

Package ‘iopsych’

July 22, 2025

Type Package

Title Methods for Industrial/Organizational Psychology

Version 0.90.1

Date 2016-03-16

Author

Allen Goebel <goebl005@umn.edu>, Jeff Jones <jone1087@umn.edu>, and Adam Beatty <abeatty@humro.org>

Maintainer Allen Goebel <goebl005@umn.edu>

Depends R (>= 3.0)

Imports mvtnorm (>= 1.0), mco (>= 1.0), stats (>= 1.0)

Description Collection of functions for IO Psychologists.

License BSD_3_clause + file LICENSE

RoxygenNote 5.0.1

NeedsCompilation no

Repository CRAN

Date/Publication 2016-04-04 13:38:31

Contents

aiEst	2
aiPux	3
aiPuxComposite	4
asvab	6
cor2d	6
d2cor	7
dComposite	7
dls2007	8
fuse	9
fuseMat	10
fuseVec	11
lMvrrc	12
paretoXX	13

paretoXY	14
rcea1994	15
reliabate	15
relWt	16
rmatReg	17
rmatRegPE	18
solveWt	18
solveWtR2	19
trModel	20
utilityB	21
utilityBcg	22
utilityRbn	23
utilityShp	24
ux	25
Index	26

aiEst	<i>Estimate adverse impact given d and sr</i>
-------	---

Description

Estimate adverse impact given d and sr

Usage

aiEst(d, sr, pct_minority)

Arguments

- | | |
|--------------|--|
| d | Subgroup difference. |
| sr | The percentage of the applicant population who are selected. |
| pct_minority | The percentage of the applicant population who are part of a given minority group. |

Value

(1) The adverse impact ratio, (2) The overall selection ration, (3) The selection ratio for the majority group, (4) The selection ratio for the minority group, and (5) the predictor cutoff value that corresponds to the given overall selection ratio

Author(s)

Jeff Jones and Allen Goebel

References

De Corte, W., Lievens, F.(2003). A Practical procedure to estimate the quality and the adverse impact of single-stage selection decisions. *International Journal of Selection and Assessment.*, 11(1), 87-95.

Examples

```
aiEst(d = 0.15, sr = 0.25, pct_minority = 0.30)
```

```
aiEst(d = 0.40, sr = 0.10, pct_minority = 0.15)
```

aiPux	<i>Estimate ai and average criterion scores for majority and minority groups.</i>
-------	---

Description

Estimate ai and average criterion scores for majority and minority groups.

Usage

```
aiPux(mr, dx, dy = 1, sr, pct_minority)
```

Arguments

mr	The correlation between the predictor and criterion composites.
dx	A vector of d values for the predictors. These d values are expected to have been computed in the direction of Majority - Minority.
dy	A vector of d values for the criteria These d values are expected to have been computed in the direction of Majority - Minority.
sr	The percentage of the applicant population who are selected.
pct_minority	The percentage of the applicant population who are part of a given minority group.

Value

- AIAdverse Impact
- Overall_srThe overall selection ratio set by the user
- Majority_srMajority Selection Rate
- Minority_srMinority Selection Rate
- Majority_StandardizedPredicted composite criterion score relative to the majority population
- Global_StandardizedPredicted composite criterion score relative to the overall population

Author(s)

Jeff Jones and Allen Goebel

References

De Corte, W., Lievens, F.(2003). A Practical procedure to estimate the quality and the adverse impact of single-stage selection decisions. *International Journal of Selection and Assessment.*, 11(1), 87-95.

Examples

```
aiPux(.6, dx=.8, sr=.3, pct_minority=.25)
aiPux(.6, dx=.8, dy=.2, sr=.3, pct_minority=.25)
```

aiPuxComposite	<i>Estimate ai and average criterion scores for majority and minority groups.</i>
----------------	---

Description

Estimate ai and average criterion scores for majority and minority groups.

Usage

```
aiPuxComposite(r_mat, y_col, x_col, dX, dY, wt_x, wt_y, sr, pct_minority)
```

Arguments

r_mat	Super correlation matrix between the predictors and criteria. This argument assumes that the predictors come first in the matrix.
y_col	A vector of columns representing criterion variables.
x_col	A vector of columns representing predictor variables.
dX	A vector of d values for the predictors. These d values are expected to have been computed in the direction of Majority - Minority.
dY	A vector of d values for the criteria These d values are expected to have been computed in the direction of Majority - Minority.
wt_x	Weights for the predictors to form the overall composite predictor.
wt_y	Weights for the criteria to form the overall composite criterion.
sr	The percentage of the applicant population who are selected.
pct_minority	The percentage of the applicant population who are part of a given minority group.

