Package 'DACF'

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Title Data Analysis with Ceiling and/or Floor Data

Version 1.0.0

Description An implementation of data analytic methods in R for analyses for data with ceiling/floor effects. The package currently includes functions for mean/variance estimation and mean comparison tests. Implemented methods are from Aitkin (1964) <doi:10.1007/BF02289723> and Liu & Wang (in prep).

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Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

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R topics documented:

f.star.test *f.star.test*

Description

conduct a Brown-Forsythe F star test

Usage

```
f.star.test(means, variances, ns)
```

Arguments

`means`	a (non-empty) numeric vector of the group means
`variances`	a (non-empty) numeric vector of the group variances
`ns`	a (non-empty) numeric vector of sample sizes per group

Value

`statistic`	the value of the adjusted Brown-Forsythe F star statistic
`p.value`	the p-value for the test
`est.f.squared`	effect size estimate as in Cohen's f squared

Examples

```
# a f star test for three-group mean comparison
f.star.test(c(-.2,0,.2),c(1,1,1),c(100,100,100))
f.star.test(c(0,0,1),c(2,1,3),c(100,100,100))
```

induce.cfe *induce.cfe*

Description

inducing ceiling/floor effects in data

Usage

```
induce.cfe(floor.perc, ceiling.perc, y)
```

Arguments

floor.perc a (non-empty) numeric value from 0 to 1 denoting the desired percentage of floor effects

ceiling.perc a (non-empty) numeric value from 0 to 1 denoting the desired percentage of ceiling effects

y a (non-empty) numeric vector of data

Value

y scores with induced ceiling/floor effects

Examples

```
x=rnorm(1000,0,1) #simulate "healthy data"
x.c20=induce.cfe(0,.2,x) #induce 20% ceiling effects into the data
sum(x.c20==max(x.c20))/length(x.c20) #check ceiling percentage
x.f20=induce.cfe(.2,0,x) #induce 20% floor effects into the data
sum(x.f20==min(x.f20))/length(x.f20) #check ceiling percentage
```

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lw.f.star *lw.f.star*

Description

conduct an F star with for data with ceiling/floor effects

Usage

```
lw.f.star(data, formula, method_type)
```

Arguments

data a dataframe of data with ceiling/floor effects and corresponding group variables in wide format

formula a formula denoting the dependent and independent variable, e.g., y~group

method_type a character string specifying the preferred method type. "a" uses the original sample size and "b" uses after-truncation sample size.

Value

statistic the value of the Brown-Forsythe F star statistics

p.value the p-value for the test

est.f.squared effect size estimate in Cohen’s f squared

Examples

```
dat=threeganova.sim(1000,.16,1)
dat[dat$group==1,3]=induce.cfe(0,.15,dat[dat$group==1,3])
lw.f.star(dat,y~group,"a") #using truncated n
lw.f.star(dat,y~group,"b") #using original n
```

lw.t.test *lw.t.test*

Description

conduct a t test adjusting for ceiling and/or floor effects

Usage

```
lw.t.test(x1, x2, method_type)
```

Arguments

x1	a (non-empty) numeric vector of data values for group 1 with floor/ceiling effects
x2	a (non-empty) numeric vector of data values for group 2 with floor/ceiling effects
method_type	a character string specifying the preferred method type. "a" uses the original sample size and "b" uses after-truncation sample size.

Value

statistic	the value of the adjusted t test statistics
p.value	the p-value for the test
est.d	effect size estimate as in Cohen's d
conf.int	95% confidence interval

Examples

```
x1.c=induce.cfe(0,.3,rnorm(1000,20,5)) #group 1 scores with 30% ceiling data
x2.c=induce.cfe(.15,0,rnorm(1000,30,5)) #group 2 scores with 15% floor data
lw.t.test(x1.c,x2.c,"a") #using truncated n
lw.t.test(x1.c,x2.c,"b") #using original n
```

rec.mean.var *rec.mean.var*

Description

recover mean and variance of the data with ceiling/floor effects

Usage

```
rec.mean.var(y)
```

Arguments

y	a (non-empty) numeric vector of data with ceiling/floor effects

Value

ceiling.percentage	the percentage of ceiling values in the data
floor.percentage	the percentage of floor values in the data
est.mean	estimated mean of the true scores
est.var	estimated variance of the true scores

Examples

```
# simulate normally distributed true scores
x=rnorm(1000,2,4)
mean(x); var(x)
# induce 20% floor effects
# and estimate the true mean variance from the floor data
x.f=induce.cfe(.2,0,x)
rec.mean.var(x.f)
# induce 20% ceiling effects
# and estimate the true mean and variance from the ceiling data
x.c=induce.cfe(0,.2,x)
rec.mean.var(x.c)
# induce 20% and 10% of floor and ceiling effects, respectively
# and estimate the true mean and variance from the data with floor and ceiling effects
x.cf=induce.cfe(.2,.1,x)
rec.mean.var(x.cf)
```

`threeganova.sim` *threeganova.sim*

Description

simulate three-group anova data

Usage

```
threeganova.sim(group_n, f_sqr, sd.1)
```

Arguments

`group_n`	a (non-empty) numeric value of desired sample size per group
`f_sqr`	a (non-empty) numeric value of desired Cohen's f squared value
`sd.1`	a (non-empty) numeric value of desired standard deviation ratio

Value

a dataframe containing scores "y", grouping factor "group", and residual errors.

Examples

```
sample.3g=threeganova.sim(1000,.16,5) #data of n=1000, sd1=sd3=1 and sd2=5, and f^2=.16
colnames(sample.3g) #examine the column names
dim(sample.3g) #examine the data structure
aggregate(sample.3g$y,sd,by=list(sample.3g$group)) #check group standard deviations
```

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