Package 'rmcorr'

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Title Repeated Measures Correlation

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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.

Depends R (>= 3.2.1)

License GPL-2

LazyData true

Imports stats, grDevices, graphics, psych, RColorBrewer

RoxygenNote 6.0.1

Suggests knitr, rmarkdown, plotrix, lme4, ggplot2, merTools, pwr

VignetteBuilder knitr

NeedsCompilation no

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R topics documented:

rmcorr-package *A package for computing the repeated measures correlation coefficient*

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.

Details

details

References

Bakdash, J.Z., & Marusich, L.R. (2017). Repeated Measures Correlation. *Frontiers in Psychology, 8*, 256. https://doi.org/10.3389/fpsyg.2017.00456.

bland1995 *Repeated measurements of intramural pH and PaCO2*

Description

A dataset containing the repeated measurements of intramural pH and PaCO2 for eight subjects, from Bland & Altman (1995).

Usage

```
bland1995
```

Format

A data frame with 47 rows and 3 variables

- `[, 1] Subject`
- `[, 2] pH`
- `[, 3] PacO2`

Source

Bland, J.M., & Altman, D.G. (1995). Calculating correlation coefficients with repeated observations: Part 1 - correlation within subjects. *BMJ, 310*, 446.

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

`[, 1]`	`sub`	Subject ID
`[, 2]`	`block`	Block ID
`[, 3]`	`rt`	Mean reaction time
`[, 4]`	`acc`	Mean accuracy

Source

Gilden, D.L., Thornton, T.L., & Marusich, L.R. (2010). The serial process in visual search. *Journal of Experimental Psychology: Human Perception and Performance, 36*, 533-542.

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

```
## S3 method for class 'rmc'
plot(x, dataset, overall = T, palette = NULL, xlab = NULL,
  ylab = NULL, overall.col = "gray60", overall.lwd = 3, overall.lty = 2,
  ...)
```

Arguments

x	an object of class "rmc" generated from the rmcorr function.
dataset	the data frame containing the variables.
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

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

## 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, raz2005, 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, gilden2010, overall = FALSE, lty = 2, xlab = "Reaction Time", ylab = "Accuracy")
```

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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

Raz, N., Lindenberger, U., Rodrigue, K.M., Kennedy, K.M., Head, D., Williamson, A., Dahle, C., Gerstorf, D., & Acker, J.D. (2005). Regional brain changes in aging healthy adults: General trends, individual differences, and modifiers. *Cerebral Cortex, 15*, 1676-1689.

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rmcorr *Calculate the repeated measures correlation coefficient.*

Description

Calculate the repeated measures correlation coefficient.

Usage

```
rmcorr(participant, measure1, measure2, dataset, 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.
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.

See Also

plot.rmc

Examples

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

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