Package 'apa'

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Type Package

Title Format Outputs of Statistical Tests According to APA Guidelines

Version 0.3.4

Description Formatter functions in the 'apa' package take the return value of a statistical test function, e.g. a call to chisq.test() and return a string formatted according to the guidelines of the APA (American Psychological Association).

URL https://github.com/dgromer/apa

BugReports https://github.com/dgromer/apa/issues

License GPL (>= 3)

Depends R (>= 3.1.0)

Imports dplyr (>= 0.4), magrittr, MBESS, purrr, rmarkdown, stringr, tibble

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anova_apa *Report ANOVA in APA style*

Description

Report ANOVA in APA style

Usage

```
anova_apa(
  x,
  effect = NULL,
  sph_corr = c("greenhouse-geisser", "gg", "huynh-feldt", "hf", "none"),
  force_sph_corr = FALSE,
  es = c("petasq", "pes", "getasq", "ges"),
 format = c("text", "markdown", "rmarkdown", "html", "latex", "latex_math", "docx",
    "plotmath"),
  info = FALSE,
  print = TRUE
)
```

Arguments

x	A call to aov, ez::ezANOVA, or afex::afex_ez, afex::afex_car or afex::afex_4
effect	Character string indicating the name of the effect to display. If is NULL, all effects are reported (default).
sph_corr	Character string indicating the method used for correction if the assumption of sphericity is violated (only applies to repeated-measures and mixed design ANOVA). Can be one of "greenhouse-geisser" (default), "huynh-feldt" or "none" (you may also use the abbreviations "gg" or "hf").
force_sph_corr	Logical indicating if sphericity correction should be applied to all within factors regardless of what the result of Mauchly's test of sphericity is (default is FALSE).
es	Character string indicating the effect size to display in the output, one of "petasq" (partial eta squared) or "getasq" (generalized eta squared) (you may also use the abbreviations "pes" or "ges").
format	Character string specifying the output format. One of "text", "markdown", "rmarkdown", html, "latex", "latex_math", "docx" or "plotmath".

info	Logical indicating whether to print a message on the used test (default is FALSE)
print	Logical indicating whether to print the formatted output via cat (TRUE, default) or return as a data frame.

Examples

```
# Using the ez package
library(ez)
data(ANT)

x <- ezANOVA(ANT[ANT$error==0,], dv = rt, wid = subnum,
             within = c(cue, flank), between = group, detailed = TRUE)
anova_apa(x)

# Using the afex package
library(afex)
data(md_12.1)

y <- aov_ez(id = "id", dv = "rt", data = md_12.1,
            within = c("angle", "noise"))
anova_apa(y)
```

---

apa *APA Formatting for RMarkdown Reports*

Description

A wrapper around the *_apa functions, providing a convenient way to use the formatters in inline code in RMarkdown documents.

Usage

```
apa(x, effect = NULL, format = "rmarkdown", print = FALSE, ...)
```

Arguments

x	An R object. Must be a call to one of afex::aov_4, afex::aov_car, afex::aov_ez, chisq.test, cor.test, ez::ezANOVA or t_test.
effect	(only applicable if x is an ANOVA) Character string indicating the name of the effect to display. If is NULL, all effects are reported (default).
format	Character string specifying the output format. One of "text", "markdown", "rmarkdown", html, "latex" or "docx".
print	Logical indicating whether to return the result as an R object (FALSE) or print using cat (TRUE).
...	Further arguments passed to other methods

See Also

anova_apa, chisq_apa, cor_apa, t_apa

`chisq_apa` *Report Chi-squared test in APA style*

Description

Report Chi-squared test in APA style

Usage

```
chisq_apa(
  x,
  print_n = FALSE,
  format = c("text", "markdown", "rmarkdown", "html", "latex", "latex_math", "docx",
    "plotmath"),
  info = FALSE,
  print = TRUE
)
```

Arguments

`x`	A call to `chisq.test`
`print_n`	Logical indicating whether to show sample size in text
`format`	Character string specifying the output format. One of `"text"`, `"markdown"`, `"rmarkdown"`, `html`, `"latex"`, `"latex_math"`, `"docx"` or `"plotmath"`.
`info`	Logical indicating whether to print a message on the used test (default is `FALSE`)
`print`	Logical indicating whether to print the formatted output via `cat` (`TRUE`, default) or return as character string.

Examples

```
# Example data from ?chisq.test
m <- rbind(c(762, 327, 468), c(484, 239, 477))

chisq_apa(chisq.test(m))
```

cohens_d *Cohen's d*

Description

Calculate Cohen's d from raw data or a call to `t_test`/`t.test`.

