Package ‘iopsych’

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Description Collection of functions for IO Psychologists.

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R topics documented:

`aiEst` *Estimate adverse impact given d and sr*

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 Goebl

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

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
- Overeall_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 Goebl

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

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
- Overeall_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 Goebl

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 Goebl 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 Goebl 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

`rxx`	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 rxx.

Value

A vector of correlation coefficients.

Note

This is essentially the same function as solveWt().

Author(s)

Jeff Jones and Allen Goebl

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` *Decorte, Lievens, & Sackett (2007) example data*

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. emphJournal 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 overalapping 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

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

Value

A correlation coefficient.

Author(s)

Allen Goebl and Jeff Jones

References

Lord, F.M. & Novick, M.R. (1968). *Statisticl theories of menal 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 *The intercorrelation among items and composites made of these items.*

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 Goebl 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 — *Computes the correlation between a composite and a vector of items.*

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 Goebl and Jeff Jones

References

Lord, F.M. & Novick, M.R. (1968). *Statisticl 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 Goebl.

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

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

Value

- betasA matrix of beta weights for each criteria weight
- wt_oneThe weight given to the first criterion
- multiple_rThe correlation between the predictor and criterion composites

Author(s)

Allen Goebl 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 algorithim.
`pop`	The population or number of cases used by the algorithim.
`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 Goebl 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` *Ree, Carretta, Earles, Albert (1994)*

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` *Disattenuate a correlation matrix using an estimate of the component reliabilities*

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 or reliabilities.

Value

A reliabated (disattenauted) correlation matrix.

Author(s)

Allen Goebl 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` *Relative weights*

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 Goebl

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 Goebl 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 evalauted with respect to rxx.

Usage

```
rmatRegPE(rxx)
```

Arguments

rxx	A matrix of predictor intercorrelations.

Value

Partially evaluated regression function.

Author(s)

Allen Goebl 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

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

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 Goebl 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
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 Goebl 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

rxy	The correaltion 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 Goebl 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.
rxy	the correlation between the predictor composite and the criterion.
uxs	The average predicter 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 Goebl 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 predicter 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 Goebl 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 predicter 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 Goebl 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 rxy 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 recieving a treatment and the group not recieving a treatment, expressed in standard deviation units.
`cost`	The cost of the intervention per participant.
`period`	The anticipate duration of the training effect.

Value

Estimated gain in utility.

Author(s)

Allen Goebl 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 predicter composite.

Author(s)

Allen Goebl 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)
```

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