Package ‘vICC’

December 8, 2020

Type Package
Title Varying Intraclass Correlation Coefficients
Version 1.0.0
Date 2020-12-05
Description Compute group-specific intraclass correlation coefficients, Bayesian testing of homogenous within-group variance, and spike-and-slab model selection to determine which groups share a common within-group variance in a one-way random effects model <10.31234/osf.io/hpq7w>.
License GPL-2
Depends R (>= 4.0.0)
Imports coda (>= 0.19-4), ggplot2, methods, nlme, Rdpack (>= 0.11-1), rjags (>= 4-10)
Encoding UTF-8
LazyData true
RoxygenNote 7.1.1
RdMacros Rdpack
BugReports https://github.com/donaldRwilliams/vICC/issues
NeedsCompilation no
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Repository CRAN
Date/Publication 2020-12-08 09:40:02 UTC

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change_group

Description

Change the group ID to be consecutive numbers, starting at 1, which is required for model fitting.

Usage

change_group(group)

Arguments

- group: Numeric Vector. The grouping variable (e.g., subjects).

Value

Updated group ID.

Examples

# congruent trials
dat <- subset(flanker, id %in% c(39, 23, 2))
change_group(dat$id)

coef.vicc

Description

Extract the group-specific coefficients (fixed effect + random effect).

Usage

## S3 method for class 'vicc'
coef(object, cred = 0.9, ...)

---

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# congruent trials
dat <- subset(flanker, id %in% c(39, 23, 2))
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coef.vicc

Description

Extract the group-specific coefficients (fixed effect + random effect).

Usage

## S3 method for class 'vicc'
coef(object, cred = 0.9, ...)

---
Arguments

object An object of class vicc
cred Numeric. Credible interval width (defaults to 0.90).
... Currently ignored.

Value

An array with the summarized parameters

Examples

Y <- flanker
# congruent trials
congruent <- subset(Y, cond == 0)

# subset 25 from each group
dat <- congruent[unlist(tapply(1:nrow(congruent),
    congruent$id,
    head, 25)), ]

# fit model
fit <- vicc(y = dat$rt,
    group = dat$id,
    iter = 250,
    burnin = 10,
    type = "customary")

coeff(fit)
Value

Summarized fixed effects

Examples

# data
Y <- flanker

# congruent trials
congruent <- subset(Y, cond == 0)

# subset 25 from each group
dat <- congruent[unlist(tapply(1:nrow(congruent),
                          congruent$id,
                          head, 25)), ]

fit <- vicc(
    y = dat$rt,
    group = dat$id,
    iter = 250,
    burnin = 10,
    type = "pick_none"
)

fixef(fit)

data("flanker")

Description

A dataset containing 33660 rows and 7 columns.

- Block
- Trial number
- Arrow direction (1=left, 2=right)
- Condition (0 = congruent, 1=neutral, 2=incongruent)
- Correct (1) or incorrect (0)
- Reaction time (seconds)

Usage

data("flanker")
**pip**

**Format**

A dataframe 33660 rows and 7 columns.

**Note**

Reaction times less than 0.20 and greater than 2 seconds were removed.

**References**


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**pip**

*Posterior Inclusion Probabilities*

**Description**

Extract the posterior inclusion probabilities (PIP) for either the random intercepts for sigma or the random effects standard deviation for sigma.

**Usage**

`pip(object, ...)`

**Arguments**

- `object` Ab object of class vicc.
- `...` Currently ignored.

**Value**

A data frame.

**Note**

The PIPs indicate whether the groups differ from the fixed effect, or average, within-group variance. If the PIP is large, this indicates there is high probability that group differs from the common variance. A marginal Bayes factor can be computed as PIP / (1 - PIP), assuming that `prior_prob = 0.5`. 
Examples

```r
# congruent trials
congruent <- subset(flanker, cond == 0)

# subset 25 from each group
dat <- congruent[unlist(tapply(1:nrow(congruent),
                           congruent$id,
                           head, 25)), ]

# fit model
fit <- vicc(y = dat$rt,
            group = dat$id,
            iter = 250,
            burnin = 10,
            type = "pick_group")

pip(fit)
```

---

**plot.pip**  
*Plot pip Objects*

**Description**

Bar plot for the posterior inclusion probabilities, which corresponds to the probability that each group differs from the average within-group variance.

