

# Appendix C.V: Pesponse Pattern Tile Plot

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Load packages

```
#library(MplusAutomation) # A conduit between R & Mplus
library(here)           # To locate or send files within the Rproject folder
library(glue)           # To insert R code within strings
library(gt)             # For pretty tables
library(reshape2)       # For manipulating plot data
library(cowplot)        # For pretty plots
library(patchwork)      # To effortlessly combine plots
library(tidyverse)      # For everything else...
```

Read data file n\_3000\_lca\_rep1.dat (N=3000; Replication 1)

```
sim_data <- read.delim2(here("C1-Simulation", "n_3000_lca_rep1.dat"),
  sep = "", header = FALSE) %>%
  select(-V18) %>%
  setNames(
    c("primary", "change", "interupt", "initiat", "engage", "approach", "response", "expect",
      "new", "same", "relative", "objects", "sequence", "trans", "avoid", "control", "touch")) %>%
  purrr::modify_if(is.character, as.numeric) %>%
  select(1:5)
```

Identify each response patterns and label (pattern\_id)

```
resp_data <- sim_data %>%
  mutate(pattern = pmap_chr(list(primary, change, interupt, initiat, engage), ~ paste0(..1, ..2, ..3, ..4, ..5)))
  mutate(pattern_id = dense_rank(pattern))
```

```
order_highest <- resp_data %>%
  group_by(pattern) %>%
  summarize(frequency = n(),
    primary = first(primary),
    change = first(change),
    interupt = first(interupt),
    initiat = first(initiat),
    engage = first(engage)) %>%
  arrange(desc(frequency)) %>%
  ungroup() %>%
  head(9)
```

Generate Table 28

```
order_highest %>% gt()
```

pattern	frequency	primary	change	interrupt	initiat	engage
00000	619	0	0	0	0	0
11111	487	1	1	1	1	1
11110	188	1	1	1	1	0
01000	173	0	1	0	0	0
00010	164	0	0	0	1	0
10111	156	1	0	1	1	1
01111	154	0	1	1	1	1
11011	104	1	1	0	1	1
11101	88	1	1	1	0	1

```
plot_lca_function <- function(df,class_dist,item_num,class_num,freq=1, lty,
                              item_labels=c("Primary","Change", "Interrupt","Initiate", "Engage"),
                              legend_position="none", class_labels,plot_title=""){

plot_data <- as.data.frame(df)

c_size <- as.data.frame(class_dist)
colnames(c_size) <- paste0("cs")
c_size <- c_size %>% mutate(cs = round(cs*100, 2))
colnames(plot_data) <- paste0(class_labels, glue(" ({c_size[1:class_num,]}%)"))

plot_data <- cbind(Var = paste0("U", 1:item_num), plot_data)
plot_data$Var <- factor(plot_data$Var,
                        labels = item_labels)
plot_data$Var <- fct_inorder(plot_data$Var)

pd_long_data <- melt(plot_data, id.vars = "Var")

# This syntax uses the data.frame created above to produce the plot with `ggplot()`

p <- pd_long_data %>%
  ggplot(aes(x = as.integer(Var), y = value,
             shape = variable, colour = variable)) +
  geom_point(size = 4) + geom_line( size=freq, lty = lty ) +
  scale_x_continuous("", breaks = 1:item_num, labels = item_labels) +
  scale_y_continuous(limits = c(0,1), n.breaks = 5) +
  scale_colour_grey() +
  labs(title = plot_title, y = "") +
  theme_cowplot() +
  theme(legend.title = element_blank(),
        legend.position = legend_position,
        axis.text.x = element_text(size = 10, vjust = 1))

p
return(p)
}
```

