Package ‘LagSequential’

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Type Package

Title Functions for analyzing lag-sequential categorical data

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LazyLoad yes

LazyData yes

Description This package provides functions for conducting lag sequential analyses.
The programs read a stream of codes, or a frequency transition matrix, and
produce a variety of lag sequential statistics, including transitional
frequencies, expected transitional frequencies, transitional probabilities,
z values, adjusted residuals, Yule's Q values, likelihood ratio tests of
stationarity across time and homogeneity across groups or segments, transformed
kappas for unidirectional dependence, bidirectional dependence, parallel
and nonparallel dominance, and significance levels based on both parametric
and randomization tests.

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LagSequential-package *Functions for analyzing lag-sequential categorical data*

Description

This package provides functions for conducting lag sequential analyses. The programs read a stream of codes, or a frequency transition matrix, and produce a variety of lag sequential statistics, including transitional frequencies, expected transitional frequencies, transitional probabilities, z values, adjusted residuals, Yule's Q values, likelihood ratio tests of stationarity across time and homogeneity across groups or segments, transformed kappas for unidirectional dependence, bidirectional dependence, parallel and nonparallel dominance, and significance levels based on both parametric and randomization tests.

References

O'Connor, B. P. (1999). Simple and flexible SAS and SPSS programs for analyzing lag-sequential categorical data. *Behavior Research Methods, Instrumentation, and Computers, 31,* 718-726.

bidirectional *bidirectional*

Description

Tests for bidirectional dependence between pairs of sequential transitions.

Usage

```
bidirectional(data, ncodes = 6, labels = NULL, lag = 1,
  adjacent = 1, tailed = 1, permtest = 0, nperms = 10,
  nblocks = 3, confid = 95)
```

Arguments

`data`	A one-column, all-numeric dataframe or vector of code sequences, or a square frequency transition matrix. If data is not a frequency transition matrix, then data must be a series of integer codes with values ranging from "1" to what ever value the user specifies in the "ncodes" argument. Cases with missing values are not permitted in the data file.
`ncodes`	The number of possible code values.
`labels`	Optional argument for providing labels to the code values. Accepts a list of string variables. Labels should not exceed five characters. If unspecified, codes will be labeled "Code1", "Code2", etc.
`lag`	The lag number for the analyses.
`adjacent`	Can adjacent values be coded the same? Enter "0" if adjacent events can never be the same. Enter "1" if adjacent events can always be the same. Enter "2" if some adjacent events can, and others cannot, be the same; then enter the appropriate onezero matrix for your data.

`tailed`	Specify whether significance tests are one-tailed or two-tailed. Options are "1" or "2".
`permtest`	Do you want to run permutation tests of significance? Options are "0" for no, or "1" for yes. Warning: these computations can be time consuming.
`nperms`	The number of permutations per block.
`nblocks`	The number of blocks of permutations.
`confid`	The percentage confidence intervals for the permutation tests. Options are "95" for 95 percent confidence intervals or 99 for 99 percent confidence intervals.

Details

This function tests the bidirectional dependence of behaviours *i* to *j*, and *j* to *i*, an additive sequential pattern described by Wampold and Margolin (1982) and Wampold (1989, 1992). Bidirectional dependence suggests a reciprocal effect of behaviours. That is, behaviour *i* influences behaviour *j* and behaviour *j* influences behaviour *i*. For example, if behaviour *i* is a husband's positive behaviour, and behaviour *j* is his wife's positive behaviour, a test of bidirectional dependence asks whether the husband reciprocates the wife's positive behaviour, *and* the wife reciprocates the husband's positive behaviour (See Margolin and Wampold, 1982). Bidirectional dependence is sometimes called a "circuit".

Value

A list with the following elements:

`freqs`	The transitional frequency matrix
`bifreqs`	The bidirectional frequencies
`expbifreqs`	The expected bidirectional frequencies
`kappas`	The bidirectional kappas
`z`	The z values for the kappas
`pk`	The p values (significance levels) for the kappas

Author(s)

Zakary A. Draper & Brian P. O'Connor

References

O'Connor, B. P. (1999). Simple and flexible SAS and SPSS programs for analyzing lag-sequential categorical data. *Behavior Research Methods, Instrumentation, and Computers, 31,* 718-726.

