# Package ‘beezdiscounting’

November 16, 2023

**Title** Behavioral Economic Easy Discounting  
**Version** 0.3.1  
**Date** 2023-11-15  
**Maintainer** Brent Kaplan &lt;bkaplan.ku@gmail.com&gt;  
**Description** Facilitates some of the analyses performed in studies of behavioral economic discounting. The package supports scoring of the 27-Item Monetary Choice Questionnaire (see Kaplan et al., 2016; &lt;doi:10.1007/s40614-016-0070-9&gt;) and scoring of the minute discounting task (see Koffarnus & Bickel, 2014; &lt;doi:10.1037/a0035973&gt;) using the Qualtrics 5-trial discounting template (see the Qualtrics Minute Discounting User Guide; &lt;doi:10.13140/RG.2.2.26495.79527&gt;), which is also available as a .qsf file in this package.  
**License** GPL (>= 2)  
**URL** https://github.com/brentkaplan/beezdiscounting  
**Encoding** UTF-8  
**RoxygenNote** 7.2.3  
**Depends** R (>= 2.10)  
**Imports** dplyr, gtools, magrittr, psych, stringr, tidyr  
**LazyData** true  
**NeedsCompilation** no  
**Author** Brent Kaplan [aut, cre, cph] (&lt;https://orcid.org/0000-0002-3758-6776&gt;)  
**Repository** CRAN  
**Date/Publication** 2023-11-16 22:33:55 UTC

## R topics documented:

<table>
<thead>
<tr>
<th>Function</th>
<th>Lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>ans_dd</td>
<td>2</td>
</tr>
<tr>
<td>ans_pd</td>
<td>3</td>
</tr>
<tr>
<td>calc_dd</td>
<td>3</td>
</tr>
<tr>
<td>calc_pd</td>
<td>4</td>
</tr>
<tr>
<td>five.fivetrial_dd</td>
<td>4</td>
</tr>
<tr>
<td>five.fivetrial_pd</td>
<td>5</td>
</tr>
</tbody>
</table>
ans_dd

Converts answers from 5.5 trial delay discounting from Qualtrics template

Usage

ans_dd(df)

Arguments

df A dataframe containing all the columns

Value

A dataframe with the ResponseId, index, and response (ss or ll).

Examples

ans_dd(five.fivetrial_dd)
**ans_pd**

Converts answers from 5.5 trial probability discounting from Qualtrics template

**Description**

Converts answers from 5.5 trial probability discounting from Qualtrics template

**Usage**

```r
ans_pd(df)
```

**Arguments**

- `df`: A dataframe containing all the columns

**Value**

A dataframe with the ResponseId, index, and response (sc or lu).

**Examples**

```r
ans_pd(five.fivetrial_pd)
```

---

**calc_dd**

Calculate scores, answers, and timing for 5.5 trial delay discounting from Qualtrics template

**Description**

Calculate scores, answers, and timing for 5.5 trial delay discounting from Qualtrics template

**Usage**

```r
calc_dd(df)
```

**Arguments**

- `df`: A dataframe containing all the columns from the template.

**Value**

A dataframe with k/ed50 values, answers, timing

**Examples**

```r
calc_dd(five.fivetrial_dd)
```
calc_pd

*Calculate scores, answers, and timing for 5.5 trial probability discounting from Qualtrics template*

## Description

Calculate scores, answers, and timing for 5.5 trial probability discounting from Qualtrics template

## Usage

```r
calc_pd(df)
```

## Arguments

- `df` A dataframe containing all the columns from the template.

## Value

A dataframe with h/ep50 values, answers, timing

## Examples

```r
calc_pd(five.fivetrial_pd)
```

## five.fivetrial_dd

*Example Qualtrics output from the 5.5 trial delay discounting template.*

## Description

An example dataset containing four participants’ data (two typical discounting patterns and two patterns suggesting potential misattention to the task).