Value

- AIAdverse Impact
- Overall_srThe overall selection ratio set by the user
- Majority_srMajority Selection Rate
- Minority_srMinority Selection Rate
- Majority_StandardizedPredicted composite criterion score relative to the majority population
- Global_StandardizedPredicted composite criterion score relative to the overall population

Author(s)

Jeff Jones and Allen Goebel

References

De Corte, W., Lievens, F.(2003). A Practical procedure to estimate the quality and the adverse impact of single-stage selection decisions. *International Journal of Selection and Assessment.*, 11(1), 87-95. De Corte, W. (2003). Caiqs user's guide. <http://allserv.rug.ac.be/~wdecorte/software.html>

Examples

```
# Example taken from De Corte, W. (2003)
R <- matrix(c(1.000, 0.170, 0.000, 0.100, 0.290, 0.160,
              0.170, 1.000, 0.120, 0.160, 0.300, 0.260,
              0.000, 0.120, 1.000, 0.470, 0.120, 0.200,
              0.100, 0.160, 0.470, 1.000, 0.240, 0.250,
              0.290, 0.300, 0.120, 0.240, 1.000, 0.170,
              0.160, 0.260, 0.200, 0.250, 0.170, 1.000), 6, 6)

wt_x <- c(.244, .270, .039, .206)
wt_y <- c(6, 2)
sr    <- 0.25
pct_minority <- .20

# Note that the d-values are reversed from what the CAIQS manual reports (see pg 4)
dX    <- c(1, 0.09, 0.09, 0.20)
dY    <- c(0.450, 0.0)

aiPuxComposite(R, 5:6, 1:4, dX, dY, wt_x, wt_y, sr, pct_minority)

# compare the output from predictAI with the output in the CAIQS manual on page 7 where SR = .250
```

asvab

Wee, Newman, & Joseph, (2014) ASVAB data

Description

This dataset was published in Wee, S., Newman, D. A., & Joseph, D. L. (2014) and describes the results of a military validation study. The first four rows contain the intercorrelations of the four predictor variables. The fifth row contains the black-white score differences (d). Rows 6-12 contain the correlations between the four predictor variables and the six job performance variables.

Usage

```
asvab
```

Format

A data frame with 12 rows and 4 columns.

References

Wee, S., Newman, D. A., & Joseph, D. L. (2014). More than g: Selection quality and adverse impact implications of considering second-stratum cognitive abilities. *Journal of Applied Psychology*, 99(4), *Journal of Applied Psychology*, 92(5), 1380.

cor2d

Convert from r to d

Description

Convert from r to d

Usage

```
cor2d(r)
```

Arguments

r A r-value or a vector of r values.

Value

A d value or a vector of d values.

Author(s)

Allen Goebel and Jeff Jones

Examples

```
cor2d(.3)
cor2d(((1:9)/10))
```

d2cor

Convert from d to r

Description

Convert from d to r

Usage

```
d2cor(d)
```

Arguments

d A d-value or a vector of d values.

Value

A r value or a vector of r values.

Author(s)

Allen Goebel and Jeff Jones

Examples

```
d2cor(.3)
d2cor(((1:9)))
```

dComposite

Estimates the d of a composite.

Description

Estimates the d of a composite.

Usage

```
dComposite(rxx, d_vec, wt_vec = rep(1, length(d_vec)))
```

Arguments

- `rx` A matrix of predictor intercorrelations.
- `d_vec` A vector containing d's for each predictor.
- `wt_vec` A vector containing the weights of each item in `rx`.

Value

A vector of correlation coefficients.

Note

This is essentially the same function as `solveWt()`.

Author(s)

Jeff Jones and Allen Goebel

References

Sackett, P. R., & Ellingson, J. E. (1997). *Personnel Psychology*, 50(3), 707-721.

