Package ‘regtomean’

January 29, 2021

Type Package
Title Regression Toward the Mean
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Imports formattable, effsize, mefa, plyr, plotrix, sjPlot, sjmisc,
sjlabelled,
Description In repeated measures studies with extreme large or small values it is common
that the subjects measurements on average are closer to the mean of the basic population.
Interpreting possible changes in the mean in such situations can lead to biased results
since the values were not randomly selected, they come from truncated sampling.
This method allows to estimate the range of means where treatment effects are likely to occur
when regression toward the mean is present.
Ostermann, T., Willich, Stefan N. & Luedtke, Rainer. (2008). Regression toward the mean - a de-
tection method for unknown population mean based on Mee and Chua's algorithm. BMC Medi-
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**Description**

This function calculates the correlation for the data and Cohen’s d effect sizes, both based on pooled an on treatment standard deviations.

**Usage**

cordata("Before","After",data)

**Arguments**

- **Before**: a numeric vector giving the data values for the first (before) measure.
- **After**: a numeric vector giving the data values for the second (after) measure.
- **data**: an optional data frame containing the variables in the formula. By default the variables are taken from environment (formula).

**Details**

This function computes the correlation between both measures as also both effect sizes based on Cohen’s d statistic.

The inputs must be numeric.

**Value**

Return a table containing the correlation, effect size pooled and effect size based on treatment.

**Author(s)**

Daniela R. Recchia, Thomas Ostermann.

**References**


**See Also**

cohen.d, cor
Examples
cordata("Before","After",data=language_test)

language_test  Language Test in High School

Description
A dataset with scores from 8 students who failed a high school test and could not get their diploma. They repeated the exam and got new scores.

Usage
data("language_test")

Format
A data frame with 8 observations on the following 9 variables.

Student  a numeric vector
Before   a numeric vector
After    a numeric vector
‘Total N’ a numeric vector
Cross    a numeric vector
‘Pre-treatment Mean’ a numeric vector
‘Pre-treatment Std’ a numeric vector
‘Post-treatment Mean’ a numeric vector
‘Post-treatment Std’ a numeric vector

Source

Examples
data(language_test)
## maybe str(language_test) ; plot(language_test) ...
Description

This function calculates and plots treatment and regression effects of both before and after measures as also its p-values.

Usage

meechua_eff.CI(x, n, se.after)

Arguments

x a data frame containing the results from meechua_reg. It is stored as mod_coef.
n the original sample size (number of observations) from data.
se.after the estimated standard error from meechua_reg. It is stored as se.after.

Details

After performing the meechua_reg the model coefficients mod_coef as also its global variable se.after are used as input in this function to estimate treatment and regression effects.

Value

Two plots are performed, the first "Treatment Effect and p-value" and the second "Confidence Intervals" for mu.

Author(s)

Daniela R. Recchia, Thomas Ostermann

References


See Also

meechua_reg
Examples

# First perform replicate_data and meechua_reg
replicate_data(language_test,50,60,"Before","After",data=language_test)
meechua_sort <- meechua[with(meechua,order(mu)),]
meechua_reg(meechua_sort)
meechua_eff.CI(mod_coef,8,se_after)

---

meechua_plot       Plot models from meechua_reg

Description

This functions plots all 4 diagnostics for the each linear regression model: "Residuals vs Fitted", "Normal Q-Q", "Scale-Location" and "Residuals vs Leverage".

Usage

meechua_plot(x)

Arguments

x List containing the estimated linear models from meechua_reg. It is stored as models.

Details

For each model from models 4 diagnostic plots are performed. For the first model the numbers 1 to 4 should be given, for the second model numbers from to 8 and so on.

Value

Diagnostics plots for the set of models from meechua_reg.

Author(s)

Daniela R. Recchia, Thomas Ostermann.

References


See Also

plot.lm, meechua_reg
Examples

```r
# models are an output from meechua_reg
replicate_data(language_test,50,60,"Before","After",data=language_test)
mee_chua_sort <- mee_chua[with(mee_chua,order(mu)),]
meechua_reg(mee_chua_sort)
meechua_plot(models)
```

---

**meechua_reg**  
*Fit linear models on the (replication) data.*

---

**Description**

This function fit linear models for a subset of data frames.

**Usage**

```r
meechua_reg(x)
```

**Arguments**

- `x`  
  Data to be used in the regression.

**Details**

The data used for the regression must be sorted by `mu`.

A set of linear models will be estimated and model coefficients are saved and stored in `mod_coef`.

The estimated standard error for the `after` measure is also stored in `se_after` to be used further in other functions.

**Value**

A table containing the estimations for each `mu`. Global variables `models`, `mod_coef`, `se_after` are stored for further analysis.

**Author(s)**

Daniela R. Recchia, Thomas Ostermann.

**References**


**See Also**

`lm`, `dply`
Examples

#sort mu ##
replicate_data(language_test,50,60,"Before","After",data=language_test)
mee_chua_sort <- mee_chua[with(mee_chua,order(mu)),]

meechua_reg(mee_chua_sort)

replicate_data

Replicates before and after values 100 times.

Description

This function replicates 100 times the before and after values giving a start and end reference.

Usage

replicate_data(x,start,end,by=NULL,Before,After,data=NULL)

Arguments

x a data frame containing the variables to be analyzed.
start a start value for mu.
end an end value for mu.
by an increment for the sequence, if not informed (default) the increment is calculated as the difference between end-start.
Before a numeric vector giving the data values for the first (before) measure.
After a numeric vector giving the data values for the second (after) measure.
data an optional data frame containing the before and after variables in the formula. By default the variables are taken from environment (formula).

Details

In order to overcome the limitation of Mee and Chua's test regarding the population mean mu a replication of the data is performed.

After replicating the data the unknown population mean mu is systematically estimated over a range of values. Further estimations will be based on this new dataset.

Value

Return a data frame named mee_chua containing the values for mu, before and after.

Author(s)

Daniela R. Recchia, Thomas Ostermann.
References


See Also

rep

Examples

replicate_data(language_test,50,60,"Before","After",data=language_test)
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