## Usage

```r
five.fivetrial_dd
```

## Format

Example Qualtrics output
**five.fivetrial_pd**

Example Qualtrics output from the 5.5 trial probability discounting template.

**Description**

An example dataset containing four participants’ data.

**Usage**

two.fivetrial_pd

**Format**

Example Qualtrics output

---

**generate_data_mcq**

Generate fake MCQ data

**Description**

Generate fake MCQ data

**Usage**

generate_data_mcq(n_ids = 100, n_items = 27, seed = 1234, prop_na = 0)

**Arguments**

- **n_ids** Number of subjectids
- **n_items** Number of trials
- **seed** Random seed
- **prop_na** Proportion of NAs in the entire data set

**Value**

Dataframe of subjectid, questionid, and response

**Examples**

generate_data_mcq(n_ids = 2, n_items = 27, prop_na = .01)
inn

Calculates item nearest neighbor imputation approach discussed by Yeh et al. (2023)

Description

Calculates item nearest neighbor imputation approach discussed by Yeh et al. (2023)

Usage

inn(dat, random, verbose)

Arguments

dat A single subject’s 27-item MCQ data in long form
random Boolean whether to insert a random draw (0 or 1) for NAs
verbose Boolean whether to print subject and question ids pertaining to missing data

Value

An imputed data set to be scored

long_to_wide_mcq

Reshape MCQ data long to wide

Description

Reshape MCQ data long to wide

Usage

long_to_wide_mcq(dat, q_col = "questionid", ans_col = "response")

Arguments

dat Long format MCQ
q_col Name of the question column (default is "questionid")
ans_col Name of the answer column (default is "response")

Value

Wide format data frame
long_to_wide_mcq_excel

Reshape MCQ data from long to wide (as used in the 21- and 27-Item Monetary Choice Questionnaire Automated Scorer)

Description

Reshape MCQ data from long to wide (as used in the 21- and 27-Item Monetary Choice Questionnaire Automated Scorer)

Usage

long_to_wide_mcq_excel(dat, subj_col = "subjectid", ans_col = "response")

Arguments

dat  Long format MCQ data
subj_col  Character column name of subject ids
ans_col  Character column name of responses

Value

Wide format MCQ data that can be used in the Excel Automated Scorers

Examples

long_to_wide_mcq_excel(generate_data_mcq(2))

mcq27  Example 27-item MCQ data

Description

A dataset containing two participants’ data (same data as in the paper by Kaplan et al., 2016)

Usage

mcq27

Format

Long-form data.frame with columns: subjectid, questionid, response.
score_dd

Score 5.5 trial delay discounting from Qualtrics template

Description
Score 5.5 trial delay discounting from Qualtrics template

Usage
score_dd(df)

Arguments
df          A dataframe containing all the columns

Details
Currently assumes the attending questions are present and labeled "Attend-LL" and "Attend-SS"

Value
A dataframe with id, indexes, response, k value, and effective delay 50.

Examples
score_dd(five.fivetrial_dd)

score_mcq27

Score 27-item MCQ

Description
Score 27-item MCQ

Usage
score_mcq27(
  dat = dat,
  impute_method = "none",
  round = 6,
  random = FALSE,
  return_data = FALSE,
  verbose = FALSE
)
score_one_mcq27

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dat</td>
<td>Dataframe (longform) with subjectid, questionid, and response (0 for SIR/SS and 1 for LDR/LL)</td>
</tr>
<tr>
<td>impute_method</td>
<td>One of: &quot;none&quot;, &quot;ggm&quot;, &quot;GGM&quot;, &quot;inn&quot;, &quot;INN&quot;</td>
</tr>
<tr>
<td>round</td>
<td>Numeric specifying number of decimal places (passed to base::round())</td>
</tr>
<tr>
<td>random</td>
<td>Boolean whether to insert a random draw (0 or 1) for NAs. Default is FALSE</td>
</tr>
<tr>
<td>return_data</td>
<td>Boolean whether to return the original data and new imputed responses. Default is FALSE.</td>
</tr>
<tr>
<td>verbose</td>
<td>Boolean whether to print subject and question ids pertaining to missing data. Default is FALSE.</td>
</tr>
</tbody>
</table>

