

Stat 135: χ^2 -test for Goodness-of-fit and Independence

1. A die was tossed 60 times. The outcomes are listed below:

Outcome	Observed Frequency	Expected Frequency
1	4	
2	6	
3	17	
4	16	
5	8	
6	9	
sum	60	60

2. Census data for NYC indicate that of the under 18 population, 29.2% is white, 28.2% is black, 31.5% is Latino, 9.1% is Asian, and 2% are other ethnicities. The NYCLU points out that of 26,181 police officers, 64.8% are white, 14.5% are black, 19.1% are Latino, and 1.4% are Asian. Do the police reflect an appropriate ethnic composition of youth?

3. M&M candy colors have been varied over the years. The color distribution in a bag of M&M Milk Chocolate Candies is supposed to be 24% blue, 14% brown, 16% green, 20% orange, 13% red, and 14% yellow. You open up a 14 oz bag and find 61 brown, 59 yellow, 49 red, 77 orange, 141 blue, and 88 green. Use a goodness of fit test to examine how well this bag fits with the percents stated by the M&M Mars company.

4. The table below summarizes the result of a study (conducted by the University of Texas Southwestern Medical Center) researching whether the risk of Hepatitis C is related to a person's "tattoo status". (Hep. C causes about 10,000 deaths per year in the U.S.)

	Hep. C	No Hep. C	Total
Tattoo, parlor	17	35	52
Tattoo, elsewhere	8	53	61
No Tattoo	22	491	513
Total	47	579	626

5. There is a growing body of literature demonstrating that early exposure to frightening movies is associated with lingering fright symptoms. As part of a class on media effects, college students were asked to write narrative accounts of their exposure to frightening movies before the age of 13. More than one-fourth of the respondents said that some of the fright symptoms were still present in waking life. The following table breaks down these results by gender. Is there an association between lingering fright symptoms and gender? Or are they independent?

Ongoing fright symptoms	Men	Women	Total
Yes	7	29	36
No	31	50	81
Total	38	79	117