14.1: Chi-Squared Goodness of Fit

Are the colors in a bag of M&M’s evenly distributed?

We will check a bag of M&M’s (a sample of M&M’s) a perform a **chi-squared goodness of fit test** to test this:

1.) State:

Ho:

where $p\_{i}$=true proportion of M&M’s that are color $i$

Ha:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* OR \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Ho:

Ha:

2.) Plan:

Name of Test:

Assumptions/Conditions:

 1) Was your sample an SRS of the population of interest?

 2) **Are your expected counts at least 5**? 🡨 come back to this one.

3.) Calculations:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Color** | **Brown** | **Yellow** | **Red** | **Orange** | **Green** | **Blue** |
| **Observed (O)** |  |  |  |  |  |  |
| **Expected (E)** |  |  |  |  |  |  |
| **(O – E)2 / E** |  |  |  |  |  |  |

Find the chi-square test statistic:

$χ^{2}=Σ\frac{(O-E)^{2}}{E}$with d.f. = number of groups – 1

 d.f. =

4) Interpretation:

The M&M’s/Mars Company claims that the mix of M&M’s plain chocolate candies will contain 30% browns, 20% each of yellows and reds and 10% each of oranges, greens and blues. We would like to test **this** claim.

1.) State:

Ho:

where $p\_{i}$=true proportion of M&M’s that are color $i$

Ha:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* OR \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Ho:

Ha:

2.) Plan:

Name of Test:

Assumptions/Conditions:

 1) Was your sample an SRS of the population of interest?

 2) **Are your expected counts at least 5**? 🡨 come back to this one.

3.) Calculations:

|  |  |  |  |  |  |  |
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| **Color** | **Brown** | **Yellow** | **Red** | **Orange** | **Green** | **Blue** |
| **Observed (O)** |  |  |  |  |  |  |
| **Expected (E)** |  |  |  |  |  |  |
| **(O – E)2 / E** |  |  |  |  |  |  |

Find the chi-square test statistic:

$χ^{2}=Σ\frac{(O-E)^{2}}{E}$with d.f. = number of groups – 1

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4) Interpretation: