# Package 'DECIDE'

October 12, 2022

**Type** Package

**Title** DEComposition of Indirect and Direct Effects

**Version** 1.3

**Date** 2022-06-06

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**Description** Calculates various estimates for measures of educational
differentials, the relative importance of primary and secondary
effects in the creation of such differentials and compares the
estimates obtained from two datasets.

**License** GPL (>= 2)

**LazyLoad** yes

**NeedsCompilation** no

**Repository** CRAN

**Date/Publication** 2022-06-06 23:20:05 UTC

## R topics documented:

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| DECIDE-package | *Decomposition of Indirect and Direct Effects* |

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**Description**

Calculates various estimates for measures of educational differentials, the relative importance of primary and secondary effects in the creation of such differentials and compares the estimates obtained from two datasets.

**Details**

|          |            |
|----------|------------|
| Package: | DECIDE     |
| Type:    | Package    |
| Version: | 1.3        |
| Date:    | 2022-06-06 |
| License: | GPL (>= 2) |
| LazyLoad:| yes        |

See `relative.importance`.

**Author(s)**

Christiana Kartsonaki

Maintainer: Christiana Kartsonaki <christiana.kartsonaki@gmail.com>

**References**

Kartsonaki, C., Jackson, M. and Cox, D. R. (2013). Primary and secondary effects: Some methodological issues, in Jackson, M. (ed.) *Determined to succeed?*, Stanford: Stanford University Press.

Erikson, R., Goldthorpe, J. H., Jackson, M., Yaish, M. and Cox, D. R. (2005) On Class Differentials in Educational Attainment. *Proceedings of the National Academy of Sciences*, **102**: 9730–9733

Jackson, M., Erikson, R., Goldthorpe, J. H. and Yaish, M. (2007) Primary and secondary effects in class differentials in educational attainment: The transition to A-level courses in England and Wales. *Acta Sociologica*, **50** (3): 211–229

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| compare.relimp | *Compare estimates of log odds, log odds ratios and relative importance obtained by two datasets* |

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**Description**

Computes 95% confidence intervals for the differences in log odds of transition, log odds ratios and relative importance estimates between the two datasets. Also calculates chi-squared test statistics and p-values for testing whether the differences are different from zero.

## Usage

```
compare.relimp(dataset1, dataset2)
```

## Arguments

| | |
|---|---|
| `dataset1` | is the first dataset; a data frame with 4 columns, in the following order: 1: student's ID, 2: class, 3: transition (0 if not, 1 if yes) and 4: performance score. |
| `dataset2` | is the second dataset; a data frame with 4 columns, in the following order: 1: student's ID, 2: class, 3: transition (0 if not, 1 if yes) and 4: performance score. |

## Value

| | |
|---|---|
| `ci.diff.lo` | 95% confidence intervals for differences in log odds of transition |
| `test.diff.lo` | Test statistic for differences in log odds |
| `test.diff.lo.pvalue` | |
| | p-value for testing for differences in log odds |
| `ci.diff.lor` | 95% confidence intervals for differences in log odds ratios |
| `test.diff.lo` | Test statistic for differences in log odds ratios |
| `test.diff.lo.pvalue` | |
| | p-value for testing for differences in log odds ratios |
| `ci.diff.ri.1` | 95% confidence intervals for relative importance estimates - 1 |
| `ci.diff.ri.2` | 95% confidence intervals for relative importance estimates - 2 |
| `ci.diff.ri.avg` | 95% confidence intervals for relative importance estimates - average |

## Author(s)

Christiana Kartsonaki

## References

Kartsonaki, C., Jackson, M. and Cox, D. R. (2013). Primary and secondary effects: Some methodological issues, in Jackson, M. (ed.) *Determined to succeed?*, Stanford: Stanford University Press.

