

Package ‘deliberr’

May 8, 2026

Type Package

Title Methods for Deliberation Analysis

Version 0.1.0

URL <https://github.com/gumbelino/deliberr>,
<https://gumbelin.shinyapps.io/deliberr>

BugReports <https://github.com/gumbelino/deliberr/issues>

Description An implementation of deliberative reasoning index (DRI) and related tools for analysis of deliberation survey data. Calculation of DRI, plot of intersubjective correlations (IC), generation of large-language model (LLM) survey data, and permutation tests are supported. Example datasets and a graphical user interface (GUI) are also available to support analysis. For more information, see Niemeyer and Veri (2022) [doi:10.1093/oso/9780192848925.003.0007](https://doi.org/10.1093/oso/9780192848925.003.0007).

License MIT + file LICENSE

Encoding UTF-8

LazyData true

Imports stats, dplyr, shiny, tibble, ggplot2, rstatix, grid, psych,
tidyr, rlang, glue, httr, purrr, readr, jsonlite, lifecycle,
uuid,

RoxygenNote 7.3.3

Suggests DT, gridExtra, knitr, readxl, rmarkdown

Depends R (>= 3.5)

NeedsCompilation no

Author Gustavo Kreia Umbelino [aut, cre] (ORCID:
<https://orcid.org/0000-0001-7754-9606>),
Francesco Veri [aut] (ORCID: <https://orcid.org/0000-0002-9295-6776>),
Swiss National Science Foundation (SNSF) [fnd]

Maintainer Gustavo Kreia Umbelino <gustavo.kreiaumbelino@zda.uzh.ch>

Repository CRAN

Date/Publication 2025-12-19 14:50:02 UTC

Contents

format_dri_survey	2
get_dri	3
get_dri_alpha	4
get_dri_case	5
get_dri_ic	6
get_dri_ind	6
get_dri_llm_response	7
get_llm_response	8
get_model_ids	10
human_data	11
make_dri_llm_prompts	11
open_gui	12
permute_dri	12
plot_dri_ic	13
prompts	14
roles	15
summarize_perm_dri	15
surveys	16
Index	17

format_dri_survey	<i>Format DRI survey</i>
-------------------	--------------------------

Description

format_dri_survey helps transform raw survey data into useful objects for further manipulation with deliberr

Usage

```
format_dri_survey(
  survey_info = list(type = NA_character_, order = NA_integer_, statement =
    NA_character_, name = NA_character_, scale_max = NA_integer_, q_method = NA)
)
```

Arguments

survey_info survey information needed to format DRI survey

Value

A list of survey info, including name, considerations data, policies data, scale_max or the upper bound of Likert-scale survey questions, and q_method which flags whether the survey uses Q methodology

See Also

[surveys](#) for raw survey data formatting

Examples

```
dri_survey <- format_dri_survey(surveys[surveys$name == "acp", ])  
  
dri_survey$name  
dri_survey$considerations
```

get_dri

Get DRI from a Group of Participants

Description

get_dri calculates the deliberation reasoning index (DRI) for a group of deliberation participants

Usage

```
get_dri(ic, adjusted = TRUE)
```

Arguments

ic	dataframe generated by <code>get_dri_ic(data)</code>
adjusted	a logical indicating whether to use the original or adjusted DRI calculation formula

Value

the group-level DRI value

See Also

[get_dri_ic\(\)](#) to generate ic parameter

Other IC methods: [get_dri_ind\(\)](#)

Examples

```
# get pre-deliberation (stage_id == 1) data from BEP case  
data <- human_data[human_data$stage_id == 1 & human_data$case == "BEP", ]  
  
# calculate IC  
ic <- get_dri_ic(data)  
  
# generate DRI  
get_dri(ic)
```

```
# same as the mean of individual DRIs  
mean(get_dri_ind(ic)$dri)
```

get_dri_alpha	<i>Get DRI Cronbach's Alpha</i>
---------------	---------------------------------

Description

get_dri_alpha calculates the internal consistency of DRI survey responses using Cronbach's alpha

Usage

```
get_dri_alpha(data)
```

Arguments

data the raw DRI survey response data

Value

a dataframe with alpha_c, alpha_p, and alpha_all with values of Cronbach's alpha for considerations, policy preferences, and both, respectively

See Also

[human_data](#) for raw survey response data formatting

[psych::alpha\(\)](#) for details on Cronbach's alpha calculation

Other DRI survey methods: [get_dri_case\(\)](#), [get_dri_ic\(\)](#)

