

Package: vICC (via r-universe)

September 30, 2024

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

Author Donald Williams [aut, cre]

Maintainer Donald Williams <drwilliams@ucdavis.edu>

Repository CRAN

Date/Publication 2020-12-08 09:40:02 UTC

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| | |
|--------------|------------------------|
| change_group | <i>Change Group ID</i> |
|--------------|------------------------|

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 | <i>Extract the Group-Specific Coefficients</i> |
|-----------|--|

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 <code>vicc</code> |
| 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")

coef(fit)

```

fixef.vicc

Extract Fixed Effects

Description

Summarize the fixed effects.

Usage

```

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

```

Arguments

| | |
|--------|---|
| object | An object of class <code>vicc</code> . |
| cred | Numeric. Credible interval width (defaults to 0.90) |
| ... | Currently ignored. |

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)
```

flanker

Data: Flanker Task data from Hedge et al. (2018).

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")
```

Format

A dataframe 33660 rows and 7 columns.


```
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

```
## 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.

Examples

```
# 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

Plot vicc Objects

Description

Plot the group-specific coefficients or the random effects.

Usage

```
## 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

```
# 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 | <i>Extract Posterior Samples</i> |
|-------------------|----------------------------------|

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

```
# 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` *Print pip Objects*

Description

Print pip Objects

Usage

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

Arguments

| | |
|------------------|-------------------------|
| <code>x</code> | An object of class pip. |
| <code>...</code> | Currently ignored. |

`print.vicc` *Print vicc Objects*

Description

Print vicc Objects

Usage

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

Arguments

| | |
|-------------------|--|
| <code>x</code> | An object of class vicc. |
| <code>cred</code> | Numeric. Credible interval width (defaults to 0.90). |
| <code>...</code> | Currently ignored |

`ranef.vicc`*Extract the Random Effects*

Description

Extract the group-specific parameter estimates.

Usage

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

Arguments

| | |
|---------------------|--|
| <code>object</code> | An object of class <code>vicc</code> |
| <code>cred</code> | Numeric. Credible interval width (defaults to <code>0.90</code>). |
| <code>...</code> | Currently ignored. |

Value

An array with the summarized parameters.

Examples

```
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)
```

 vicc

Varying Intraclass Correlation Coefficients

Description

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

Usage

```
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

Williams DR, Martin SR, Rast P (2019). "Putting the Individual into Reliability: Bayesian Testing of Homogeneous Within-Person Variance in Hierarchical Models." *PsyArXiv*.

Examples

```
# 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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