Wampold, B. E., & Margolin, G. (1982). Nonparametric strategies to test the independence of behavioral states in sequential data. *Psychological Bulletin, 92,* 755-765.

Wampold, B. E. (1989). Kappa as a measure of pattern in sequential data. *Quality & Quantity, 23,* 171-187.

Wampold, B. E. (1992). The intensive examination of social interactions. In T. Kratochwill & J. Levin (Eds.), *Single-case research design and analysis: New directions for psychology and education* (pp. 93-131). Hillsdale, NJ: Erlbaum.

Examples

```
bidirectional(data_Wampold_1982, ncodes = 6,
              labels=c('HPos','HNeu','HNeg','WPos','WNeu','WNeg') )
```

---

data_seqgroups *data_seqgroups*

Description

A column vector of simulated data with 393 observations in 3 segments (which could, e.g., be groups or dyads).

Details

A column vector of simulated data with 393 observations in 3 segments (which could, e.g., be groups or dyads). The beginning of each segment is indicated by a number greater than 999. The data set is provided as trial data for the seqgroups function.

Examples

```
summary(data_seqgroups)
```

---

data_sequential *data_sequential*

Description

A column vector of trial data for sequential analyses.

Details

A column vector with 122 observations (codes). The data are provided as trial data for the sequential, bidirectional, twocells, paradom, and nonparadom functions.

Examples

```
summary(data_sequential)
```

data_Wampold_1982 *data_Wampold_1982*

Description

A vector of code sequences that mimic the frequency transition matrix and the statistical results reported in Wampold & Margolin (1982).

Details

A column vector of 200 sequential codes. The data are provided as trial data for the paradom and nonparadom functions.

References

Wampold, B. E., & Margolin, G. (1982). Nonparametric strategies to test the independence of behavioral states in sequential data. *Psychological Bulletin, 92,* 755-765.

Examples

```
summary(data_Wampold_1982)
```

data_Wampold_1984 *data_Wampold_1984*

Description

A vector of code sequences that mimic the frequency transition matrix and the statistical results reported in Wampold (1984).

Details

A column vector of 200 sequential codes. The data are provided as trial data for the paradom and nonparadom functions.

References

Wampold, B. E. (1984). Tests of dominance in sequential categorical data. *Psychological Bulletin, 96,* 424-429.

Examples

```
summary(data_Wampold_1984)
```

nonparadom	*nonparadom*

Description

Tests for nonparallel dominance, a form of asymmetry in predictability, between i to j and k to L (Wampold, 1984, 1989, 1992, 1995).

Usage

```
nonparadom(data, ncodes = 6, i, j, k, L, labels = NULL, lag = 1, adjacent = 1,
           tailed = 1, permtest = 0, nperms = 10, nblocks = 3, confid = 95)
```

Arguments

`data`	A one-column all-numeric dataframe or vector of code sequences, or a square frequency transition matrix. If data is not a frequency transition matrix, then data must be a series of integer codes with values ranging from "1" to what ever value the user specifies in the "ncodes" argument. Cases with missing values are not permitted in the data file.
`ncodes`	The number of possible code values.
`i`	Code value for i.
`j`	Code value for j.
`k`	Code value for k.
`L`	Code value for L.
`labels`	Optional argument for providing labels to the code values. Accepts a list of string variables. Labels should not exceed five characters. If unspecified, codes will be labeled "Code1", "Code2", etc.
`lag`	The lag number for the analyses.
`adjacent`	Can adjacent values be coded the same? Options are "1" for yes or "0" for no.
`tailed`	Specify whether significance tests are one-tailed or two-tailed. Options are "1" or "2".
`permtest`	Do you want to run permutation tests of significance? Options are "0" for no, or "1" for yes. Warning: these computations can be time consuming.
`nperms`	The number of permutations per block.
`nblocks`	The number of blocks of permutations.
`confid`	The percentage confidence intervals for the permutation tests. Options are "95" for 95 percent confidence intervals or 99 for 99 percent confidence intervals.

