

# Package: beezdiscounting (via r-universe)

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**Title** Behavioral Economic Easy Discounting

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**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; <[doi:10.1007/s40614-016-0070-9](https://doi.org/10.1007/s40614-016-0070-9)>) and scoring of the minute discounting task (see Koffarnus & Bickel, 2014; <[doi:10.1037/a0035973](https://doi.org/10.1037/a0035973)>) using the Qualtrics 5-trial discounting template (see the Qualtrics Minute Discounting User Guide; <[doi:10.13140/RG.2.2.26495.79527](https://doi.org/10.13140/RG.2.2.26495.79527)>), which is also available as a .qsf file in this package.

**License** GPL (>= 2)

**URL** <https://github.com/brentkaplan/beezezdiscounting>

**Encoding** UTF-8

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**Depends** R (>= 2.10)

**Imports** dplyr, ggplot2, gtools, magrittr, psych, stringr, tidyr

**LazyData** true

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

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ans_dd	<i>Converts answers from 5.5 trial delay discounting from Qualtrics template</i>
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---

### Description

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	<i>Converts answers from 5.5 trial probability discounting from Qualtrics template</i>
--------	--

---

**Description**

Converts answers from 5.5 trial probability discounting from Qualtrics template

**Usage**

```
ans_pd(df)
```

**Arguments**

df                    A dataframe containing all the columns

**Value**

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

**Examples**

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

---

calc_dd	<i>Calculate scores, answers, and timing for 5.5 trial delay discounting from Qualtrics template</i>
---------	--

---

**Description**

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

**Usage**

```
calc_dd(df)
```

**Arguments**

df                    A dataframe containing all the columns from the template.

**Value**

A dataframe with k/ed50 values, answers, timing

**Examples**

```
calc_dd(five.fivetrial_dd)
```

---

calc_pd	<i>Calculate scores, answers, and timing for 5.5 trial probability discounting from Qualtrics template</i>
---------	--

---

**Description**

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

**Usage**

```
calc_pd(df)
```

**Arguments**

df                    A dataframe containing all the columns from the template.

**Value**

A dataframe with h/ep50 values, answers, timing

**Examples**

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

---

five.fivetrial_dd	<i>Example Qualtrics output from the 5.5 trial delay discounting template.</i>
-------------------	--

---

**Description**

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

**Usage**

```
five.fivetrial_dd
```

**Format**

Example Qualtrics output

---

five.fivetrial_pd	<i>Example Qualtrics output from the 5.5 trial probability discounting template.</i>
-------------------	--

---

**Description**

An example dataset containing four participants' data.

**Usage**

```
five.fivetrial_pd
```

**Format**

Example Qualtrics output

---

generate_data_mcq	<i>Generate fake MCQ data</i>
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---

**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)
```

---

get_lookup_table	<i>Get internal lookup table for the 27-item MCQ</i>
------------------	--

---

**Description**

Get internal lookup table for the 27-item MCQ

**Usage**

```
get_lookup_table()
```

**Value**

Dataframe with questionid, magnitude, and kindiff

**Examples**

```
get_lookup_table()
```

---

inn	<i>Calculates item nearest neighbor imputation approach discussed by Yeh et al. (2023)</i>
-----	--

---

**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	<i>Reshape MCQ data long to wide</i>
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---

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

---

**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.

---

plot.prop\_ss\_output

*Plot Proportion of SIR/SS Choices by k Value*

---

**Description**

This function creates a plot of the proportion of SIR/SS choices by k value using the output of the prop\_ss function.

**Usage**

```
## S3 method for class 'prop_ss_output'  
plot(  
  x,  
  ...,  
  pt_shape = 21,  
  pt_fill = "white",  
  pt_size = 3,  
  title = "Proportion of SIR/SS choices by k value",  
  xlab = "k value rank",  
  ylab = "Proportion of SS choices"  
)
```



**Arguments**

x	Output from the prop_ss function
...	Additional arguments passed to ggplot2::geom_point()
pt_shape	Shape of the points in the plot. Default is 21.
pt_fill	Fill color of the points in the plot. Default is "white".
pt_size	Size of the points in the plot. Default is 3.
title	Title of the plot. Default is "Proportion of SIR/SS choices by k value".
xlab	Label for the x-axis. Default is "k value rank".
ylab	Label for the y-axis. Default is "Proportion of SS choices".

**Value**

A ggplot object.

**Examples**

