# Package 'BTTL'

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**Type** Package

**Title** Bradley-Terry Transfer Learning

**Version** 1.0.0

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**Description** Implements the methodological developments found in Hermes, van Heerwaarden, and Behrouzi (2024) <doi:10.48550/arXiv.2408.10558>, and allows for the statistical modeling of multi-attribute pairwise comparison data.

**License** GPL-3

**Encoding** UTF-8

**LazyData** true

**Depends** R (>= 3.10)

**NeedsCompilation** no

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**Repository** CRAN

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## Contents

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bttl                          *Bradley-Terry Transfer Learning*

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## Description

Contains the main function of this package that is used to estimate the parameter of interest $\alpha$. The inner workings of the function are described in Hermes et al., (2024).

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## Usage

```
bttl(y, M, c_s)
```

## Arguments

y            A list consisting of $S$ matrices with each matrix containing pairwise compar-
             isons across $M$ objects. The first matrix in the list should contain the pairwise
             comparisons on the primary attribute. The other matrices should contain pair-
             wise comparisons on the secondary attributes. The first column of each matrix
             should contain the preferred object (winner) and the second column should con-
             tain the non-preferred object (loser).

M            Total number of objects encountered across the pairwise comparisons.

c_s          Constant determining the strictness of the inclusion of attributes in the informa-
             tive set. Smaller values lead to smaller $\mathcal{S}$. We typically set this parameter equal
             to 1.

## Value

alpha_est    A vector of length $M$ that contains the parameter estimates $\hat{\alpha}$ for all objects in
             the data on the primary attribute.

S_hat        A vector containing the indices of attributes that are included in $\hat{\mathcal{S}}$.

## Author(s)

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## References

1. Hermes, S., van Heerwaarden, J., and Behrouzi, P. (2024). Multi-Attribute Preferences: A Trans-
fer Learning Approach. arXiv preprint, arXiv:2408.10558

## Examples

```
# we first obtain the pairwise comparison data
y <- data(eba)

# now we can fit our model
result <- bttl(y, 13, 1)
```

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eba                                   *Pairwise comparison data*

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## Description

This is a real dataset containing pairwise preferences on 13 different eba varieties across eight attributes.

## Usage

```
data("eba")
```

## Format

A list with eight matrices. Each matrix consists of pairwise comparisons across one of the eight attributes. The first column contains the preferred object, whilst the second column contains the non-preferred object. In order of appearance, the matrices contain pairwise comparisons on the following attributes: consumer overall preference, color, odour, firmness, stretchability, taste, smoothness and mouldability.

## Details

Contains the data used in the Hermes et al. (2024) paper.

## Source

Data from the Hermes et al. (2024) paper is based on Olaosebikan et al. (2023).

## References

1. Hermes, S., van Heerwaarden, J., and Behrouzi, P. (2024). Multi-Attribute Preferences: A Transfer Learning Approach. arXiv preprint, arXiv:2408.10558
2. Olaosebikan, O., A. Bello, K. De Sousa, R. Ndjouenkeu, M. Adesokan, E. Alamu, A. Agbona, J. Van Etten, F. N. K´egah, D. Dufour, et al. (2023). Drivers of consumer acceptability of cassava gari-eba food products across cultural and environmental settings using the triadic comparison of technologies approach (tricot). Journal of the Science of Food and Agriculture.

## Examples

```
data(eba)
```

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