

Package ‘medmod’

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Type Package

Title Simple Mediation and Moderation Analysis

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Description This toolbox allows you to do simple mediation and moderation analysis. Models are estimated with the 'lavaan' package by Rosseel (2012) <[doi:10.18637/jss.v048.i02](https://doi.org/10.18637/jss.v048.i02)>; standard errors for the mediation estimates are computed with the delta method following Sobel (1982) <[doi:10.2307/270723](https://doi.org/10.2307/270723)> or by bootstrapping. It is also available as a module for 'jamovi' (see <<https://www.jamovi.org>> for more information). You can find an in depth tutorial on the 'lavaan' model syntax used for this package on <<https://lavaan.ugent.be/tutorial/index.html>>.

License GPL (>= 2)

Encoding UTF-8

Depends R (>= 3.2)

Imports jmvcore (>= 1.0.0), R6, lavaan, ggplot2 (>= 3.4.0), rlang

Suggests testthat

URL <https://github.com/raviselker/medmod>

BugReports <https://github.com/raviselker/medmod/issues>

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NeedsCompilation no

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medmod-package*medmod: Simple Mediation and Moderation Analysis*

Description

This toolbox allows you to do simple mediation and moderation analysis. Models are estimated with the 'lavaan' package by Rosseel (2012) [doi:10.18637/jss.v048.i02](https://doi.org/10.18637/jss.v048.i02); standard errors for the mediation estimates are computed with the delta method following Sobel (1982) [doi:10.2307/270723](https://doi.org/10.2307/270723) or by bootstrapping. It is also available as a module for 'jamovi' (see <https://www.jamovi.org> for more information). You can find an in depth tutorial on the 'lavaan' model syntax used for this package on <https://lavaan.ugent.be/tutorial/index.html>.

Details

Simple mediation analysis	med()
Simple moderation analysis	mod()

Author(s)

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See Also

Useful links:

- <https://github.com/raviselker/medmod>
- Report bugs at <https://github.com/raviselker/medmod/issues>

med

Mediation

Description

Simple mediation analysis. Estimates the indirect, direct and total effects of a model in which a predictor influences the dependent variable through a mediator. The model is fitted with the lavaan package (Rosseel, 2012); standard errors are computed with the delta method (equivalent to the Sobel test for the indirect effect) or by bootstrapping. Optionally provides the individual path estimates, an estimate plot, and an annotated path diagram of the model.

Usage

```
med(
  data,
  dep,
  med,
  pred,
  estMethod = "standard",
  bootstrap = 1000,
  test = TRUE,
  ci = FALSE,
  ciWidth = 95,
  pm = FALSE,
  paths = FALSE,
  label = FALSE,
  estPlot = FALSE,
  pathDiagram = FALSE,
  pathDiagramLabel = TRUE,
  pathDiagramEst = TRUE,
  pathDiagramSig = TRUE
)
```

Arguments

data	the data as a data frame
dep	a string naming the dependent variable
med	a string naming the mediator variable
pred	a string naming the predictor variable
estMethod	'standard' (default), or 'bootstrap', the estimation method to use
bootstrap	a number between 1 and 100000 (default: 1000) specifying the number of samples that need to be drawn in the bootstrap method
test	TRUE (default) or FALSE, provide 'Z' and 'p' values for the mediation estimates
ci	TRUE or FALSE (default), provide a confidence interval for the mediation estimates

ciWidth	a number between 50 and 99.9 (default: 95) specifying the confidence interval width that is used as 'ci'
pm	TRUE or FALSE (default), provide the percent mediation effect size for the mediation estimates
paths	TRUE or FALSE (default), provide the individual estimates of the paths in the mediation model
label	TRUE (default) or FALSE, provide insightful labels for all estimates
estPlot	TRUE or FALSE (default), provide an estimate plot where for each estimator the estimated coefficient and confidence intervals are plotted.
pathDiagram	TRUE or FALSE (default), provide a path diagram of the mediation model.
pathDiagramLabel	TRUE (default) or FALSE, annotate the path diagram arrows with the path labels.
pathDiagramEst	TRUE (default) or FALSE, annotate the path diagram arrows with the estimated coefficients.
pathDiagramSig	TRUE (default) or FALSE, annotate the path diagram arrows with significance stars.

