

Package ‘eiCompare’

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Type Package

Title Compares EI, Goodman, RxC Estimates

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Description

Compares estimates from three ecological inferences routines, based on King et. al.'s approach.

License GPL (>= 2)

Depends eiPack, methods, tmvtnorm, foreach, ggplot2,

Imports data.table, ucminf, R.utils, mvtnorm, msm, mnormt, cubature,
ellipse, plotrix, plyr, tidyr, magrittr, stringr

NeedsCompilation no

R topics documented:

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eiCompare-package	<i>Compares EI, Goodman, RxC Estimates</i>
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Description

Compares estimates from three ecological inferences routines, based on King et. al.'s approach.

Details

See demo(demo, "eiCompare") for examples on how to use code

Author(s)

Loren Collingwood

Maintainer: Loren Collingwood <loren.collingwood@ucr.edu>

References

Gary King (1997). A Solution to the Ecological Inference Problem. Princeton: Princeton University Press. Lau, Olivia, Ryan Moore, and Michael Kellerman. eiPack: Ecological Inference and Higher-Dimension Data Management

bayes_table_make	<i>EI:RxC Bayes Table Make</i>
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Description

Creates data.frame() table from eiPack RxC output, in the same format as ei_est_gen

Usage

```
bayes_table_make(ei_bayes_object, cand_vector, table_names)
```

Arguments

ei_bayes_object	Output from eiPack ei.reg.bayes() function
cand_vector	Character vector of candidate name variables, usually "pct_johns" or something
table_names	Character vector of column names, e.g., c("RxC: Pct Hisp", "RxC: Pct Asian")

Value

Data frame object in similar vein to ei_est_gen

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

O. Lau, R. T. Moore, and M. Kellermann. eipack: RxC ecological inference and higher-dimension data management. *New Functions for Multivariate Analysis*, 18(1):43, 2006.

Examples

```
# TOY DATA EXAMPLE
canda <- runif(5)
candb <- 1-canda
white <- runif(5)
black <- 1 - white
total <- round( runif(5, min=20, max=40), 0)

toy <- data.frame(canda, candb, white, black, total)

cands <- c("canda", "candb")
table_names <- c("RxC: PCT Black", "RxC PCT White")

# Generate formula for passage to ei.reg.bayes() function
form <- formula(cbind(canda,candb) ~ cbind(black, white))
# Run Bayesian model
suppressWarnings (
ei_bayes <- ei.reg.bayes(form, data=toy, sample=100, truncate=TRUE)
)
# Table Creation, using function bayes_table_make
ei_bayes_res <- bayes_table_make(ei_bayes, cand_vector= cands, table_names = table_names)
ei_bayes_res

# Load Package Data
data(corona)
# Create Character Vectors
cands <- c("pct_husted","pct_spiegel","pct_ruth","pct_button","pct_montanez","pct_fox")
table_names <- c("RxC: Pct Hisp", "RxC: Pct Asian", "RxC: Pct White")

# Generate formula for passage to ei.reg.bayes() function
form <- formula(cbind(pct_husted,pct_spiegel,pct_ruth,pct_button,pct_montanez,pct_fox)
~ cbind(pct_hisp, pct_asian, pct_white))
# Run Bayesian model
suppressWarnings (
ei_bayes <- ei.reg.bayes(form, data=corona, sample=10000, truncate=TRUE)
)
# Table Creation, using function bayes_table_make
ei_bayes_res <- bayes_table_make(ei_bayes, cand_vector= cands, table_names = table_names)
ei_bayes_res
```

corona

Corona Precinct Racial Bloc Voting Data

Description

Data taken from a 2014 California election, with precinct results and racial demographics for Corona, CA precincts

Usage

```
data("corona")
```

Format

A data frame with 46 observations on the following 12 variables.

```
precinct a numeric vector  
totvote a numeric vector  
pct_husted a numeric vector  
pct_spiegel a numeric vector  
pct_ruth a numeric vector  
pct_button a numeric vector  
pct_montanez a numeric vector  
pct_fox a numeric vector  
pct_hisp a numeric vector  
pct_asian a numeric vector  
pct_white a numeric vector  
pct_non_lat a numeric vector
```