**Usage**

```r
## S3 method for class 'pip'
plot(x, fill = "black", width = 0.5, ...)
```

**Arguments**

- **x** An object of class pip.
- **fill** Character string. Which color for the bars (defaults to black)?
- **width** Numeric. The width for the bars (defaults to 0.5).
- **...** Currently ignored

**Value**

A ggplot object.
# congruent trials
congruent <- subset(flanker, cond == 0)

# subset 25 from each group
dat <- congruent[unlist(tapply(1:nrow(congruent),
congruent$id,
head, 25)), ]

fit <- vicc(
  y = dat$rt,
  group = dat$id,
  iter = 500,
  burnin = 10,
  type = "pick_group"
)

pips <- pip(fit)

plot(pips)

---

**Plot vicc Objects**

**Description**
Plot the group-specific coefficients or the random effects.

**Usage**

```r
# S3 method for class 'vicc'
plot(x, type = "coef", ...)
```

**Arguments**

- `x` An object of class vicc.
- `type` Character string. Which parameters should be plotted? The options are `ranef` and `coef` (the default).
- `...` Currently ignored.

**Value**
A ggplot object.
Examples

```r
# congruent trials
congruent <- subset(flanker, cond == 0)

# subset 25 from each group
dat <- congruent[unlist(tapply(1:nrow(congruent),
                        congruent$id,
                        head, 25)), ]

# fit model
fit <- vicc(y = dat$rt,
            group = dat$id,
            iter = 250,
            burnin = 10,
            type = "customary")

plts <- plot(fit)
```

---

**posterior_samples**

*Extract Posterior Samples*

**Description**

Extract posterior samples for `vicc` objects

**Usage**

`posterior_samples(object)`

**Arguments**

- `object` An object of class `vicc`

**Value**

An object of class `data.frame`

**Examples**

```r
# congruent trials
congruent <- subset(flanker, cond == 0)

# subset 25 from each group
dat <- congruent[unlist(tapply(1:nrow(congruent),
                        congruent$id,
                        head, 25)), ]
```
# fit model
fit <- vicc(y = dat$rt,
    group = dat$id,
    iter = 250,
    burnin = 10,
    type = "customary")
samps <- posterior_samples(fit)

print.pip  

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

Arguments  

x  

An object of class pip.  

...  

Currently ignored.

print.vicc  

## S3 method for class 'vicc'
print(x, cred = 0.95, ...)  

Arguments  

x  

An object of class vicc.  

cred  

Numeric. Credible interval width (defaults to 0.90).  

...  

Currently ignored
Extract the Random Effects

Description

Extract the group-specific parameter estimates.

Usage

```r
## S3 method for class 'vicc'
ranef(object, cred = 0.9, ...)
```

Arguments

- `object`: An object of class `vicc`.
- `cred`: Numeric. Credible interval width (defaults to 0.90).
- `...`: Currently ignored.

Value

An array with the summarized parameters.

Examples

```r
flanker <- vICC::flanker
# congruent trials
congruent <- subset(flanker, cond == 0)
# subset 25 from each group
dat <- congruent[unlist(tapply(1:nrow(congruent),
congruent$id,
head, 25)), ]
# fit model
fit <- vicc(y = dat$rt,
group = dat$id,
iter = 250,
burnin = 10,
type = "customary")
ranef(fit)
```
Description

Compute varying intraclass correlation coefficients with the method introduced in Williams et al. (2019).

Usage

```r
vicc(
  y,
  group,
  type = "pick_group",
  iter = 5000,
  chains = 2,
  burnin = 500,
  prior_scale = 1,
  prior_prob = 0.5
)
```

Arguments

- **y**: Numeric vector. The outcome variable.
- **group**: Numeric vector. The grouping variable (e.g., subjects). Note that the groups must be numbered from 1 to the total number of groups. See `change_group`.
- **type**: Character string. Which model should be fitted (defaults to `pick_group`)? The options are described in Details.
- **iter**: Numeric. The number of posterior samples per chain (excluding `burnin`).
- **chains**: Numeric. The number of chains (defaults to 2).
- **burnin**: Numeric. The number of burnin samples, which are discarded (defaults to 500).
- **prior_scale**: Numeric. The prior distribution scale parameter (defaults to 1). Note the prior is a half student-t distribution with 10 degrees of freedom.
- **prior_prob**: Numeric. The prior inclusion probability (defaults to 0.5). This is used for `type = "pick_tau"` or `type = "pick_group"` and ignored otherwise.

Value

An object of class `vicc`.

References

Examples

```r
# congruent trials
congruent <- subset(flanker, cond == 0)

# subset 25 from each group
dat <- congruent[unlist(tapply(1:nrow(congruent),
                           congruent$id,
                           head, 25)), ]

# fit model
fit <- vicc(y = dat$rt,
             group = dat$id,
             iter = 250,
             burnin = 10,
             type = "customary")
```
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