

# Package ‘attenuation’

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**Type** Package

**Title** Correcting for Attenuation Due to Measurement Error

**Version** 1.0.0

**Description** Confidence curves, confidence intervals and p-values for correlation coefficients corrected for attenuation due to measurement error. Implements the methods described in Moss (2019, <[doi:10.48550/arXiv.1911.01576](https://doi.org/10.48550/arXiv.1911.01576)>).

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**URL** <https://github.com/JonasMoss/attenuation/>

**BugReports** <https://github.com/JonasMoss/attenuation/issues>

**Encoding** UTF-8

**LazyData** true

**Suggests** testthat, covr, spelling

**RoxygenNote** 6.1.1

**Language** en-US

**NeedsCompilation** no

**Author** Jonas Moss [aut, cre] (ORCID: <<https://orcid.org/0000-0002-6876-6964>>)

**Maintainer** Jonas Moss <jonas.gjertsen@gmail.com>

**Repository** CRAN

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cc *Confidence curves for attenuated correlation coefficients.*

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## Description

Confidence curves for attenuated correlation coefficients.

## Usage

```
cc(r, N, lower = -1, upper = 1, by = 0.001, method = "corr",  
   k = NULL)
```

## Arguments

r	Numeric vector of three elements in [-1,1]. r[1] is the correlation between the noisy measures X' and Y', r[2] is the correlation between the noisy X' and the true X, while r[3] is the correlation between the noisy Y' and the true Y.
N	Numeric vector of three positive integers. N[i] is the sample size for r[i].
lower	Lower bound for the curve. Defaults to -1.
upper	Upper bound for the curve. Defaults to 1.
by	Increment of the sequence from lower to upper.
method	The type of confidence curve. Can be "corr", "cronbach", "HS" or "free". See the details of <a href="#">p_value</a> .
k	Numeric vector of two positive integers. k[i] is the number of testlets for the for r[i+1]. Only needed for method "cronbach".

## Value

An object of class ccaf.

## Examples

```
r = c(0.20, sqrt(0.45), sqrt(0.55))  
N = c(100, 100, 100)  
plot(cc(r, N))
```

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ci	<i>Calculate a confidence interval for an attenuated correlation coefficient.</i>
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**Description**

Calculate a confidence interval for an attenuated correlation coefficient.

**Usage**

```
ci(r, N, level = 0.95, method = "corr", k = NULL)
```

**Arguments**

r	Numeric vector of three elements in [-1,1]. r[1] is the correlation between the noisy measures X' and Y', r[2] is the correlation between the noisy X' and the true X, while r[3] is the correlation between the noisy Y' and the true Y.
N	Numeric vector of three positive integers. N[i] is the sample size for r[i].
level	Numeric in [0, 1]. Confidence level of the interval. Defaults to 0.95.
method	The type of confidence curve. Can be "corr", "cronbach", "HS" or "free". See the details of <a href="#">p_value</a> .
k	Numeric vector of two positive integers. k[i] is the number of testlets for the for r[i+1]. Only needed for method "cronbach".

**Value**

Numeric in [0, 1]. The p-value under null-hypothesis rho.

**Examples**

```
r = c(0.20, sqrt(0.45), sqrt(0.55))
N = c(100, 100, 100)
ci(r, N) # Calculates 95% confidence set for rho.
```

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lines.ccaf	<i>Add a plot a confidence curve of attenuated correlation coefficients.</i>
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**Description**

Add a plot a confidence curve of attenuated correlation coefficients.

**Usage**

```
## S3 method for class 'ccaf'
lines(x, type = "l", col = "red3", lwd = 2, ...)
```

**Arguments**

x	An object of class ccaf. The confidence curve to plot.
type	The type of plot.
col	The color of the curve.
lwd	The thickness of the curve.
...	Passed to lines.

**Value**

An invisible copy of x.

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plot.ccaf	<i>Plot a confidence curve of attenuated correlation coefficients.</i>
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**Description**

Plot a confidence curve of attenuated correlation coefficients.

**Usage**

```
## S3 method for class 'ccaf'  
plot(x, y, level = 0.95, ...)
```

**Arguments**

x	An object of class ccaf. The confidence curve to plot.
y	Ignored; supported for compatibility with the plot generic.
level	Level to highlight. Defaults to 0.95. If NULL, highlights no level.
...	Passed to plot.

**Value**

An invisible copy of x.

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print.ccaf	<i>Print method for ccaf</i>
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**Description**

Print method for ccaf

**Usage**

```
## S3 method for class 'ccaf'
print(x, digits = 3, ...)
```

**Arguments**

x	Object of class ccaf.
digits	Passed to signif.
...	Ignored.

**Value**

Invisible copy of x.

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p_value	<i>Calculate the p-value for an attenuated correlation coefficient.</i>
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**Description**

This function calculates four types of p-values for correlations coefficients corrected for attenuation, chosen in "method". The different p-values are described in Moss (2019). "corr" is the correlation based p-value, "cronbach" is the Cronbach alpha based p-value, "HS" is the Hunter-Schmidt p-value, while "free" is the correlation based p-value without positive constraints.

**Usage**

```
p_value(rho, r, N, method = "corr", k = NULL)
```

**Arguments**

rho	Numeric vector in [-1,1]. The correlation under the null hypothesis.
r	Numeric vector of three elements in [-1,1]. r[1] is the correlation between the noisy measures X' and Y', r[2] is the correlation between the noisy X' and the true X, while r[3] is the correlation between the noisy Y' and the true Y. They are the square root of the reliabilities. Must be positive method to "corr" and "cronbach".
N	Numeric vector of three positive integers. N[i] is the sample size for r[i].

method	The type of p-value. Can be "corr", "cronbach", "HS" or "free". See the details.
k	Numeric vector of two positive integers. $k[i]$ is the number of testlets for the for $r[i+1]$ . Only needed for method "cronbach".

**Value**

Numeric in  $[0, 1]$ . The p-value under the null-hypothesis that the true correlation is rho.

**Examples**

```
r = c(0.20, sqrt(0.45), sqrt(0.55))
N = c(100, 100, 100)
p_value(rho = 0, r, N) # Tests rho = 0.
```

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