Package 'neuroUp'

July 22, 2025

Type Package

Title Plan Sample Size for Task fMRI Research using Bayesian Updating

Version 0.3.1

Description Calculate the precision in mean differences (raw or Cohen's D) and correlation coefficients for different sample sizes. Uses permutations of the collected functional magnetic resonance imaging (fMRI) region of interest data. Method described in Klapwijk, Jongerling, Hoijtink and Crone (2024) <doi:10.31234/osf.io/cz32t>.

License MIT + file LICENSE

Encoding UTF-8

LazyData true

RoxygenNote 7.3.2

NeedsCompilation no

Imports dplyr, rlang, ggplot2, psychometric, tibble, magrittr, bootstrap

Suggests knitr, readr, rmarkdown, testthat (>= 3.0.0), vdiffr

Config/testthat/edition 3

Depends R (>= 2.10)

VignetteBuilder knitr

URL https://eduardklap.github.io/neuroUp/, https://github.com/eduardklap/neuroUp

BugReports https://github.com/eduardklap/neuroUp/issues

Author Eduard Klapwijk [aut, cre, cph] (ORCID: <https://orcid.org/0000-0002-8936-0365>), Herbert Hoijtink [aut, cph] (ORCID: <https://orcid.org/0000-0001-8509-1973>), Joran Jongerling [aut, cph] (ORCID: <https://orcid.org/0000-0001-5697-1381>)

Maintainer Eduard Klapwijk <et.klapwijk@gmail.com>

Repository CRAN

Date/Publication 2024-08-28 08:20:05 UTC

Contents

`estim_corr` *Estimate correlations*

Description

`estim_corr` determines point estimate, SD and SE, 95% Credibility Intervals, and interval width, for Pearson correlations for multiple sample sizes

Usage

```
estim_corr(data, vars_of_interest, sample_size, k = 50, name = "")
```

Arguments

`data`	Dataframe with the data to be analyzed
`vars_of_interest`	Vector containing the names of the variables to be correlated: `c("var1", "var2")`
`sample_size`	The range of sample size to be used: `min:max`
`k`	The number of permutations to be used for each sample size. Defaults to `50`
`name`	The title of the dataset or variables to be displayed with the figure. Defaults to `""`

Value

- `tbl_select` returns a `tibble::tibble()` containing estimates of the Pearson correlation between two correlated variables with associated SD, SE, 95% CI, and width of the 95% CI (lower, upper) for five different sample sizes (starting with the minimum sample size, then 1/5th parts of the total dataset).
- `fig_corr` returns a scatterplot where for the five different sample sizes, 10 out of the total number of HDCIs computed are displayed (in green). The average estimate with credible interval summarizing the total number of HDCIs for each sample size are plotted in orange
- `fig_corr_nozero` returns a barplot where for each of the five sample sizes the proportion of permutations not containing zero is displayed
- `tbl_total` returns a `tibble::tibble()` containing estimates of the Pearson correlation between two correlated variables with associated SD, SE, 95% CI, and width of the 95% CI (lower, upper) for all sample sizes, including the permutation number.

Examples

```
data_gambling <- gambling
estim_corr(data_gambling,
  c("lnacc_self_winvsloss", "age"), 20:221,
  10, "Gambling NAcc correlation with age")
```

`estim_diff` *Estimate differences (unstandardized and Cohen's d)*

Description

`estim_diff` determines point estimate, SD and SE, 95% Credibility Intervals, and interval width, for both differences in raw means and Cohen's d's for multiple sample sizes

Usage

```
estim_diff(data, vars_of_interest, sample_size, k = 50, name = "")
```

Arguments

`data`	Dataframe with the data to be analyzed
`vars_of_interest`	Vector containing the names of the variables to be compared on their means: `c("var1", "var2")`
`sample_size`	The range of sample size to be used `min:max`
`k`	The number of permutations to be used for each sample size. Defaults to 50
`name`	The title of the dataset or variables to be displayed with the figure. Defaults to `""`

Value

- `tbl_select` returns a `tibble::tibble()` containing estimates of the difference in raw means and of Cohen's d with associated SD, SE, 95% CI, and width of the 95% CI (lower, upper) for five different sample sizes (starting with the minimum sample size, then 1/5th parts of the total dataset).
- `fig_diff` returns a scatterplot for the difference in raw means, where for the five different sample sizes, 10 out of the total number of HDCI's computed are displayed (in light blue). The average estimate with credible interval summarizing the total number of HDCIs for each sample size are plotted in reddish purple
- `fig_nozero` returns a barplot where for each of the five sample sizes the proportion of permutations not containing zero is displayed for the difference in raw means
- `fig_cohens_d` returns a scatterplot for Cohen's d, where for the five different sample sizes, 10 out of the total number of HDCI's computed are displayed (in light blue). The average estimate with credible interval summarizing the total number of HDCIs for each sample size are plotted in reddish purple

- `fig_d_nozero` returns a barplot where for each of the five sample sizes the proportion of permutations not containing zero is displayed for Cohen's d
- `tbl_total` returns a `tibble::tibble()` containing estimates of the difference in raw means and of Cohen's d with associated SD, SE, 95% CI, and width of the 95% CI (lower, upper) for all sample sizes, including the permutation number.