Examples

```
# get pre-deliberation (stage_id == 1) data from Mayo case  
data <- human_data[human_data$stage_id == 1 & human_data$case == "Mayo", ]  
get_dri_alpha(data)
```

get_dri_case	<i>Get DRI from Case</i>
--------------	--------------------------

Description

get_dri_case calculates the pre- and post-deliberation DRI from a specific deliberation case

Usage

```
get_dri_case(  
  case,  
  adjusted = TRUE,  
  method = "wilcox",  
  alternative = "greater",  
  data = NULL  
)
```

Arguments

case	a character string specifying the name of the case in human_data
adjusted	a logical indicating whether you want the original or adjusted DRI formula
method	a character string specifying the method for statistical testing, must be one of "wilcox" (default) or "t.test"
alternative	a character string specifying the alternative hypothesis, must be one of "greater" (default), "two.sided" or "less". You can specify just the initial letter
data	a survey responses dataframe, must include pre- (stage_id == 1) and post-deliberation (stage_id == 2) data

Value

a tibble with with the following components: case, pre, post, delta, p_value, and significance

See Also

[human_data](#) for raw survey response data formatting

Other DRI survey methods: [get_dri_alpha\(\)](#), [get_dri_ic\(\)](#)

Examples

```
get_dri_case("Activate")  
  
# same as  
get_dri_case("Activate", data = human_data)
```

get_dri_ic	<i>Get DRI Intersubjective Consistency (IC)</i>
------------	---

Description

get_dri_ic calculates the intersubjective consistency (IC) between deliberation participants using their DRI survey responses

Usage

```
get_dri_ic(data)
```

Arguments

data the raw DRI survey response data

Value

dataframe with pnums or participant numbers, pnum1 and pnum2, or the unique number of participant 1 and 2, respectively, ccor and pcor, or the correlation between considerations statement ratings and policy preference rankings, respectively, and dj, or the modal orthogonal distance d for a given pair j

See Also

[human_data](#) for raw survey response data formatting

Other DRI survey methods: [get_dri_alpha\(\)](#), [get_dri_case\(\)](#)

Examples

```
# get post-deliberation (stage_id == 2) data from Zukunft case
data <- human_data[human_data$stage_id == 2 & human_data$case == "Zukunft", ]
get_dri_ic(data)
```

get_dri_ind	<i>Get DRI from Individual Participants</i>
-------------	---

Description

get_dri_ind calculates the DRI for each individual participant at a deliberation

Usage

```
get_dri_ind(ic, adjusted = TRUE)
```

Arguments

`ic` dataframe generated by `get_dri_ic(data)`
`adjusted` a logical indicating whether to use the original or adjusted DRI calculation formula

Value

tibble with `pnum` as participant number and their respective individual dri

See Also

[get_dri_ic\(\)](#) to generate `ic` parameter

Other IC methods: [get_dri\(\)](#)

Examples

```
# get post-deliberation (stage_id == 2) data from Zukunft case
data <- human_data[human_data$stage_id == 2 & human_data$case == "Zukunft", ]

# generate IC
ic <- get_dri_ic(data)

# get individual DRIs
get_dri_ind(ic)
```

`get_dri_llm_response` *Get DRI LLM Response*

Description

`get_dri_llm_response` uses <https://openrouter.ai> to generate artificial LLM responses to DRI survey questions

Usage

```
get_dri_llm_response(  
  model_id,  
  survey_info = list(type = NA_character_, order = NA_integer_, statement =  
    NA_character_, name = NA_character_, scale_max = NA_integer_, q_method = NA),  
  api_key = Sys.getenv("OPENROUTER_API_KEY"),  
  role_info = list(uid = NA_character_, role = NA_character_, description =  
    NA_character_),  
  n = 1,  
  request_log_path = NA_character_  
)
```

Arguments

model_id	a model_id string from openrouter.ai
survey_info	a list with survey question information, including type, order, statement, name, scale_max, and q_method
api_key	the API key generated by OpenRouter
role_info	a named list with basic data of a role (i.e., uid, role, description)
n	the number of responses requested (default = 1)
request_log_path	an optional path to a file where the request texts are saved

Value

a dataframe with n survey responses by model_id, including a unique identifier, uuid, a creation timestamp, created_at_utc, the time it took to generate the response, time_s, the estimated cost in USD, est_cost_usd, whether the response is valid, is_valid, and the reason it is not, invalid_reason

See Also

[get_model_ids\(\)](#) for all currently available model ids from openrouter.ai
Other LLM methods: [get_model_ids\(\)](#), [make_dri_llm_prompts\(\)](#)

