

# Package ‘wstats’

March 12, 2026

**Title** Weighted Descriptive Statistics

**Version** 0.1.1

**Description** Weighted versions of common descriptive statistics (variance, standard deviation, covariance, correlation, quantiles).

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**Encoding** UTF-8

**RoxygenNote** 7.3.3

**Imports** glue, rlang

**Suggests** pkgdown, testthat (>= 3.0.0)

**Config/testthat/edition** 3

**LinkingTo** cpp11

**NeedsCompilation** yes

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**Repository** CRAN

**Date/Publication** 2026-03-12 08:20:02 UTC

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weighted_cor	<i>Weighted correlation</i>
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**Description**

Weighted correlation coefficient, computed as  $\text{weighted\_cov}(x, y, w) / (\text{weighted\_sd}(x, w) * \text{weighted\_sd}(y, w))$ .

**Usage**

```
weighted_cor(x, y, w, na.rm = FALSE)
```

**Arguments**

x	A numeric vector of observations.
y	A numeric vector of observations (same length as x).
w	A numeric vector of non-negative weights (need not sum to 1).
na.rm	Logical. If TRUE, observations with any NA in x, y, or w are removed before computation.

**Value**

A single numeric value in [-1, 1].

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weighted_cov	<i>Weighted covariance</i>
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**Description**

Computes the population (importance-weight) weighted covariance  $\text{sum}(w\_hat * (x - \mu_x) * (y - \mu_y))$ .

**Usage**

```
weighted_cov(x, y, w, na.rm = FALSE)
```

**Arguments**

x	A numeric vector of observations.
y	A numeric vector of observations (same length as x).
w	A numeric vector of non-negative weights (need not sum to 1).
na.rm	Logical. If TRUE, observations with any NA in x, y, or w are removed before computation.

**Value**

A single numeric value.

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weighted_kurtosis	<i>Weighted excess kurtosis</i>
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**Description**

Computes the population weighted excess kurtosis:  $\text{sum}(w\_hat * ((x - \mu) / \sigma)^4) - 3$ .

**Usage**

```
weighted_kurtosis(x, w, na.rm = FALSE)
```

**Arguments**

x	A numeric vector of observations.
w	A numeric vector of non-negative weights (need not sum to 1).
na.rm	Logical. If TRUE, paired NAs in x and w are removed before computation. If FALSE (default) and any NA is present, NA is returned.

**Value**

A single numeric value.

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weighted_mad	<i>Weighted median absolute deviation</i>
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**Description**

Computes the weighted MAD as the weighted median of  $|x - \text{median}(x, w)|$ , scaled by constant (default 1.4826 for consistency with `stats::mad()` under normality).

**Usage**

```
weighted_mad(x, w, na.rm = FALSE, constant = 1.4826)
```

**Arguments**

x	A numeric vector of observations.
w	A numeric vector of non-negative weights (need not sum to 1).
na.rm	Logical. If TRUE, paired NAs in x and w are removed before computation. If FALSE (default) and any NA is present, NA is returned.
constant	Scale factor (default 1.4826).

**Value**

A single numeric value.

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weighted_median	<i>Weighted median</i>
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**Description**

Convenience wrapper: `weighted_quantile(x, w, 0.5, na.rm)`.

**Usage**

```
weighted_median(x, w, na.rm = FALSE)
```

**Arguments**

x	A numeric vector of observations.
w	A numeric vector of non-negative weights (need not sum to 1).
na.rm	Logical. If TRUE, paired NAs in x and w are removed before computation. If FALSE (default) and any NA is present, NA is returned.

**Value**

A single numeric value.

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weighted_quantile	<i>Weighted quantiles</i>
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**Description**

Computes weighted quantiles using a type-7 analog: observations are placed at the midpoints of their weight intervals in the cumulative weight distribution, rescaled to [0, 1], and quantiles are obtained by linear interpolation. For equal weights this matches `quantile(x, type = 7)`.

**Usage**

```
weighted_quantile(x, w, probs = seq(0, 1, 0.25), na.rm = FALSE)
```

**Arguments**

x	A numeric vector of observations.
w	A numeric vector of non-negative weights (need not sum to 1).
probs	A numeric vector of probabilities in [0, 1].
na.rm	Logical. If TRUE, paired NAs in x and w are removed.

**Value**

A numeric vector of the same length as probs.

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weighted_sd	<i>Weighted standard deviation</i>
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**Description**

Square root of `weighted_var()`.

**Usage**

```
weighted_sd(x, w, na.rm = FALSE)
```

**Arguments**

x	A numeric vector of observations.
w	A numeric vector of non-negative weights (need not sum to 1).
na.rm	Logical. If TRUE, paired NAs in x and w are removed before computation. If FALSE (default) and any NA is present, NA is returned.

**Value**

A single numeric value.

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weighted_skewness	<i>Weighted skewness</i>
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**Description**

Computes the population weighted skewness (Fisher's  $g_1$ ):  $\text{sum}(w\_hat * ((x - \mu) / \sigma)^3)$ .

**Usage**

```
weighted_skewness(x, w, na.rm = FALSE)
```

**Arguments**

x	A numeric vector of observations.
w	A numeric vector of non-negative weights (need not sum to 1).
na.rm	Logical. If TRUE, paired NAs in x and w are removed before computation. If FALSE (default) and any NA is present, NA is returned.

**Value**

A single numeric value.

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weighted_var	<i>Weighted variance</i>
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**Description**

Computes the population (importance-weight) weighted variance  $\sum(w\_hat * (x - mu)^2)$  where  $w\_hat = w / \sum(w)$  and  $mu = \text{weighted.mean}(x, w)$ .

**Usage**

```
weighted_var(x, w, na.rm = FALSE)
```

**Arguments**

x	A numeric vector of observations.
w	A numeric vector of non-negative weights (need not sum to 1).
na.rm	Logical. If TRUE, paired NAs in x and w are removed before computation. If FALSE (default) and any NA is present, NA is returned.

**Value**

A single numeric value.

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