Factor Congruence coefficient

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Functions

Data wrangling

- data to obtain inputs for congruence coefficient matrices

```
#Call data = Ipsatized or Original data
files <- function(dataType){
  dir_ls(here::here("data"))%>%
  as_tibble() %>%
  filter(str_detect(value, {{dataType}}))
}

#creating the main col names - factor# and dpecify g or ng
rename_df <- function(d) {
  #look for the col which has sum of NA's equal to the number of rows in the data frame - we want to re
  col_miss_log <- apply(d, 2, function(x) sum(is.na(x)) == nrow(d))
  #Give the col which has logical = T; this is the blank col
  col_miss <- seq_along(d)[col_miss_log]
  #Remove the first col, the blank col and the co next to blank col
  d_subset <- d[ ,-c(1, col_miss, col_miss + 1)]
  #create the main stem for g_
  nms1 <- gsub("^(\\d?\\d).+", "g_\\1", names(d_subset)[seq(1, col_miss - 2)])
  nms2 <- gsub("^(\\d?\\d).+", "ng_\\1", names(d_subset)[seq(col_miss - 1, length(names(d_subset)))])
  names(d_subset) <- c(nms1, nms2)
  d_subset
}

#add sheet name to the factor names = g/ng_sheetname_fact#
add_sheetname <- function(d, sheetname) {
  d <- rename_df(d)
  prefix <- gsub("\\d", "", names(d))
  digits <- gsub("\\D", "", names(d))
  nms <- paste0(prefix, sheetname, "_", digits)
  names(d) <- nms
  d
}

dataType = "Ipsatized"
final_data <- function(dataType){
  file <- files({{dataType}})
  sheets <- readxl::excel_sheets(file$value)
  list_sheets <- map(sheets, ~readxl::read_xlsx(file$value, sheet = .x, n_max = 360))
```

```
  list_all_sheets <- map2(list_sheets, sheets, add_sheetname)
  list_all_sheets
}
```

Input for HungarianSolver

```
#splits each list into two dataframes called grads and non-grads
split_list <- function(d){
  #create the "grads" dataframe
  grads <- d %>%
   data.frame() %>%
    dplyr::select(starts_with('g')) %>%
    tibble()

   #create the "non-grads" dataframe
  nograds <- d %>%
   data.frame() %>%
    dplyr::select(starts_with('ng')) %>%
    tibble()

  #build a list of these two dataframes
l <- list(grads, nograds)
names(l) <- c("grads", "nograds")
l #output the list
}


#Get a list of all congruence coefficients
congrunce_mat_unnamed <- function(dataType){

  #get the list of sheets - appropriate var names
  ips_data <- final_data({{dataType}})

  #split the lists into grads and non-grads dfs
  list_all <- map(ips_data, split_list)

  #get congruence coefficients for each list
 map(list_all, ~psych::factor.congruence(.x$grads, .x$nograds))
}

#Get a list of all congruence coefficients with named matrices
congrunce_mat <- function(dataType){
  #list of matrices but unnamed
  list_mats <- congrunce_mat_unnamed ({{dataType}})

  #get the sheet name to be used for naming the matrices
    file <- files({{dataType}})
  sheet_name <- readxl::excel_sheets(file$value)

  #name the dataframes in the list
  names(list_mats) <- c(sheet_name)
```

```
  #named dataframes in a list of congruence coefficient matrices
  list_mats
}
```

Matching pairs and melted matrix

```
#Adds id columns to the pairs
 add_id_pairs <- function(pair){
   df <- pair %>%
     data.frame() %>%
     mutate(id = str_c(X1, "_",X2)) %>%
     rename( "grad" = "X1",
             "no_grad" = "X2" )
   df
 }

 #Adds id columns to the mat long
 add_id_matLong <- function(mat_long){
retain_rows <- mat_long %>%
  data.frame() %>%
  #extract digits after the 2nd underscore
  mutate(id_g = str_extract(Var1 , "[^_]*$"),
         id_ng = str_extract(Var2 , "[^_]*$"),
         id = paste0(id_g, "_", id_ng)) %>%
  select(-id_g, - id_ng)
retain_rows
 }

#Fucntion to compute congruence coefficients
 compute_avg.cc <- function(model){
  avg_cc <- model %>%
      summarise(avg_cc = mean(abs(cc)))
  avg_cc
}
```