Value

Summary dataframe

Examples

score_mcq27(mcq27)

---

score_one_mcq27 Score one subject's 27-item MCQ

Description

Score one subject’s 27-item MCQ

Usage

score_one_mcq27(dat, impute_method = "none", round = 6)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dat</td>
<td>One subject’s 27 items from the MCQ</td>
</tr>
<tr>
<td>impute_method</td>
<td>One of: &quot;none&quot;, &quot;ggm&quot;, &quot;GGM&quot;, &quot;inn&quot;, &quot;INN&quot;</td>
</tr>
<tr>
<td>round</td>
<td>Numeric specifying number of decimal places (passed to base::round())</td>
</tr>
</tbody>
</table>

Value

Vector with scored 27-item MCQ metrics

Examples

beezdiscounting:::score_one_mcq27(mcq27[mcq27$subjectid %in% 1, ])
score_pd

Score 5.5 trial probability discounting from Qualtrics template

Description
Score 5.5 trial probability discounting from Qualtrics template

Usage
score_pd(df)

Arguments
df A dataframe containing all the columns

Details
Currently assumes the attending questions are present and labeled "Attend-LL" and "Attend-SS"

Value
A dataframe with id, indexes, response, h value, and effective probability 50.

Examples
score_pd(five.fivetrial_pd)

timing_dd

Extract timing metrics from 5.5 trial delay discounting from Qualtrics template

Description
Extract timing metrics from 5.5 trial delay discounting from Qualtrics template

Usage
timing_dd(df)

Arguments
df A dataframe containing all the columns

Details
Currently assumes the attending questions are present and labeled "Attend-LL" and "Attend-SS"
`timing_pd`  

**Value**  

A dataframe with ResponseId, indexes, values and timing  

**Examples**  

`timing_dd(five.fivetrial_dd)`

---

`timing_pd`  

*Extract timing metrics from 5.5 trial probability discounting from Qualtrics template*

**Description**  

Extract timing metrics from 5.5 trial probability discounting from Qualtrics template  

**Usage**  

`timing_pd(df)`

**Arguments**  

`df`  

A dataframe containing all the columns  

**Details**  

Currently assumes the attending questions are present and labeled "Attend-LL" and "Attend-SS"  

**Value**  

A dataframe with ResponseId, indexes, values and timing  

**Examples**  

`timing_pd(five.fivetrial_pd)`
wide_to_long_mcq

**Description**
Reshape MCQ data wide to long

**Usage**

```r
wide_to_long_mcq(dat, items = 27)
```

**Arguments**

- `dat` Wide format MCQ assuming subject id is in column 1
- `items` Number of MCQ questions

**Value**
Long format data frame

---

wide_to_long_mcq_excel

**Description**
Reshape MCQ data from wide (as used in the 21- and 27-Item Monetary Choice Questionnaire Automated Scorer) to long

**Usage**

```r
wide_to_long_mcq_excel(dat)
```

**Arguments**

- `dat` Wide format MCQ data as used in the Excel Automated Scorers

**Value**
Long format data frame

**Examples**

```r
wide_to_long_mcq_excel(long_to_wide_mcq_excel(generate_data_mcq(2)))
```
Index

* datasets
  five.fivetrial_dd, 4
  five.fivetrial_pd, 5
  mcq27, 7

ans_dd, 2
ans_pd, 3

calc_dd, 3
calc_pd, 4

five.fivetrial_dd, 4
five.fivetrial_pd, 5

generate_data_mcq, 5

inn, 6

long_to_wide_mcq, 6
long_to_wide_mcq_excel, 7

mcq27, 7

score_dd, 8
score_mcq27, 8
score_one_mcq27, 9
score_pd, 10

timing_dd, 10
timing_pd, 11

wide_to_long_mcq, 12
wide_to_long_mcq_excel, 12