## Response pattern tile plot (Figure 7)

```
a <- plot_lca_function(  
  df = list(c1 = rep(0,5)),  
  class_dist = 1,  
  freq = 3, lty = 1,  
  item_num = 5, class_num = 1,  
  class_labels = c("Class-1"),  
  plot_title = "Pattern 1 (f=619)")  
  
b <- plot_lca_function(  
  df = list(c1 = rep(1,5)),  
  class_dist = 1,  
  freq = 2.5, lty = 2,  
  item_num = 5, class_num = 1,  
  class_labels = c("Class-1"),  
  plot_title = "Pattern 2 (f=487)")  
  
c <- plot_lca_function(  
  df = list(c1 = c(rep(1,4), rep(0,1))),  
  class_dist = 1,  
  freq = 2, lty = 3,  
  item_num = 5, class_num = 1,  
  class_labels = c("Class-1"),  
  plot_title = "Pattern 3 (f=188)")  
  
d <- plot_lca_function(  
  df = list(c1 = c(rep(0,1), rep(1,1), rep(0,3))),  
  class_dist = 1,  
  freq = 2, lty = 3,  
  item_num = 5, class_num = 1,  
  class_labels = c("Class-1"),  
  plot_title = "Pattern 4 (f=173)")  
  
e <- plot_lca_function(  
  df = list(c1 = c(rep(0,3), rep(1,1), rep(0,1))),  
  class_dist = 1,  
  freq = 1.5, lty = 4,  
  item_num = 5, class_num = 1,  
  class_labels = c("Class-1"),  
  plot_title = "Pattern 5 (f=164)")  
  
f <- plot_lca_function(  
  df = list(c1 = c(rep(1,1), rep(0,1), rep(1,3))),  
  class_dist = 1,  
  freq = 1, lty = 5,  
  item_num = 5, class_num = 1,  
  class_labels = c("Class-1"),  
  plot_title = "Pattern 6 (f=156)")  
  
g <- plot_lca_function(  
  df = list(c1 = c(rep(0,1), rep(1,4))),  
  class_dist = 1,
```

```

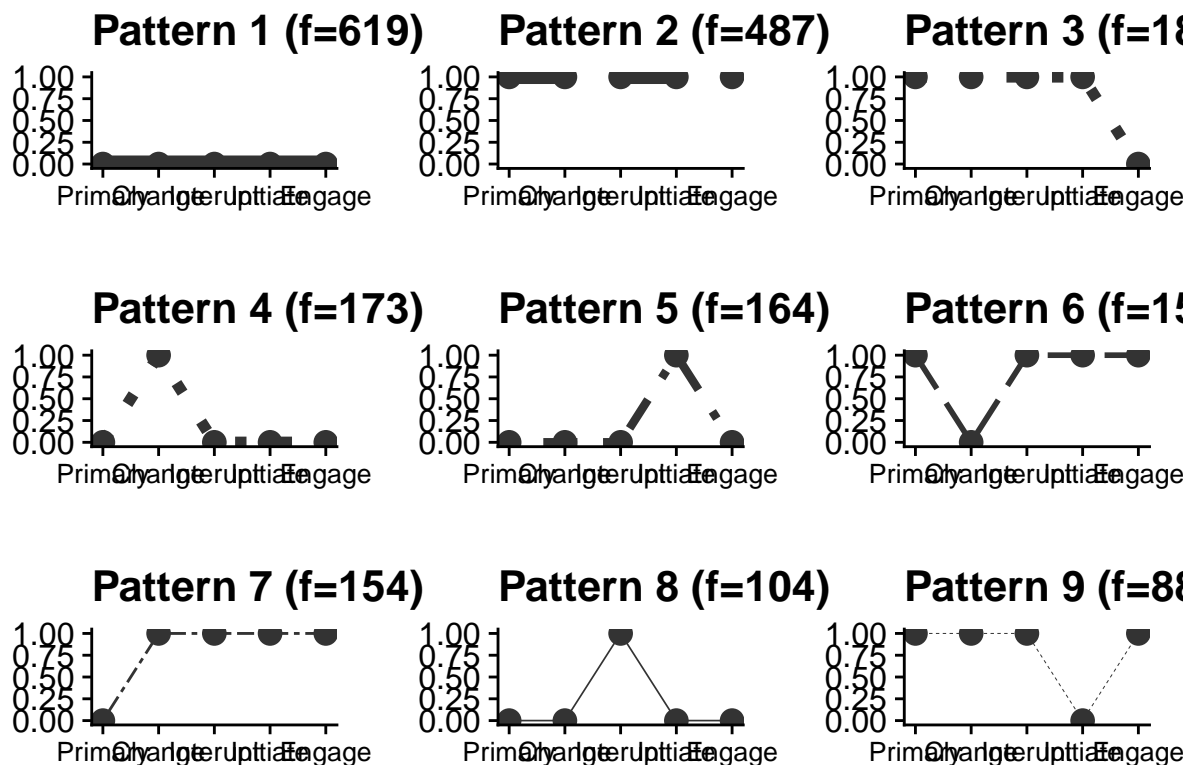
freq = .5, lty = 6,
item_num = 5, class_num = 1,
class_labels = c("Class-1"),
plot_title = "Pattern 7 (f=154)")

h <- plot_lca_function(
  df = list(c1 = c(rep(0,2), rep(1,1), rep(0,2))),
  class_dist = 1,
  freq = .3, lty = 7,
  item_num = 5, class_num = 1,
  class_labels = c("Class-1"),
  plot_title = "Pattern 8 (f=104)")

i <- plot_lca_function(
  df = list(c1 = c(rep(1,3), rep(0,1), rep(1,1))),
  class_dist = 1,
  freq = .15, lty = 8,
  item_num = 5, class_num = 1,
  class_labels = c("Class-1"),
  plot_title = "Pattern 9 (f=88)")

(a+b+c)/(d+e+f)/(g+h+i)

```



Save Figure 7

```

ggsave(here("figures", "CV_pattrn_tile_plot.png"), dpi=300, height=9, width=10, units="in")

```