

# Package ‘interactionTest’

November 30, 2018

**Type** Package

**Title** Calculates Critical Test Statistics to Control False Discovery Rates in Marginal Effects Plots

**Version** 1.1

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**Author** Justin Esarey and Jane Lawrence Sumner

**Maintainer** Justin Esarey <justin@justinesarey.com>

**Description** Implements the procedures suggested in Esarey and Sumner (2017) <<http://justinesarey.com/interaction-overconfidence.pdf>> for controlling the false discovery rate when constructing marginal effects plots for models with interaction terms.

**Depends** stats, R (>= 3.4)

**License** GPL

**LazyData** true

**RoxygenNote** 6.1.0

**Encoding** UTF-8

**NeedsCompilation** no

**Repository** CRAN

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## R topics documented:

bootFun . . . . .	2
fdrInteraction . . . . .	2
findMultiLims . . . . .	4
legfig . . . . .	4
<b>Index</b>	<b>6</b>

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bootFun	<i>Bootstrapping t-statistics</i>
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**Description**

This function is defunct.

**Usage**

```
bootFun(...)
```

**Arguments**

... Any argument to the function (ignored).

**References**

Esarey, Justin, and Jane Lawrence Sumner. 2018. "Corrigendum to 'Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate.'"

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fdrInteraction	<i>Critical t-statistic</i>
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**Description**

This function calculates the critical t-statistic to limit the false discovery rate (Benjamini and Hochberg 1995) for a marginal effects plot to a specified level.

**Usage**

```
fdrInteraction(me.vec, me.sd.vec, df, level = 0.95)
```

**Arguments**

me.vec	A vector of marginal effects.
me.sd.vec	A vector of standard deviations for the marginal effects.
df	Degrees of freedom.
level	The level of confidence. Defaults to 0.95.

**Value**

The critical t-statistic for the interaction.

**Author(s)**

Justin Esarey and Jane Lawrence Sumner

## References

- Benjamini, Yoav, and Yosef Hochberg. 1995. "Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing." *Journal of the Royal Statistical Society, Series B* 57(1): 289-300.
- Clark, William R., and Matt Golder. 2006. "Rehabilitating Duverger's Theory." *Comparative Political Studies* 39(6): 679-708.
- Esarey, Justin, and Jane Lawrence Sumner. 2017. "Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate." URL: <<http://justinesarey.com/interaction-overconfidence.pdf>>.

## Examples

```
## Not run:
data(legfig)                # Clark and Golder 2006 replication data

# limit to established democracies from the 1990s
dat<-subset(legfig, subset=(nineties==1 & old==1))

lin.mod <- lm(enepl ~ eneg + logmag + logmag_enepl + uppertier_enepl + uppertier +
proximity1 + proximity1_enepl + enepl, data=dat)

# save betas
beta.mod <- coefficients(lin.mod)
# save vcv
vcv.mod <- vcov(lin.mod)

# calculate MEs
mag <- seq(from=0.01, to=5, by=0.01)
me.vec <- beta.mod[2] + beta.mod[4]*mag
me.se <- sqrt( vcv.mod[2,2] + (mag^2)*vcv.mod[4,4] + 2*(mag)*(vcv.mod[2,4]) )

ci.hi <- me.vec + 1.697 * me.se
ci.lo <- me.vec - 1.697 * me.se

plot(me.vec ~ mag, type="l", ylim = c(-4, 6))
lines(ci.hi ~ mag, lty=2)
lines(ci.lo ~ mag, lty=2)

fdrInteraction(me.vec, me.se, df=lin.mod$df, level=0.90)                # 4.233986

ci.hi <- me.vec + 4.233986 * me.se
ci.lo <- me.vec - 4.233986 * me.se

lines(ci.hi ~ mag, lty=2, lwd=2)
lines(ci.lo ~ mag, lty=2, lwd=2)

abline(h=0, lty=1, col="gray")
legend("topleft", lwd=c(1,2), lty=c(1,2), legend=c("90% CI", "90% FDR CI"))

## End(Not run)
```

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findMultiLims	<i>Determine Critical t-Statistic For Marginal Effects Plot</i>
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**Description**

This function is defunct.

**Usage**

```
findMultiLims(...)
```

**Arguments**

... Any argument to the function (ignored).

**References**

Esarey, Justin, and Jane Lawrence Sumner. 2018. "Corrigendum to 'Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate.'"

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legfig	<i>Replication data for Clark and Golder (2006)</i>
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**Description**

District magnitude and ethnic heterogeneity data from a pooled sample of established democracies in the 1990s. Data originally from Clark and Golder (2006).

**Format**

A data frame with 754 rows and 33 variables:

**country** country name

**countrynumber** country number

**year** year of observation

**enep1** electoral parties

**eneg** ethnic heterogeneity

**logmag** district magnitude

**legelec** legislative election

**preselec** presidential election

**regime** regime as of 31 Dec of given year (0=democracy, 1=dictatorship)

**regime\_leg** regime type at time of leg. election (0=democracy, 1=dictatorship)

**eighties** election in 1980s closest to 1985

**nineties** election in 1990s closest to 1995  
**old** elections in countries that did not transition to democracy in 1990s  
**avemag** average district magnitude  
**districts** number of electoral districts  
**enep** effective number of ethnic groups fearon  
**enep\_others** n/a  
**enpp** parliamentary parties - uncorrected  
**enpp\_others** n/a  
**enpp1** parliamentary parties - corrected  
**enpres** effective number of presidential candidates  
**medmag** median district magnitude  
**newdem** first election of new democracy  
**proximity1** proximity - continuous  
**proximity2** proximity - dichotomous  
**seats** assembly size  
**upperseats** number of upper tier seats  
**uppertier** percentage of uppertier seats  
**uppertier\_eneq** uppertier\*eneq  
**logmag\_eneq** logmag\*eneq  
**proximity1\_enpres** proximity1\*enpres  
**twoelections** n/a  
**twoelections1** n/a ...

#### Source

Clark, William R., and Matt Golder. 2006. "Rehabilitating Duverger's Theory." *Comparative Political Studies* 39(6): 679-708.

# Index

[bootFun](#), [2](#)

[fdrInteraction](#), [2](#)

[findMultiLims](#), [4](#)

[legfig](#), [4](#)