Examples

```
Rxx <- matrix(.3, 3, 3); diag(Rxx) <- 1
ds <- c(.2, .4, .3)
dComposite(rxx = Rxx, d_vec = ds)

Rxx <- matrix(c(1.0, 0.3, 0.2,
                0.3, 1.0, 0.1,
                0.2, 0.1, 1.0), 3, 3)
ds <- c(.1, .3, .7)
ws <- c(1, .5, .5)
dComposite(rxx = Rxx, d_vec = ds, wt_vec = ws)
```

dls2007	<i>Decorte, Lievens, & Sackett (2007) example data</i>
---------	--

Description

This hypothetical dataset was published in Decorte, W., Lievens, F., Sackett, P. R. (2007). The first column contains black-white subgroup difference scores. Columns 2-7 contain a hypothetical predictor, job performance correlation matrix.

Usage

dls2007

Format

A data frame with 6 rows and 7 columns.

References

De Corte, W., Lievens, F., & Sackett, P. R. (2007) Combining predictors to achieve optimal trade-offs between selection quality and adverse impact. *Journal of Applied Psychology*, 92(5), 1380.

 fuse

Computes the correlation between two composites of items.

Description

Computes the correlation between two composites of items. Composites may contain overlapping items. Items weights for each composite may be specified.

Usage

```
fuse(r_mat, a, b, wt_a = rep(1, length(a)), wt_b = rep(1, length(b)))
```

Arguments

<code>r_mat</code>	A correlation matrix.
<code>a</code>	The items used for composite A specified as a vector of column numbers.
<code>b</code>	The items used for composite B specified as a vector of column numbers.
<code>wt_a</code>	A vector containing the weights of each item in composite A.
<code>wt_b</code>	A vector containing the weights of each item in composite B.

Value

A correlation coefficient.

Author(s)

Allen Goebel and Jeff Jones

References

Lord, F.M. & Novick, M.R. (1968). *Statistical theories of mental test scores.*, 97-98.

Examples

```

Rxx <- matrix(c(1.00, 0.25, 0.50, 0.61,
               0.25, 1.00, 0.30, 0.10,
               0.50, 0.30, 1.00, -0.30,
               0.61, 0.10, -0.30, 1.00), 4, 4)

a <- c(1, 3)
b <- c(2, 4)

# Example using overlapping items and weights
Rxx <- matrix(.3, 4, 4); diag(Rxx) <- 1
a <- c(1, 2, 4)
b <- c(2, 3)
wt_a <- c(.60, .25, .15)
wt_b <- c(2, 3)

fuse(r_mat = Rxx, a = a, b = b, wt_a = wt_a, wt_b = wt_b)

```

fuseMat	<i>The intercorrelation among items and composites made of these items.</i>
---------	---

Description

The key matrix is used to specify any number of weighted item composites. A correlation matrix of these composites and the original correlation matrix is then computed and returned.

Usage

```

fuseMat(r_mat, key_mat, type = "full")

```

Arguments

r_mat	A correlation matrix.
key_mat	A matrix with one row for each composite and one column for each item contained in r_mat. The value if each element corresponds to the weight given to an item.
type	The type of output desired.

Value

If type = cxc then a matrix of the intercorrelations between the specified composites are returned. If type = cxr then the intercorrelations between the original item and the specified composites are returned. If type = full then all the intercorrelations between both the original items and the specified composites are returned.

Author(s)

Allen Goebel and Jeff Jones

Examples

```

Rxx <- matrix(c(1.00, 0.25, 0.50, 0.61,
               0.25, 1.00, 0.30, 0.10,
               0.50, 0.30, 1.00, -0.30,
               0.61, 0.10, -0.30, 1.00), 4, 4); Rxx

# Single composite
Key <- matrix(c(1, 2, 3, -1), 1, 4); Key

fuseMat(r_mat = Rxx, key_mat = Key)

# Three composites
Key <- matrix(c(1, 2, 3, -1,
               2, 1, 0, -2,
               1, 1, 0, 0), 3, 4, byrow = TRUE)

fuseMat(Rxx, Key)

```

fuseVec	<i>Computes the correlation between a composite and a vector of items.</i>
---------	--

Description

Computes the correlation between a composite and a vector of items.

Usage

```

fuseVec(r_mat, a, wt_a = rep(1, length(a)), output = "vec")

```

Arguments

r_mat	A correlation matrix.
a	The items used for composite A specified as a vector of column numbers.
wt_a	A vector containing the weights of each item in composite A.
output	Output can be set to "mat", to return a matrix made up of the newly generated correlations appened to the original correlation matrix.

Value

A vector of correlation coefficients.

Author(s)

Allen Goebel and Jeff Jones

References

Lord, F.M. & Novick, M.R. (1968). *Statistical theories of mental test scores.*, 97-98.