Details

Tests for nonparallel dominance or asymmetry in predictability, which is the difference in predictability between i to j and k to L (e.g., whether a partner follows a negative behaviour with a positive behaviour), as described by Wampold (1984, 1989, 1992, 1995).

Value

Displays the transitional frequency matrix, expected frequencies, expected and observed nonparallel dominance frequencies, kappas, the z values for the kappas, and the significance levels.

Returns a list with the following elements:

`freqs`	The transitional frequency matrix
`expfreqs`	The expected frequencies
`npdomfreqs`	The nonparallel dominance frequencies
`expnpdomfreqs`	The expected nonparallel dominance frequencies
`domtypes`	There are 4 sequential dominance case types described by Wampold (1989). These cases describe the direction of the effect for *i* on *j* and *j* on *i*. The four cases are: (1) *i* increases *j*, and *j* increases *i*, (2) *i* decreases *j*, and *j* decreases *i*, (3) *i* increases *j*, and *j* decreases *i*, and (4) *i* decreases *j*, and *j* increases *i*. Each cell of this matrix indicates the case that applies to the transition indicated by the cell.
`kappas`	The nonparallel dominance kappas
`z`	The z values for the kappas
`pk`	The p-values for the kappas

Author(s)

Zakary A. Draper & Brian P. O'Connor

References

O'Connor, B. P. (1999). Simple and flexible SAS and SPSS programs for analyzing lag-sequential categorical data. *Behavior Research Methods, Instrumentation, and Computers, 31,* 718-726.

Wampold, B. E., & Margolin, G. (1982). Nonparametric strategies to test the independence of behavioral states in sequential data. *Psychological Bulletin, 92,* 755-765.

Wampold, B. E. (1984). Tests of dominance in sequential categorical data. *Psychological Bulletin, 96,* 424-429.

Wampold, B. E. (1989). Kappa as a measure of pattern in sequential data. *Quality & Quantity, 23,* 171-187.

Wampold, B. E. (1992). The intensive examination of social interactions. In T. Kratochwill & J. Levin (Eds.), *Single-case research design and analysis: New directions for psychology and education* (pp. 93-131). Hillsdale, NJ: Erlbaum.

Wampold, B. E. (1995). Analysis of behavior sequences in psychotherapy. In J. Siegfried (Ed.), *Therapeutic and everyday discourse as behavior change: Towards a micro-analysis in psychotherapy process research* (pp. 189-214). Norwood, NJ: Ablex.

Examples

```
nonparadom(data_Wampold_1984, ncodes = 6, i = 5, j = 3, k = 6, L = 2,
           labels=c('HPos','HNeu','HNeg','WPos','WNeu','WNeg') )
```

paradom *paradom*

Description

Tests for parallel dominance in sequential data.

Usage

```
paradom(data, ncodes = 6, labels = NULL, lag = 1, adjacent = 1,
        tailed = 1, permtest = 0, nperms = 10, nblocks = 3, confid = 95)
```

Arguments

`data`	A one-column all-numeric dataframe or vector of code sequences, or a square frequency transition matrix. If data is not a frequency transition matrix, then data must be a series of integer codes with values ranging from "1" to what ever value the user specifies in the "ncodes" argument. Cases with missing values are not permitted in the data file.
`ncodes`	The number of possible code values.
`labels`	Optional argument for providing labels to the code values. Accepts a list of string variables. Labels should not exceed five characters. If unspecified, codes will be labeled "Code1", "Code2", etc.
`lag`	The lag number for the analyses.
`adjacent`	Can adjacent values be coded the same? Options are "1" for yes or "0" for no.
`tailed`	Specify whether significance tests are one-tailed or two-tailed. Options are "1" or "2".
`permtest`	Do you want to run permutation tests of significance? Options are "0" for no, or "1" for yes. Warning: these computations can be time consuming.
`nperms`	The number of permutations per block.
`nblocks`	The number of blocks of permutations.
`confid`	The percentage confidence intervals for the permutation tests. Options are "95" for 95 percent confidence intervals or 99 for 99 percent confidence intervals.

