SOC 4015/5050: Lecture 05 Equations

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Binomial Distribution

For the binomial distribution, let:
n = number of independent trials
p = probability of success in each trial

Mean

$$\mu = np \tag{1}$$

Standard Deviation

$$\sigma = \sqrt{np\left(1-p\right)} \tag{2}$$

Poisson Distribution

For the Poisson distribution, let:
n = count of independent events
p = probability of success in each event

$$\lambda = np \tag{3}$$

Standard Normal Distribution

Standardized Scores: Population

$$z = \frac{x-\mu}{\sigma} \tag{4}$$

Standardized Scores: Sample

$$z = \frac{x-\bar{x}}{s} \tag{5}$$

Skew

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

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

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

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.