

Lab report 2: on the significance of correlation



**ASSIGN
BUSTER**

The Significance of Correlation Correlation is a measure of the strength of the association between two sets of variables. The most widely used method of calculating the strength of the correlation between two sets of variables is Pearson's product-moment correlation coefficient which is designated as r and often times referred to as Pearson's r . The coefficient of correlation ranges from -1 to $+1$. A correlation coefficient of -1 at one extreme indicates a perfectly negative correlation between the independent and the dependent variable while a correlation coefficient of $+1$ indicates a perfectly positive correlation between the two sets of variables. If $r = -0.5$, or $r = +0.05$ then there is a moderately negative or a moderately positive association between both sets of variables. The closer r is to $+1$ and -1 the stronger the level of association while the closer r is to 0 the weaker the level of association. A value of $r = 0$ indicates that there is no association between the independent and the dependent variables. In order to determine the statistical significance of a correlation result the p -value which represents the probability is compared with the significance level. If the p -value is less than the significance level then the null hypothesis: $r = 0$ is rejected and the alternative hypothesis: $r \neq 0$ is accepted. On the other hand if the p -value is greater than the significance level then the null hypothesis: $r = 0$ is accepted and the alternative hypothesis: $r \neq 0$ is rejected.

The SPSS Manual which is written by Julie Pallant provides several examples of how the SPSS software can be used to perform correlation analysis. The data set that I have chosen to perform my analysis on is Sleep4ED. This dataset represents a survey of 271 subjects with ages from 18 to 84 years of age and consisting of both male and female. The survey questions related to sleep behavior patterns, gender, weight, and height. The correlations of the

variables in the dataset were found to be significantly correlated in some cases with varying levels of correlation.

The variables - gender and fall asleep while driving found to be statistically significant but were spurious correlations since they have no meaning.

Having recoded the variable gender using 0 to represent females and 1 to represent males and 'fall asleep while driving' using a 1 for yes and a 2 for no response to the question - 'Have you ever fallen asleep while driving?' the results are represented in Table 1.

Descriptive Statistics

N

Minimum

Maximum

Mean

Std. Deviation

Sex

271

0

1

.45

.498

asleep while driving

249

1

2

1.88

.331

Valid N (listwise)

249

Correlations

sex

fall asleep while driving

Sex

Pearson Correlation

1

.194**

Sig. (2-tailed)

.002

N

271

249

fall asleep while driving

Pearson Correlation

.194**

1

Sig. (2-tailed)

.002

N

249

249

** . Correlation is significant at the 0.01 level (2-tailed).

Table 1

Table 1 indicates that there is a statistically significant correlation between

<https://assignbuster.com/lab-report-2-on-the-significance-of-correlation/>

gender and falling asleep while driving with females being more susceptible. The correlation coefficient is 0.194 and the p-value is 0.002 which is less than the significance level of 0.01. The fact is that the cause for falling asleep is not related to being simply male or female since males can also fall asleep as a result of being tired. A meaningful explanation in this case would be that the females who answered the questions were likely to be suffering from anemia or tend to be tired while driving.

Weight and physical fitness happened to be two of the variables from the Sleep4ED dataset for which the correlation were not only statistically significant but were also meaningful. The question - 'Overall, how would you rate your physical fitness?' was used to assess physical fitness with scores from 1 to 10 - 1 and 10 representing poor and very good respectively. Table 2 provides information on the results.

Descriptive Statistics

N

Minimum

Maximum

Mean

Std. Deviation

Weight

249

43

160

73.38

15.284

physical fitness

266

1

10

6.42

1.717

Valid N (listwise)

245

Correlations

physical fitness

Weight

physical fitness

Pearson Correlation

1

-.157*

Sig. (2-tailed)

.014

N

266

245

Weight

Pearson Correlation

-.157*

1

Sig. (2-tailed)

.014

N

245

249

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2

Table 2 indicates that there is a statistically significant negative correlation between poor physical fitness and weight with $p = 0.014$ at the 5% significance level. Therefore, as weight increases physical fitness deteriorates and so people who are weightier tend to become tired easily. However, some other explanations may include genetics and diseases. The results suggest that some correlations are meaningful while others are not. However, adding another variable may result in meaningful interpretations. This is the nature of statistics.