Categorical Data Analysis: Chi-Squared Tests

13.2 Checking the Assumptions for a Chi-Square Goodness-of-Fit Test

1. The Humane Society of the United States claims that among dog owners: 60% own one dog, 28% own two dogs, and 12% own three dogs or more dogs. Students at FIU conduct a random sample of 40 households to test the claim from the Humane Society. The results are shown below. Does the data collected fit the sample size requirement for a X^2 one-way test?

One Dog	Two Dogs	Three or More Dogs
26	11	3

2. The U.S. Department of Health and Human Services claimed in 2007 that among people who are 18 - 25 years old: 42.6% have never used Illicit Drugs, 24.2% have used them in their lifetime, but have not used in the past year, and 33.2% have used in the past year. Twenty-five people in this age group are randomly selected and are surveyed. The results are given below. Does the data collected meet the sample size requirement for a X^2 one-way test?

Never Used	Used in Their Lifetime	Used in the Past Year
11	4	10

Answers:

1. The expected values have to all be 5 or larger in order for the sample size requirement to be met.

$E(1dog) = n(p_{1dog}) = 40(0.6) = 24$

$E(2dogs) = n(p_{2dogs}) = 40(0.28) = 11.2$

$E(3+dogs) = n(p_{3+dogs}) = 40(0.12) = 4.8$ **

**Since this last expected value is less than 5, the sample size requirement is not met.

2. The expected values have to all be 5 or larger in order for the sample size requirement to be met.

   $E(never) = n(p_{never}) = 25(0.426) = 10.65$

   $E(inLifetime) = n(p_{inLifetime}) = 25(0.242) = 6.05$

   $E(pastYr) = n(p_{pastYr}) = 25(0.332) = 8.3$

   Since all of the expected values are at least 5 (greater than or equal to 5), the sample size requirement has been met.