References

Riverside County, CA board of elections

Examples

```
data(corona)  
head(corona)  
str(corona)
```

cor_06

Corona 2006

Description

Precinct vote data from a Corona, CA 2006 election

Usage

```
data("cor_06")
```

Format

A data frame with 47 observations on the following 8 variables.

```
precinct a numeric vector
totvote a numeric vector
pct_latino a numeric vector
pct_other a numeric vector
pct_breitenbucher a numeric vector
pct_montanez a numeric vector
pct_spiegel a numeric vector
pct_skipworth a numeric vector
```

References

Riverside County, CA board of elections

Examples

```
data(cor_06)
# Look at data
head(cor_06)
str(cor_06)
```

eiread

Quantities of Interest from Ecological Inference Estimation

Description

eiread is the command that pulls quantities of interest from the ei object. The command returns a list of quantities of interest requested by the user.

Usage

```
eiread(ei.object, ...)
```

Arguments

```
ei.object      An ei object from the function ei.
...           A list of quantities of interest for eiread() to return. See values below.
```

Details

Used within ei_est_gen() function. See ei::ei() help file for further details

Note

Used within ei_est_gen() function. See ei::ei() help file for further details

Author(s)

Gary King «email: king@harvard.edu» and Molly Roberts «email: roberts8@fas.harvard.edu»

References

Gary King (1997). A Solution to the Ecological Inference Problem. Princeton: Princeton University Press.

Examples

```
# TOY DATA EXAMPLE
canda <- c(.1, .09, .85, .9, .92)
candb <- 1-canda
white <- c(.8, .9, .10, .08, .11)
black <- 1 - white
total <- c(30,80, 70, 20, 29)
toy <- data.frame(canda, candb, white, black, total)

# CREATE VECTORS
cands <- c("canda")
race_group <- c("~ black") # only use one group for example
table_names <- c("EI: PCT Black", "EI: PCT White")

# RUN ei_est_gen()
# KEEP DATA TO JUST ONE ROW FOR EXAMPLE (time) ONLY!
results <- ei_est_gen(cands, race_group, "total",
                      data = toy[c(1,3,5),], table_names = table_names, sample=100)

results
```

ei_compare-class	<i>Class "ei_compare"</i>
------------------	---------------------------

Description

An S4 class object stemming from `ei_rc_good_table()`, used for plotting, and examining comparison results.

Objects from the Class

Objects can, in principle, be created by calls of the form `new("ei_compare", ...)`. However, the preferred form is to have them called `ei_rc_good_table()`

Slots

data: Object of class "data.frame"

groups: Object of class "character"