Examples

```
# get DRI survey
survey_info <- surveys[surveys$name == "acp",]

# select a model from openrouter
model_id <- "google/gemini-2.5-flash-lite"

# send request to openrouter API
## Not run:
llm_data <- get_dri_llm_response(model_id, survey_info)
## End(Not run)
```

get_llm_response

Get LLM Response from OpenRouter.ai

Description

get_llm_response sends a prompt to a specified large language model (LLM) through the OpenRouter.ai API and returns the text response. It can also manage conversation history

Usage

```
get_llm_response(
  user_prompt,
  model_id = "x-ai/grok-3-mini",
  system_prompt = NA_character_,
  context = NULL,
  temperature = 0,
  api_key = Sys.getenv("OPENROUTER_API_KEY")
)
```

Arguments

<code>user_prompt</code>	a string containing the prompt or question for the model
<code>model_id</code>	a string specifying the model to use (e.g., "google/gemini-flash-1.5"). You can find model names on the OpenRouter.ai website
<code>system_prompt</code>	A string defining the role or behavior of the model. This is only used for the first message in a conversation (when 'context' is NULL)
<code>context</code>	a list representing the conversation history. If provided, the 'system_prompt' is ignored, as the context is assumed to contain the full history. Defaults to NULL for a new conversation
<code>temperature</code>	a numeric value between 0 and 2 that controls the randomness of the model's output. Higher values mean more "creative" responses
<code>api_key</code>	a string containing your OpenRouter.ai API key. It is strongly recommended to use the default, which retrieves the key from an environment variable named OPENROUTER_API_KEY

Value

A list containing three elements: response, context, and cost cost is a list containing prompt_cost, completion_cost, and total_cost in USD

Examples

```
## Not run:
# Make sure to set your API key first
# Sys.setenv(OPENROUTER_API_KEY = "your_api_key_here")

# First turn of the conversation
first_turn <- get_llm_response(
  user_prompt = "What are the three main benefits of using R for data analysis?",
  model_id = "x-ai/grok-3-mini",
  system_prompt = "You are a helpful assistant who provides concise answers."
)
cat("--- Initial Response ---\n")
cat(first_turn$response)
cat(paste0("\n--- Total Cost: $",
  format(first_turn$cost$total_cost, scientific = FALSE), " ---\n"))
```

```
# Follow-up question using the context from the first turn
second_turn <- get_llm_response(
  user_prompt = "Can you elaborate on the second benefit you mentioned?",
  model_id = "x-ai/grok-3-mini",
  context = first_turn$context
)
cat("\n\n--- Follow-up Response ---\n")
cat(second_turn$response)
cat(paste0("\n--- Total Cost: $", format(second_turn$cost$total_cost,
scientific = FALSE), " ---\n"))

## End(Not run)
```

get_model_ids

Get Model IDs

Description

get_model_ids uses OpenRouter to get provider and model names. The model_id can be recreated as provider/model

Usage

```
get_model_ids()
```

Value

a dataframe with columns provider and model

See Also

Other LLM methods: [get_dri_llm_response\(\)](#), [make_dri_llm_prompts\(\)](#)

Examples

```
get_model_ids()
```

human_data	<i>Human data</i>
------------	-------------------

Description

Pre- and post-deliberation DRI survey data from 24 deliberation cases around the world. Some cases used the same survey.

Usage

```
human_data
```

Format

A data frame with 67 variables, including survey, case, stage_id, C1...C50 and P1...P10.

make_dri_llm_prompts	<i>Make DRI LLM Prompts</i>
----------------------	-----------------------------

Description

make_dri_llm_prompts creates the system and user prompts used for generating LLM DRI survey data

Usage

```
make_dri_llm_prompts(  
  dri_survey,  
  role_info = list(uid = NA_character_, role = NA_character_, description =  
    NA_character_)  
)
```

Arguments

dri_survey	a list of formatted DRI survey questions
role_info	information about a specific role, including unique identifier uid, role name, and role description

Value

a list of lists with four variables: system, considerations, policies, and reason prompts

See Also

[format_dri_survey\(\)](#) for how to format dri_survey

[prompts](#) for how prompts are formatted

Other LLM methods: [get_dri_llm_response\(\)](#), [get_model_ids\(\)](#)

Examples

```
# get ccps as an example survey
dri_survey <- format_dri_survey(surveys[surveys$name == "ccps",])

# create an example role from scratch
role_info <- list(
  uid = "sur",
  role = "surfer",
  description = "likes the ocean"
)

make_dri_llm_prompts(dri_survey, role_info)
```

open_gui

Open Graphical User Interface (GUI)

Description

open_gui uses shiny to open an interactive interface for code-free DRI analysis

Usage

```
open_gui()
```

Value

NA

Examples

```
## Not run:
open_gui()

## End(Not run)
```

permute_dri

Permute DRI

Description

permute_dri tests whether the links between considerations and policy preferences are consistent or likely due to chance