Examples

```
data_feedback <- feedback
estim_diff(data_feedback,
  c("mfg_learning", "mfg_application"), 20:71,
  10, "Feedback middle frontal gyrus")
```

`feedback` *Feedback task fMRI region of interest data*

Description

A dataset containing the parameter estimates of the atlas-based middle frontal gyrus (Harvard-Oxford cortical atlas; thresholded at 50%; center-of-mass coordinates x = -4, y = 22, z = 43),), with one value for the mean activation during learning and one value for the mean activation during application for all participants.

Usage

```
feedback
```

Format

A data frame with 271 rows and 4 variables:

participant_id unique id for every participant

age age in years (8.01-25.95)

mfg_learning parameter estimates for the middle frontal gyrus during the learning phase (-2.54-4.83)

mfg_application parameter estimates for the middle frontal gyrus during the application phase (-6.46-3.09)

Source

Peters, S., & Crone, E. A. (2017). Increased striatal activity in adolescence benefits learning. Nature Communications, 8(1), 1983. doi:10.1038/s4146701702174z

gambling *Gambling task fMRI region of interest data*

Description

A dataset containing the parameter estimates of the anatomical mask of the left nucleus accumbens (Harvard-Oxford subcortical atlas; thresholded at 40%; 28 voxels included), with one value for the mean activation during winning and one value for the mean activation during losing for all participants.

Usage

```
gambling
```

Format

A data frame with 221 rows and 5 variables:

participant_id unique id for every participant

age age in years (11.94-28.46)

lnacc_self_win parameter estimates for the left nucleas accumbens during winning (-2.78-3.41)

lnacc_self_loss parameter estimates for the left nucleas accumbens during losing (-3.84-3.28)

lnacc_self_winvsloss parameter estimates for the left nucleas accumbens for the contrast winning versus losing (-2.60-4.47)

Source

Schreuders, E., Braams, B. R., Blankenstein, N. E., Peper, J. S., Guroglu, B., & Crone, E. A. (2018). Contributions of reward sensitivity to ventral striatum activity across adolescence and early adulthood. Child development, 89(3), 797-810. doi:10.1111/cdev.13056

self_eval *Self-evaluations task fMRI region of interest data*

Description

A dataset containing the parameter estimates of the left medial prefrontal cortex (x = -6, y = 50, z = 4), with one value for the mean activation during self-evaluation and one value for the mean activation during the control condition for all participants.

Usage

```
self_eval
```

Format

A data frame with 149 rows and 4 variables:

participant_id unique id for every participant

age age in years (11.00-20.92)

mpfc_self parameter estimates for the left medial prefrontal cortex during self-evaluation (-2.82-4.97)

mpfc_control parameter estimates for the lmedial prefrontal cortex during the control condition (-7.17-3.50)

Source

van der Cruijsen, R., Blankenstein, N. E., Spaans, J. P., Peters, S., & Crone, E. A. (2023). Longitudinal self-concept development in adolescence. Social Cognitive and Affective Neuroscience, 18(1), nsac062. doi:10.1093/scan/nsac062

---

vicar_char *Vicarious Charity task fMRI region of interest data*

Description

A dataset containing the parameter estimates from the anatomical mask of the left nucleus accumbens (Harvard-Oxford subcortical atlas; thresholded at 40%; center-of-mass coordinates x = -10, y = 12, z = -7; 28 voxels included), with one value for the mean activation during gaining for self and one value for the mean activation during no-gain for self and charity for all participants.

Usage

```
vicar_char
```

Format

A data frame with 156 rows and 4 variables:

participant_id unique id for every participant

age age in years (11.00-21.17)

nacc_selfgain parameter estimates for the left nucleus accumbens during gaining for self (-5.66-3.05)

nacc_bothnogain parameter estimates for the left nucleus accumbens during no-gain for self and charity (-6.44-2.97)

Source

Spaans, J., Peters, S., Becht, A., van der Cruijsen, R., van de Groep, S., & Crone, E. A. (2023). Longitudinal neural and behavioral trajectories of charity contributions across adolescence. Journal of Research on Adolescence, 33(2), 480-495. doi:10.1111/jora.12820

Index