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

Examples

```
# TOY DATA EXAMPLE
canda <- c(.1, .09, .85, .9, .92)
candb <- 1-canda
white <- c(.8, .9, .10, .08, .11)
black <- 1 - white
total <- c(30,80, 70, 20, 29)
toy <- data.frame(canda, candb, white, black, total)

# CREATE VECTORS
cands <- c("canda")
race_group <- c("~ black") # only use one group for example
table_names <- c("EI: PCT Black", "EI: PCT White")

# RUN ei_est_gen()
# KEEP DATA TO JUST ONE ROW FOR EXAMPLE (time) ONLY!
results <- ei_est_gen(cands, race_group, "total",
                      data = toy[c(1,3,5),], table_names = table_names, sample=100)

# Generate formula for passage to ei.reg.bayes() function
form <- formula(cbind(canda,candb) ~ cbind(black, white))
# Run Bayesian model
suppressWarnings (
  ei_bayes <- ei.reg.bayes(form, data=toy, sample=100, truncate=TRUE)
)

table_names <- c("RxC: PCT Black", "RxC: PCT White")
cands <- c("canda", "candb")
ei_bayes_res <- bayes_table_make(ei_bayes, cand_vector= cands, table_names = table_names)
ei_bayes_res <- ei_bayes_res[c(1,2,5),]
# Combine Results, results in object of class ei_compare
ei_rc_combine <- ei_rc_good_table(results, ei_bayes_res,
                                groups= c("Black", "White")
)
# Produces data and character vector, which can be sent to plot()
ei_rc_combine

# Warning: Takes a while to run
# Load corona data
data(corona)
# Generate character vectors
cands <- c("pct_husted","pct_spiegel","pct_ruth","pct_button","pct_montanez","pct_fox")
race_group3 <- c("~ pct_hisp", "~ pct_asian", "~ pct_white")
table_names <- c("EI: Pct Lat", "EI: Pct Asian", "EI: Pct White")
# Run EI iterative Fitting
results <- ei_est_gen(cand_vector=cands, race_group = race_group3,
total = "totvote", data = corona, table_names = table_names)

# EI: RxC model
# Generate formula
form <- formula(cbind(pct_husted,pct_spiegel,pct_ruth,pct_button,pct_montanez,pct_fox)
~ cbind(pct_hisp, pct_asian, pct_white))
ei_bayes <- ei.reg.bayes(form, data=corona, sample=10000, truncate=TRUE)
# RxC table names
table_names <- c("RxC: Pct Hisp", "RxC: Pct Asian", "RxC: Pct White")
```

```
# Table Creation, using function bayes_table_make in ei_est_generalize.R file
ei_bayes_res <- bayes_table_make(ei_bayes, cand_vector= cand, table_names = table_names)

# Combine Results, results in object of class ei_compare
ei_rc_combine <- ei_rc_good_table(results, ei_bayes_res,
groups= c("Latino", "Asian", "White")
)
# Produces data and character vector, which can be sent to plot()
ei_rc_combine
```

ei_est_gen

*Iterative EI Estimation***Description**

Iteratively fits EI models for candidates and racial/ethnic groups

Usage

```
ei_est_gen(cand_vector, race_group, total, rho = 10, data, table_names,
sample = 1000, tomog = F, density_plot = F, beta_yes=F,...)
```

Arguments

cand_vector	Character vector of candidate names, taken from the dataset
race_group	Character vector of formula, e.g., "~ pct_latino"
total	Character vector (e.g., "totvote") of total variable name from data, variable in data is numeric
rho	Rho parameter for ei() estimate, defaults to 10, numeric
data	data.frame() object containing the data
table_names	Character vector of table names with same length as race_group. Used for formatting output. If only one racial group, must provide "Pct. Other" as second element of vector
sample	Number of samples used for EI calculation, default = 1000
tomog	Logical to display tomography plot. If true will save pdf plot to working directory. Default is FALSE
density_plot	Logical to display density plot of betab and betaw. If true will save pdf plot to working directory. Default is FALSE
beta_yes	Logical to export betas (b, w) in list object in addition to table of results. Default is FALSE
...	Arguments passed onto ei() function

Value

Data frame/table object containing EI individually estimated results. If beta_yes=T, two list items, first the data frame table of results, second dataframe of betas themselves.

Note

If this results in an error, "Error in .subset2(x, i, exact = exact) : invalid subscript type 'list'", just rerun the algorithm again.

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

eiPack. Gary King (1997). A Solution to the Ecological Inference Problem. Princeton: Princeton University Press.

Examples

```
# TOY DATA EXAMPLE
canda <- c(.1, .09, .85, .9, .92)
candb <- 1-canda
white <- c(.8, .9, .10, .08, .11)
black <- 1 - white
total <- c(30,80, 70, 20, 29)
toy <- data.frame(canda, candb, white, black, total)

# CREATE VECTORS
cands <- c("canda")
race_group <- c("~ black") # only use one group for example
table_names <- c("EI: PCT Black", "EI: PCT White")

# RUN ei_est_gen()
# KEEP DATA TO JUST ONE ROW FOR EXAMPLE (time) ONLY!
ei_est_gen(cands, race_group, "total",
           data = toy[c(1,3,5),], table_names = table_names, sample=100)

# WARNING -- May take a little while to execute
# Load Package Data
data(corona)
# Create Character Vectors
cands <- c("pct_husted","pct_spiegel","pct_ruth","pct_button","pct_montanez","pct_fox")
race_group3 <- c("~ pct_hisp", "~ pct_asian", "~ pct_white")
table_names <- c("EI: Pct Hisp", "EI: Pct Asian", "EI: Pct White")

# Run ei_est_gen function
results <- ei_est_gen(cand_vector=cands, race_group = race_group3,
total = "totvote", data = corona, table_names = table_names)

results
# Run ei_est_gen function; Exporting betas into data frame
results_w_betas <- ei_est_gen(cand_vector=cands, race_group = race_group3,
total = "totvote", data = corona, table_names = table_names, beta_yes=T)

results_w_betas[[1]]# table of mean estimates
results_w_betas[[2]]# betas of estimates for each precinct
```

