

11.1: Why It Matters- Chi-Square Tests

In this module, *Chi-Square Tests*, we again focus on inference with categorical variables. We learn three new hypothesis tests, two of which are an extension of hypothesis tests about proportions that we learned in the modules *Inference for One Proportion* and *Inference for Two Proportions*. This module does not focus on estimating a parameter, so there is nothing about confidence intervals in this module.

Here is the Big Picture of Statistics with the new material for *Chi-Square Tests* highlighted in purple.

Following are examples of research questions that procedures in this module can address:

Goodness-of-Fit Test: Test a claim about the distribution of a categorical variable in a population.

- During the presidential election of 2008, the Pew Research Center collected survey data that suggested that 24% of registered voters were liberal, 38% were moderate, and 38% were conservative. Is the distribution of political views different this year?
- The distribution of blood types for whites in the United States is 45% type O, 41% type A, 10% type B, and 4% type AB. Is the distribution of blood types different for Asian Americans?

Test of Independence: Test a claim about the relationship between two categorical variables in a population.

- For young adults in the United States, is gender related to body image?
- Is alcohol abuse by New York firefighters dependent on participation in the 9/11 rescue operation?
- In the United States, is race associated with political views (conservative, moderate, liberal)?

Test of Homogeneity: Test a claim about the distribution of a categorical variable in several populations.

- Does the use of steroids in collegiate athletics differ across the three NCAA divisions?
- Was the distribution of political views (liberal, moderate, conservative) different for the last three presidential elections in the United States?

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