Correlations

```
> ### Descriptive Statistics

> (CorrelationData) |> describeMoments()

Summary Statistics for the Data

              N       M       SD     Skew     Kurt
Outcome1  4.000   2.000   2.449    0.544   -2.944
Outcome2  4.000   6.000   2.449    0.544   -2.944

> (CorrelationData) |> describeCovariances()

Covariances for the Data

          Outcome1 Outcome2
Outcome1     6.000    3.000
Outcome2     3.000    6.000

> (CorrelationData) |> describeCorrelations()

Correlations for the Data

          Outcome1 Outcome2
Outcome1     1.000    0.500
Outcome2     0.500    1.000

> ### Inferential Statistics

> (CorrelationData) |> testCorrelations()

Hypothesis Tests for the Correlations

                          R      SE      df       t       p
Outcome1 & Outcome2   0.500   0.612   2.000   0.816   0.500
```

These statistics were obtained using the "Descriptives" command described on the previous page of this guide. Note that they are calculated separately for each variable.

These matrices represent the conjunction of both variables and therefore present the statistics relevant to the relationship between the two variables.

The Sum of Cross Products ("SCP") is not easily determined from the summary statistics of the output, but rather from the data (and the calculations are therefore not shown here).

The Covariance ("COV") is a function of the Sum of Cross Products and the sample size:

$$COV = \frac{SCP}{(N-1)} = \frac{9.000}{(4-1)} = 3.000$$

The Correlation coefficient ("r") is a function of the covariance and the standard deviations of both variables:

$$r = \frac{COV}{(SD_X)(SD_Y)} = \frac{3.000}{(2.449)(2.449)} = .500$$

The "t", "df", and "p" columns provide a statistical significance test of whether the correlation differs from zero:

$$t = \frac{r}{\sqrt{(1-r^2)/(N-2)}} = \frac{.500}{\sqrt{(1-.500^2)/(4-2)}} = .816$$

The *t* statistic follows a non-normal (studentized or *t*) distribution that depends on degrees of freedom. Here, *df* = *N* – 2 = 4 – 2 = 2. A *t* with 2 *df* that equals .816 has a two-tailed probability (*p*) of .500, which is not a