Data for Congruence coefficient matrix

- columns are renamed
- list of matrices for every sheet

```
ips_data <- congrunce_mat ("Ipsatized")
orig_data <- congrunce_mat ("Original")
```

```
#In Hungarian $pairs
# [,1 ] -rownames - "grads"; [,2] - colnames - "non-grads"
    pairings_ips <- map(ips_data, ~RcppHungarian::HungarianSolver(-1*(abs(.x)))$pairs)#only retain the
    pairings_ips <- map(pairings_ips, add_id_pairs)#pairs with id_col
```

```
    pairings_orig <- map(orig_data, ~RcppHungarian::HungarianSolver(-1*(abs(.x)))$pairs)#only retain th
    pairings_orig <- map(pairings_orig, add_id_pairs) #pairs with id_col
```

Melt matrices

- melt the congruence coefficient matrices
- use an id to retain rows which overlap with the pairs
- compute average of all absolute values of congruence coefficient for every model

```
#Figure out how to set decimal places to three in R
# Output of the factors used for the average cc
#Output table for avg. cc's
options(digits=3)
z = congrunce_mat("Ipsatized")
mat_long_ips <- map(z, ~reshape2::melt(.x, na.rm=TRUE, value.name="cc"))
mat_long_ips <- map(mat_long_ips, add_id_matLong) #mat_long with id_col

r = congrunce_mat("Original")
mat_long_orig <- map(r, ~reshape2::melt(.x, na.rm=TRUE, value.name="cc"))
mat_long_orig <- map(mat_long_orig, add_id_matLong)#mat_long with id_col

#retain the relevant rows in mat_long, they match with the pairings
final_cc_list <- map2(mat_long_orig, pairings_orig, semi_join, by = "id")

all_avg.cc <- map(final_cc_list,compute_avg.cc) %>%
               reshape2::melt() %>%
               select(-variable) %>%
               rename("Model" = "L1",
                      "Avg_cc" = "value") %>%
               select(Model, Avg_cc) %>%
               mutate(Avg_cc = round(Avg_cc,2))
```

```
make_table <- function(df){
  tab = df %>%
  data.frame() %>%
  kbl()
  tab
}

map(final_cc_list, make_table)
```

```
## $unr1r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_unr1r\_1 & ng\_unr1r\_1 & -0.98 & 1\_1\\
## \hline
## \end{tabular}
##
```

```
## $vx2r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_vx2r\_2 & ng\_vx2r\_1 & 0.98 & 2\_1\\
## \hline
## g\_vx2r\_1 & ng\_vx2r\_2 & 0.98 & 1\_2\\
## \hline
## \end{tabular}
##
## $vx3r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_vx3r\_1 & ng\_vx3r\_1 & 0.98 & 1\_1\\
## \hline
## g\_vx3r\_2 & ng\_vx3r\_2 & 0.95 & 2\_2\\
## \hline
## g\_vx3r\_3 & ng\_vx3r\_3 & 0.95 & 3\_3\\
## \hline
## \end{tabular}
##
## $vx4r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_vx4r\_1 & ng\_vx4r\_1 & 0.95 & 1\_1\\
## \hline
## g\_vx4r\_2 & ng\_vx4r\_2 & 0.92 & 2\_2\\
## \hline
## g\_vx4r\_3 & ng\_vx4r\_3 & 0.89 & 3\_3\\
## \hline
## g\_vx4r\_4 & ng\_vx4r\_4 & 0.19 & 4\_4\\
## \hline
## \end{tabular}
##
## $vx5r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_vx5r\_1 & ng\_vx5r\_1 & 0.97 & 1\_1\\
## \hline
## g\_vx5r\_2 & ng\_vx5r\_2 & 0.93 & 2\_2\\
## \hline
## g\_vx5r\_4 & ng\_vx5r\_3 & 0.88 & 4\_3\\
## \hline
```

```
## g\_vx5r\_3 & ng\_vx5r\_4 & 0.93 & 3\_4\\
## \hline
## g\_vx5r\_5 & ng\_vx5r\_5 & 0.83 & 5\_5\\
## \hline
## \end{tabular}
##
## $vx6r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_vx6r\_1 & ng\_vx6r\_1 & 0.94 & 1\_1\\
## \hline
## g\_vx6r\_2 & ng\_vx6r\_2 & 0.97 & 2\_2\\
## \hline
## g\_vx6r\_4 & ng\_vx6r\_3 & 0.90 & 4\_3\\
## \hline
## g\_vx6r\_3 & ng\_vx6r\_4 & 0.94 & 3\_4\\
## \hline
## g\_vx6r\_6 & ng\_vx6r\_5 & 0.84 & 6\_5\\
## \hline
## g\_vx6r\_5 & ng\_vx6r\_6 & 0.88 & 5\_6\\
## \hline
## \end{tabular}
##
## $vx8r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_vx8r\_1 & ng\_vx8r\_1 & 0.96 & 1\_1\\
## \hline
## g\_vx8r\_2 & ng\_vx8r\_2 & 0.96 & 2\_2\\
## \hline
## g\_vx8r\_3 & ng\_vx8r\_3 & 0.94 & 3\_3\\
## \hline
## g\_vx8r\_8 & ng\_vx8r\_4 & -0.77 & 8\_4\\
## \hline
## g\_vx8r\_6 & ng\_vx8r\_5 & 0.88 & 6\_5\\
## \hline
## g\_vx8r\_5 & ng\_vx8r\_6 & 0.89 & 5\_6\\
## \hline
## g\_vx8r\_4 & ng\_vx8r\_7 & 0.91 & 4\_7\\
## \hline
## g\_vx8r\_7 & ng\_vx8r\_8 & 0.87 & 7\_8\\
## \hline
## \end{tabular}
##
## $eq19r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
```

```
## Var1 & Var2 & cc & id\\
## \hline
## g\_eq19r\_2 & ng\_eq19r\_1 & 0.91 & 2\_1\\
## \hline
## g\_eq19r\_1 & ng\_eq19r\_2 & 0.86 & 1\_2\\
## \hline
## g\_eq19r\_5 & ng\_eq19r\_3 & 0.88 & 5\_3\\
## \hline
## g\_eq19r\_4 & ng\_eq19r\_4 & 0.85 & 4\_4\\
## \hline
## g\_eq19r\_3 & ng\_eq19r\_5 & 0.81 & 3\_5\\
## \hline
## g\_eq19r\_9 & ng\_eq19r\_6 & 0.76 & 9\_6\\
## \hline
## g\_eq19r\_16 & ng\_eq19r\_7 & 0.71 & 16\_7\\
## \hline
## g\_eq19r\_12 & ng\_eq19r\_8 & 0.79 & 12\_8\\
## \hline
## g\_eq19r\_13 & ng\_eq19r\_9 & 0.85 & 13\_9\\
## \hline
## g\_eq19r\_10 & ng\_eq19r\_10 & 0.73 & 10\_10\\
## \hline
## g\_eq19r\_6 & ng\_eq19r\_11 & 0.69 & 6\_11\\
## \hline
## g\_eq19r\_18 & ng\_eq19r\_12 & 0.61 & 18\_12\\
## \hline
## g\_eq19r\_19 & ng\_eq19r\_13 & 0.62 & 19\_13\\
## \hline
## g\_eq19r\_14 & ng\_eq19r\_14 & -0.56 & 14\_14\\
## \hline
## g\_eq19r\_8 & ng\_eq19r\_15 & 0.73 & 8\_15\\
## \hline
## g\_eq19r\_15 & ng\_eq19r\_16 & 0.66 & 15\_16\\
## \hline
## g\_eq19r\_7 & ng\_eq19r\_17 & 0.84 & 7\_17\\
## \hline
## g\_eq19r\_11 & ng\_eq19r\_18 & 0.75 & 11\_18\\
## \hline
## g\_eq19r\_17 & ng\_eq19r\_19 & 0.59 & 17\_19\\
## \hline
## \end{tabular}
##
## $ob20r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_ob20r\_2 & ng\_ob20r\_1 & 0.80 & 2\_1\\
## \hline
## g\_ob20r\_8 & ng\_ob20r\_2 & 0.93 & 8\_2\\
## \hline
## g\_ob20r\_13 & ng\_ob20r\_3 & 0.60 & 13\_3\\
## \hline
```

```
## g\_ob20r\_5 & ng\_ob20r\_4 & 0.92 & 5\_4\\
## \hline
## g\_ob20r\_4 & ng\_ob20r\_5 & 0.94 & 4\_5\\
## \hline
## g\_ob20r\_12 & ng\_ob20r\_6 & 0.88 & 12\_6\\
## \hline
## g\_ob20r\_14 & ng\_ob20r\_7 & -0.91 & 14\_7\\
## \hline
## g\_ob20r\_16 & ng\_ob20r\_8 & 0.64 & 16\_8\\
## \hline
## g\_ob20r\_7 & ng\_ob20r\_9 & -0.91 & 7\_9\\
## \hline
## g\_ob20r\_3 & ng\_ob20r\_10 & -0.82 & 3\_10\\
## \hline
## g\_ob20r\_17 & ng\_ob20r\_11 & 0.78 & 17\_11\\
## \hline
## g\_ob20r\_1 & ng\_ob20r\_12 & 0.80 & 1\_12\\
## \hline
## g\_ob20r\_19 & ng\_ob20r\_13 & 0.92 & 19\_13\\
## \hline
## g\_ob20r\_18 & ng\_ob20r\_14 & -0.51 & 18\_14\\
## \hline
## g\_ob20r\_9 & ng\_ob20r\_15 & 0.80 & 9\_15\\
## \hline
## g\_ob20r\_10 & ng\_ob20r\_16 & 0.69 & 10\_16\\
## \hline
## g\_ob20r\_15 & ng\_ob20r\_17 & -0.78 & 15\_17\\
## \hline
## g\_ob20r\_6 & ng\_ob20r\_18 & 0.88 & 6\_18\\
## \hline
## g\_ob20r\_11 & ng\_ob20r\_19 & 0.75 & 11\_19\\
## \hline
## g\_ob20r\_20 & ng\_ob20r\_20 & -0.92 & 20\_20\\
## \hline
## \end{tabular}
##
## $ob42r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_ob42r\_1 & ng\_ob42r\_1 & -0.81 & 1\_1\\
## \hline
## g\_ob42r\_26 & ng\_ob42r\_2 & 0.69 & 26\_2\\
## \hline
## g\_ob42r\_3 & ng\_ob42r\_3 & 0.82 & 3\_3\\
## \hline
## g\_ob42r\_17 & ng\_ob42r\_4 & 0.83 & 17\_4\\
## \hline
## g\_ob42r\_4 & ng\_ob42r\_5 & 0.90 & 4\_5\\
## \hline
## g\_ob42r\_6 & ng\_ob42r\_6 & 0.84 & 6\_6\\
## \hline
```

```
## g\_ob42r\_37 & ng\_ob42r\_7 & -0.93 & 37\_7\\
## \hline
## g\_ob42r\_8 & ng\_ob42r\_8 & 0.89 & 8\_8\\
## \hline
## g\_ob42r\_41 & ng\_ob42r\_9 & -0.72 & 41\_9\\
## \hline
## g\_ob42r\_16 & ng\_ob42r\_10 & 0.83 & 16\_10\\
## \hline
## g\_ob42r\_9 & ng\_ob42r\_11 & 0.92 & 9\_11\\
## \hline
## g\_ob42r\_29 & ng\_ob42r\_12 & -0.91 & 29\_12\\
## \hline
## g\_ob42r\_34 & ng\_ob42r\_13 & 0.85 & 34\_13\\
## \hline
## g\_ob42r\_36 & ng\_ob42r\_14 & 0.78 & 36\_14\\
## \hline
## g\_ob42r\_11 & ng\_ob42r\_15 & 0.84 & 11\_15\\
## \hline
## g\_ob42r\_30 & ng\_ob42r\_16 & 0.49 & 30\_16\\
## \hline
## g\_ob42r\_10 & ng\_ob42r\_17 & 0.60 & 10\_17\\
## \hline
## g\_ob42r\_5 & ng\_ob42r\_18 & -0.46 & 5\_18\\
## \hline