Erikson, R., Goldthorpe, J. H., Jackson, M., Yaish, M. and Cox, D. R. (2005) On Class Differentials in Educational Attainment. *Proceedings of the National Academy of Sciences*, **102**: 9730–9733

Jackson, M., Erikson, R., Goldthorpe, J. H. and Yaish, M. (2007) Primary and secondary effects in class differentials in educational attainment: The transition to A-level courses in England and Wales. *Acta Sociologica*, **50** (3): 211–229

## Examples

```
# generate two datasets
set.seed(1)
data1 <- data.frame(seq(1:10), rep(c(1, 2), length.out = 10),
c(rep(0, times = 3), rep(1, times = 7)),
c(rnorm(4, 0, 1), rnorm(4, 0.5, 1), NA, NA))
```

```
data2 <- data.frame(seq(1:10), rep(c(1, 2), length.out = 10),
c(rep(0, times = 5), rep(1, times = 5)),
c(rnorm(5, 1, 1), rnorm(5, 0.5, 1)))

# run function
compare.relimp(data1, data2)
```

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create.classdata          *Create data frames for each class*

---

### Description

Takes a data frame and creates a list of data frames by splitting the data by the factor "class".

### Usage

```
create.classdata(dataset)
```

### Arguments

dataset          A data frame produced by `prepare.dataset`.

### Value

data_class       A list with number of elements equal to the number of classes and each element
                 a data frame for each class.

### Author(s)

Christiana Kartsonaki

### Examples

```
# generate a dataset
data <- data.frame(seq(1:10), rep(c(1, 2, 3), length.out = 10),
rbinom(1, n = 10, p = 0.7), c(rnorm(8, 0, 1), NA, NA))

data_clean <- prepare.data(data)

create.classdata(data_clean)
```

---

plot_transition          *Plot distributions of performance and transition propensities*

---

## Description

Plots distribution of academic performance and probabilities of transition for each class.

## Usage

```
plot_transition(dataset)
```

## Arguments

dataset          A data frame with 4 columns only, in the following order: 1: student's ID, 2: class, 3: transition (0 if not, 1 if yes) and 4: performance score.

## Value

A plot of the distributions of performance and transition propensities for each class.

## Author(s)

Christiana Kartsonaki

## References

Erikson, R., Goldthorpe, J. H., Jackson, M., Yaish, M. and Cox, D. R. (2005) On Class Differentials in Educational Attainment. *Proceedings of the National Academy of Sciences*, **102**: 9730–9733

Kartsonaki, C., Jackson, M. and Cox, D. R. (2013). Primary and secondary effects: Some methodological issues, in Jackson, M. (ed.) *Determined to succeed?*, Stanford: Stanford University Press.

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## Examples

```
# generate a dataset
set.seed(1)
data <- data.frame(seq(1:10), rep(c(1, 2), length.out = 10),
c(rep(0, times = 3), rep(1, times = 7)),
c(rnorm(4, 0, 1), rnorm(4, 0.5, 1), NA, NA))

# run function
plot_transition(data)
```

---

prepare.data                    *Prepare dataset to be used in* relative.importance

---

### Description

Prepares datasets to be in the format required by the function relative.importance. It is automatically called by relative.importance.

### Usage

```
prepare.data(dataset)
```

### Arguments

dataset             A data frame with 4 columns only, in the following order: 1: student's ID, 2:
                    class, 3: transition (0 if not, 1 if yes) and 4: performance score.

### Value

dataset             The data frame given as the argument, with column names changed and missing
                    values removed.

### Author(s)

Christiana Kartsonaki

### Examples

```
# generate a dataset
data <- data.frame(seq(1:10), rep(c(1, 2, 3), length.out = 10),
rbinom(1, n = 10, p = 0.7), c(rnorm(8, 0, 1), NA, NA))

# run function
data_clean <- prepare.data(data)
```

---

print_relimp                    *Print tables of estimates*

---

### Description

Presents various estimates for measures of educational differentials, the relative importance of primary and secondary effects and corresponding standard errors and confidence intervals.

### Usage

```
print_relimp(dataset)
```

## Arguments

dataset           A data frame with 4 columns only, in the following order: 1: student's ID, 2:
                  class, 3: transition (0 if not, 1 if yes) and 4: performance score.

## Value

Returns a more nicely presented version of the results given by `relative.importance`.

## Author(s)

Christiana Kartsonaki

## References

Kartsonaki, C., Jackson, M. and Cox, D. R. (2013). Primary and secondary effects: Some method-
ological issues, in Jackson, M. (ed.) *Determined to succeed?*, Stanford: Stanford University Press.

