

6. lead in to two sample...

Example 5: Does one's educational level influence their opinion about vaccinations? A recent Angus Reid¹ survey was taken. Each person sampled was asked to respond to the statement "The science around vaccinations isn't clear." Respondents 'strongly agree', 'moderately agree', 'moderately disagree', or 'strongly disagree'. Of the $n = 1509$ people sampled, $n = 376$ of had at least an undergraduate university education. Of these, 274 'disagreed'. A similar study concluded that of those less educated Canadians (high school or less), 55% disagree with this statement.

Does this data indicate that the proportion of Canadians having a university-level education who disagree with the 'science of vaccinations isn't clear' statement higher than the proportion of Canadians who are less educated (high school or less)? Test, regulating the probability of committing a Type I error to be 0.05.

$$P_{HS} = 0.55 = \text{prop disagree and high school or less.}$$

$$\hat{P}_u = \frac{274}{376} = \text{prop disagree and have university ed.}$$

$$H_0: P_0 \leq 0.55$$

$$H_a: P_0 > 0.55$$

$$Z_{calc} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0(1-P_0)}{n}}} = \frac{\frac{274}{376} - 0.55}{\sqrt{\frac{0.55(0.45)}{376}}} \approx 6.9660688632.$$

$$P\text{-value } P[Z > 6.966] \approx 1.63 \times 10^{-12} \Rightarrow R_{H_0}.$$

Based on this sample the prop. of university ed. people that disagree with the statement is sig. greater than 0.55!

CI \Rightarrow 95% Confidence $0.6894732 < p < 1.$ Note: lowest believable value is 0.6894... Does not include 0.55! Sig. greater!

Why are we so sure P_{HS} is 0.55? wouldn't we get sample data there as well? we should not consider the P_{HS} as a known value unless we have asked all people with high school ed or less... 2-sample hypothesis comparison!

¹ <http://angusreid.org/wp-content/uploads/2015/02/2015.02.13-Vaccinations.pdf>