

SOC 4930/5050: Week 05 Equations Quick Reference

Christopher Prener, Ph.D.

September 25th, 2017

Binomial Distribution

For the binomial distribution, let:

n = number of independent trials

p = probability of success in each trial

Mean

$$\mu = np \quad (1)$$

Standard Deviation

$$\sigma = \sqrt{np(1-p)} \quad (2)$$

Poisson Distribution

For the Poisson distribution, let:

n = count of independent events

p = probability of success in each event

$$\lambda = np \quad (3)$$

Standard Normal Distribution

Standardized Scores: Population

$$Z = \frac{x - \mu}{\sigma} \quad (4)$$

Standardized Scores: Sample

$$Z = \frac{x - \bar{x}}{s} \quad (5)$$

Skew

$$sk = \sqrt{n} \frac{\sum_{i=1}^n (x_i - \bar{x})^3}{\left(\sum_{i=1}^n (x_i - \bar{x})^2\right)^{\frac{3}{2}}} \quad (6)$$

Note that *sk* is an abbreviation that I use in my classes to differentiate skew from standard deviation. There is no single accepted abbreviation for skew. Similarly, there are a number of equations in use to calculate skew; this is one that I teach because it simplifies some of the required calculations.

Kurtosis

$$k = n \frac{\sum_{i=1}^n (x_i - \bar{x})^4}{\left(\sum_{i=1}^n (x_i - \bar{x})^2\right)^2} \quad (7)$$

Note that there are a number of accepted abbreviations for kurtosis including *k*. There are also a number of equations in use to calculate kurtosis. As with skew, this is one that I teach because it simplifies some of the required calculations.