Erikson, R., Goldthorpe, J. H., Jackson, M., Yaish, M. and Cox, D. R. (2005) On Class Differentials
in Educational Attainment. *Proceedings of the National Academy of Sciences*, **102**: 9730–9733

Jackson, M., Erikson, R., Goldthorpe, J. H. and Yaish, M. (2007) Primary and secondary effects
in class differentials in educational attainment: The transition to A-level courses in England and
Wales. *Acta Sociologica*, **50** (3): 211–229

## See Also

[relative.importance](relative.importance)

## Examples

```
# generate a dataset
set.seed(1)
data <- data.frame(seq(1:10), rep(c(1, 2, 3), length.out = 10),
rbinom(1, n = 10, p = 0.7), c(rnorm(8, 0, 1), NA, NA))

# run function
print_relimp(data)
```

---

relative.importance     *Relative importance of primary and secondary effects*

---

## Description

Calculates various estimates for measures of educational differentials, the relative importance of
primary and secondary effects and corresponding standard errors and confidence intervals.

## Usage

```
relative.importance(dataset)
```

**Arguments**

dataset          A data frame with 4 columns only, in the following order: 1: student's ID, 2: class, 3: transition (0 if not, 1 if yes) and 4: performance score.

**Value**

sample_size      Total number of individuals

no_classes       Number of classes

class_size       A list of no_classes elements, each element containing the size of each class

percentage_overall
                 Overall percentage that made the transition

percentage_class
                 A list of no_classes elements, each element containing percentage that made the transition for each class

fifty_point      50% point of transition

parameters       A data frame with the parameters of logistic regression $(\alpha, \beta)$ and normal distribution $(\mu, \sigma)$ for each class

transition_prob
                 A data frame with the transition probabilities

log_odds         A data frame with log odds of transition (diagonal elements: actual log odds for each class, off-diagonal: counterfactual log odds)

se_logodds       A data frame with the standard errors of the log odds of transition

ci_logodds       Approximate 95% confidence intervals for the log odds of transition

odds             Odds of transition

log_oddsratios   Log odds ratios

se_logoddsratios
                 Standard errors for the log odds ratios

ci_logoddsratios
                 Approximate 95% confidence intervals for the log odds ratios

oddsratios       Odds ratios

rel_imp_prim1    Estimates of the relative importance of primary effects using the first equation for calculating the relative importance

rel_imp_prim2    Estimates of the relative importance of primary effects using the second equation for calculating the relative importance

rel_imp_prim_avg
                 Estimates of the relative importance of primary effects using the the average of the two equations for calculating the relative importance

rel_imp_sec1     Estimates of the relative importance of secondary effects using the first equation for calculating the relative importance

rel_imp_sec2     Estimates of the relative importance of secondary effects using the second equation for calculating the relative importance

rel_imp_sec_avg

               Estimates of the relative importance of secondary effects using the the average of the two equations for calculating the relative importance

| | |
|---|---|
| se.ri.1 | Standard errors of the relative importance estimates given by the first equation |
| ci.ri.1 | Approximate 95% confidence intervals for the relative importance of secondary effects given by the first equation |
| se.ri.2 | Standard errors of the relative importance estimates given by the second equation |
| ci.ri.2 | Approximate 95% confidence intervals for the relative importance of secondary effects given by the second equation |
| se.ri.avg | Standard errors of the relative importance estimates given by the average of the two equations |
| ci.ri.avg | Approximate 95% confidence intervals for the relative importance of secondary effects given by the average of the two equations |

## Author(s)

Christiana Kartsonaki

## References

Kartsonaki, C., Jackson, M. and Cox, D. R. (2013). Primary and secondary effects: Some methodological issues, in Jackson, M. (ed.) *Determined to succeed?*, Stanford: Stanford University Press.

Erikson, R., Goldthorpe, J. H., Jackson, M., Yaish, M. and Cox, D. R. (2005) On Class Differentials in Educational Attainment. *Proceedings of the National Academy of Sciences*, **102**: 9730–9733

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## See Also

print_relimp, plot_transition

## Examples

```
# generate a dataset
set.seed(1)
data <- data.frame(seq(1:10), rep(c(1, 2), length.out = 10),
c(rep(0, times = 3), rep(1, times = 7)),
c(rnorm(4, 0, 1), rnorm(4, 0.5, 1), NA, NA))

# run function
relative.importance(data)
```

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