

# Package: semTests (via r-universe)

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**Type** Package

**Title** Goodness-of-Fit Testing for Structural Equation Models

**Description** Supports eigenvalue block-averaging p-values (Foldnes, Grønneberg, 2018) <[doi:10.1080/10705511.2017.1373021](https://doi.org/10.1080/10705511.2017.1373021)>, penalized eigenvalue block-averaging p-values (Foldnes, Moss, Grønneberg, WIP), penalized regression p-values (Foldnes, Moss, Grønneberg, WIP), as well as traditional p-values such as Satorra-Bentler. All p-values can be calculated using unbiased or biased gamma estimates (Du, Bentler, 2022) <[doi:10.1080/10705511.2022.2063870](https://doi.org/10.1080/10705511.2022.2063870)> and two choices of chi square statistics.

**Version** 0.5.0

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**Encoding** UTF-8

**Imports** lavaan (>= 0.6-16), CompQuadForm, progressr, future.apply

**Suggests** covr, testthat (>= 3.0.0), psych

**Config/testthat/edition** 3

**RoxygenNote** 7.3.0

**NeedsCompilation** no

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**Additional\_repositories** <https://cranhaven.r-universe.dev>

**Repository** <https://cranhaven.r-universe.dev>

**RemoteUrl** <https://github.com/cranhaven/cranhaven.r-universe.dev>

**RemoteRef** package/semTests

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## Contents

pvalues . . . . .	2
<b>Index</b>	<b>5</b>

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pvalues	<i>Calculate p-values for one or two lavaan objects.</i>
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### Description

Calculate p-values for a lavaan object using several methods, including penalized eigenvalue block-averaging and penalized regression estimators. The choice peba=4 together with chisq = "rls" and ub is recommended. Multiple p-values can be returned simultaneously.

### Usage

```
pvalues(
  object,
  trad = NULL,
  eba = NULL,
  peba = c(2, 4),
  pols = 2,
  unbiased = 1,
  chisq = c("rls", "trad"),
  extras = FALSE
)
```

### Arguments

object	A lavaan object.
trad	List of traditional p-values to calculate. Not calculated if NULL.
eba	List of which eba p-values to calculate. Not calculated if NULL.
peba	List of which peba p-values to calculate. Not calculated if NULL.
pols	List of penalization parameters to use in the penalized OLS p-value. Not calculated if NULL.
unbiased	A number between 1 and 3. 1: Calculate using the biased gamma matrix (default). 2: Calculate using the unbiased gamma matrix. 3: Calculate using both gammas.
chisq	Which chi-square statistic to base the calculations on.
extras	Returns the estimated eigenvalues and basic test statistics if checked.

## Details

The traditional methods include:

- `pstd` the standard  $p$ -value where the choice of `chisq` is approximated by a chi square distribution.
- `psb` Satorra-Bentler  $p$ -value. The  $p$ -value proposed by Satorra and Bentler (1994).
- `pss` The scaled and shifted  $p$ -value proposed by Asparouhov & Muthén (2010).
- `pcf` The Scaled F  $p$ -value proposed by Wu and Lin (2016).
- `pfull`  $p$ -value based on all eigenvalues of the asymptotic covariance matrix matrix.

The `eba` method partitions the eigenvalues into `j` equally sized sets (if not possible, the smallest set is incomplete), and takes the mean eigenvalue of these sets. Provide a list of integers `j` to partition with respect to. The method was proposed by Foldnes & Grønneberg (2018). `eba` with `j=2` or `j=4` appear to work best.

The `peba` method is a penalized variant of `eba`, described in (Foldnes, Moss, Grønneberg, WIP). It typically outperforms `eba`, and the best choice of `j` is typically 6.

`pol`s is a penalized regression method with a penalization term from ranging from 0 to infinity. Foldnes, Moss, Grønneberg (WIP) studied `pol`s=2, which has good performance in a variety of contexts.

The `unbiased` argument is TRUE if the the unbiased estimator of the fourth order moment matrix (Du, Bentler, 2022) is used. If FALSE, the standard biased matrix is used. There is no simple relationship between  $p$ -value performance and the choice of `unbiased`.

The `chisq` argument controls which basic test statistic is used. The `trad` choice uses the chi square based on the normal discrepancy function (Bollen, 2014). The `rls` choice uses the reweighted least squares statistic of Browne (1974).

## Value

A named vector of  $p$ -values.

## References

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- Bollen, K. A. (2014). *Structural Equations with Latent Variables* (Vol. 210). John Wiley & Sons. <https://doi.org/10.1002/9781118619179>

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# Index

pvalues, [2](#)