# Supplementary Material (B) - Code for Steps 1 & 2, Browne's Circular Stochastic Process Model

Andrew Mitchell<sup>a,\*</sup>, Francesco Aletta<sup>a</sup>

<sup>a</sup> University College London, Institute for Environmental Design and Engineering, Central House, 14 Upper Woburn Place, London, WC1H 0NN

#### 1. Testing the quasi-circumplex structure (Steps 1 and 2)

```
library(devtools)
library(ggplot2)
library(tidyverse)
library(dplyr)
library(readxl)
library(here)
library(knitr)
library(CircE)
library(RCurl)
source(here("utils/sem_funcs.R")) # Load our own functions
# Create a folder for the outputs
dir.create(here("outputs", Sys.Date()), showWarnings = FALSE)
output_dir <- here("outputs", Sys.Date())</pre>
# Prep variables for the circumplex analysis
# Names of the scales for circumplex analysis
scales <- c("PAQ1", "PAQ2", "PAQ3", "PAQ4", "PAQ5", "PAQ6", "PAQ7", "PAQ8")
eq.angles <-c(0, 45, 90, 135, 180, 225, 270, 315) # Ideal angles for circumplex analysis
# Load in the SATP dataset from Zenodo
temp.file <- paste0(tempfile(), ".xlsx")</pre>
download.file(
    "https://zenodo.org/records/10159673/files/SATP%20Dataset%20v1.4.xlsx",
    temp.file,
    mode="wb")
satp <- read_excel(temp.file,</pre>
   na = c("", "N/A"),
    col_types = c(
        "text", "text", "text", # Lan, Rec, Part
```

Email addresses: andrew.mitchell.18@ucl.ac.uk (Andrew Mitchell), f.aletta@ucl.ac.uk (Francesco Aletta)

 $<sup>^*</sup>$ Corresponding author

```
"numeric", # Age
"text", # Gender
"numeric", "numeric", "numeric",
"numeric", "numeric", "numeric", # PAQs
"numeric", # loud
"text", # Inst
"numeric" # sequence
)
)
```

## 1.0.1. Ipsatization

For each participant, we subtract the mean of their response to all scales across all recordings from their response to each scale for each recording. This is done at the suggestion of JM Girard/R Circumplex.

```
# Ipsatize the data
satp |>
    group_by(Participant) |>
    mutate(Mean = mean(c_across(scales), na.rm = TRUE)) -> parts_means
satp[scales] <- satp |>
    select(all_of(scales)) |>
    mutate(across(all_of(scales), ~ .x - parts_means$Mean))
```

## 1.1. Step One: Tracey's Circular Order Model

```
library(RTHORR)
source(here("utils/RTHORR_funcs.R")) # Load our own functions

# Run the RTHORR analysis
matrices <- list(na.omit(satp[scales]))
names(matrices) <- "SATP"
for (lang in unique(satp$Language)) {
    lang_data <- na.omit(satp[satp$Language == lang, ][scales])
    matrices[[lang]] <- lang_data
}
randall_df_output <- my_randall_from_df(matrices, names(matrices), ord="circular8")
knitr::kable(randall_df_output, digits=3, align = "c")</pre>
```

Table 1: Results of the Circular Order analysis of the SATP dataset.

mat	pred	met	tie	CI	р	description
1	288	283	0	0.965	0.000	SATP
2	288	272	0	0.889	0.000	arb
3	288	262	0	0.819	0.000	$\operatorname{cmn}$
4	288	284	0	0.972	0.000	deu
5	288	276	0	0.917	0.000	ell
6	288	286	0	0.986	0.000	eng
7	288	278	0	0.931	0.000	$_{ m fra}$
8	288	268	0	0.861	0.000	hrv
9	288	255	0	0.771	0.000	$\operatorname{ind}$

Table 1:	Results	of the	Circular	Order	analysis	of	the	SATP	dataset.

mat	pred	met	tie	CI	р	description
10	288	275	0	0.910	0.000	ita
11	288	264	0	0.833	0.000	$_{ m jpn}$
12	288	262	0	0.819	0.000	kor
13	288	261	0	0.812	0.000	$\operatorname{nld}$
14	288	254	0	0.764	0.000	por
15	288	283	0	0.965	0.000	spa
16	288	284	0	0.972	0.000	swe
17	288	261	0	0.812	0.000	$\operatorname{tur}$
18	288	244	0	0.694	0.002	vie
19	288	241	0	0.674	0.002	zsm

```
print("Pass: ")
[1] "Pass: "
print(randall df output[randall df output$CI > 0.7, "description"])
 [1] "SATP" "arb"
                            "deu"
                                   "ell"
                                                         "hrv"
                                                                        "ita"
                    "cmn"
                                          "eng"
                                                  "fra"
                                                                 "ind"
[11] "jpn" "kor"
                    "nld"
                           "por"
                                   "spa"
                                          "swe"
                                                  "tur"
print("Fail: ")
[1] "Fail: "
print(randall_df_output[randall_df_output$CI < 0.7, "description"])</pre>
[1] "vie" "zsm"
pass <- randall_df_output[randall_df_output$CI > 0.7, "description"][-1]
satp <- satp[satp$Language %in% pass, ] # Filter to just the languages that pass</pre>
```

## 1.2. Structural Equation Modelling using Browne's Stochastic Circumplex Model

## 1.2.1. