PSYED 2018 Fall 2015

Assignment 3

1. When the sun cannot be seen (overcast day), homing pigeons find their way back to their roots using magnetic cues from Earth (Walcott, 1972).

Consider the following study. One sample of pigeons has a magnet fastened on their heads to interfere with their ability to detect the Earth’s magnetic field. A second sample has a nonmagnetic bar of equal size and weight placed on their heads. The pigeons are driven far from their roosts and let go. The researcher measures the error of the pigeons’ heading; that is, how many degrees there are between the pigeon’s course and the true course to the home roost.

Hypothetical data are as follows:

|  |  |
| --- | --- |
| Magnetic Bar | Nonmagnetic Bar |
| 35 | 18 |
| 40 | 11 |
| 37 | 6 |
| 34 | 6 |
| 24 | 13 |

* 1. Identify the independent and dependent variables.

Independent variable—magnetic or nonmagnetic bar fastened on pigeons’ head.

Dependent variable — degrees between the pigeon’s course and the true course to the home roost.

* 1. Compute the means for the treatment groups (i.e. for each group separately).

Magnetic Bar = (35 + 40+ 37 + 34 + 24)/ 5 = 34

Nonmagnetic Bar = (18 + 11 + 6 + 6+ 13)/ 5 =10.8

* 1. Compute the variance and standard deviation for each group separately.

Magnetic Bar Group

= (35 – 34)2+ (40 – 34)2+ (37 – 34)2+ (34 – 34)2+ (24 – 34)2 = 146

Sample Variance: = 146 / 4 = 36.25

Sample SD: s =  = 6.02

Nonmagnetic Bar Group

= (18 – 10.8)2+ (11 – 10.8)2+ (6 – 10.8)2+ (6 – 10.8)2+ (13 – 10.8)2= 102.8

Sample Variance: = 102.8 / 4 = 25.7

Sample SD: s =  = 5.07

* 1. Looking at the descriptive statistics, do magnetic cues seem to help homing pigeons?

Magnetic cues. Because the mean of magnetic bar group is greater than nonmagnetic bar group. Pigeons interfered by magnet bar deviated from the true course farther than those with the assistant of magnetic cues. Also, pigeons with magnetic cues are more stable because both the variance and standard deviation for magnetic bar group are larger than nonmagnetic bar group.

1. For the data in the following sample:

6, 1, 6, 8, 7, 19, 7, 5, 3, 3, 2, 5

* 1. Sketch a frequency distribution histogram.
  2. Compute the mean and standard deviation.

Sample Mean = (1 + 2 + 3\*2 + 5\*2 + 6\*2 + 7\*2 + 8 +19) / 12 = 6



= (1 – 6)2 + (2 – 6)2 + 2\*(3 – 6)2+2\*(5 – 6)2 +2\*(6– 6)2+ 2\*(7 – 6)2+ (8 – 6)2+ (19 – 6)2 = 236

Sample SD: = = 4.6

* 1. Find the median and the semi-interquartile range.

Median (Q2) = (5+6)/2 = 5.5 Q1 = 3 Q3 = 7

Semi- interquartile range = (Q3 – Q1)/ 2 = (7 - 3) / 2 = 2

* 1. Which measures of central tendency and variability provide a better description of the sample? Explain your answer.

Median and the semi-interquartile range descript the central tendency of the sample better than the mean and SD. The average value and SD involved the outlier 19, which influenced the results.

1. A negatively skewed distribution has 65 and 10. If this entire distribution is transformed into z-scores, describe the shape, mean, and standard deviation for the resulting distribution of z-scores.

Z = (X– 65) / 10 = 0.1X – 6.5

The shape for the distribution of z-scores will be negatively skewed.

Original mean is, new mean = 0.

Standard deviation is *S*, new standard deviation *S* = 1.

1. A distribution with 65 and  6is being standardized to produce a new mean of 50 and a new standard deviation of 10. Find the new standardized value for each of the following scores from the original distribution: 71, 62, 74, and 53.

X= 71 Z = (71 – 65)/ 6 = 1 Standardized X = 1 \*10 + 50 = 60

X= 62 Z = (62 – 65)/ 6 = –0.5 Standardized X = –0.5 \*10 + 50 = 45

X= 74 Z = (74 – 65)/ 6 = 1.5 Standardized X = 1.5 \*10 + 50 = 65

X= 53 Z = (53 – 65)/ 6 = –2 Standardized X = –2 \*10 + 50 = 30

1. For a population of exam scores, a score of *X*  29 corresponds to *z*  0.5 and a score of *X*  20 corresponds to *z* 1.0. Find the mean and standard deviation for the population.

0.5 = (29 – ； – 1.0 = (20 - ) 

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