

SOURCEBOOK

DEVISE

DATA ANALYSIS

Abstract: This chapter provides step-by-step instructions on how to obtain basic statistical output using DEVISE via written instructions. Simple examples for most undergraduate-level between-subjects and within-subjects research designs are provided.

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This document is part of an online statistics sourcebook.

A browser-friendly viewing platform for the sourcebook is available:

<https://cwendorf.github.io/Sourcebook>

All data, syntax, and output files are available:

<https://github.com/cwendorf/Sourcebook>

TABLE OF CONTENTS FOR THIS CHAPTER

Frequencies	3
Descriptives	4
Transformations and Standardized Scores	5
Correlations	6
Confidence Interval for a Mean	7
One Sample t Test.....	8
Paired Samples t Test.....	9
Independent Samples t Test	10
OneWay ANOVA.....	11
Post Hoc Comparisons	12
Repeated Measures ANOVA	13
Factorial ANOVA.....	14

Frequencies

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Frequencies

Get the frequency distribution for the variable.

```
(Outcome) |> describeFrequencies()
```

Obtaining Summary Statistics

Get the percentiles for the variable.

```
(Outcome) |> describePercentiles()
```

Descriptives

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Frequencies

Get the frequency distribution for the variable.

```
(Outcome) |> describeFrequencies()
```

Obtaining Descriptive Statistics

Get the mean and standard deviation for the variable.

```
(Outcome) |> describeMoments()
```

Transformations and Standardized Scores

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Computing Transformations

Use a formula to calculate a new vector with the transformed scores.

```
trOutcome <- Outcome + 1
```

Create and display a the data set in a frame.

```
construct(Outcome, trOutcome)
```

Computing Standardized Scores

Create a new variable vector containing the standardized scores.

```
zOutcome <- scale(Outcome)
```

Create and display the data set in a frame.

```
construct(Outcome, trOutcome, zOutcome)
```

Correlations

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the means and standard deviations for the variables.

```
(CorrelationData) |> describeMoments()
```

Get the covariance matrix for the variables.

```
(CorrelationData) |> describeCovariances()
```

Get the correlation matrix for the variables.

```
(CorrelationData) |> describeCorrelations()
```

Obtaining Inferential Statistics

Get the correlation and its confidence interval. Though the confidence interval defaults to 95%, it can be changed if desired.

```
(CorrelationData) |> estimateCorrelations()  
(CorrelationData) |> estimateCorrelations(conf.level = .99)
```

Test the correlation for statistical significance.

```
(CorrelationData) |> testCorrelations()
```

Confidence Interval for a Mean

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the mean and standard deviation for the variable.

```
(Outcome) |> describeMoments()
```

Obtaining Inferential Statistics

Get the mean and its confidence interval. Though the confidence interval defaults to 95%, it can be changed if desired.

```
(Outcome) |> estimateMeans()  
(Outcome) |> estimateMeans(conf.level = .99)
```

One Sample t Test

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the mean and standard deviation for the variable.

```
(Outcome) |> describeMoments()
```

Obtaining Inferential Statistics

Get the mean difference and its confidence interval. Though the confidence interval defaults to 95%, it can be changed if desired.

```
(Outcome) |> estimateMeans(mu = 7)
(Outcome) |> estimateMeans(mu = 7, conf.level = .99)
```

Test the mean difference for statistical significance.

```
(Outcome) |> testMeans(mu = 7)
```

Get the standardized effect size for the mean difference.

```
(Outcome) |> standardizeMeans(mu = 7)
```


Paired Samples t Test

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the means and standard deviations for the variables.

```
(PairedData) |> describeMoments()
```

Obtaining Inferential Statistics

Get the mean difference and its confidence interval. Though the confidence interval defaults to 95%, it can be changed if desired.

```
(PairedData) |> estimateDifference()  
(PairedData) |> estimateDifference(conf.level = .99)
```

Test the mean difference for statistical significance.

```
(PairedData) |> testDifference()
```

Get the standardized effect size for the mean difference.

```
(PairedData) |> standardizeDifference()
```

Independent Samples t Test

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the mean and standard deviation of the dependent variable for each of the levels.

```
(Outcome~Factor) |> describeMoments()
```

Obtaining Inferential Statistics

Get the mean difference and its confidence interval. Though the confidence interval defaults to 95%, it can be changed if desired.

```
(Outcome~Factor) |> estimateDifference()  
(Outcome~Factor) |> estimateDifference(conf.level = .99)
```

Test the mean difference for statistical significance.

```
(Outcome~Factor) |> testDifference()
```

Get the standardized effect size for the mean difference.

```
(Outcome~Factor) |> standardizeDifference()
```

OneWay ANOVA

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the mean and standard deviation of the dependent variable for each of the levels.

```
(Outcome~Factor) |> describeMoments()
```

Obtaining Inferential Statistics

Get the analysis of variance source table.

```
(Outcome~Factor) |> describeEffect()
```

Test the main effect for statistical significance.

```
(Outcome~Factor) |> testEffect()
```

Get the proportion of variance accounted for by the main effect.

```
(Outcome~Factor) |> estimateEffect()
```

Post Hoc Comparisons

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the mean and standard deviation for the dependent variable for each of the levels.

```
(Outcome~Factor) |> describeMoments()
```

Obtaining Inferential Statistics

Get all pairwise mean difference and their confidence intervals while adjusting them for multiple comparisons. Though the confidence intervals default to 95%, they can be changed if desired.

```
(Outcome~Factor) |> estimatePosthoc()  
(Outcome~Factor) |> estimatePosthoc(conf.level = .99)
```

Test all pairwise mean differences for statistical significance while adjusting them for multiple comparisons.

```
(Outcome~Factor) |> testPosthoc()
```

Get standardized mean differences for all pairwise comparisons.

```
(Outcome~Factor) |> standardizePosthoc()
```

Repeated Measures ANOVA

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the means and standard deviations for the variables.

```
(RepeatedData) |> describeMoments()
```

Obtaining Inferential Statistics

Get the analysis of variance source table.

```
(RepeatedData) |> describeEffect()
```

Test the main effect for statistical significance.

```
(RepeatedData) |> testEffect()
```

Get the proportion of variance accounted for by the main effect.

```
(RepeatedData) |> estimateEffect()
```

Factorial ANOVA

Prior to the steps below, enter the data as appropriate for the analyses (described elsewhere). As always, the following commands should be typed directly in the R console window.

Obtaining Descriptive Statistics

Get the mean and standard deviation of the dependent variable for each of the levels. The “by” option tells DEVISe how to split the data.

```
(Outcome~FactorA) |> describeMoments(by = FactorB)
```

Obtaining Inferential Statistics

Get the analysis of variance source table.

```
(Outcome~FactorA) |> describeFactorial(by = FactorB)
```

Test the main effects for statistical significance.

```
(Outcome~FactorA) |> testFactorial(by = FactorB)
```

Get the proportion of variance accounted for by the main effects.

```
(Outcome~FactorA) |> estimateFactorial(by = FactorB)
```