Details

Tests for parallel dominance or asymmetry in predictability, which is the difference in predictability between i to j and j to i (e.g., whether B's behaviour is more predictable from A's behaviour than vice versa), as described by Wampold (1984, 1989, 1992, 1995).

Value

Displays the transitional frequency matrix and matrices of expected frequencies, expected and observed parallel dominance frequencies, parallel dominance kappas, z values for the kappas, and significance levels. There are four possible cases, or kinds, of parallel dominance (see Wampold 1989, 1992, 1995), and the function returns a matrix indicating the kind of case for each cell in the transitional frequency matrix.

Returns a list with the following elements:

`freqs`	The transitional frequency matrix
`expfreqs`	The expected frequencies
`domfreqs`	The parallel dominance frequencies
`expdomfreqs`	The expected parallel dominance frequencies
`domtypes`	There are 4 sequential dominance case types described by Wampold (1989). These cases describe the direction of the effect for *i* on *j* and *j* on *i*. The four cases are: (1) *i* increases *j*, and *j* increases *i*, (2) *i* decreases *j*, and *j* decreases *i*, (3) *i* increases *j*, and *j* decreases *i*, and (4) *i* decreases *j*, and *j* increases *i*. Each cell of this matrix indicates the case that applies to the transition indicated by the cell.
`kappas`	The parallel dominance kappas
`z`	The z values for the kappas
`pk`	The p-values for the kappas

Author(s)

Zakary A. Draper & Brian P. O'Connor

References

O'Connor, B. P. (1999). Simple and flexible SAS and SPSS programs for analyzing lag-sequential categorical data. *Behavior Research Methods, Instrumentation, and Computers, 31,* 718-726.

Wampold, B. E. (1984). Tests of dominance in sequential categorical data. *Psychological Bulletin, 96,* 424-429.

Wampold, B. E. (1989). Kappa as a measure of pattern in sequential data. *Quality & Quantity, 23,* 171-187.

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Wampold, B. E. (1995). Analysis of behavior sequences in psychotherapy. In J. Siegfried (Ed.), *Therapeutic and everyday discourse as behavior change: Towards a micro-analysis in psychotherapy process research* (pp. 189-214). Norwood, NJ: Ablex.

Examples

```
paradom(data_Wampold_1984, ncodes = 6,
        labels=c('HPos','HNeu','HNeg','WPos','WNeu','WNeg') )
```

`seqgroups` *seqgroups*

Description

Computes a variety of sequential analysis statistics for data that are in segments (e.g, for multiple dyads or groups.

Usage

```
seqgroups(alldata, ncodes = 6, labels = NULL, lag = 1, adjacent = 1,
          onezero = NULL, tailed = 2, test = 1, output = 2, outfile = 1)
```

