Package 'DECIDE'

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Type Package

Title 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.

License GPL (>= 2)

LazyLoad yes

NeedsCompilation no

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

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

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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

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

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

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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)
```

`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 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

See Also

`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 (α, β) and normal distribution (μ, σ) 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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