Usage

```
cohens_d(...)

## Default S3 method:
cohens_d(
  x,
  y = NULL,
  paired = FALSE,
  corr = c("none", "hedges_g", "glass_delta"),
  na.rm = FALSE,
  ...
)

## S3 method for class 'data.frame'
cohens_d(
  data,
  dv,
  iv,
  paired = FALSE,
  corr = c("none", "hedges_g", "glass_delta"),
  na.rm = FALSE,
  ...
)

## S3 method for class 'formula'
cohens_d(
  formula,
  data,
  corr = c("none", "hedges_g", "glass_delta"),
  na.rm = FALSE,
  ...
)

## S3 method for class 'htest'
cohens_d(ttest, corr = c("none", "hedges_g", "glass_delta"), ...)
```

Arguments

`...`	Further arguments passed to methods.

x	A (non-empty) numeric vector of data values.
y	An optional (non-empty) numeric vector of data values.
paired	A logical indicating whether Cohen's d should be calculated for a paired sample or two independent samples *(default)*. Ignored when calculating Cohen's for one sample.
corr	Character specifying the correction applied to calculation of the effect size: "none" *(default)* returns Cohen's d, "hedges_g" applies Hedges correction and "glass_delta" calculates Glass' Δ (uses the standard deviation of the second group).
na.rm	Logical. Should missing values be removed?
data	A data frame containing either the variables in the formula formula or the variables specified by dv and iv.
dv	Character indicating the name of the column in data for the dependent variable
iv	Character indicating the name of the column in data for the independent variable
formula	A formula of the form lhs ~ rhs where lhs is a numeric variable giving the data values and rhs either 1 for one sample or paired data or a factor with two levels giving the corresponding groups. If lhs is of class "Pair" and rhs is 1, Cohen's d for paired data will be calculated.
ttest	An object of class htest (a call to either t_test (preferred) or t.test).

Details

To calculate Cohen's d from summary statistics (M, SD, ..) use cohens_d_.

References

Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: a practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, 4, 863. doi:10.3389/fpsyg.2013.00863

Examples

```
# Calculate from raw data
cohens_d(c(10, 15, 11, 14, 17), c(22, 18, 23, 25, 20))

# Methods when working with data frames
cohens_d(sleep, dv = extra, iv = group, paired = TRUE)
# or
cohens_d(sleep, dv = "extra", iv = "group", paired = TRUE)
# formula interface
sleep2 <- reshape(sleep, direction = "wide", idvar = "ID", timevar = "group")
cohens_d(Pair(extra.1, extra.2) ~ 1, sleep2, paired = TRUE)

# Or pass a call to t_test or t.test
cohens_d(t_test(Pair(extra.1, extra.2) ~ 1, sleep2))
```

cohens_d_ *Cohen's d*

Description

Calculate Cohens'd from different statistics (see Details).

Usage

```
cohens_d_(
  m1 = NULL,
  m2 = NULL,
  sd1 = NULL,
  sd2 = NULL,
  n1 = NULL,
  n2 = NULL,
  t = NULL,
  n = NULL,
  paired = FALSE,
  corr = c("none", "hedges_g", "glass_delta")
)
```

Arguments

m1	Numeric, mean of the first group
m2	Numeric, mean of the second group
sd1	Numeric, standard deviation of the first group
sd2	Numeric, standard deviation of the second group
n1	Numeric, size of the first group
n2	Numeric, size of the second group
t	Numeric, t-test statistic
n	Numeric, total sample size
paired	Logical indicating whether to calculate Cohen's for independent samples or one sample (FALSE, *default*) or for dependent samples (TRUE).
corr	Character specifying the correction applied to calculation of the effect size: "none" *(default)* returns Cohen's d, "hedges_g" applies Hedges correction and "glass_delta" calculates Glass' Δ (uses the standard deviation of the second group).

Details

The following combinations of statistics are possible:

- m1, m2, sd1, sd2, n1 and n2
- t, n1 and n2
- t and n

References

Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: a practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, 4, 863. doi:10.3389/fpsyg.2013.00863

`cor_apa` *Report Correlation in APA style*

Description

Report Correlation in APA style

Usage

```
cor_apa(
  x,
  r_ci = FALSE,
 format = c("text", "markdown", "rmarkdown", "html", "latex", "latex_math", "docx",
    "plotmath"),
  info = FALSE,
  print = TRUE
)
```

Arguments

`x`	A call to `cor.test`
`r_ci`	Logical indicating whether to display the confidence interval for the correlation coefficient (default is `FALSE`). Only available for Pearson's product moment correlation (with n >= 4).
`format`	Character string specifying the output format. One of `"text"`, `"markdown"`, `"rmarkdown"`, `html`, `"latex"`, `"latex_math"`, `"docx"` or `"plotmath"`.
`info`	Logical indicating whether to print a message on the used test (default is `FALSE`)
`print`	Logical indicating whether to print the formatted output via `cat` (`TRUE`, default) or return as character string.