Arguments

`alldata`	An all-numeric dataframe or vector. The data are assumed to be a series of integer codes with values ranging from "1" to what ever value the user specifies in the "ncodes" argument. The beginning of each segment, or group should be specified with a number greater than 999. Cases with missing values are not permitted in the data file.
`ncodes`	The number of possible code values.
`labels`	Optional argument for providing labels to the code values. Accepts a list of string variables. Labels should not exceed five characters. If unspecified, codes will be labeled "Code1", "Code2", etc.
`lag`	The lag number for the analyses.
`adjacent`	Can adjacent values be coded the same? Enter "0" if adjacent events can never be the same. Enter "1" if adjacent events can always be the same. Enter "2" if some adjacent events can, and others cannot, be the same; then enter the appropriate onezero matrix for your data.
`onezero`	Optional argument for specifying the one-zero matrix for the data. Accepts a square matrix of ones and zeros with length ncodes. A "1" indicates that the expected frequency for a given cell is to be estimated, whereas a "0" indicates that the expected frequency for the cell should NOT be estimated, typically because it is a structural zero (codes that cannot follow one another). By default, the matrix that is created by the above commands has zeros along the main diagonal, and ones everywhere else, which will be appropriate for most data sets. However, if yor data happen to involve structural zeros that occur in cells other than the cells along the main diagonal, then you must create a ONEZERO matrix with ones and zeros that is appropriate for your data.
`tailed`	Specify whether significance tests are one-tailed or two-tailed. Options are "1" or "2".
`test`	Specify whether to run tests for homogeneity of homogeneity or stationarity. Homogeneity should be tested when groups in the data are actually different groups, whereas stationarity should be tested when groups in the data are segments of a single stream of observations. Options are "1" for homogeneity of "2" for stationarity.
`output`	Specify the desired output. Options are "1" for pooled data only, or "2" for all data sets.
`outfile`	Specify which results should be saved in an outfile.

Details

Computes a variety of sequential analysis statistics for data that are in segments (e.g, for multiple dyads or groups. This is the same as the "sequential" function provided in this package, but allows for the data to be segmented. Sequential statistics are calculated for each segment, as well as for the data pooled across all segments.

Value

For each of the groups or segments and for the pooled data, displays the transitional frequency matrix, expected frequencies, transitional probabilities, adjusted residuals and significance levels, Yule's Q values, transformed Kappas (Wampold, 1989, 1992, 1995), z values for the kappas, and significance levels.

Returns a list with the following elements:

`freqs`	The transitional frequency matrix
`expfreqs`	The expected frequencies
`probs`	The transitional probabilities
`chi`	The overall chi-square test of the difference between the observed and expected transitional frequencies
`adjres`	The adjusted residuals
`p`	The statistical significance levels
`YulesQ`	Yule's Q values, indicating the strength of the relationships between the antecedent and the consequence transitions
`kappas`	The nonparallel dominance kappas
`z`	The z values for the kappas
`pk`	The p-values for the kappas

Author(s)

Zakary A. Draper & Brian P. O'Connor

References

O'Connor, B. P. (1999). Simple and flexible SAS and SPSS programs for analyzing lag-sequential categorical data. *Behavior Research Methods, Instrumentation, and Computers, 31,* 718-726.

Wampold, B. E. (1989). Kappa as a measure of pattern in sequential data. *Quality & Quantity, 23,* 171-187.

Wampold, B. E. (1992). The intensive examination of social interactions. In T. Kratochwill & J. Levin (Eds.), *Single-case research design and analysis: New directions for psychology and education* (pp. 93-131). Hillsdale, NJ: Erlbaum.

Wampold, B. E. (1995). Analysis of behavior sequences in psychotherapy. In J. Siegfried (Ed.), *Therapeutic and everyday discourse as behavior change: Towards a micro-analysis in psychotherapy process research* (pp. 189-214). Norwood, NJ: Ablex.

Examples

```
seqgroups(data_seqgroups, ncodes = 6)
```

sequential *sequential*

Description

Computes a variety of sequential analysis statistics for one series of codes.

Usage

```
sequential(data, ncodes = 6, labels = NULL, lag = 1, adjacent = 1,
           onezero = NULL, tailed = 2, permtest = 0, nperms = 10,
           nblocks = 3, confid = 95)
```

