# Package 'catmap'

October 12, 2022

**Title** Case-Control and TDT Meta-Analysis Package

**Version** 1.6.4

**URL** http://github.com/tpq/catmap

**BugReports** http://github.com/tpq/catmap/issues

**Description** Although many software tools can perform meta-analyses on genetic case-control data,
none of these apply to combined case-control and family-
based (TDT) studies. This package conducts
fixed-effects (with inverse variance weighting) and random-
effects [DerSimonian and Laird (1986)
<DOI:10.1016/0197-2456(86)90046-2>] meta-
analyses on combined genetic data. Specifically, this package
implements a fixed-effects model [Kazeem and Farrall (2005) <DOI:10.1046/j.1529-8817.2005.00156.x>]
and a random-effects model [Nicodemus (2008) <DOI:10.1186/1471-2105-9-130>] for combined studies.

**License** GPL-2

**LazyData** true

**RoxygenNote** 6.0.1

**Depends** R (>= 2.10), stats

**Suggests** knitr, testthat

**Imports** forestplot, grid, metafor

**NeedsCompilation** no

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**Repository** CRAN

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# R topics documented:

## catmap *catmap: Case-Control and TDT Meta-Analysis Package*

### Description

This package conducts fixed-effects (with inverse variance weighting) and random-effects [DerSimonian and Laird (1986)] meta-analyses of case-control or family-based (TDT) genetic data. In addition, catmap performs meta-analyses which combine these two types of study designs. Specifically, this package implements a fixed-effects model [Kazeem and Farrall (2005)] and a random-effects model [Nicodemus (2008)] for combined studies.

### Usage

```
catmap(dataset, ci = 0.95, printout = FALSE)
```

### Arguments

| | |
|---|---|
| `dataset` | A `data.frame`, `matrix`, or file location. The input should have the following column names: name, study, t, nt, caserisk, controlrisk, casenotrisk, controlnotrisk. For a file location, provide the data in a tab-delimited format. Note that the header must have these exact columns and all cells in the table must have an entry, even if the entry is 0 or NA. See `catmapdata` for an example. |
| `ci` | A numeric value. The confidence level for confidence intervals; 0 < ci < 1. |
| `printout` | A boolean. Toggles whether a text file of the models and Q statistic results should get saved to the working directory. |

### Details

Use the output of the `catmap` function to generate figures using secondary functions. These secondary functions produce output as either a txt file, a pdf plot, or both.

A standard forest plot is available via `catmap.forest`. A funnel plot is available via `catmap.funnel`. However, no formal test of publication bias is available (see [Ioannidis and Trikalinos (2007)]).

In addition, cumulative meta-analyses over time (`catmap.cumulative`) and leave-one-out sensitivity analyses (`catmap.sense`) are available for the fixed-effects estimates and random-effects estimates.

### Author(s)

Algorithm designed and implemented by Kristin K. Nicodemus. Code modified and updated by Thom Quinn.

### See Also

catmap, catmap.forest, catmap.sense, catmap.cumulative, catmap.funnel

### Examples

```
data(catmapdata)
catmapobject <- catmap(catmapdata, 0.95, TRUE)
```

## catmap.cumulative *catmap: Cumulative Meta-Analysis*

### Description

The catmap.cumulative conducts cumulative meta-analyses and creates plots of Odds Ratios (OR) and Confidence Intervals (CI) using a fixed-effects or random-effects model. Note that studies should be listed in chronological order in the input file! This function does not re-order studies by publication year! Also note that random-effects estimates are not defined for a single (i.e., the first) study.

### Usage

```
catmap.cumulative(catmapobject, fe.forest = FALSE, re.forest = FALSE,
  printout = FALSE)
```

### Arguments

| | |
|---|---|
| catmapobject | A catmap object created by catmap. |
| fe.forest | A boolean. Toggles whether the forest plot should get saved to the current working directory. |
| re.forest | A boolean. Toggles whether the forest plot should get saved to the current working directory. |
| printout | A boolean. Toggles whether a text file of the models and Q statistic results should get saved to the working directory. |

### Author(s)

Algorithm designed and implemented by Kristin K. Nicodemus. Code modified and updated by Thom Quinn.

### See Also

catmap, catmap.forest, catmap.sense, catmap.cumulative, catmap.funnel

## Examples

```
data(catmapdata)
catmapobject <- catmap(catmapdata, 0.95, TRUE)
catmap.cumulative(catmapobject, FALSE, FALSE, FALSE)
```

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# catmap.forest *catmap: Forest Plot*

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## Description

The catmap.forest creates forest plots of the individual study Odds Ratios (OR) and Confidence Intervals (CI). It then summarizes the data using a fixed-effects or random-effects pooled OR and CI.