```
plot(prop_ss(mcq27))
```

---

```
plot.score_mcq27_output
      Plot MCQ-27 Scores
```

---

**Description**

This function creates a plot of the MCQ-27 scores for different metrics (small\_k, medium\_k, large\_k, geomean\_k, overall\_k). The function handles different logarithmic transformations of the k-values and adjusts the y-axis label accordingly.

**Usage**

```
## S3 method for class 'score_mcq27_output'
plot(x, ..., xlab = "Metric", alpha = 0.3)
```

**Arguments**

x	A data frame returned by the score_mcq27 function.
...	Additional arguments passed to methods.
xlab	Label for the x-axis. Default is "Metric".
alpha	Transparency of the points in the plot. Default is 0.3.

**Value**

A ggplot object showing the boxplot of MCQ-27 scores.

**Examples**

```
plot(score_mcq27(mcq27))
```

---

prop_ss	<i>Calculate proportion of SIR/SS responses at each k value</i>
---------	---

---

**Description**

Calculate proportion of SIR/SS responses at each k value

**Usage**

```
prop_ss(dat)
```

**Arguments**

dat	Dataframe (longform) with subjectid, questionid, and response (0 for SIR/SS and 1 for LDR/LL)
-----	---

**Value**

Dataframe with proportion of SIR/SS responses at each k rank

**Examples**

```
prop_ss(mcq27)
```

---

score_dd	<i>Score 5.5 trial delay discounting from Qualtrics template</i>
----------	--

---

**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,
  trans = "none",
  return_data = FALSE,
  verbose = FALSE
)
```

**Arguments**

dat	Dataframe (longform) with subjectid, questionid, and response (0 for SIR/SS and 1 for LDR/LL)
impute_method	One of: "none", "ggm", "GGM", "inn", "INN"
round	Numeric specifying number of decimal places (passed to base::round())
random	Boolean whether to insert a random draw (0 or 1) for NAs. Default is FALSE
trans	Transformation to apply to k values: "none", "log", or "ln". Default is "none"
return_data	Boolean whether to return the original data and new imputed responses. Default is FALSE.
verbose	Boolean whether to print subject and question ids pertaining to missing data. Default is FALSE.

**Value**

Summary dataframe

**Examples**

```
score_mcq27(mcq27)
```

---

score_one_mcq27	<i>Score one subject's 27-item MCQ</i>
-----------------	--

---

**Description**

Score one subject's 27-item MCQ

**Usage**

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

**Arguments**

dat	One subject's 27 items from the MCQ
impute_method	One of: "none", "ggm", "GGM", "inn", "INN"
round	Numeric specifying number of decimal places (passed to base::round())

**Value**

Vector with scored 27-item MCQ metrics

**Examples**

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

---

score_pd	<i>Score 5.5 trial probability discounting from Qualtrics template</i>
----------	--

---

**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)
```

---

summarize_mcq	<i>Provide a summary of the results from the MCQ ouput table.</i>
---------------	---

---

**Description**

Provide a summary of the results from the MCQ ouput table.

**Usage**

```
summarize_mcq(res, na.rm = TRUE)
```

**Arguments**

res	Dataframe with MCQ results (output from the calc_mcq function)
na.rm	Boolean whether to remove NAs from the calculation

**Value**

Dataframe with summary statistics

**Examples**

```
summarize_mcq(score_mcq27(mcq27))
```

---

timing_dd	<i>Extract timing metrics from 5.5 trial delay discounting from Qualtrics template</i>
-----------	--

---

**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"

**Value**

A dataframe with ResponseId, indexes, values and timing

**Examples**

```
timing_dd(five.fivetrial_dd)
```

---

timing_pd	<i>Extract timing metrics from 5.5 trial probability discounting from Qualtrics template</i>
-----------	--

---

**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	<i>Reshape MCQ data wide to long</i>
------------------	--------------------------------------

---

**Description**

Reshape MCQ data wide to long

**Usage**

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

---

**Description**

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

**Usage**

```
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**

```
wide_to_long_mcq_excel(long_to_wide_mcq_excel(generate_data_mcq(2)))
```

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