Examples

```
data(dls2007)
dat <- dls2007
rxx <- dat[1:4, 2:5]
items <- c(1,3)
wt_a <- c(2,1)

fuseVec(r_mat=rxx, a=items)
fuseVec(r_mat=rxx, a=items, wt_a=wt_a, output="mat")
```

lMvrrc

Lawley multivariate range restriction correction.

Description

Lawley multivariate range restriction correction.

Usage

```
lMvrrc(rcov, vnp, as_cor = TRUE)
```

Arguments

rcov	The covariance matrix of the restricted sample.
vnp	The covariance matrix of predictors explicitly used for selection. This matrix should be based on the the unrestricted population.
as_cor	This argument can be set to FALSE to return a covariance matrix.

Value

The the correlation matrix or variance covariance in the unrestricted population.

Author(s)

The original function was written by Adam Beatty and adapted by Allen Goebel.

References

Lawley D. N (1943). A note on Karl Pearson's selection formulae. *Proceedings of the Royal Society of Edinburgh.*, 62(Section A, Pt. 1), 28-30.

Examples

```
data(rcea1994)
vstar <- rcea1994$vstar
vpp <- rcea1994$vpp

lMvrrc(rcov=vstar, vnp=vpp)
```

paretoXX

*Computes data needed for a XX Pareto plot.***Description**

Computes data needed for a XX Pareto plot.

Usage

```
paretoXX(r_mat, x_col, y_col, pts = 100)
```

Arguments

<code>r_mat</code>	A correlation matrix.
<code>x_col</code>	A vector of columns representing predictor variables.
<code>y_col</code>	A vector of columns representing criterion variables.
<code>pts</code>	The number of points used. Determines accuracy.

Value

- `betas`A matrix of beta weights for each criteria weight
- `wt_one`The weight given to the first criterion
- `multiple_r`The correlation between the predictor and criterion composites

Author(s)

Allen Goebel and Jeff Jones

Examples

```
# Setup Data
data(dls2007)
r_mat <- dls2007[1:6, 2:7]

#Run Model
XX1 <- paretoXX(r_mat=r_mat, x_col=1:4, y_col=5:6)

# Plot Multiple correlations
plot(c(0,1), c(.3,.5), type="n", xlab="C1 Wt", ylab="mr")
lines(XX1$wt_one, (XX1$R2)[,1])
lines(XX1$wt_one, (XX1$R2)[,2])
```

paretoXY

Computes data needed for a XY Pareto plot.

Description

Computes data needed for a XY Pareto plot.

Usage

```
paretoXY(r_mat, x_col, y_col, d_vec, gen = 100, pop = 100,
         pred_lower = rep(-2, length(x_col)), pred_upper = rep(2, length(x_col)))
```

Arguments

r_mat	A correlation matrix.
x_col	A vector of columns representing predictor variables.
y_col	A vector of columns representing criterion variables.
d_vec	A vector of d scores.
gen	The number of iterations used by the algorithm.
pop	The population or number of cases used by the algorithm.
pred_lower	The minimum weight allowed for each predictor.
pred_upper	The maximum weight allowed for each predictor.

Value

- betasA matrix of beta weights for each criteria weight
- mr_dA matrix of multiple correlations or d values corresponding to each row of beta weights.
- pareto_optimalA vector indicating whether each value is pareto optimal

Author(s)

Allen Goebel Jeff Jones

Examples

```
data(dls2007)
dat <- dls2007
r_mat <- dat[1:6, 2:7]
x_col <- 1:4
y_col <- 5:6
d_vec <- dat[1:4, 1]

paretoXY(r_mat=r_mat, x_col=1:4, y_col=5, d_vec=d_vec, pred_lower=c(0,0,0,0))
paretoXY(r_mat=r_mat, x_col=1:4, y_col=c(5,6))
```

rcea1994	<i>Ree, Carretta, Earles, Albert (1994)</i>
----------	---

Description

This example data was published in Ree, M. J., Carretta, T. R., Earles, J. A., & Albert, W. (1994). The data set contains two matrices stored as a list, which can be used to demonstrate multivariate range restriction corrections. The vstar matrix is the variance-covariance matrix of the unrestricted sample. The vpp matrix is the variance covariance matrix of the restricted sample. The vpp matrix represents the subset of variables which were explicitly used for selection, which are also found in the upper left corner of the vstar matrix.