Arguments

`data`	A one-column all-numeric dataframe or vector of code sequences, or a square frequency transition matrix. If data is not a frequency transition matrix, then data must be a series of integer codes with values ranging from "1" to what ever value the user specifies in the "ncodes" argument. Cases with missing values are not permitted in the data file.
`ncodes`	The number of possible code values.
`labels`	Optional argument for providing labels to the code values. Accepts a list of string variables. Labels should not exceed five characters. If unspecified, codes will be labeled "Code1", "Code2", etc.
`lag`	The lag number for the analyses.
`adjacent`	Can adjacent values be coded the same? Enter "0" if adjacent events can never be the same. Enter "1" if adjacent events can always be the same. Enter "2" if some adjacent events can, and others cannot, be the same; then enter the appropriate onezero matrix for your data.
`onezero`	Optional argument for specifying the one-zero matrix for the data. Accepts a square matrix of ones and zeros with length ncodes. A "1" indicates that the expected frequency for a given cell is to be estimated, whereas a "0" indicates that the expected frequency for the cell should NOT be estimated, typically because it is a structural zero (codes that cannot follow one another). By default, the matrix that is created by the above commands has zeros along the main diagonal, and ones everywhere else, which will be appropriate for most data sets. However, if yor data happen to involve structural zeros that occur in cells other than the cells along the main diagonal, then you must create a ONEZERO matrix with ones and zeros that is appropriate for your data.
`tailed`	Specify whether significance tests are one-tailed or two-tailed. Options are "1" or "2".
`permtest`	Do you want to run permutation tests of significance? Options are "0" for no, or "1" for yes. Warning: these computations can be time consuming.
`nperms`	The number of permutations per block.
`nblocks`	The number of blocks of permutations.
`confid`	The percentage confidence intervals for the permutation tests. Options are "95" for 95 percent confidence intervals or 99 for 99 percent confidence intervals.

Details

Tests unidirectional dependence of states (codes). Specifically, this function tests the hypothesis that state *i* (the consequence) follows state *j* (the antecedent) with a greater than chance probability. Computes a variety of statistics including two indices of effect size with corresponding significance tests. The larger the effect the more like the consequence is to follow the antecedent.

Value

Displays the transitional frequency matrix, expected frequencies, transitional probabilities, adjusted residuals and significance levels, Yule's Q values, transformed Kappas (Wampold, 1989, 1992, 1995), z values for the kappas, and significance levels.

Returns a list with the following elements:

`freqs`	The transitional frequency matrix
`expfreqs`	The expected frequencies
`probs`	The transitional probabilities
`chi`	The overall chi-square test of the difference between the observed and expected transitional frequencies
`adjres`	The adjusted residuals
`p`	The statistical significance levels
`YulesQ`	Yule's Q values, indicating the strength of the relationships between the antecedent and the consequence transitions
`kappas`	The nonparallel dominance kappas
`z`	The z values for the kappas
`pk`	The p-values for the kappas

Author(s)

Brian P. O'Connor & Zakary A. Draper

References

O'Connor, B. P. (1999). Simple and flexible SAS and SPSS programs for analyzing lag-sequential categorical data. *Behavior Research Methods, Instrumentation, and Computers, 31,* 718-726.

Wampold, B. E. (1989). Kappa as a measure of pattern in sequential data. *Quality & Quantity, 23,* 171-187.

Wampold, B. E. (1992). The intensive examination of social interactions. In T. Kratochwill & J. Levin (Eds.), *Single-case research design and analysis: New directions for psychology and education* (pp. 93-131). Hillsdale, NJ: Erlbaum.

Wampold, B. E. (1995). Analysis of behavior sequences in psychotherapy. In J. Siegfried (Ed.), *Therapeutic and everyday discourse as behavior change: Towards a micro-analysis in psychotherapy process research* (pp. 189-214). Norwood, NJ: Ablex.

Examples

```
# data is a one-column all-numeric dataframe of code sequences
sequential(data_sequential, ncodes = 6)

# in this case, data is the frequency transition matrix from Griffin & Gottman (1990, p. 137)
# Griffin, W. A., & Gottman, J. M. (1990). Statistical methods for analyzing family
# interaction. In G. R. Patterson (Ed.), Family social interaction: Content and methodology
# issues in the study of aggression and depression (pp. 130-168). Hillsdale, NJ: Erlbaum.
freqs <- t(matrix(c(
0, 0, 0, 0, 2, 2,
0,10, 5, 5,60,20,
0, 9, 2, 1, 3, 0,
0, 3, 0, 1, 5, 0,
3,54, 6, 2,24, 8,
1,24, 2, 1, 3, 12  ), 6, 6) )

sequential(freqs, ncodes=6, adjacent = 1, labels=c('H+','Ho','H-','W+','Wo','W-'))
```

`twocells` *twocells*

Description

Simultaneously tests the the unidirectional dependence of *i* to *j*, and the unidirectional dependence of *k* to *L*, an additive pattern described by Wampold and Margolin (1982) and Wampold (1989, 1992).

