Designing Choice Experiments using the support.CEs package.

Sidney Sherborne*

This is a quick guide to using the support.CEs package to design a choice experiment. This is currently limited to forced-choice experiments with binary attributes (i.e. the attribute is present or not present).

The following packages are used in the following code. Install these first.

```
# These packages are required for the code to work.
# Remove the # symbol to uncomment them so they will run.

# install.packages("support.CEs")
# install.packages("dplyr")
# install.packages("kableExtra")

library(support.CEs)
library(dplyr)
library(kableExtra)
```

Below is a custom function which takes an input number of binary attributes and returns the design matrix.

```
create_design <- function(n_attributes) {

  # Creating the list of 4 attributes with two levels each.
  attribute_list <<- list(paste0("A", 1:2))

  for (i in 2:n_attributes){
    attribute_list[i] <<- list(c(paste0(LETTERS[i],1),
                                 paste0(LETTERS[i],2)))
  }

  # Plugging list into the support.CEs function.
  design_4 <- Lma.design(attribute.names = attribute_list,
                         nalternatives =  2,
                         nblocks = 1)

  # Getting design matrix.
  design_matrix <- make.design.matrix(design_4,
                                      categorical.attributes = paste0("X",1:n_attributes),
                                      binary = FALSE)

  # Removing the 'no choice option'.
  design_matrix <- design_matrix %>% filter(!ALT == 3) %>%
  # Recoding 1 and 0 to Yes and No.
    mutate_at(.vars = paste0(LETTERS[1:n_attributes],2),
              function(x) ifelse(x==1, "Yes", "No"))  %>%
```

*The Cognition Company, sidney.sherborne@cognitioncompany.com

```
    select(QES, paste0(LETTERS[1:n_attributes],2))

  # Renaming Table Names
  names(design_matrix) <- c("Question", paste0("Attribute ", 1:n_attributes))

  return(design_matrix)
}
```

The code below selects the number of attributes. Then displays the table containing the structure of the choice experiment. The result of the table can be found in Table 1.

```
# Select number of attributes.
n_attributes <- 4

# Run the function above.
create_design(n_attributes) %>%
# Format the resulting table.
  kable(caption = "Structure of experiment.",
        label = "structure",
        booktabs = T,
        align = "c",
        escape = F,
        linesep = c('','\\addlinespace\\hline\\addlinespace')) %>%
  kable_styling("condensed",
                full_width = F,
                latex_options=c("scale_down","HOLD_position")) %>%
  print()
```

Table 1: Structure of experiment.

Question	Attribute 1	Attribute 2	Attribute 3	Attribute 4
1	No	No	Yes	No
1	No	Yes	No	Yes
2	Yes	Yes	No	No
2	No	Yes	No	No
3	Yes	No	No	No
3	Yes	No	No	Yes
4	No	No	Yes	No
4	Yes	Yes	Yes	No
5	No	No	No	Yes
5	No	No	Yes	No
6	No	Yes	Yes	Yes
6	No	No	No	Yes
7	Yes	No	Yes	Yes
7	Yes	No	No	No
8	Yes	Yes	Yes	No
8	No	No	Yes	No
9	No	Yes	No	Yes
9	Yes	Yes	No	No
10	Yes	No	No	Yes
10	No	Yes	Yes	Yes
11	No	Yes	No	No
11	Yes	No	Yes	Yes
12	Yes	Yes	Yes	Yes
12	Yes	Yes	Yes	Yes