

Package ‘LogisticRCI’

May 7, 2026

Type Package

Title Linear and Logistic Regression-Based Reliable Change Index

Version 1.1

Date 2022-03-09

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Imports methods, graphics, stats, utils

Suggests ggplot2, knitr, rmarkdown, markdown

VignetteBuilder knitr

Depends R (>= 3.6.0)

Description Here we provide an implementation of the linear and logistic regression-based Reliable Change Index (RCI), to be used with `lm` and binomial `glm` model objects, respectively, following Moral et al. <<https://psyarxiv.com/gq7az/>>. The `RCI` function returns a score assumed to be approximately normally distributed, which is helpful to detect patients that may present cognitive decline.

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NeedsCompilation no

Repository CRAN

Date/Publication 2022-03-09 11:10:02 UTC

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LogisticRCI-package *Linear and Logistic Regression-Based Reliable Change Index*

Description

Here we provide an implementation of the linear and logistic regression-based Reliable Change Index (RCI), to be used with `lm` and binomial `glm` model objects, respectively, following Moral et al. <<https://psyarxiv.com/gq7az/>>. The RCI function returns a score assumed to be approximately normally distributed, which is helpful to detect patients that may present cognitive decline.

Details

Linear and Logistic Regression-Based Reliable Change Index

Here we provide an implementation of the linear and logistic regression-based Reliable Change Index (RCI), to be used with `lm` and binomial `glm` model objects, respectively. The RCI function returns a score assumed to be approximately normally distributed, which is helpful to detect patients that may present cognitive decline.

Author(s)

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References

Moral, R.A., Diaz-Orueta, U., Oltra-Cucarella, J. (preprint) Logistic versus linear regression-based Reliable Change Index: implications for clinical studies with diverse sample sizes. DOI: 10.31234/osf.io/gq7az

See Also

[RCI](#)

RCI *Calculate the Linear or Logistic Regression-Based Reliable Change Index (RCI)*

Description

This function calculates the RCI for `lm` and binomial `glm` objects.

Usage

```
RCI(model)
```

Arguments

model An lm or binomial glm object.

Details

This function takes a fitted model object as input and computes either the linear (for lm objects) or logistic (for binomial glm) regression-based reliable change index for each observation.

Value

The function returns a numeric vector.

Author(s)

Rafael A. Moral, Unai Diaz-Orueta and Javier Oltra-Cucarella.

References

Moral, R.A., Diaz-Orueta, U., Oltra-Cucarella, J. (preprint) Logistic versus linear regression-based Reliable Change Index: implications for clinical studies with diverse sample sizes. DOI: 10.31234/osf.io/gq7az

Examples

```
data(RCI_sample_data)

linear_fit <- lm(score ~ baseline + age + gender + education,
                 data = RCI_sample_data)

logistic_fit <- glm(cbind(score, 15 - score) ~ baseline + age + gender + education,
                   family = binomial,
                   data = RCI_sample_data)

linear_RCI <- RCI(linear_fit)
logistic_RCI <- RCI(logistic_fit)

plot(linear_RCI, logistic_RCI)
```

RCI_newpatient	<i>Calculate the Linear or Logistic Regression-Based Reliable Change Index (RCI) for a New Patient Based on a Fitted Model</i>
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Description

This function calculates the RCI for a new patient based on a fitted lm or binomial glm model object.

Usage

```
RCI_newpatient(model, new)
```

Arguments

model	An lm or binomial glm object.
new	A data frame with data for the new patient.

Details

This function takes a fitted model object and new patient data as input and computes either the linear (for lm objects) or logistic (for binomial glm) regression-based reliable change index. The names of the variables in the new patient data have to match the names of the predictors and response variable for the fitted model.

Value

The function returns a numeric vector.

Author(s)

Rafael A. Moral, Unai Diaz-Orueta and Javier Oltra-Cucarella.

References

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Examples

```
data(RCI_sample_data)

## fitting models to sample
linear_fit <- lm(score ~ baseline + age + gender + education,
                 data = RCI_sample_data)

logistic_fit <- glm(cbind(score, 15 - score) ~ baseline + age + gender + education,
                   family = binomial,
                   data = RCI_sample_data)

## new patient data
new_patient <- data.frame("age" = 68,
                          "gender" = "male",
                          "score" = 9,
                          "baseline" = 11,
                          "education" = 12)

## calculating RCI for new patient without refitting model
RCI_newpatient(model = linear_fit, new = new_patient)
RCI_newpatient(model = logistic_fit, new = new_patient)
```

RCI_sample_data	<i>Sample Data for RCI Calculation</i>
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Description

This dataset is a simulated sample of 100 patients from a study on cognitive decline.

Usage

```
data("RCI_sample_data")
```

Format

A data frame with 100 observations on the following 5 variables:

age The patient's age.

gender A factor with two levels: "male" or "female".

score The score obtained after 6 months.

baseline The score obtained at the start of the study.

education Number of years of education.

Examples

```
data(RCI_sample_data)
```

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