

## 15.4: Pineapple on Pizza

There is a very passionate and on-going debate on whether or not pineapple should go on pizza. Being the objective, rational data analysts that we are, we will collect empirical data to see if we can settle this debate once and for all. We gather data from a group of adults asking for a simple Yes/No answer.

### Step 1: State the Hypotheses

We start, as always, with our hypotheses. Our null hypothesis of no difference will state that an equal number of people will say they do or do not like pineapple on pizza, and our alternative will be that one side wins out over the other:

$H_0$  : An equal number of people do and do not like pineapple on pizza

$H_A$  : A significant majority of people will agree one way or the other

### Step 2: Find the Critical Value

To avoid any potential bias in this crucial analysis, we will leave  $\alpha$  at its typical level. We have two options in our data (Yes or No), which will give us two categories. Based on this, we will have 1 degree of freedom. From our  $\chi^2$  table, we find a critical value of 3.84.

### Step 3: Calculate the Test Statistic

The results of the data collection are presented in Table 15.4.1. We had data from 45 people in all and 2 categories, so our expected values are  $E = 45/2 = 22.50$ .

Table 15.4.1: Results of Data collection

	Yes	No	Total
Observed	26	19	45
Expected	22.50	22.50	45

We can use these to calculate our  $\chi^2$  statistic:

$$\chi^2 = \frac{(26 - 22.50)^2}{22.50} + \frac{(19 - 22.50)^2}{22.50} = 0.54 + 0.54 = 1.08$$

### Step 4: Make the Decision

Our observed test statistic had a value of 1.08 and our critical value was 3.84. Our test statistic was smaller than our critical value, so we fail to reject the null hypothesis, and the debate rages on.

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