is different from 0.312. Do so by following the steps below.
   a) Step 1: Check Conditions.
   b) Step 2: State a null and alternative hypothesis.
   c) Step 3: Calculate the value of the test statistic.
   d) Step 4: Use Table Z to calculate a P-value.
   e) Step 5: Use the P-value to reach a decision and state a conclusion in context.

2. Is the proportion of brown eyes in the population larger than the proportion of blue eyes (0.312)? Several random samples of size 25 are combined to come up with a random sample of 250. Note that because we are sampling with replacement we can get as large a sample as we want. Also, because we are sampling with replacement, we don’t have to worry about the 10% condition. In this random sample of 250 there were 91 students with brown eyes. Perform the steps of a test of hypothesis to answer the question about the proportion of brown eyes in the population.
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