Package 'ClinSigMeasures'

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Description Provides measures of effect sizes from summarized continuous variables as well as diagnostic accuracy statistics for 2x2 table data. Includes functions for Cohen's d, Cohen's q, partial eta-squared, coefficient of variation, odds ratio, likelihood ratios, sensitivity, specificity, positive and negative predictive values, and Youden index.

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cohens_d *Cohen's d Calculation*

Description

Calculates a Cohen's d effect size using the means and standard deviations of two independent groups

Usage

```
cohens_d(Group1_Mean, Group1_SD, Group2_Mean, Group2_SD)
```

Arguments

Group1_Mean	Mean for Group 1
Group1_SD	Standard Deviation for Group 1
Group2_Mean	Mean for Group 2
Group2_SD	Standard Deviation for Group 2

Value

A single value representing the Cohen's d effect size

Author(s)

Mike Malek-Ahmadi

References

1. Cohen, Jacob (1988). Statistical Power Analysis for the Behavioral Sciences. Routledge. ISBN 978-1-134-74270-7.

2. Malek-Ahmadi M, Perez SE, Chen K, Mufson EJ. Neuritic and diffuse plaque associations with memory in non-cognitively impaired elderly. J Alzheimers Dis 2016;53(4):1641-1652.

Examples

```
#From Table 2 in Malek-Ahmadi et al (2016)
#comparing groups with (0.75+/-0.35) and without (0.49+/-0.29) neuritic plaques
#on a global cognitive score (z-score).

cohens_d(0.75, 0.35, 0.49, 0.29)
```

cohens_q *Cohen's q Calculation*

Description

Calculates Cohen's q for the effect size of the difference between two correlation values

Usage

```
cohens_q(corr1, corr2)
```

Arguments

corr1	Correlation for First Group
corr2	Correlation for Second Group

Value

A single value representing Cohen's q

Author(s)

Mike Malek-Ahmadi

References

1. Cohen, Jacob (1988). Statistical Power Analysis for the Behavioral Sciences. Routledge. ISBN 978-1-134-74270-7.

2. Yang G, Li D, Rao Y, Lu F. The relationship between cortical thickness and language comprehension varies with sex in healthy young adults: a large sample analysis. Neuroreport 2020;31(2):184-188.

Examples

```
#From Yang et al (2020), Cohen's q for the difference between female and male correlation
#values for vocabulary comprehension and cortical thickness.

cohens_q (0.318, 0.174)
```

cv *Coefficient of Variation Calculation*

Description

Calculates the coefficient of variation for a mean and standard deviation

Usage

```
cv(Mean, SD)
```

Arguments

Mean	Mean for a dataset
SD	Standard Deviation for a dataset

Value

A single value representing the Coefficient of Variation

Author(s)

Mike Malek-Ahmadi

References

1. Everitt B (1998). The Cambridge Dictionary of Statistics. Cambridge, UK New York: Cambridge University Press. ISBN 978-0521593465.

2. Bedeian AG, Mossholder KW. On the use of the coefficient of variation as a measure of diversity. Organizational Research Methods 2000;3(3):285-297.

Examples

```
#From Bedeian & Mossholder (2000), Table 2 Group A data.

cv(28, 7)
```

lr_neg *Likelihood Ratio Negative Calculation From a 2x2 Table*

Description

Calculates diagnostic test likelihood ratio negative and 95 percent confidence intervals for data from a 2x2 table

Usage

```
lr_neg(Cell1, Cell2, Cell3, Cell4)
```

Arguments

Cell1	Value for cases with a positive test
Cell2	Value for controls with a positive test
Cell3	Value for cases with a negative test
Cell4	Value for controls with a negative test

Value

Likelihood Ratio Negative and 95 percent confidence intervals

Author(s)

Mike Malek-Ahmadi

References

1. Grimes DA, Schultz KF. Refining clinical diagnosis with likelihood ratios. Lancet 2005;365:1500-1505.

2. Dujardin B, Van den Ende J, Van Gompel A, Unger JP, Van der Stuyft P. Likelihood ratios: a real improvement for clinical decision making? European Journal of Epidemiology 1994 Feb;10(1):29-36.

