2-Proportion Confidence Interval and Significance Test

Is yawning contagious? Results from Mythbusters experiment:

Did subject yawn?	Yawn seed (1)	No yawn seed (2)	Total
Yes	10	4	14
No	24	12	36
Total	34	16	50

What proportion of those who had the yawn seed yawned? $\hat{p}_1 =$

What proportion those who didn't have the yawn seed yawned? $\hat{p}_2 =$

Draw a segmented bar graph:

Difference in the sample proportions: $\hat{p}_1 - \hat{p}_2 =$

Relative Risk:

Those with the yawn seed were ____________ times more likely to yawn than those without.

Are the variables whether or not there was a yawn seed and whether or not the subject yawned independent?

If the variables are independent (yawn seed had no effect on whether or not subject yawned):

What proportion yawned? $\hat{p}_c =$

How many would you expect to yawn in each group?

What would you expect the difference in the proportions between the two groups to be? $p_1 - p_2 =$

$\hat{p}_1 - \hat{p}_2$ (difference in sample proportions that yawned)

What proportion of times did we get the observed difference $\hat{p}_1 - \hat{p}_2$= _________?

What does this number represent (interpret)?

Does this provide evidence that more people yawn with the yawn seed than without?

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Repeat the simulation if $\hat{p}_1 = \frac{12}{34} = .353$ and $\hat{p}_2 = \frac{2}{16} = .125$

What proportion of times did we get the observed difference $\hat{p}_1 - \hat{p}_2 = .228$?

Does this provide evidence that more people yawn with the yawn seed than without?

Statistical significance: the likelihood of an observed result by asking how often such an extreme result would occur by chance alone. If the sample result is unlikely to occur by chance alone, it is said to be statistically significant. The probability of obtaining a result at least as extreme as the sample by chance alone is known as the ______________.

The CLT says the sampling distribution of $\hat{p}_1 - \hat{p}_2$ (the difference in the sample proportions) will be:

- Approx. normal if

- Have a mean of $p_1 - p_2$(the difference in the actual proportions)

- Have a standard deviation of

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Infant sleeping position	1992	1996	Total
Stomach	700	240	940
Back	300	760	1060
Total	1000	1000	2000

$\hat{p}_1 =$ $\hat{p}_2 =$ $\hat{p}_c =$

Define Parameter/Write Hypotheses:

Check Conditions:

Large counts:

Two independent random sample the two populations (obs. Study)

Or random assignment to two groups (experiment)

Test statistic/p-value:

Conclusion:

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Confidence Interval:

(conditions are the same as significance test)

Confidence interval estimate the *difference* in the population proportions, not the actual values.

What does it tell you if the values are both positive?

Both negative?

What if 0 is included in the interval?