# An R Markdown program to create the experimental design for a Discrete Choice Experiment (DCE) exploring online help seeking in socially anxious young people

Parts 2 & 3: Pilot Study Analysis And Final survey design

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# 1 About this code

## 1.1 Motivation

This sub-routine was used to analyse pilot survey responses and generate a final survey choice efficient design and choice cards for for a Discrete Choice Experiment study that is currently being written up. Future versions of this program will include details of the parent study.

## 1.2 Status

This code has been adapted from the code originally used in the study to make it easier to generalise. If you have access to the study dataset, this code will still generate an identical design to that used in our study. Future releases of this program will include synthetic data to allow those without access to the study dataset to run it from start to finish. The replication code will produce an efficient design with different choice sets to that produced in the original study.

### 1.3 Use

When using this code it is important to note that some of the steps in this program involve interactivity - they generate a prompt that a user must respond to before proceeding. Therefore, **this code should be run step by step** (i.e run one chunk at a time and do not try to run the program by knitting the R Markdown version of this code). Although it would be possible to add work-arounds to the interactivity issue, running the program by knitting the RMD version is still not recommended as it will prevent the documents generated by this program from rendering properly.

## 2 Prepare workspace

### 2.1 Install and load required libraries

If you do not already have the required libraries to run this program installed, you can do so by un-commenting and running the following lines.

```
# devtools::install_github("ready4-dev/ready4")
# devtools::install_github("ready4-dev/mychoice") # add lwgeom to imports
# devtools::install_github("ready4-dev/ready4use")
```

Next we load the libraries required to run this program.

```
library(ready4)
library(ready4use)
library(mychoice)
```

### 2.2 Specify whether program is a reproduction or replication

We begin by declaring whether this program is to be executed in order to reproduce the design of the original study or to replicate that study (which will produce a survey design with similar but different features). If choosing a replication, change the below setting to `F`.

```
reproduce_1L_lgl <- T
```

### 2.3 Specify data directories

We next specify where our input data can be located and where we wish to write our outputs to. You must supply these details or the rest of this code will not work.

```
paths_ls <- list(input_data_dir_1L_chr = "PROVIDE DETAILS HERE",
                 output_data_dir_1L_chr = "PROVIDE DETAILS HERE",
                 raw_data_fl_nms_chr = "PROVIDE DETAILS HERE")
```

We also specify the online data repository. Note, if you do not have write permissions to the below repository any subsequent command to "share" outputs will not execute correctly.

```
X <- Ready4useRepos(dv_nm_1L_chr = "springtolife",
                    dv_ds_nm_1L_chr = "https://doi.org/10.7910/DVN/VGPIPS",
                    dv_server_1L_chr = "dataverse.harvard.edu")
```

## 2.4 Reproducibility

We now set a seed to aid reproducibility.

```
set.seed(1001)
```

Having set the seed, it is now likely that if you run the syntax described in this document on your own installation of R you will get identical results to those reported in this document. However, if you do not, it may be that you have a different version of R, or of some of the packages that we used to produce this analysis. We therefore save a record of the software that we have on the machine used for this analysis so this can be made available for comparisons.

```
session_ls <- sessionInfo()
```

# 3 Ingest data

We ingest the responses to our pilot survey.

```
pilot_ds_tb <- get_table_from_loc_file(paste0(paths_ls$input_data_dir_1L_chr,
                                              "/",
                                              paths_ls$pilot_ds_fl_nm_1L_chr),
                                       heading_rows_1L_int = 3L,
                                       force_numeric_1L_lgl = T)
```

We also retrieve details about the design of our pilot survey.

```
dce_design_ls <- ingest(X,
                        fls_to_ingest_chr = ifelse(!reproduce_1L_lgl,"CCC_pilot_dce_design_ls","DDD_pilot_dce_design_ls"),
                        metadata_1L_lgl = F)
```

# 4 Analyse data

The analysis algorithm we are going to apply involves random sampling so a seed must be set to make results reproducible. Note, for some random seeds "NULL" values will be generated that will prevent the analysis executing in full. If this occurs, change the random seed and rerun the code.

```
dce_design_ls <- add_design_spec(dce_design_ls,
                                 pilot_ds_tb = pilot_ds_tb,
                                 choice_var_pfx_1L_chr = "DCE_B",
                                 constraints_ls = list(Endorsers_non_expert = c(0.005, Inf),
                                                       Endorsers_expert = c(0.006, Inf),
                                                       Cost = c(-Inf, -0.0499)),
                                 draws_1L_int = 100L,
                                 seed_1L_int = 1985,
                                 set_idx_1L_int = 1L)
```

# 5 Update survey design

We now update the survey experimental design based on analysis of pilot survey results.

```
if(reproduce_1L_lgl){
  dce_design_ls$efnt_dsn_ls <- append(dce_design_ls$efnt_dsn_ls,
                                     list(readRDS(file = paste0(paths_ls$output_data_dir_1L_chr,
                                                                "/Archive/Design_Records/no_app_optout_ls.rds"))) %>% # Replace with DV ing
                                          stats::setNames(paste0("Set_", length(dce_design_ls$efnt_dsn_ls) + 1)))
  }else{
    dce_design_ls <- add_design_spec(dce_design_ls,  priors_idx_1L_int = 1L, set_idx_1L_int = 1)
}
```

# 6 Create final survey HTML choice cards

We can now generate HTML choice cards for each block of the final survey.

```
dce_design_ls <- add_design_spec(dce_design_ls,
                                 add_choice_cards_1L_lgl = T,
                                 block_idxs_ls = {if(reproduce_1L_lgl){
                                   list(as.integer(c(3,5,6,7,8,9,12,14,15,18,19,20,23,24,28)),
                                    as.integer(setdiff(1:dce_design_ls$choice_sets_ls$nbr_of_sets_1L_int,
                                                       c(3,5,6,7,8,9,12,14,15,18,19,20,23,24,28)))) %>%
                                     stats::setNames(paste0(paste0("block_",1:2),"_int"))}else{list()}},
                                 transform_att_nms_1L_lgl = T)
```

# 7 Preview final survey

We can now preview all of our choice cards in an interactive Shiny app.

```
launch_survey_preview(dce_design_ls, block_1L_int = 1L)
```

```
launch_survey_preview(dce_design_ls, block_1L_int = 2L)
```

# 8 Share work

The final step is to share our work with others in an online repository. Note, if you don't have write permissions for `X`, you should replace `X` with an alternative `Ready4useRepos` object that provides details of a repository for which you have write permissions.

```
Y <- share(X,
           obj_to_share_xx = dce_design_ls,
           fl_nm_1L_chr = ifelse(reproduce_1L_lgl,"DDD_final_dce_design_ls","CCC_dce_design_ls"),
           description_1L_chr = paste0("DCE design specification for final version of survey - ",
                                       ifelse(reproduce_1L_lgl,"reproduction","replication")," (output of dce_sa_design program)"))
```