ei_rc_good_table	Create EI Comparison Table
------------------	----------------------------

Description

Takes output from EI model, EI RxC model, Goodman regression, and puts them into a data frame table for useful analysis and comparison.

Usage

```
ei_rc_good_table(ei, rc, good, groups, include_good = F)
```

Arguments

ei	Table/data frame object result from ei_est_gen. This assumes beta_yes=F in ei_est_gen(). See example below for beta_yes=T in ei_est_gen().
rc	Table/data frame from EI:RxC process from bayes_table_make()
good	Table/data frame from Goodman regression, from goodman_generalize(). Default is nothing
groups	Character vector of voting blocks (e.g., c("Latino", "White"))
include_good	Logical, default is FALSE (F), Set to TRUE (T) if including a Goodman table/data object

Value

Object of class ei_compare containing a 1. data.frame() slot of comparisons across the three models;
2. Character vector of group names used for later plotting

Note

Most of the time the user will not include the Goodman table, as they are interested in the EI vs. EI:RxC comparison

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

eiPack, King et. al. (<http://gking.harvard.edu/eiR>)

Examples

```
# TOY DATA EXAMPLE
canda <- c(.1, .09, .85, .9, .92)
candb <- 1-canda
white <- c(.8, .9, .10, .08, .11)
black <- 1 - white
total <- c(30,80, 70, 20, 29)
toy <- data.frame(canda, candb, white, black, total)
```

```

# CREATE VECTORS
cands <- c("canda")
race_group <- c("~ black") # only use one group for example
table_names <- c("EI: PCT Black", "EI: PCT White")

# RUN ei_est_gen()
# KEEP DATA TO JUST ONE ROW FOR EXAMPLE (time) ONLY!
results <- ei_est_gen(cands, race_group, "total",
                      data = toy[c(1,3,5),], table_names = table_names, sample=100)

# Generate formula for passage to ei.reg.bayes() function
form <- formula(cbind(canda,candb) ~ cbind(black, white))
# Run Bayesian model
suppressWarnings (
  ei_bayes <- ei.reg.bayes(form, data=toy, sample=100, truncate=TRUE)
)

table_names <- c("RxC: PCT Black", "RxC: PCT White")
cands <- c("canda", "candb")
ei_bayes_res <- bayes_table_make(ei_bayes, cand_vector= cands, table_names = table_names)
ei_bayes_res <- ei_bayes_res[c(1,2,5),]
# Combine Results, results in object of class ei_compare
ei_rc_combine <- ei_rc_good_table(results, ei_bayes_res,
                                groups= c("Black", "White"))
)
# Produces data and character vector, which can be sent to plot()
ei_rc_combine

# Warning: Takes a while to run
# Load corona data
data(corona)
# Generate character vectors
cands <- c("pct_husted","pct_spiegel","pct_ruth","pct_button","pct_montanez","pct_fox")
race_group3 <- c("~ pct_hisp", "~ pct_asian", "~ pct_white")
table_names <- c("EI: Pct Lat", "EI: Pct Asian", "EI: Pct White")
# Run EI iterative Fitting
results <- ei_est_gen(cand_vector=cands, race_group = race_group3,
                      total = "totvote", data = corona, table_names = table_names)

# EI: RxC model
# Generate formula
form <- formula(cbind(pct_husted,pct_spiegel,pct_ruth,pct_button,pct_montanez,pct_fox)
~ cbind(pct_hisp, pct_asian, pct_white))
suppressWarnings (
  ei_bayes <- ei.reg.bayes(form, data=corona, sample=10000, truncate=TRUE)
)
# RxC table names
table_names <- c("RxC: Pct Hisp", "RxC: Pct Asian", "RxC: Pct White")
# Table Creation, using function bayes_table_make in ei_est_generalize.R file
ei_bayes_res <- bayes_table_make(ei_bayes, cand_vector= cands, table_names = table_names)

# Combine Results, results in object of class ei_compare
ei_rc_combine <- ei_rc_good_table(results, ei_bayes_res,