Usage

```
permute_dri(data, iterations = 10000, verbose = FALSE, summary = TRUE)
```

Arguments

data	raw DRI survey dataframe
iterations	number permutations to generate
verbose	a logical flag to print time of permutation
summary	a logical indicating whether to return the raw data or summary of test results; raw data is optimal for plotting permutation results

Value

dataframe with permutation test results, raw or summarized. Summarized results include the number of participants, *n*, the observed DRI, *obs_dri*, the number of permutations conducted, *n_perm*, the mean permutation DRI, *mean_perm_dri*, and the frequency which the permutation DRI is greater or equal to the observed DRI, *p*

Examples

```
# get pre-deliberation (stage_id == 1) data from Zukunft case
data <- human_data[human_data$stage_id == 1 & human_data$case == "Zukunft", ]

# permute DRI 100 times
permute_dri(data, iterations = 100)
```

plot_dri_ic *Plot DRI Intersubjective Consistency (IC)*

Description

plot_dri_ic creates a dot plot of deliberation IC where each dot represents a pair of participants

Usage

```
plot_dri_ic(
  ic,
  title = NA_character_,
  suffix = NA_character_,
  dri = NA_real_,
  caption = NULL
)
```

Arguments

ic	dataframe generated by get_dri_ic(data)
title	title of the plot
suffix	string to be added after the title separated by :
dri	numeric value generated by get_dri(ic); if omitted, get_dri is called by default
caption	a string to be displayed under the plot

Value

an IC plot

See Also

[get_dri_ic\(\)](#) for how to generate the ic parameter

[get_dri\(\)](#) for how to generate the dri parameter

Examples

```
# get post-deliberation (stage_id == 2) data from Zukunft case
data <- human_data[human_data$stage_id == 2 & human_data$case == "Zukunft", ]

# set plot optional parameters
title <- "Case Zukunft"
suffix <- "Post-Deliberation IC Plot"
caption <- "this is an example plot"

# calculate ic
ic <- get_dri_ic(data)

plot_dri_ic(ic, title, suffix, caption = caption)
```

prompts

Prompts

Description

Prompts used in DRI surveys for humans and LLMs.

Usage

```
prompts
```

Format

A data frame with two variables: type and prompt

roles	<i>Roles</i>
-------	--------------

Description

Roles used to generate LLM role-playing data.

Usage

```
roles
```

Format

A data frame with five variables: uid, type, article, role and description.

summarize_perm_dri	<i>Summarize DRI Permutation Test Results</i>
--------------------	---

Description

summarize_perm_dri summarizes the results of a permutation test done using permute_dri(..., summary = FALSE); useful for summarizing results after plotting permutation results

Usage

```
summarize_perm_dri(perms, type = "common")
```

Arguments

perms	results of the permutation test generated by permute_dri()
type	which type of statistics to summarize (e.g., "common", "robust", "mean")

Value

summary of permutation test

See Also

[permute_dri\(\)](#) for generating the perms parameter
[rstatix::get_summary_stats\(\)](#) for values of type

Examples

```
# get pre-deliberation (stage_id == 1) data from Zukunft case
data <- human_data[human_data$stage_id == 1 & human_data$case == "Zukunft", ]

# create permutations
perms <- permute_dri(data, iterations = 100, summary = FALSE)

summarize_perm_dri(perms)
```

surveys

Surveys

Description

All survey data used in deliberations.

Usage

surveys

Format

A data frame with six variables: type, order, statement, name, scale_max and q_method.

Index

* DRI survey methods

get_dri_alpha, 4
get_dri_case, 5
get_dri_ic, 6

* IC methods

get_dri, 3
get_dri_ind, 6

* LLM methods

get_dri_llm_response, 7
get_model_ids, 10
make_dri_llm_prompts, 11

* datasets

human_data, 11
prompts, 14
roles, 15
surveys, 16

format_dri_survey, 2
format_dri_survey(), 11

get_dri, 3, 7
get_dri(), 14
get_dri_alpha, 4, 5, 6
get_dri_case, 4, 5, 6
get_dri_ic, 4, 5, 6
get_dri_ic(), 3, 7, 14
get_dri_ind, 3, 6
get_dri_llm_response, 7, 10, 11
get_llm_response, 8
get_model_ids, 8, 10, 11
get_model_ids(), 8

human_data, 4–6, 11

make_dri_llm_prompts, 8, 10, 11

open_gui, 12

permute_dri, 12
permute_dri(), 15
plot_dri_ic, 13

prompts, 11, 14

psych::alpha(), 4

roles, 15

rstatix::get_summary_stats(), 15

summarize_perm_dri, 15

surveys, 3, 16