## g\_ob42r\_32 & ng\_ob42r\_19 & -0.80 & 32\_19\\
## \hline
## g\_ob42r\_19 & ng\_ob42r\_20 & 0.70 & 19\_20\\
## \hline
## g\_ob42r\_39 & ng\_ob42r\_21 & -0.92 & 39\_21\\
## \hline
## g\_ob42r\_14 & ng\_ob42r\_22 & -0.84 & 14\_22\\
## \hline
## g\_ob42r\_38 & ng\_ob42r\_23 & -0.86 & 38\_23\\
## \hline
## g\_ob42r\_25 & ng\_ob42r\_24 & 0.66 & 25\_24\\
## \hline
## g\_ob42r\_40 & ng\_ob42r\_25 & 0.88 & 40\_25\\
## \hline
## g\_ob42r\_7 & ng\_ob42r\_26 & -0.82 & 7\_26\\
## \hline
## g\_ob42r\_27 & ng\_ob42r\_27 & 0.84 & 27\_27\\
## \hline
## g\_ob42r\_24 & ng\_ob42r\_28 & 0.75 & 24\_28\\
## \hline
## g\_ob42r\_12 & ng\_ob42r\_29 & -0.73 & 12\_29\\
## \hline
## g\_ob42r\_23 & ng\_ob42r\_30 & 0.83 & 23\_30\\
## \hline
## g\_ob42r\_20 & ng\_ob42r\_31 & -0.88 & 20\_31\\
## \hline
## g\_ob42r\_13 & ng\_ob42r\_32 & 0.79 & 13\_32\\
## \hline
## g\_ob42r\_35 & ng\_ob42r\_33 & 0.78 & 35\_33\\
## \hline
```

```
## g\_ob42r\_22 & ng\_ob42r\_34 & 0.78 & 22\_34\\
## \hline
## g\_ob42r\_18 & ng\_ob42r\_35 & -0.80 & 18\_35\\
## \hline
## g\_ob42r\_15 & ng\_ob42r\_36 & -0.80 & 15\_36\\
## \hline
## g\_ob42r\_42 & ng\_ob42r\_37 & -0.46 & 42\_37\\
## \hline
## g\_ob42r\_33 & ng\_ob42r\_38 & 0.86 & 33\_38\\
## \hline
## g\_ob42r\_21 & ng\_ob42r\_39 & -0.71 & 21\_39\\
## \hline
## g\_ob42r\_31 & ng\_ob42r\_40 & -0.84 & 31\_40\\
## \hline
## g\_ob42r\_28 & ng\_ob42r\_41 & -0.68 & 28\_41\\
## \hline
## g\_ob42r\_2 & ng\_ob42r\_42 & -0.73 & 2\_42\\
## \hline
## \end{tabular}
##
## $eq50r
##
## \begin{tabular}[t]{l|l|r|l}
## \hline
## Var1 & Var2 & cc & id\\
## \hline
## g\_eq50r\_1 & ng\_eq50r\_1 & 0.81 & 1\_1\\
## \hline
## g\_eq50r\_2 & ng\_eq50r\_2 & 0.82 & 2\_2\\
## \hline
## g\_eq50r\_5 & ng\_eq50r\_3 & 0.78 & 5\_3\\
## \hline
## g\_eq50r\_27 & ng\_eq50r\_4 & 0.47 & 27\_4\\
## \hline
## g\_eq50r\_8 & ng\_eq50r\_5 & 0.81 & 8\_5\\
## \hline
## g\_eq50r\_13 & ng\_eq50r\_6 & 0.76 & 13\_6\\
## \hline
## g\_eq50r\_4 & ng\_eq50r\_7 & 0.76 & 4\_7\\
## \hline
## g\_eq50r\_24 & ng\_eq50r\_8 & 0.79 & 24\_8\\
## \hline
## g\_eq50r\_9 & ng\_eq50r\_9 & 0.64 & 9\_9\\
## \hline
## g\_eq50r\_11 & ng\_eq50r\_10 & 0.75 & 11\_10\\
## \hline
## g\_eq50r\_20 & ng\_eq50r\_11 & 0.69 & 20\_11\\
## \hline
## g\_eq50r\_18 & ng\_eq50r\_12 & 0.69 & 18\_12\\
## \hline
## g\_eq50r\_15 & ng\_eq50r\_13 & 0.73 & 15\_13\\
## \hline
## g\_eq50r\_17 & ng\_eq50r\_14 & 0.74 & 17\_14\\
## \hline
```

```