Usage

```
rcea1994
```

Format

A list containing a 4x4 matrix and a 2x2 matrix as elements.

References

Ree, M. J., Carretta, T. R., Earles, J. A., & Albert, W. (1994). Sign changes when correcting for range restriction: A note on Pearson's and Lawley's selection formulas. *Journal of Applied Psychology*, 72(2), 298.

reliabate	<i>Disattenuate a correlation matrix using an estimate of the component reliabilities</i>
-----------	---

Description

Disattenuate a correlation matrix using an estimate of the component reliabilities

Usage

```
reliabate(r_mat, rel_vec)
```

Arguments

r_mat	A correlation matrix
rel_vec	A vector of reliabilities.

Value

A reliabated (disattenuated) correlation matrix.

Author(s)

Allen Goebel and Jeff Jones

Examples

```
r_mat <- matrix(c(1.00, 0.25, 0.30,
                  0.25, 1.00, 0.50,
                  0.30, 0.50, 1.00), 3, 3)
rel   <- c(.70, .64, .81)
reliabate(r_mat = r_mat, rel_vec = rel)
```

relWt	<i>Relative weights</i>
-------	-------------------------

Description

Function to implement Johnson’s (2000) relative weight computation.

Usage

```
relWt(r_mat, y_col, x_col)
```

Arguments

- r_mat A correlation matrix.
- y_col A vector of columns representing criterion variables.
- x_col A vector of columns representing predictor variables.

Value

A list containing the objects `eps`, `beta_star`, and `lambda_star`. The object `eps` contains the vector of relative weights of the predictors whose sum is equivalent to the model R^2 (see Johnson, 2000, ps 8 - 9). The object `beta_star` contains the regression weights from regressing the criterion on Z, the ‘best fitting orthogonal approximation’ of the predictor variables (see Johnson, 2000, p. 5). The object `lambda_star` contains the regression coefficients from regressing Z on the predictor variables (see Jonhson, 2000, p. 8).

Author(s)

Jeff Jones and Allen Goebel

References

Johnson, J. (2000). A heuristic method for estimating the relative weight of predictor variables in multiple regression. *Multivariate Behavioral Research*, 35, 1–19.

Examples

```
Rs <- matrix(c(1.0, 0.2, 0.3, 0.4, -0.4,
              0.2, 1.0, 0.5, 0.1, 0.1,
              0.3, 0.5, 1.0, 0.2, -0.3,
              0.4, 0.1, 0.2, 1.0, 0.4,
              -0.4, 0.1, -0.3, 0.4, 1.0), 5, 5)

ys <- 5
xs <- 1:4

relWt(Rs, ys, xs)
```

rmatReg

*Regression***Description**

Regression

Usage

```
rmatReg(r_mat, y_col, x_col)
```

Arguments

r_mat A correlation matrix.

y_col The column representing the criterion variable.

x_col A vector of columns representing predictor variables.

Value

Regression beta weights and R2.

Author(s)

Allen Goebel and Jeff Jones

Examples

```
Rs <- matrix(c(1.0, 0.2, 0.3, 0.4, -0.4,
              0.2, 1.0, 0.5, 0.1, 0.1,
              0.3, 0.5, 1.0, 0.2, -0.3,
              0.4, 0.1, 0.2, 1.0, 0.4,
              -0.4, 0.1, -0.3, 0.4, 1.0), 5, 5)

ys <- 5
xs <- 1:4

rmatReg(Rs, ys, xs)
```

rmatRegPE

Partially evaluated regression

Description

Returns a function for calculating beta weights and R2 which has been partially evaluated with respect to rxx.

Usage

```
rmatRegPE(rxx)
```

Arguments

rxx A matrix of predictor intercorrelations.

Value

Partially evaluated regression function.

Author(s)

Allen Goebel and Jeff Jones

Examples

```
Rxx <- matrix(c(1.00, 0.25, 0.40,
                0.25, 1.00, 0.30,
                0.40, 0.30, 1.00), 3, 3)

rmatRegPE(Rxx)
```

solveWt

Find r given arbitrary predictor weights

Description

Find r given arbitrary predictor weights

Usage

```
solveWt(r_mat, y_col, x_col, wt)
```

Arguments

<code>r_mat</code>	A correlation matrix.
<code>y_col</code>	A vector of columns representing criterion variables.
<code>x_col</code>	A vector of columns representing predictor variables.
<code>wt</code>	A vector of predictor weights or a list of multiple vectors.

