

12.4: Hypotheses

Unlike t -tests and ANOVAs, correlation is not used to assess differences and similarities among different groups or conditions. Instead, it is used to assess whether two quantitative variables are related and, if so, in which way and how strongly. Hypotheses for correlation can be non directional, in which case they require a two-tailed test of the hypothesis, or directional, in which case they require a one-tailed test of the hypothesis.

For the bivariate correlation, the non-directional research hypothesis is that the two variables will be related. The corresponding null hypothesis is that the two variables are not related. The relationship between variables is summarized with the symbol r which can range from 0 (indicating no relationship) up to positive or negative 1.00 (each of which indicate a perfect relationship). However, hypotheses are about truths beyond the sample so population symbols should be used for those. The symbol for correlation with samples is r and for populations is the Greek letter ρ (named “rho”). Thus, ρ will be use in place of r when hypotheses are written in symbol format. The non-directional research and corresponding null hypotheses for bivariate correlation can be summarized as follows:

Non-Directional Hypothesis for a Bivariate Correlation

Research hypothesis	Variable X will be related to Variable Y.	$H_A : \rho_{xy} \neq 0$
Null hypothesis	Variable X will not be related to Variable Y.	$H_0 : \rho_{xy} = 0$

There are two directional hypotheses possible for bivariate correlation. The first is that there will be a positive relationship between the two variables. This version of the research and corresponding null hypotheses can be summarized as follows:

Positive, Directional Hypothesis for a Bivariate Correlation

Research hypothesis	Variable X will be positively related to Variable Y.	$H_A : \rho_{xy} > 0$
Null hypothesis	Variable X will not be positively related to Variable Y.	$H_0 : \rho_{xy} \leq 0$

The second possible directional hypothesis is that there will be a negative relationship between the two variables. This version of the research and corresponding null hypotheses can be summarized as follows:

Negative, Directional Hypothesis for Bivariate Correlation

Research hypothesis	Variable X will be negatively related to Variable Y.	$H_A : \rho_{xy} < 0$
Null hypothesis	Variable X will not be negatively related to Variable Y. <i>Note: this could also be worded as “Variable X will be positively related or unrelated to Variable Y.”</i>	$H_0 : \rho_{xy} \geq 0$

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