Problem Set #11 – Solutions

1. A researcher conducted a study looking at the relationship between volunteer work and two variables: empathy and anxiety. The subjects were asked to indicate how much time they spent volunteering at various community organizations (e.g., Amherst Survival Center); this was the dependent measure. The subjects were also asked to complete quick measures of empathy and anxiety (predictor variables). Statistical analyses indicated that the correlation between volunteering and anxiety was -.80; the correlation between volunteering and empathy was .40.
   1. Were people more or less likely to volunteer if there were more anxious? Explain.

The correlation coefficient between volunteering and anxiety was negative, which implies an inverse relationship. That means, as people became MORE anxious, they spent LESS time volunteering.

* 1. Was the relationship between volunteering and empathy stronger or weaker than the relationship between volunteering and anxiety? Explain.

The relationship between volunteering and empathy was closer to zero than the correlation between volunteering and anxiety. All things being equal, the further the correlation is from zero, the stronger the relationship. Therefore, the relationship between empathy and volunteering was weaker than the relationship between volunteering and anxiety.

1. Starbucks is looking for a new marketing angle and they decide to target college students. They want to show that drinking coffee makes you work harder. They decide to collect some data to support their claim. They approach students at the end of the day and ask them to report the number of cups of coffee they drank (X) and the number of hours worked in the library (Y). The data is below.
   1. Calculate a pearson correlation and interpret the association.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | Y | X2 | Y2 | X\*Y |
| 1 | 7 | 1 | 49 | 7 |
| 4 | 2 | 16 | 4 | 8 |
| 1 | 3 | 1 | 9 | 3 |
| 1 | 6 | 1 | 36 | 6 |
| 2 | 0 | 4 | 0 | 0 |
| 0 | 6 | 0 | 36 | 0 |
| 2 | 3 | 4 | 9 | 6 |
| 1 | 5 | 1 | 25 | 5 |
| ∑x = 12 | ∑y = 32 | ∑x2 = 28 | ∑y2 = 168 | ∑xy = 35 |

SP = ∑xy – [(∑x)( ∑y)/n] = 35 – [(12)(32)/8]= 35-48 = -13

SSx == = 28 – 18 = 10

SSy = =  = 168 – 128 = 40

 = = = -13/20 = -.65

There is a negative correlation between coffee drinking and time spent in the library (r = -.65). The more coffee students report drinking, the less time they spend in the library.

* 1. Should Starbucks worry that caffeine consumption has detrimental effects on work ethic? Why or why not?

Probably not, correlation does not prove causation. To figure out if coffee causes work problems, we’d need an experimental study. It is possible that students who drink coffee do their work elsewhere or that students who drink more coffee get work done faster and therefore need to be at the library for a shorter amount of time.