Examples

```
#From Table 1 in Dujardin et al (1994)

lr_neg(72, 9, 25, 137)
```

lr_pos *Likelihood Ratio Positive Calculation From a 2x2 Table*

Description

Calculates diagnostic test likelihood ratio positive and 95 percent confidence intervals for data from a 2x2 table

Usage

```
lr_pos(Cell1, Cell2, Cell3, Cell4)
```

Arguments

Cell1	Value for cases with a positive test
Cell2	Value for controls with a positive test
Cell3	Value for cases with a negative test
Cell4	Value for controls with a negative test

Value

Likelihood Ratio Positive and 95 percent confidence intervals

Author(s)

Mike Malek-Ahmadi

References

1. Grimes DA, Schultz KF. Refining clinical diagnosis with likelihood ratios. Lancet 2005;365:1500-1505.

2. Dujardin B, Van den Ende J, Van Gompel A, Unger JP, Van der Stuyft P. Likelihood ratios: a real improvement for clinical decision making? European Journal of Epidemiology 1994 Feb;10(1):29-36.

Examples

```
#From Table 1 in Dujardin et al (1994)

lr_pos(72, 9, 25, 137)
```

nnt *Number Needed to Treat Calculation From a 2x2 Table*

Description

Calculates number needed to treat and 95 percent confidence intervals for data from a 2x2 table

Usage

```
nnt(Cell1, Cell2, Cell3, Cell4)
```

Arguments

Cell1	Value for cases with a positive outcome
Cell2	Value for cases with a negative outcome
Cell3	Value for controls with a positive outcome
Cell4	Value for controls with a negative outcome

Value

Number Needed to Treat and 95 percent confidence intervals

Author(s)

Mike Malek-Ahmadi

References

1. Cook RJ, Sackett DL. The number needed to treat: a clinically useful measure of treatment effect [published correction appears in BMJ 1995 Apr 22;310(6986):1056]. BMJ. 1995;310(6977):452-454.

2. Zar HJ, Cotton MF, Strauss S et al Effect of isoniazid prophylaxi on mortality of tuberculosis in children with HIV: randomised controlled trial. BMJ 2007; 136-9.

Examples

```
#Mortality data from Zar et al (2007)

nnt(121, 11, 110, 21)
```

npv *Negative Predictive Value Calculation From a 2x2 Table*

Description

Calculates diagnostic test negative predictive value and 95 percent confidence intervals for data from a 2x2 table

Usage

```
npv(Cell1, Cell2, Cell3, Cell4)
```

Arguments

Cell1	Value for cases with a positive test
Cell2	Value for controls with a positive test
Cell3	Value for cases with a negative test
Cell4	Value for controls with a negative test

Value

Negative Predictive Value and 95 percent confidence intervals

Author(s)

Mike Malek-Ahmadi

References

1. Trevethan R. Sensitivity, specificity, and predictive values: Foundations, pliabilities, and pitfalls in research and practice. Frontiers in Public Health 2017;5:307.

2. Safari S, Baratloo A, Elfil M, Negida A. Evidence Based Emergency Medicine Part 2: Positive and negative predictive values of diagnostic tests. Emerg (Tehran) 2015;3(3):87-88.

Examples

```
#From Figure 2 in Safari et al (2015)

npv(15, 6, 25, 34)
```

odds_ratio *Odds Ratio Calculation From a 2x2 Table*

Description

Calculates an odds ratio and 95 percent confidence intervals for data from a 2x2 table

Usage

```
odds_ratio(Cell1, Cell2, Cell3, Cell4)
```

Arguments

Cell1	Value for cases with the factor/exposure of interest
Cell2	Value for cases without the factor/exposure of interest
Cell3	Value for controls with the factor/exposure of interest
Cell4	Value for controls without the factor/exposure of interest

Value

Odds ratio and 95 percent confidence intervals

Author(s)

Mike Malek-Ahmadi

References

1.Mufson EJ, Malek-Ahmadi M, Perez SE, Chen K. Braak staging, plaque pathology, and APOE status in elderly persons without cognitive impairment. Neurobiol Aging 2016;37:147-153.

Examples

```
# From Table 1 in Mufson et al (2016), using data for gender (Male/Female)
#and Braak stage group classification (I-II/III-V).

#Female/Braak III-V = 46, Female/Braak I-II = 14, Male/Braak III-V = 32,
#Male/Braak I-II = 31.

odds_ratio(46, 14, 32, 31)
```

partial_eta_sq *Partial Eta Squared Calculation*

Description

Calculates partial eta squared effect size for ANOVAs

Usage

```
partial_eta_sq(SS.Between, SS.Error)
```

Arguments

SS.Between	Sum of Squares Between from ANOVA Output
SS.Error	Sum of Squares Error from ANOVA Output

Value

A single value representing partial eta squared

Author(s)

Mike Malek-Ahmadi

References

1. Levine TR, Hullett CR. Eta squared, partial eta squared, and misreporting of effect size in communication research. Human Communication Research 2002;28:612-625.

