

4.1: Examining Relationships

Learning Objectives

At the end of this section you should be able to answer the following questions:

- What is a statistical relationship?
- What is the difference between a positive and negative relationship?
- What does a Pearson correlation coefficient indicate?

When we discuss relationships or associations between variables, the terms “relationship” and “association” mean that two variables change, or vary, together. However, just because two variables change together does not mean that this change is statistically significant. Thus, there are two types of variation or relationships – significant and nonsignificant.

As a researcher, looking into the relationships between psychological constructs can tell me a great deal about how certain mental health concerns and behaviours effects individuals with respect to behavioural and emotional levels. For example, does a person with greater levels of social connection and support have greater feelings of well-being? Do people with greater levels of mindfulness have lower levels of perceived stress? These are questions that can be answered using correlational analyses.

So what is a statistical relationship? A statistical relationship is the association between two variables that is statistically significant. This significance is based on the level of a probability test, which is a *p-value* in the case of Pearson correlation coefficients. If one variable increases or decreases, an associated variable will also show an increase or decrease, and it is statistically significant if this variability can be attributed to more than chance. An example is calorie intake and weight, as more calories are consumed, weight will likely increase. This type of example shows a positive relationship between the variables which means that as one variable increases the other also increases (e.g., as height increases, weight usually increases). However, relationships can be either positive or negative. A negative relationship is present when one variable increases, the other decreases (e.g., as stress levels increase, health will likely decrease).

A Pearson correlation coefficient (represented as an *r* value statistically) is a very useful tool in psychological research. However, there are many other types of correlation coefficients, such as the Spearman rank-order correlation coefficient, which is a nonparametric measure of association between two variables.

A Pearson correlation draws on a “line of best fit” that will be imposed through the two variables in the data to establish the relationship between two variables. Using the linear model, the Pearson’s correlation coefficient (which is represented by an *r*), represents the strength of the association. This means that the distance from the data points show the line of best fit and how strongly the two variables are related. Mathematically, the Pearson correlation is calculated from the central tendency statistic of the mean and the standard deviation for each of the variables. Have a look at the below illustration by clicking on the link labelled “Chapter Four – Line of Best Fit,” which displays a graph with the Line of Best Fit for the two variables mental distress and physical illness. The variables are in fact correlated with a significant Pearson correlation coefficient ($r = .472, p < .000$).

PowerPoint: Line of Best Fit

Take a look at the following PowerPoint slides:

- [Chapter Four – Line of Best Fit](#)

The Pearson correlation coefficient can range from +1 to -1, with positive values indicating that as one value increases (e.g., as height increases, weight increases) the other also increases, or negative values which show that as one value increases, the other decreases (e.g., as stress increases health decreases). The stronger the association between the two variables, the closer to 1 the value will be.

Coefficient, *r*

Strength of Association

Positive

Negative

Small

.1 to .3

-0.1 to -0.3

Medium

.3 to .5

-0.3 to -0.5

Large

.5 to 1.0

-0.5 to -1.0

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