## Usage

```
catmap.forest(catmapobject, fe.forest = FALSE, re.forest = FALSE)
```

## Arguments

| | |
|---|---|
| catmapobject | A catmap object created by catmap. |
| fe.forest | A boolean. Toggles whether the forest plot should get saved to the current working directory. |
| re.forest | A boolean. Toggles whether the forest plot should get saved to the current working directory. |

## Author(s)

Algorithm designed and implemented by Kristin K. Nicodemus. Code modified and updated by Thom Quinn.

## See Also

catmap, catmap.forest, catmap.sense, catmap.cumulative, catmap.funnel

## Examples

```
data(catmapdata)
catmapobject <- catmap(catmapdata, 0.95, TRUE)
catmap.forest(catmapobject, TRUE, TRUE)
```

## catmap.funnel *catmap: Funnel Plot*

### Description

The catmap.funnel creates a funnel plot of the individual Log Odds Ratio against the standard error of the Log Odds Ratio. The vertical line indicates the combined Log Odds Ratio. Per the metafor package, "A pseudo confidence interval region is drawn around this value with bounds equal to +/- 1.96 SE".

### Usage

```
catmap.funnel(catmapobject, funnel = FALSE)
```

### Arguments

| | |
|---|---|
| catmapobject | A catmap object created by catmap. |
| funnel | A boolean. Toggles whether the funnel plot should get saved to the current working directory. |

### Author(s)

Algorithm designed and implemented by Kristin K. Nicodemus. Code modified and updated by Thom Quinn.

### See Also

catmap, catmap.forest, catmap.sense, catmap.cumulative, catmap.funnel

### Examples

```
data(catmapdata)
catmapobject <- catmap(catmapdata, 0.95, TRUE)
catmap.funnel(catmapobject, TRUE)
```

## catmap.sense *catmap: Leave-One-Out Sensitivity Analysis*

### Description

The catmap.sense conducts leave-one-out sensitivity analyses and creates plots of Odds Ratios (OR) and Confidence Intervals (CI) using a fixed-effects or random-effects model.

### Usage

```
catmap.sense(catmapobject, fe.forest = FALSE, re.forest = FALSE,
  printout = FALSE)
```

### Arguments

| | |
|---|---|
| catmapobject | A catmap object created by catmap. |
| fe.forest | A boolean. Toggles whether the forest plot should get saved to the current working directory. |
| re.forest | A boolean. Toggles whether the forest plot should get saved to the current working directory. |
| printout | A boolean. Toggles whether a text file of the models and Q statistic results should get saved to the working directory. |

### Author(s)

Algorithm designed and implemented by Kristin K. Nicodemus. Code modified and updated by Thom Quinn.

### See Also

catmap, catmap.forest, catmap.sense, catmap.cumulative, catmap.funnel

### Examples

```
data(catmapdata)
catmapobject <- catmap(catmapdata, 0.95, TRUE)
catmap.sense(catmapobject, FALSE, FALSE, FALSE)
```

## catmapdata *Example* catmap *Data*

### Description

An example data set for use with catmap. All input data should have the header as part of the file and either 0 or NA values for entries not relevant to that particular study design. For example, TDT studies should have the caserisk, controlrisk, casenotrisk and controlnotrisk values set to either 0 or NA.

### Usage

```
catmapdata
```

### Format

A data.frame with 5 observations and 8 variables.

- name: a factor with study name and optionally year of publication. NOTE: if year of publication is included there must be no space between study name and year. A comma or underscore works nicely (e.g., Abrams,2001 Peter,2002 Todd,2003 Wei,2007 Yu,2007)
- study: a numeric vector containing 1 if the study is TDT and 2 if the study is case-control

- t: a numeric vector containing counts of alleles transmitted in the TDT study
- nt: a numeric vector containing counts of alleles not transmitted in the TDT study
- caserisk: a numeric vector containing counts of risk alleles in cases
- controlrisk: a numeric vector containing counts of risk alleles in controls
- casenotrisk: a numeric vector containing counts of non-risk alleles in cases
- controlnotrisk: a numeric vector containing counts of non-risk alleles in controls

### Author(s)

Algorithm designed and implemented by Kristin K. Nicodemus. Code modified and updated by Thom Quinn.

### See Also

`catmap`, `catmap.forest`, `catmap.sense`, `catmap.cumulative`, `catmap.funnel`

## `makeForest` *Make Forest Plot*

### Description

A back-end wrapper function used to make forest plots.

### Usage

```
makeForest(catmapobject, summary = "", main = "Main Title",
  mean = exp(catmapobject$logOR), lower = catmapobject$lbci.fe,
  upper = catmapobject$ubci.fe, study = c("Study", sub(",", " ",
  catmapobject$studyname)))
```

### Arguments

`catmapobject` A catmap object created by `catmap`.

`summary` A character string. The kind of summary statistic to plot. Select from "fixed" or "random".

`main` A character string. The figure title.

`mean, lower, upper, study`
Numeric or character vectors. Used to guide the construction of the forest plot.

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