## g\_eq50r\_3 & ng\_eq50r\_15 & 0.71 & 3\_15\\
## \hline
## g\_eq50r\_6 & ng\_eq50r\_16 & 0.70 & 6\_16\\
## \hline
## g\_eq50r\_7 & ng\_eq50r\_17 & -0.72 & 7\_17\\
## \hline
## g\_eq50r\_10 & ng\_eq50r\_18 & 0.65 & 10\_18\\
## \hline
## g\_eq50r\_36 & ng\_eq50r\_19 & 0.52 & 36\_19\\
## \hline
## g\_eq50r\_30 & ng\_eq50r\_20 & 0.52 & 30\_20\\
## \hline
## g\_eq50r\_41 & ng\_eq50r\_21 & 0.53 & 41\_21\\
## \hline
## g\_eq50r\_26 & ng\_eq50r\_22 & -0.55 & 26\_22\\
## \hline
## g\_eq50r\_12 & ng\_eq50r\_23 & 0.70 & 12\_23\\
## \hline
## g\_eq50r\_19 & ng\_eq50r\_24 & 0.62 & 19\_24\\
## \hline
## g\_eq50r\_14 & ng\_eq50r\_25 & 0.64 & 14\_25\\
## \hline
## g\_eq50r\_23 & ng\_eq50r\_26 & 0.71 & 23\_26\\
## \hline
## g\_eq50r\_49 & ng\_eq50r\_27 & 0.53 & 49\_27\\
## \hline
## g\_eq50r\_46 & ng\_eq50r\_28 & 0.57 & 46\_28\\
## \hline
## g\_eq50r\_29 & ng\_eq50r\_29 & 0.61 & 29\_29\\
## \hline
## g\_eq50r\_47 & ng\_eq50r\_30 & 0.58 & 47\_30\\
## \hline
## g\_eq50r\_40 & ng\_eq50r\_31 & 0.47 & 40\_31\\
## \hline
## g\_eq50r\_25 & ng\_eq50r\_32 & 0.75 & 25\_32\\
## \hline
## g\_eq50r\_33 & ng\_eq50r\_33 & 0.69 & 33\_33\\
## \hline
## g\_eq50r\_43 & ng\_eq50r\_34 & 0.35 & 43\_34\\
## \hline
## g\_eq50r\_42 & ng\_eq50r\_35 & -0.63 & 42\_35\\
## \hline
## g\_eq50r\_44 & ng\_eq50r\_36 & 0.56 & 44\_36\\
## \hline
## g\_eq50r\_32 & ng\_eq50r\_37 & 0.61 & 32\_37\\
## \hline
## g\_eq50r\_50 & ng\_eq50r\_38 & 0.38 & 50\_38\\
## \hline
## g\_eq50r\_45 & ng\_eq50r\_39 & 0.53 & 45\_39\\
## \hline
## g\_eq50r\_31 & ng\_eq50r\_40 & 0.64 & 31\_40\\
## \hline
## g\_eq50r\_22 & ng\_eq50r\_41 & 0.72 & 22\_41\\
## \hline
```

```
## g\_eq50r\_21 & ng\_eq50r\_42 & 0.64 & 21\_42\\
## \hline
## g\_eq50r\_34 & ng\_eq50r\_43 & 0.52 & 34\_43\\
## \hline
## g\_eq50r\_48 & ng\_eq50r\_44 & -0.70 & 48\_44\\
## \hline
## g\_eq50r\_16 & ng\_eq50r\_45 & 0.63 & 16\_45\\
## \hline
## g\_eq50r\_28 & ng\_eq50r\_46 & 0.64 & 28\_46\\
## \hline
## g\_eq50r\_39 & ng\_eq50r\_47 & 0.57 & 39\_47\\
## \hline
## g\_eq50r\_35 & ng\_eq50r\_48 & 0.56 & 35\_48\\
## \hline
## g\_eq50r\_38 & ng\_eq50r\_49 & 0.64 & 38\_49\\
## \hline
## g\_eq50r\_37 & ng\_eq50r\_50 & 0.39 & 37\_50\\
## \hline
## \end{tabular}
```

```
make_table(final_cc_list$vx5r)
```

Var1	Var2	cc	id
g_vx5r_1	ng_vx5r_1	0.97	1_1
g_vx5r_2	ng_vx5r_2	0.93	2_2
g_vx5r_4	ng_vx5r_3	0.88	4_3
g_vx5r_3	ng_vx5r_4	0.93	3_4
g_vx5r_5	ng_vx5r_5	0.83	5_5

```
kbl(all_avg.cc , caption = "Average Congruence Coefficients", booktabs = T) %>%
kable_styling(latex_options = c("striped", "hold_position"))
```

Table 1: Average Congruence Coefficients

Model	Avg_cc
unr1r	0.98
vx2r	0.98
vx3r	0.96
vx4r	0.74
vx5r	0.91
vx6r	0.91
vx8r	0.90
eq19r	0.75
ob20r	0.81
ob42r	0.78
eq50r	0.63