What is an expected frequency?*

Arnold Mwesigye

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An **expected frequency** is a theoretical predicted frequency obtained from an experiment presumed to be true until statistical evidence in the form of a hypothesis test indicates otherwise. An observed frequency, on the other hand, is the actual frequency that is obtained from the experiment. The events[1] being predicted must be mutually exclusive.

To test the hypothesis, the "Chi-square" is calculated by finding the difference between each observed and theoretical frequency, squaring them, dividing each by the theoretical frequency, and taking the sum of the results:

Chi Square = ((**O** - **E**) * (**O** - **E**)) / **E**

where:

O = an observed frequency

E = an **expected (theoretical) frequency**, asserted by the null hypothesis

Example:

To test the hypothesis that a random sample of 100 people has been drawn from a population in which men and women are equal in frequency, the observed number of men and women would be compared to the theoretical frequencies of 50 men and 50 women. If there were 45 men in the sample and 55 women;

Chi Square = {((45-50) * (45-50)) / 50} + {((55-50) *(55-50)) / 50} = 1

This proves that the hypothesis is true.

References:

Wikipedia. "Expected Frequency", Wikipedia Foundation Inc, "http://en.wikipedia.org/wiki/Pearsons_Chi_Square"[2] , Last accessed 17th February 2006.

Wikipedia. "Expected Frequency", Wikipedia Foundation Inc, "http://en.wikipedia.org/wiki/Goodness_of_fit"[3] , Last accessed 17th February 2006.

Arnold Mwesigye

Petrina Mangala

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[1] http://cnx.org/content/m13476/latest/

[2] http://en.wikipedia.org/wiki/Pearsons_Chi_Square

[3] http://en.wikipedia.org/wiki/Goodness_of_fit