Value

The correlation between the weighted predictor composite and criterion.

Note

This uses a simpler, faster version of the same formula used for `fuse()`.

Author(s)

Allen Goebel and Jeff Jones

Examples

```
library(iopsychn)
#Get Data
data(dls2007)
r_mat <- dls2007[1:6, 2:7]

#Get weights
unit_wt <- c(1,1,1,1)
other_wt <- c(1,2,1,.5)
wt_list <- list(unit_wt, other_wt)

#Solve
solveWt(r_mat=r_mat, y_col=6, x_col=1:4, wt=unit_wt)
solveWt(r_mat=r_mat, y_col=6, x_col=1:4, wt=other_wt)
solveWt(r_mat=r_mat, y_col=6, x_col=1:4, wt=wt_list)
```

solveWtR2

Find R2 given arbitrary predictor weights

Description

Find R2 given arbitrary predictor weights

Usage

```
solveWtR2(r_mat, y_col, x_col, wt)
```

Arguments

r_mat	A correlation matrix.
y_col	A vector of columns representing criterion variables.
x_col	A vector of columns representing predictor variables.
wt	A vector of predictor weights or a list of multiple vectors.

Value

Regression R2.

Note

This just calls solveWt() and squares the output.

Author(s)

Allen Goebel and Jeff Jones

Examples

```
library(iopsych)
#Get Data
data(dls2007)
r_mat <- dls2007[1:6, 2:7]

#Get weights
unit_wt <- c(1,1,1,1)
other_wt <- c(1,2,1,.5)
wt_list <- list(unit_wt, other_wt)

#Solve
solveWtR2(r_mat=r_mat, y_col=6, x_col=1:4, wt=unit_wt)
solveWtR2(r_mat=r_mat, y_col=6, x_col=1:4, wt=other_wt)
solveWtR2(r_mat=r_mat, y_col=6, x_col=1:4, wt=wt_list)
```

trModel

Taylor-Russell Ratio

Description

Computes the Taylor Russel ratio

Usage

```
trModel(rxy, sr, br)
```

Arguments

rxxy	The correalltion between the predictor composite and the criterion.
sr	The selection ratio.
br	The base rate of the criterion. The cutoff point indicating success or failure.

Value

The success ratio.

Author(s)

Allen Goebel and Jeff Jones

References

Taylor, H. C., & Russell, J. T. (1939). The relationship of validity coefficients to the practical effectiveness of tests in selection: Discussion and tables. *Journal of Applied Psychology*, 25(5), 565.

Examples

```
trModel(rxy=.5, sr=.5, br=.6)
```

utilityB

Boudreau Utility Model.

Description

This utility model extends the BCG model with additional financial variables.

Usage

```
utilityB(n = 1, sdy, rxy = NULL, uxs = NULL, sr = NULL, pux = NULL,
  cost = 0, period = 1, v = 0, tax = 0, i = 0)
```

Arguments

n	The size of the applicant pool
sdy	The standard deviation of performance in monetary units.
rxxy	the correlation between the predictor composite and the criterion.
uxs	The average predictor score of those selected. If the uxs is unknown, the sr argument can used instead.
sr	A selection ratio or a vector of selection ratios.
pux	The expected average criterion score of selected applicants.
cost	The cost per applicant of a selection system.

period	The anticipated tenure of selected employees.
v	The proportion of new costs to new revenue (i.e. sc/sv).
tax	The marginal tax rate.
i	Discount rate.

Value

Estimated gain in utility.

Note

This functions can except either (1) pux, (2) uxs and rxy, or (3) sr and rxy.

Author(s)

Allen Goebel and Jeff Jones

References

Boudreau, J.W. (1983). Economic considerations in estimating the utility of human resource productivity improvement programs. *Personnel Psychology*, 36, 551-576.

Examples

```
utilityB(sdy=10000, rxy=.50, sr=.30, period=4, v=.5, tax=.1, i=.02)
```

utilityBcg

Brogeden-Cronbach-Gleser Utility Model.

Description

Estimates the utility of an employee selection system.

Usage

```
utilityBcg(n = 1, sdy, rxy = NULL, uxs = NULL, sr = NULL, pux = NULL,
  cost = 0, period = 1)
```

Arguments

n	The size of the applicant pool
sdy	The standard deviation of performance in monetary units.
rxy	The correlation between the predictor composite and the criterion.
uxs	The average predictor score of those selected. If the uxs is unknown, the sr argument can used instead.
sr	A selection ratio or a vector of selection ratios.

puX	The expected average criterion score of selected applicants
cost	The cost per applicant of a selection system.
period	The anticipated tenure of selected employees.

