

# R-code multivariate multilevel logistic regression

```
# Load packages -----  
  
library(haven)  
library(dplyr)  
library(brms)  
library(tidyr)  
library(tidybayes)  
  
# Load data -----  
  
# Reads the data from the working directory  
data <- read_sav("data.sav")  
  
# Data cleaning -----  
  
data_clean <- data |>  
  mutate(  
    across(  
      c(kjonn, Etn, Tsent),  
      haven::as_factor  
    ),  
    across(  
      starts_with("Endring"),  
      haven::as_factor  
    ),  
    across(  
      starts_with("3kat"),
```

```

    \ (x) relevel(x, ref = "No change")
  ),
  across(
    ses_fr:s ses_mr,
    \ (x) x - 3
  ),
  alder = scale(alder),
  Int_arm_2r = factor(
    Int_arm_2r,
    levels = c(2,1),
    labels = c("Kontroll", "Intervensjon")
  )
) |>
drop_na(
  kjonn,
  alder,
  Etn,
  ses_fr,
  ses_mr,
  Int_arm_2r,
  Tsent,
  starts_with("Endring")
)

```

# Create and run the model -----

```

model_Endring <- brm(
  bf(
    mvbind(
      Endring_s7_3kat,
      Endring_s8_3kat,
      Endring_s9_3kat,
      Endring_s10_3kat
    ) ~ 1 +
      kjonn + alder + Etn + ses_fr + ses_mr + Int_arm_2r + Tsent + (1|p|Idsk)
  ),
  family = categorical(),
  data = data_clean,
  iter = 4000,
  chains = 4,

```

```

cores = 4,
prior = prior(normal(0,2.5), class = "b"),
control = list(adapt_delta = .95),
backend = "cmdstanr"
)

# Extract fixed effects parameters -----

model_Endring %>%
  gather_draws(`b.*`, regex = TRUE) |>
  mutate(.value = exp(.value)) |>
  median_hdci() |>
  separate(
    .variable,
    into = c("b", "mu", "Endring", "var"),
    sep = "_"
  ) |>
  arrange(Endring) |>
  select(mu:.upper)

# Extract random effects parameters -----

model_Endring |>
  gather_draws(`sd.*`, regex = TRUE) |>
  median_hdci() |>
  separate(
    .variable,
    into = c("sd", "ldsk", "empty", "mu", "Endring", "var"),
    sep = "_"
  ) |>
  select(mu, Endring, .value:.upper)

```