Package ‘rmcorr’

April 1, 2021

Title  Repeated Measures Correlation
Version  0.4.3
Author  Jonathan Z. Bakdash, Laura R. Marusich
Maintainer  Laura R. Marusich <laura.m.cooper20.civ@mail.mil>
Description  Compute the repeated measures correlation, a statistical technique for determining the overall within-individual relationship among paired measures assessed on two or more occasions, first introduced by Bland and Altman (1995). Includes functions for diagnostics, p-value, effect size with confidence interval including optional bootstrapping, as well as graphing. Also includes several example datasets. For more details, see Bakdash and Marusich (2017) <doi:10.3389/fpsyg.2017.00456>.
Depends  R (>= 3.2.1)
License  GPL-2
LazyData  true
Imports  stats, grDevices, graphics, psych, RColorBrewer
RoxygenNote  7.1.1
Encoding  UTF-8
Suggests  knitr, rmarkdown, plotrix, ggplot2, lme4, merTools, pwr, AICcmodavg, pals
VignetteBuilder  knitr
NeedsCompilation  no
Repository  CRAN
Date/Publication  2021-04-01 21:40:07 UTC

R topics documented:

rmcorr-package ................................................................. 2
bland1995 ................................................................. 2
gilden2010 ................................................................. 3
plot.rmc ................................................................. 3
print.rmc ................................................................. 5
Description
Compute the repeated measures correlation, a statistical technique for determining the overall within-individual relationship among paired measures assessed on two or more occasions, first introduced by Bland and Altman (1995). Includes functions for diagnostics, p-value, effect size with confidence interval including optional bootstrapping, as well as graphing. Also includes several example datasets. For more details, see Bakdash and Marusich (2017) <doi:10.3389/fpsyg.2017.00456>.

Details
details

References

bland1995

Description

Usage
bland1995

Format
A data frame with 47 rows and 3 variables
- [,1] Subject
- [,2] pH
- [,3] Pac02

Source
gilden2010

Repeated measurements of reaction time and accuracy

Description
A dataset containing four repeated measurements of reaction time (RT) and accuracy from eleven subjects in a visual search experiment. Each measurement is the mean RT and accuracy from a block of 288 search trials, blocks of visual search, for eleven subjects.

Usage

gilden2010

Format
A data frame with 44 rows and 4 variables

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[, 1]</td>
<td>sub</td>
<td>Subject ID</td>
<td></td>
</tr>
<tr>
<td>[, 2]</td>
<td>block</td>
<td>Block ID</td>
<td></td>
</tr>
<tr>
<td>[, 3]</td>
<td>rt</td>
<td>Mean reaction time</td>
<td></td>
</tr>
<tr>
<td>[, 4]</td>
<td>acc</td>
<td>Mean accuracy</td>
<td></td>
</tr>
</tbody>
</table>

Source

plot.rmc

Plot the repeated measures correlation coefficient.

Description
plot.rmc produces a scatterplot of measure1 on the x-axis and measure2 on the y-axis, with a different color used for each subject. Parallel lines are fitted to each subject’s data.

Usage

```r
## S3 method for class 'rmc'
plot(
  x,
  dataset = NULL,
  overall = F,
  palette = NULL,
  xlab = NULL,
)```

Arguments

- **x**: an object of class "rmc" generated from the `rmcorr` function.
- **dataset**: Deprecated: This argument is no longer required.
- **overall**: logical: if TRUE, plots the regression line between `measure1` and `measure2`, ignoring the participant variable.
- **palette**: the palette to be used. Defaults to the RColorBrewer "Paired" palette.
- **xlab**: label for the x axis, defaults to the variable name for `measure1`.
- **ylab**: label for the y axis, defaults to the variable name for `measure2`.
- **overall.col**: the color of the overall regression line.
- **overall.lwd**: the line thickness of the overall regression line.
- **overall.lty**: the line type of the overall regression line.
- **...**: additional arguments to `plot`.

See Also

- `rmcorr`

Examples

```r
## Bland Altman 1995 data
my.rmc <- rmcorr(participant = Subject, measure1 = PacO2, measure2 = pH, dataset = bland1995)
plot(my.rmc, overall = TRUE)

#using ggplot instead
ggplot2::ggplot(bland1995, ggplot2::aes(x = PacO2, y = pH, group = factor(Subject),
    color = factor(Subject))) +
ggplot2::geom_point(ggplot2::aes(colour = factor(Subject))) +
ggplot2::geom_line(ggplot2::aes(y = my.rmc$model$fitted.values), linetype = 1)

## Raz et al. 2005 data
my.rmc <- rmcorr(participant = Participant, measure1 = Age, measure2 = Volume, dataset = raz2005)
library(RColorBrewer)
blueset <- brewer.pal(8, 'Blues')
pal <- colorRampPalette(blueset)
plot(my.rmc, overall = TRUE, palette = pal, overall.col = 'black')

## Gilden et al. 2010 data
my.rmc <- rmcorr(participant = sub, measure1 = rt, measure2 = acc, dataset = gilden2010)
plot(my.rmc, overall = FALSE, lty = 2, xlab = "Reaction Time", ylab = "Accuracy")
```
print.rmc

Print the results of a repeated measures correlation

Description

Print the results of a repeated measures correlation

Usage

## S3 method for class 'rmc'
print(x, ...)

Arguments

x
An object of class "rmc", a result of a call to rmcorr.

... additional arguments to print.

See Also

rmcorr

Examples

## Bland Altman 1995 data
blandrmc <- rmcorr(Subject, PacO2, pH, bland1995)
blandrmc


raz2005

Repeated measurements of age and cerebellar volume

Description

A dataset containing two repeated measures, on two occasions (Time), of age and adjusted volume of cerebellar hemispheres from 72 participants. Data were captured from Figure 8, Cerebellar Hemispheres (lower right) of Raz et al. (2005).

Usage

raz2005

Format

A data frame with 144 rows and 4 variables

[, 1] Participant  Participant ID
[, 2] Time        Measurement time
[, 3] Age         Participant's age (years)
[, 4] Volume      Adjusted volume of cerebellar hemispheres (cm^3)
Source

---

rmcorr

Calculate the repeated measures correlation coefficient.

Usage

rmcorr(
  participant,
  measure1,
  measure2,
  dataset,
  CI.level = 0.95,
  CIs = c("analytic", "bootstrap"),
  nreps = 100,
  bstrap.out = F
)

Arguments

participant A variable giving the subject name/id for each observation.
measure1 A numeric variable giving the observations for one measure.
measure2 A numeric variable giving the observations for the second measure.
dataset The data frame containing the variables.
CI.level The confidence level of the interval
CIs The method of calculating confidence intervals.
nreps The number of resamples to take if bootstrapping.
bstrap.out Determines if the output include the bootstrap resamples.

Value

A list with class "rmc" containing the following components.

r the value of the repeated measures correlation coefficient.
df the degrees of freedom
p the p-value for the repeated measures correlation coefficient.
CI the 95% confidence interval for the repeated measures correlation coefficient.
model the multiple regression model used to calculate the correlation coefficient.
resamples the bootstrap resampled correlation values.
References


See Also

`plot.rmc`

Examples

```r
## Bland Altman 1995 data
rmcorr(Subject, PacO2, pH, bland1995)
```
Index

bland1995, 2

gilden2010, 3

plot, 4
plot.rmc, 3, 7
print, 5
print.rmc, 5

raz2005, 5
rmcorr, 4, 5, 6
rmcorr-package, 2