```

```

groups= c("Latino", "Asian", "White")
)
ei_rc_combine

# If set beta_yes=T in ei_est_gen(), then combine like this, where results[[1]] is the table of results:
#ei_rc_combine2 <- ei_rc_good_table(results[[1]], ei_bayes_res, groups= c("Black", "White"))

```

goodman_generalize	<i>Goodman Regression Generalization</i>
--------------------	--

Description

Makes summary table out of multiple heckman regression results, for multiple candidates and groups

Usage

```
goodman_generalize(cand_vector, race_group, total, data, table_names, ...)
```

Arguments

cand_vector	Character vector of candidate names, taken from the dataset
race_group	Character vector of formula, e.g., "~ pct_latino"
total	Character vector (e.g., "totvote") of total variable name from data, variable in data is numeric
data	data.frame() object containing the data
table_names	Character vector of table names with same length as race_group. Used for formatting output
...	Arguments passed onto lm() function

Value

Object of class data.frame() returned containing table summary of all the Goodman regressions

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

eiPack King et. al. (<http://gking.harvard.edu/eiR>) L. A. Goodman. Ecological regressions and behavior of individuals. American Sociological Review, 1953.

See Also

[ei_rc_good_table](#)

Examples

```
# Load corona data
data(corona)
# Generate character vectors
cands <- c("pct_husted", "pct_spiegel", "pct_ruth", "pct_button", "pct_montanez", "pct_fox")
race_group3 <- c("~ pct_hisp", "~ pct_asian", "~ pct_white")

# Goodman Regression
table_names <- c("Good: Pct Lat", "Good: Pct Asian", "Good: Pct Wht")
good_corona <- goodman_generalize(cands, race_group3, "totvote", corona, table_names)
```

lac_10

*Los Angeles County Data***Description**

Los Angeles County precinct dataset from 2010 election

Usage

```
data("lac_10")
```

Format

A data frame with 4980 observations on the following 10 variables.

```
precinct a character vector
tot_reg a numeric vector
i_jones a numeric vector
i_delatore a numeric vector
votescast a numeric vector
lat_voters a numeric vector
pct_latino a numeric vector
pct_delatorre a numeric vector
pct_jones a numeric vector
pct_other a numeric vector
```

Source

Los Angeles county

Examples

```
data(lac_10)
head(lac_10)
str(lac_10)
```

Description

'plot' method for the class 'ei'.

Usage

```
## S3 method for class 'ei'
## S3 method for class 'ei'
plot(x, ...)
```

Arguments

x	An ei object from the function ei.
...	A list of options to return in graphs. See values below.

Details

Returns any of a set of possible graphical objects, mirroring those in the examples in King (1997). Graphical option lci is a logical value specifying the use of the Law of Conservation of Ink, where the implicit information in the data is represented through color gradients, i.e. the color of the line is a function of the length of the tomography line. This can be passed as an argument and is used for “tomogD” and “tomog” plots.

Value

tomogD	Tomography plot with the data only. See Figure 5.1, page 81.
tomog	Tomography plot with ML contours. See Figure 10.2, page 204.
tomogCI	Tomography plot with 80% confidence intervals. Confidence intervals appear on the screen in red with the remainder of the tomography line in yellow. The confidence interval portion is also printed thicker than the rest of the line. See Figure 9.5, page 179.
tomogCI95	Tomography plot with 95% confidence intervals. Confidence intervals appear on the screen in red with the remainder of the tomography line in yellow. The confidence interval portion is also printed thicker than the rest of the line. See Figure 9.5, page 179.
tomogE	Tomography plot with estimated mean posterior B_ib and B_iw points.
tomogP	Tomography plot with mean posterior contours.
betab	Density estimate (i.e., a smooth version of a histogram) of point estimates of B_ib's with whiskers.
betaw	Density estimate (i.e., a smooth version of a histogram) of point estimates of B_iw's with whiskers.
xt	Basic X_i by T_i scatterplot.
xtc	Basic X_i by T_i scatterplot with circles sized proportional to N_i.
xtfit	X_i by T_i plot with estimated E(T_i X_i) and conditional 80% confidence intervals. See Figure 10.3, page 206.

