Package 'sstFun'

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Title Estimating Stop Signal Reaction Times and Stop Signal Delay

Description Helper functions for estimating the SSRT (stop signal reaction time) in a Stop-Signal Task based on Verbruggen et al. (2019) <doi:10.7554/eLife.46323> and a mid-run estimates method for computing the mean SSD (stop signal delay) based on Levitt (1971) <doi:10.1121/1.1912375>.

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Imports cli, dplyr, utils, rlang

URL https://github.com/sonntasa/sstFun

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intSSRT *Integration Method of computing the SSRT*

Description

utilises the RT distribution of go trials in a Stop-Signal task to estimate the Stop-Signal Reaction Time using the distribution of go-trials (with replacement of go-omissions) and the probability of giving a response when a signal is present for each participant (see Verbruggen et al., 2019).

Usage

```
intSSRT(
  dat,
  participant = id,
  trial_type = trial_type,
  corr = corr,
  ssd = ssd,
  rt = rt,
  replace_slow = TRUE,
  RTmax = 600,
  mid_run = TRUE
)
```

Arguments

dat	a dataframe containing id number, rt, accuracy, the conditions and stop-signal delays
participant	Name of the column containing the personal identifier.
trial_type	the column that reflects the current trial type (stop vs. go)
corr	boolean that reflects whether the current trial is Correct
ssd	Name of the column containing the current stop signal delay
rt	Reaction times
replace_slow	boolean that indicates whether slow values should be replaced with the slowest correct RT, to correct distribution (see Verbruggen et al., 2019)
RTmax	maximum RT boundary to determine slow responses
mid_run	boolean whether the mid-run average should be used to compute the SSD

Value

a dataframe containing the id, an estimate of the SSRT, nth reaction time, used to compute the SSRT, the mean Stop Signal delay, the p(response | signal), the mid-run estimate of the SSD, the number of runs that went into the estimation of the SSD and the estimated SSRT.

Examples

```
set.seed(1)
dat <- data.frame(
  id = 1,
  trial_type = rep(c("go", "stop"), c(60, 20)),
  corr = c(rep(TRUE, 60), rep(c(TRUE, FALSE), 10)),
  ssd = c(rep(NA, 60), rep(c(100, 150, 200, 150), 5)),
  rt = c(round(rnorm(60, 500, 80)), rep(NA, 20))
)
intSSRT(dat,
  participant = id, trial_type = trial_type, corr = corr,
  ssd = ssd, rt = rt, mid_run = FALSE
)
```

---

meanSSRT *Mean Estimation of the SSRT*

Description

Estimates the SSRT with the mean method: mean go RT minus the mean SSD. This assumes that p(response | signal) = 0.5.

Usage

```
meanSSRT(
  dat,
  participant = id,
  trial_type = trial_type,
  corr = corr,
  ssd = ssd,
  rt = rt,
  RTexc = FALSE,
  RTrep = FALSE,
  ErrExc = FALSE,
  RTmin = 100,
  RTmax = 600,
  mid_run = TRUE
)
```

Arguments

dat	a dataframe with one row per trial.
participant	column containing the participant identifier.
trial_type	column containing the trial type ("go" vs. "stop").
corr	logical column, TRUE if the trial was correct.
ssd	column containing the stop-signal delay.

rt	column containing the reaction times.
RTexc	logical; if TRUE, go trials with RTs outside [RTmin, RTmax] are excluded from the mean go RT.
RTrep	logical; if TRUE, go-omissions are replaced with the RTmax value.
ErrExc	logical; if TRUE, incorrect trials are excluded from the analysis
RTmin, RTmax	bounds of the RT window used when RTexc = TRUE.
mid_run	logical; if TRUE, the mid-run SSD estimate is subtracted from the mean go RT, otherwise the mean SSD. The mid-run estimate is returned either way.

Value

a dataframe with one row per participant: meanRT, meanSSD, mid_run_estimate, n_runs and SSRT.

Examples

```
set.seed(1)
dat <- data.frame(
  id = 1,
  trial_type = rep(c("go", "stop"), c(60, 20)),
  corr = c(rep(TRUE, 60), rep(c(TRUE, FALSE), 10)),
  ssd = c(rep(NA, 60), rep(c(100, 150, 200, 150), 5)),
  rt = c(round(rnorm(60, 500, 80)), rep(NA, 20))
)
meanSSRT(dat,
  participant = id, trial_type = trial_type, corr = corr,
  ssd = ssd, rt = rt
)
```

---

mid_run_avg *mid-run average estimation of the SSD*

Description

Estimates the SSD with the mid-run estimates method (Levitt, 1971; Wetherill & Levitt, 1965). To this end, the average mid-point of every second run is used (per participant) to compute the average SSD.

Usage

```
mid_run_avg(
  dat,
  participant = id,
  trial_type = trial_type,
  ssd = ssd,
  stop_value = "stop",
  every_second = TRUE
)
```

Arguments

dat	a dataframe containing id, ssd, trial_type
participant	Name of the column containing the participant identifier.
trial_type	the column that reflects the current trial type (stop vs. go)
ssd	Name of the column containing the current stop signal delay
stop_value	prevents silent failing, coding of stop trials
every_second	boolean use every second run or use all (full) runs

Value

a dataframe containing an estimate of the SSD and the number of runs used to calculate the SSD

Examples

```
dat <- data.frame(
  id = 1,
  trial_type = "stop",
  ssd = rep(c(100, 150, 200, 150, 100), 10)
)
mid_run_avg(dat, participant = id, trial_type = trial_type, ssd = ssd)
mid_run_avg(dat, participant = id, trial_type = trial_type, ssd = ssd, every_second = FALSE)
```

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