Usage

```
twocells(data, i, j, k, L, ncodes = 6, labels = NULL, lag = 1,
         adjacent = 1, tailed = 1, permtest = 0, nperms = 10,
         nblocks = 3, confid = 95)
```

Arguments

`data`	A one-column all-numeric dataframe or vector of code sequences, or a square frequency transition matrix. If data is not a frequency transition matrix, then data must be a series of integer codes with values ranging from "1" to what ever value the user specifies in the "ncodes" argument. Cases with missing values are not permitted in the data file.
`i`	Code value for *i*.
`j`	Code value for *j*.
`k`	Code value for *k*.
`L`	Code value for *L*.
`ncodes`	The number of possible code values.
`labels`	Optional argument for providing labels to the code values. Accepts a list of string variables. Labels should not exceed five characters. If unspecified, codes will be labeled "Code1", "Code2", etc.
`lag`	The lag number for the analyses.
`adjacent`	Can adjacent values be coded the same? Options are "1" for yes, and "0" for no.

`tailed` Specify whether significance tests are one-tailed or two-tailed. Options are "1" or "2".

`permtest` Do you want to run permutation tests of significance? Options are "0" for no, or "1" for yes. Warning: these computations can be time consuming.

`nperms` The number of permutations per block.

`nblocks` The number of blocks of permutations.

`confid` The percentage confidence intervals for the permutation tests. Options are "95" for 95 percent confidence intervals or 99 for 99 percent confidence intervals.

Details

This function simultaneously tests the unidirectional dependence of *i* to *j* and the unidirectional dependence of *k* to *L*. The user specifies the code values used for *i*, *j*, *k*, and *L* in the analyses. This function is useful for answering theoretical questions about behaviour. For example, Wampold and Margolin (1982) described a situation wherein a spouse responds to negative behaviours with something other than a negative behaviour.

Value

Displays the transitional frequency matrix, observed and expected values for the two cell test, kappa, the z value for kappa, and the significance level.

Returns a list with the following elements:

`freqs` The transitional frequency matrix

`expfreqs` The expected frequencies

`twocellfreq` The observed number of transitions from *i* to *j* and from *k* to *L*.

`kappa` The twocells kappa

`z` The z value for the kappa

`pk` The p-value for the kappa

Author(s)

Zakary A. Draper & Brian P. O'Connor

References

O'Connor, B. P. (1999). Simple and flexible SAS and SPSS programs for analyzing lag-sequential categorical data. *Behavior Research Methods, Instrumentation, and Computers, 31,* 718-726.

Wampold, B. E., & Margolin, G. (1982). Nonparametric strategies to test the independence of behavioral states in sequential data. *Psychological Bulletin, 92,* 755-765.

Wampold, B. E. (1989). Kappa as a measure of pattern in sequential data. *Quality & Quantity, 23,* 171-187.

Wampold, B. E. (1992). The intensive examination of social interactions. In T. Kratochwill & J. Levin (Eds.), *Single-case research design and analysis: New directions for psychology and education* (pp. 93-131). Hillsdale, NJ: Erlbaum.

Wampold, B. E. (1995). Analysis of behavior sequences in psychotherapy. In J. Siegfried (Ed.), *Therapeutic and everyday discourse as behavior change: Towards a micro-analysis in psychotherapy process research* (pp. 189-214). Norwood, NJ: Ablex.

Examples

```
twocells(data_Wampold_1982, ncodes = 6, i = 6, j = 1, k = 3, L = 4,
         labels=c('HPos','HNeu','HNeg','WPos','WNeu','WNeg') )
```

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