Examples

```
#From Levine & Hullett (2002), Example 1 in Table 1

partial_eta_sq(2500, 800)
```

ppv *Positive Predictive Value Calculation From a 2x2 Table*

Description

Calculates diagnostic test positive predictive value and 95 percent confidence intervals for data from a 2x2 table

Usage

```
ppv(Cell1, Cell2, Cell3, Cell4)
```

Arguments

Cell1	Value for cases with a positive test
Cell2	Value for controls with a positive test
Cell3	Value for cases with a negative test
Cell4	Value for controls with a negative test

Value

Positive Predictive Value and 95 percent confidence intervals

Author(s)

Mike Malek-Ahmadi

References

1. Trevethan R. Sensitivity, specificity, and predictive values: Foundations, pliabilities, and pitfalls in research and practice. Frontiers in Public Health 2017;5:307.

2. Safari S, Baratloo A, Elfil M, Negida A. Evidence Based Emergency Medicine Part 2: Positive and negative predictive values of diagnostic tests. Emerg (Tehran) 2015;3(3):87-88.

Examples

```
#From Figure 2 in Safari et al (2015)

ppv(15, 6, 25, 34)
```

---

sensitivity *Sensitivity Calculation From a 2x2 Table*

Description

Calculates diagnostic test sensitivity and 95 percent confidence intervals for data from a 2x2 table

Usage

```
sensitivity(Cell1, Cell2, Cell3, Cell4)
```

Arguments

Cell1	Value for cases with a positive test
Cell2	Value for controls with a positive test
Cell3	Value for cases with a negative test
Cell4	Value for controls with a negative test

Value

Sensitivity and 95 percent confidence intervals

Author(s)

Mike Malek-Ahmadi

References

1. Trevethan R. Sensitivity, specificity, and predictive values: Foundations, pliabilities, and pitfalls in research and practice. Frontiers in Public Health 2017;5:307.

2. Weissberger GH, Strong JV, Stefanidis KB, Summers MJ, Bondi MW, Stricker NH. Diagnostic accuracy of memory measures in Alzheimer's dementia and mild Cognitive Impairment: a Systematic Review and Meta-Analysis. Neuropsychol Rev. 2017;27(4):354-388.

Examples

```
#Sensitivity calculation from Figure 11, Line 22 of Weissberger et al

sensitivity (121, 50, 13, 199)
```

---

specificity *specificity Calculation From a 2x2 Table*

Description

Calculates diagnostic test specificity and 95 percent confidence intervals for data from a 2x2 table

Usage

```
specificity(Cell1, Cell2, Cell3, Cell4)
```

Arguments

Cell1	Value for cases with a positive test
Cell2	Value for controls with a positive test
Cell3	Value for cases with a negative test
Cell4	Value for controls with a negative test

Value

Specificity and 95 percent confidence intervals

Author(s)

Mike Malek-Ahmadi

References

1. Trevethan R. Sensitivity, specificity, and predictive values: Foundations, pliabilities, and pitfalls in research and practice. Frontiers in Public Health 2017;5:307.

2. Weissberger GH, Strong JV, Stefanidis KB, Summers MJ, Bondi MW, Stricker NH. Diagnostic accuracy of memory measures in Alzheimer's dementia and mild Cognitive Impairment: a Systematic Review and Meta-Analysis. Neuropsychol Rev. 2017;27(4):354-388.

Examples

```
#Specificity calculation from Figure 11, Line 22 of Weissberger et al

specificity (121, 50, 13, 199)
```

---

youden_index *Youden Index Calculation From a 2x2 Table*

Description

Calculates the Youden Index for data from a 2x2 table

Usage

```
youden_index(Cell1, Cell2, Cell3, Cell4)
```

Arguments

`Cell1`	Value for cases with a positive test
`Cell2`	Value for controls with a positive test
`Cell3`	Value for cases with a negative test
`Cell4`	Value for controls with a negative test

Value

Youden Index

Author(s)

Mike Malek-Ahmadi

References

1. Ruopp MD, Perkins NJ, Whitcomb BW, Schisterman EF. Youden Index and optimal cut-point estimated from observations affected by a lower limit of detection. Biom J 2008;50(3):419-430.

2. Shaikh SA (2011) Measures derived from a 2 x 2 table for an accuracy of a diagnostic test. J Biomet Biostat 2:128

Examples

```
#From Shaikh (2011), page 3, 2x2 table for "Diagnostic Test Evaluation"

youden_index(105, 171, 15, 87)
```

Index