xtfitg	xtfit with Goodman's regression line superimposed.
estsims	All the simulated B_{ib} 's by all the simulated B_{iw} 's. The simulations should take roughly the same shape of the mean posterior contours, except for those sampled from outlier tomography lines.
boundXb	X_i by the bounds on B_{ib} (each precinct appears as one vertical line), see the lines in the left graph in Figure 13.2, page 238.
boundXw	X_i by the bounds on B_{iw} (each precinct appears as one vertical line), see the lines in the right graph in Figure 13.2, page 238.
truth	Compares truth to estimates at the district and precinct-level. Requires truth in the ei object. See Figures 10.4 (page 208) and 10.5 (page 210).
movieD	For each observation, one tomography plot appears with the line for the particular observation darkened. After the graph for each observation appears, the user can choose to view the next observation (hit return), jump to a specific observation number (type in the number and hit return), or stop (hit "s" and return).
movie	For each observation, one page of graphics appears with the posterior distribution of B_{ib} and B_{iw} and a plot of the simulated values of B_{ib} and B_{iw} from the tomography line. The user can choose to view the next observation (hit return), jump to a specific observation number (type in the number and hit return), or stop (hit "s" and return).

Note

Used within the `ei_est_gen()`

Author(s)

Gary King «email: king@harvard.edu» and Molly Roberts «email: roberts8@fas.harvard.edu»

References

Gary King (1997). A Solution to the Ecological Inference Problem. Princeton: Princeton University Press.

Examples

```
# TOY DATA EXAMPLE
canda <- c(.1, .09, .85, .9, .92)
candb <- 1-canda
white <- c(.8, .9, .10, .08, .11)
black <- 1 - white
total <- c(30,80, 70, 20, 29)
toy <- data.frame(canda, candb, white, black, total)

# CREATE VECTORS
cands <- c("canda")
race_group <- c("~ black") # only use one group for example
table_names <- c("EI: PCT Black", "EI: PCT White")

# RUN ei_est_gen()
# KEEP DATA TO JUST ONE ROW FOR EXAMPLE (time) ONLY!
results <- ei_est_gen(cands, race_group, "total",
  data = toy[c(1,3,5),], table_names = table_names,
  sample=100, tomog=TRUE)
```

```
# Delete Pdf files produced
getwd() # Show working directory
list.files() # show all files in directory
# To remove pdf files, make sure no other pdf files in directory
# system ("rm *.pdf ")
```

plot.ei_compare

Plot Method for class ei_compare

Description

Allows quick plotting, using plot() of EI vs EI:RxC differences. Produces ggplot2 output, amazing.

Usage

```
## S3 method for class 'ei_compare'
plot(x, ...)
```

Arguments

x	Object of class ei_compare, from the ei_rc_good_table() function
...	Arguments passed onto plot() and par()

Details

Limited amount of plotting flexibility. If user wants more flexibility extract relevant objects from ei_rc_good_table() output and do your own plotting!

