Package ‘vICC’

October 12, 2022

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**

```r
change_group(group)
```

**Arguments**

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

**Value**

Updated group ID.

**Examples**

```r
# 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**

```r
## 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")

go(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 vicc.  
cred         Numeric. Credible interval width (defaults to 0.90)  
...          Currently ignored.
Value

Summarized fixed effects

Examples

```r
# 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  


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.

Note

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

References


<table>
<thead>
<tr>
<th>pip</th>
<th>Posterior Inclusion Probabilities</th>
</tr>
</thead>
</table>

Description

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

Usage

```r
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.
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 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

# 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**

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

**Arguments**

- `x` An object of class pip.
- `...` Currently ignored.

### print.vicc

**Print vicc Objects**

**Description**

Print vicc Objects

**Usage**

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

Arguments

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

Value

An object of class `vicc`.

References

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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