Value

A results object containing:

results\$med	a table containing mediation estimates
results\$paths	a table containing the individual path estimates
results\$pathDiagram	an image
results\$estPlot	an image
results\$modelSyntax	the lavaan syntax used to fit the mediation model

Tables can be converted to data frames with `asDF` or `as.data.frame`. For example:

```
results$med$asDF
as.data.frame(results$med)
```

Examples

```
set.seed(1234)
X <- rnorm(100)
M <- 0.5*X + rnorm(100)
Y <- 0.7*M + rnorm(100)
dat <- data.frame(X=X, M=M, Y=Y)

med(dat, dep = "Y", pred = "X", med = "M")

#
# Mediation Estimates
# -----
#   Effect      Estimate    SE      Z      p
# -----
```

#	Indirect	0.3736	0.0920	4.059	< .001
#	Direct	0.0364	0.1044	0.348	0.728
#	Total	0.4100	0.1247	3.287	0.001
#	-----				
#					
#					

mod	Moderation
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Description

Simple moderation analysis. Estimates a model in which the effect of a predictor on the dependent variable depends on the value of a moderator, testing the main effects of predictor and moderator and their interaction. All variables are mean-centered before the model is fitted with the lavaan package (Rosseel, 2012); standard errors are computed with the delta method or by bootstrapping. Optionally provides a simple slope analysis with a corresponding plot, and an annotated path diagram of the model.

Usage

```
mod(  
  data,  
  dep,  
  mod,  
  pred,  
  estMethod = "standard",  
  bootstrap = 1000,  
  label = FALSE,  
  test = TRUE,  
  ci = FALSE,  
  ciWidth = 95,  
  pathDiagram = FALSE,  
  pathDiagramLabel = TRUE,  
  pathDiagramEst = TRUE,  
  pathDiagramSig = TRUE,  
  pathDiagramMainEffect = FALSE,  
  simpleSlopeEst = FALSE,  
  simpleSlopePlot = FALSE  
)
```

Arguments

- data the data as a data frame
- dep a string naming the dependent variable
- mod a string naming the moderator variable

pred	a string naming the predictor variable
estMethod	'standard' (default), or 'bootstrap', the estimation method to use
bootstrap	a number between 1 and 100000 (default: 1000) specifying the number of samples that need to be drawn in the bootstrap method
label	TRUE or FALSE (default), provide the coefficient labels (b1, b2, b3) used in the model and the path diagram
test	TRUE (default) or FALSE, provide 'Z' and 'p' values for the mediation estimates
ci	TRUE or FALSE (default), provide a confidence interval for the mediation estimates
ciWidth	a number between 50 and 99.9 (default: 95) specifying the confidence interval width that is used as 'ci'
pathDiagram	TRUE or FALSE (default), provide a conceptual path diagram of the moderation model.
pathDiagramLabel	TRUE (default) or FALSE, annotate the path diagram arrows with the path labels.
pathDiagramEst	TRUE (default) or FALSE, annotate the path diagram arrows with the estimated coefficients.
pathDiagramSig	TRUE (default) or FALSE, annotate the path diagram arrows with significance stars.
pathDiagramMainEffect	TRUE or FALSE (default), draw the moderator's main effect on the dependent variable (b2) in the path diagram.
simpleSlopeEst	TRUE or FALSE (default), provide the estimates of the simple slopes.
simpleSlopePlot	TRUE or FALSE (default), provide a plot of the simple slopes.

Value

A results object containing:

results\$mod	a table containing moderation estimates
results\$pathDiagram	an image
results\$simpleSlope\$estimates	a table containing the simple slope estimates
results\$simpleSlope\$plot	an image
results\$modelSyntax	the lavaan syntax used to fit the moderation model

Tables can be converted to data frames with `asDF` or `as.data.frame`. For example:

```
results$mod$asDF
as.data.frame(results$mod)
```

Examples

```

set.seed(1234)
X <- rnorm(100)
M <- rnorm(100)
X_M <- X*M
Y <- 0.7*X + 0.1*M + 4.2*X_M + rnorm(100)
dat <- data.frame(X=X, M=M, Y=Y)

```

```

mod(dat, dep = "Y", pred = "X", mod = "M")

```

```

#
# Moderation Estimates
# -----
#           Estimate      SE      Z      p
# -----
# X           0.951      0.0965    9.86    < .001
# M          -0.471      0.0923   -5.10    < .001
# X:M          4.185      0.1009   41.50    < .001
# -----
#
#

```

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