

# Package ‘LogisticRCI’

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**Type** Package

**Title** Linear and Logistic Regression-Based Reliable Change Index

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**Author** Rafael de Andrade Moral [aut, cre],  
Unai Diaz-Orueta [aut],  
Javier Oltra-Cucarella [aut]

**Maintainer** Rafael de Andrade Moral <rafael.deandrademoral@mu.ie>

**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.

**License** GPL (>= 2)

**NeedsCompilation** no

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

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### 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)

Rafael de Andrade Moral [aut, cre], Unai Diaz-Orueta [aut], Javier Oltra-Cucarella [aut]

Maintainer: Rafael de Andrade Moral <[rafael.deandrademoral@mu.ie](mailto:rafael.deandrademoral@mu.ie)>

### 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](#)

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

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### 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)
```

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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

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)

## 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)
```

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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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