# Package 'TSEwgt'

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**Type** Package

**Title** Total Survey Error Under Multiple, Different Weighting Schemes

**Version** 0.1.0

**Maintainer** Joshua Miller <joshlmiller@msn.com>

**Description** Calculates total survey error (TSE) for a survey under multiple, different weighting schemes, using both scale-dependent and scale-independent metrics. Package works directly from the data set, with no hand calculations required: just upload a properly structured data set (see TESTWGT and its documentation), properly input column names (see functions documentation), and run your functions. For more on TSE, see: Weisberg, Herbert (2005, ISBN:0-226-89128-3); Biemer, Paul (2010) <doi:10.1093/poq/nfq058>; Biemer, Paul et.al. (2017, ISBN:9781119041672); etc.

**Note** 'TSEwgt' is a companion package to 'TSE'. Each package calculates TSE, but the former for multiple, different surveys, and the latter for a single survey under multiple, different weighting schemes.

**Imports** stats

**Depends** R (>= 3.5)

**License** GPL (>= 2)

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 6.1.1

**Suggests** knitr, rmarkdown

**NeedsCompilation** no

**Author** Joshua Miller [aut, cre]

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`AVEMAEw` *Average mean absolute error (aMAE)*

---

## Description

Calculates average mean absolute error (aMAE) under multiple, different weighting schemes

## Usage

```
AVEMAEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| `Actual` | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| `Survey` | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| `Weights` | weights to be applied to Survey data; objects are weights columns |

## Details

aMAE for weighting scheme # => mean value of the MAEs for specified variables under weighting scheme # => mean value of MAEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average mean absolute error (aMAE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVEMAEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

---

AVEMAPEw *Average mean absolute percentage error (aMAPE)*

---

## Description

Calculates average mean absolute percentage error (aMAPE) under multiple, different weighting schemes

## Usage

```
AVEMAPEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aMAPE for weighting scheme # => mean value of the aMAPEs for specified variables under weighting scheme # => mean value of aMAPEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average mean absolute percentage error (aMAPE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVEMAPEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

AVEMSEw *Average mean squared error (aMSE) with bias-variance decomposition*

## Description

Calculates average mean squared error (aMSE) with bias-variance decomposition under multiple, different weighting schemes

## Usage

```
AVEMSEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aMSE for weighting scheme # => mean value of the MSEs for specified variables under weighting scheme # => mean value of MSEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average mean squared error (aMSE) with bias-variance decomposition under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVEMSEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

AVEMSLEw *Average mean squared logarithmic error (aMSLE)*

## Description

Calculates average mean squared logarithmic error (aMSLE) under multiple, different weighting schemes

## Usage

```
AVEMSLEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aMSLE for weighting scheme # => mean value of the aMSLEs for specified variables under weighting scheme # => mean value of aMSLEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average mean squared logarithmic error (aMSLE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVEMSLEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

AVERAEw *Average relative absolute error (aRAE)*

## Description

Calculates average relative absolute error (aRAE) under multiple, different weighting schemes

## Usage

```
AVERAEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aRAE for weighting scheme # => mean value of the aRAEs for specified variables under weighting scheme # => mean value of aRAEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average relative absolute error (aRAE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVERAEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

AVERMSEw *Average root mean squared error (aRMSE)*

## Description

Calculates average root mean squared error (aRMSE) under multiple, different weighting schemes

## Usage

```
AVERMSEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aRMSE for weighting scheme # => mean value of the RMSEs for specified variables under weighting scheme # => mean value of RMSEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average root mean squared error (aRMSE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVERMSEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

AVERMSLEw *Average root mean squared logarithmic error (aRMSLE)*

## Description

Calculates average root mean squared logarithmic error (aRMSLE) under multiple, different weighting schemes

## Usage

```
AVERMSLEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aRMSLE for weighting scheme # => mean value of the aRMSLEs for specified variables under weighting scheme # => mean value of aRMSLEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average root mean squared logarithmic error (aRMSLE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVERMSLEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

AVERRSEw *Average root relative squared error (aRRSE)*

## Description

Calculates average root relative squared error (aRRSE) under multiple, different weighting schemes

## Usage

```
AVERRSEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aRRSE for weighting scheme # => mean value of the aRRSEs for specified variables under weighting scheme # => mean value of aRRSEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average root relative squared error (aRRSE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVERRSEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

AVERSEw *Average relative squared error (aRSE)*

## Description

Calculates average relative squared error (aRSE) under multiple, different weighting schemes

## Usage

```
AVERSEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aRSE for weighting scheme # => mean value of the aRSEs for specified variables under weighting scheme # => mean value of aRSEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average relative squared error (aRSE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVERSEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

AVESMAPEw *Average symmetric mean absolute percentage error (aSMAPE)*

## Description

Calculates average symmetric mean absolute percentage error (aSMAPE) under multiple, different weighting schemes

## Usage

```
AVESMAPEw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Details

aSMAPE for weighting scheme # => mean value of the aSMAPEs for specified variables under weighting scheme # => mean value of aSMAPEs for objects in Survey=data.frame() * objects in Weights=data.frame()

## Value

Average symmetric mean absolute percentage error (aSMAPE) under multiple, different weighting schemes

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
AVESMAPEw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

FULLSDw *Full scale-dependent statistics*

## Description

Calculates full scale-dependent statistics

## Usage

```
FULLSDw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

## Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

## Value

Full scale-dependent statistics

## Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

## Examples

```
FULLSDw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

FULLSIw *Full scale-independent statistics*

## Description

Calculates full scale-independent statistics

## Usage

```
FULLSIw(Actual = data.frame(), Survey = data.frame(),
  Weights = data.frame())
```

### Arguments

| | |
|---|---|
| Actual | data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Survey |
| Survey | data from a survey; objects are variable columns from a survey that corruspond to variable columns from Actual |
| Weights | weights to be applied to Survey data; objects are weights columns |

### Value

Full scale-independent statistics

### Note

Make sure to properly order inputs, per the example: Actual=data.frame() objects and corruspond-ing Survey=data.frame() objects must be given in the same order as each other; and Weights=data.frame() objects must be given in sequence of weighting scheme #.

### Examples

```
FULLSIw(Actual=data.frame(TESTWGT$A1, TESTWGT$A2),
Survey=data.frame(TESTWGT$Q1, TESTWGT$Q2),
Weights=data.frame(TESTWGT$W1, TESTWGT$W2))
```

---

## TESTWGT

*A data set created by merging 1) "actual" data from a "gold standard" survey (A1, A2), and 2) data from another survey (Q1, Q2), including weights columns for that data (W1, W2). A1/Q1 and A2/Q2 are responses to the same two questions, asked to the same 10 respondents (ID), along the same 1-99 response scale.*

---

### Description

A data set created by merging 1) "actual" data from a "gold standard" survey (A1, A2), and 2) data from another survey (Q1, Q2), including weights columns for that data (W1, W2). A1/Q1 and A2/Q2 are responses to the same two questions, asked to the same 10 respondents (ID), along the same 1-99 response scale.

### Usage

```
TESTWGT
```

### Format

A data frame with 10 rows and 7 variables

**ID, A1, A2, Q1, Q2, W1, W2** Paired "actual"/survey data with weights columns for survey data

**Source**

Example data generated by author

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