Value

Estimated gain in utility.

Note

This functions can except either (1) pux, (2) uxs and rxy, or (3) sr and rxy.

Author(s)

Allen Goebel and Jeff Jones

References

Cronbach, L. J., & Gleser, G. C. (1965). *Psychological tests and personnel decisions.*, 37-40.

Examples

```
utilityBcg(sdy=10000, rxy=.50, sr=.30)
```

utilityRbn

Raju-Burke-Normand Utility Model

Description

This utility model uses SD of job performance ratings rather than the SD of job performance in monetary units.

Usage

```
utilityRbn(n = 1, sdr, a, rxy, uxs = NULL, sr = NULL, pux = NULL,
  cost = 0, period = 1)
```

Arguments

n	The size of the applicant pool.
sdr	The standard deviation of ratings of job performance.
a	The average total compensation.
rxy	The correlation between the predictor composite and the criterion.
uxs	The average predictor score of those selected. If the uxs is unknown, the sr argument can used instead.
sr	A selection ratio or a vector of selection ratios.

pu _x	The expected average criterion score of selected applicants.
cost	The cost per applicant of a selection system.
period	The anticipated tenure of selected employees.

Value

Estimated gain in utility.

Note

This functions can except either (1) pu_x, (2) ux_s and r_{xy}, or (3) sr and r_{xy}.

Author(s)

Allen Goebel and Jeff Jones

References

Raju, N.S., Burke, M.J. and Normand, J. (1990). A new approach for utility analysis. *Journal of Applied Psychology*, 75, 3-12.

Examples

```
utilityRbn(sdr=10000, a=90000, rxy=.50, sr=.30)
```

utilityShp

Schmidt-Hunter-Pearlman Utility Model.

Description

This model calculates the utility of an intervention accepting d rather than r_{xy} as an argument.

Usage

```
utilityShp(n = 1, sdy, d, cost = 0, period = 1)
```

Arguments

n	The number of employees involved in the intervention.
sdy	The standard deviation of performance in monetary units.
d	The difference in job performance between the group receiving a treatment and the group not receiving a treatment, expressed in standard deviation units.
cost	The cost of the intervention per participant.
period	The anticipated duration of the training effect.

Value

Estimated gain in utility.

Author(s)

Allen Goebel and Jeff Jones

References

Schmidt, F. L., Hunter, J. E., & Pearlman, K. (1982). Assessing the economic impact of personnel programs on workforce productivity. *Personnel Psychology*, 35(2), 333-347.

Examples

```
utilityShp(sdy=10000, d=.50, period=4)
```

 ux

The average score of selected applicants on a predictor composite.

Description

When scores on the predictor composite are assumed to be normally distributed, the average score of selected applicants can be computed for an arbitrary selection ratio using the ordinate of the normal curve.

Usage

```
ux(sr)
```

Arguments

sr A selection ratio or a vector of selection ratios.

Value

ux: The average score of those selected on a predictor composite.

Author(s)

Allen Goebel and Jeff Jones

References

Naylor, J. C., & Shine, L. C. (1965). A table for determining the increase in mean criterion score obtained by using a selection device. *Journal of Industrial Psychology*, 78-109.

Examples

```
ux(.6)
```

Index

* datasets

- asvab, [6](#)
- dls2007, [8](#)
- rcea1994, [15](#)

- aiEst, [2](#)
- aiPux, [3](#)
- aiPuxComposite, [4](#)
- asvab, [6](#)

- cor2d, [6](#)

- d2cor, [7](#)
- dComposite, [7](#)
- dls2007, [8](#)

- fuse, [9](#)
- fuseMat, [10](#)
- fuseVec, [11](#)

- lMvrrc, [12](#)

- paretoXX, [13](#)
- paretoXY, [14](#)

- rcea1994, [15](#)
- reliabate, [15](#)
- relWt, [16](#)
- rmatReg, [17](#)
- rmatRegPE, [18](#)

- solveWt, [18](#)
- solveWtR2, [19](#)

- trModel, [20](#)

- utilityB, [21](#)
- utilityBcg, [22](#)
- utilityRbn, [23](#)
- utilityShp, [24](#)
- ux, [25](#)