INTRODUCTION TO Z-SCORES

A. What are z-scores?

1. z-scores, or standard scores, compare values in a dataset to each other; as we will see when we discuss the normal curve and do some inferential statistics, z-scores are important components of statistical argumentation.

2. Computing z-scores, as with many statistical measures, depends upon whether one is computing the measure for a population or a sample

What are z-scores? (cont'd)

a. for a population

$$z_i = \frac{x_i - \mu}{\sigma} = \frac{\chi}{\sigma}$$

b. for a sample

$$z_i = \frac{x_i - \bar{x}}{s} = \frac{\chi}{s}$$

where χ= the deviation score

Computing z-scores (cont’d)

thus, z = the deviation score divided by the standard deviation

OR

z is a measure how far an observation is from the mean, as measured in units of standard deviations

B. Examples from our model distribution

1. What is the z-score or an observation of 10 monographs, i.e., what is z_{10}, or how many standard deviations is an observation of 10 monographs from the mean?

a. $$z_{10} = \frac{x - \mu}{\sigma} = \frac{10 - 6.1}{5.5} = \frac{3.9}{5.5} = 0.71$$

b. An observation of 10 monographs is 0.71 standard deviations **above** the mean

Examples (cont'd)

2. Is $z_5 > 0$ or <0? Why?

a. $$z_5 = \frac{x - \mu}{\sigma} = \frac{5 - 6.1}{5.5} = 0.20$$

b. 5 monographs is 0.20 standard deviations **below** the mean of this dataset

C. Summary

1. $z < 0$, if $x <$ mean

2. $z > 0$, if $x >$ mean

3. $z = 0$, if $x =$ mean (a highly unusual case)