Value

ggplot2 graph output of EI and RxC differences

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

eiPack, King et. al. (<http://gking.harvard.edu/eiR>)

Examples

```
# TOY DATA EXAMPLE
canda <- c(.1, .09, .85, .9, .92)
candb <- 1-canda
white <- c(.8, .9, .10, .08, .11)
black <- 1 - white
total <- c(30,80, 70, 20, 29)
toy <- data.frame(canda, candb, white, black, total)

# CREATE VECTORS
```



```

cands <- c("canda")
race_group <- c("~ black") # only use one group for example
table_names <- c("EI: PCT Black", "EI: PCT White")

# RUN ei_est_gen()
# KEEP DATA TO JUST ONE ROW FOR EXAMPLE (time) ONLY!
results <- ei_est_gen(cands, race_group, "total",
                      data = toy[c(1,3,5),], table_names = table_names, sample=100)

# Generate formula for passage to ei.reg.bayes() function
form <- formula(cbind(canda,candb) ~ cbind(black, white))
# Run Bayesian model
suppressWarnings (
  ei_bayes <- ei.reg.bayes(form, data=toy, sample=100, truncate=TRUE)
)

table_names <- c("RxC: PCT Black", "RxC: PCT White")
cands <- c("canda", "candb")
ei_bayes_res <- bayes_table_make(ei_bayes, cand_vector= cands, table_names = table_names)
ei_bayes_res <- ei_bayes_res[c(1,2,5),]
# Combine Results, results in object of class ei_compare
ei_rc_combine <- ei_rc_good_table(results, ei_bayes_res,
                                groups= c("Black", "White"))
)
# Produces data and character vector, which can be sent to plot()
ei_rc_combine

# PLOT EI DIFFERENCES
plot(ei_rc_combine)

# Warning: Takes a while to run
# Load corona data
data(corona)
# Generate character vectors
cands <- c("pct_husted","pct_spiegel","pct_ruth","pct_button","pct_montanez","pct_fox")
race_group3 <- c("~ pct_hisp", "~ pct_asian", "~ pct_white")
table_names <- c("EI: Pct Lat", "EI: Pct Asian", "EI: Pct White")
# Run EI iterative Fitting
results <- ei_est_gen(cand_vector=cands, race_group = race_group3,
                      total = "totvote", data = corona, table_names = table_names)

# EI: RxC model
# Generate formula
form <- formula(cbind(pct_husted,pct_spiegel,pct_ruth,pct_button,pct_montanez,pct_fox)
~ cbind(pct_hisp, pct_asian, pct_white))
suppressWarnings (
  ei_bayes <- ei.reg.bayes(form, data=corona, sample=10000, truncate=TRUE)
)
# RxC table names
table_names <- c("RxC: Pct Hisp", "RxC: Pct Asian", "RxC: Pct White")
# Table Creation, using function bayes_table_make in ei_est_generalize.R file
ei_bayes_res <- bayes_table_make(ei_bayes, cand_vector= cands, table_names = table_names)

# Goodman Regression
table_names <- c("Good: Pct Lat", "Good: Pct Asian", "Good: Pct Wht")
good_corona <- goodman_generalize(cands, race_group3, "totvote", corona, table_names)

```

```
# Combine Results, results in object of class ei_compare
ei_rc_g_combine <- ei_rc_good_table(results, ei_bayes_res, good_corona,
                                   groups= c("Latino", "Asian", "White"))
)
# Plot the Results
plot(ei_rc_g_combine)
```

summary.ei

*Summarize Ecological Inference Estimates***Description**

'summary' method for the class 'ei'.

Usage

```
## S3 method for class 'ei'
## S3 method for class 'ei'
summary(object, ...)
```

Arguments

object object An ei object from the function ei.
 A list of options to return in graphs. See values below.

Note

Used within ei_est_gen() function

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References

Gary King (1997). A Solution to the Ecological Inference Problem. Princeton: Princeton University Press.

Examples

```
# TOY DATA EXAMPLE
canda <- c(.1, .09, .85, .9, .92)
candb <- 1-canda
white <- c(.8, .9, .10, .08, .11)
black <- 1 - white
total <- c(30,80, 70, 20, 29)
toy <- data.frame(canda, candb, white, black, total)

# CREATE VECTORS
cands <- c("canda")
race_group <- c("~ black") # only use one group for example
table_names <- c("EI: PCT Black", "EI: PCT White")
```

```
# RUN ei_est_gen()
# KEEP DATA TO JUST ONE ROW FOR EXAMPLE (time) ONLY!
results <- ei_est_gen(cands, race_group, "total",
                      data = toy[c(1,3,5),], table_names = table_names, sample=100)
results
```

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