Examples

```
# Example data from ?cor.test
x <- c(44.4, 45.9, 41.9, 53.3, 44.7, 44.1, 50.7, 45.2, 60.1)
y <- c( 2.6,  3.1,  2.5,  5.0,  3.6,  4.0,  5.2,  2.8,  3.8)

cor_apa(cor.test(x, y))

# Spearman's rho
cor_apa(cor.test(x, y, method = "spearman"))

# Kendall's tau
cor_apa(cor.test(x, y, method = "kendall"))
```

petasq *Partial Eta Squared*

Description

Partial Eta Squared

Usage

```
petasq(x, effect)
```

Arguments

x	A call to aov, ez::ezANOVA or afex::aov_ez or afex::aov_car or afex::aov_4
effect	Character string indicating the name of the effect for which the partial eta squared should be returned.

petasq_ *Partial Eta Squared*

Description

Calculate the partial eta squared effect size from sum of squares.

$$\eta_p^2 = \frac{SS_effect}{SS_effect + SS_error}$$

Usage

```
petasq_(ss_effect, ss_error)
```

Arguments

ss_effect	numeric, sum of squares of the effect
ss_error	numeric, sum of squares of the corresponding error

t_apa *Report t-Test in APA style*

Description

Report t-Test in APA style

Usage

```
t_apa(
  x,
  es = "cohens_d",
  es_ci = FALSE,
 format = c("text", "markdown", "rmarkdown", "html", "latex", "latex_math", "docx",
    "plotmath"),
  info = FALSE,
  print = TRUE
)
```

Arguments

x	A call to t_test or t.test
es	Character specifying the effect size to report. One of "cohens_d" (default), "hedges_g" or "glass_delta" if x is an independent samples t-test. Ignored if x is a paired samples or one sample t-test (cohen's d is reported for these test).
es_ci	Logical indicating whether to add the 95 for Cohen's d (experimental; default is FALSE).
format	Character string specifying the output format. One of "text", "markdown", "rmarkdown", html, "latex", "latex_math", "docx" or "plotmath".
info	Logical indicating whether to print a message on the used test (default is FALSE)
print	Logical indicating whether to print the formatted output via cat (TRUE, default) or return as character string.

Examples

```
# Two independent samples t-test
t_apa(t_test(1:10, y = c(7:20)))

# Two dependent samples t-test
sleep2 <- reshape(sleep, direction = "wide", idvar = "ID", timevar = "group")
t_apa(t_test(Pair(extra.1, extra.2) ~ 1, sleep2))
```

t_test *Student's t-Test*

Description

A wrapper for `t.test` which includes the original data in the returned object.

Usage

```
t_test(x, ...)

## Default S3 method:
t_test(
  x,
  y = NULL,
  alternative = c("two.sided", "less", "greater"),
  mu = 0,
  paired = FALSE,
  var.equal = FALSE,
  conf.level = 0.95,
  ...
)

## S3 method for class 'formula'
t_test(formula, data, subset, na.action, ...)
```

Arguments

`x`	a (non-empty) numeric vector of data values.
`...`	further arguments to be passed to or from methods.
`y`	an optional (non-empty) numeric vector of data values.
`alternative`	a character string specifying the alternative hypothesis, must be one of `"two.sided"` (default), `"greater"` or `"less"`. You can specify just the initial letter.
`mu`	a number indicating the true value of the mean (or difference in means if you are performing a two sample test).
`paired`	a logical indicating whether you want a paired t-test.
`var.equal`	a logical variable indicating whether to treat the two variances as being equal. If `TRUE` then the pooled variance is used to estimate the variance otherwise the Welch (or Satterthwaite) approximation to the degrees of freedom is used.
`conf.level`	confidence level of the interval.
`formula`	a formula of the form `lhs ~ rhs` where `lhs` is a numeric variable giving the data values and `rhs` either `1` for a one-sample or paired test or a factor with two levels giving the corresponding groups. If `lhs` is of class `"Pair"` and `rhs` is `1`, a paired test is done.

data	an optional matrix or data frame (or similar: see model.frame) containing the variables in the formula formula. By default the variables are taken from environment(formula).
subset	an optional vector specifying a subset of observations to be used.
na.action	a function which indicates what should happen when the data contain NAs. Defaults to getOption("na.action").

See Also

t.test

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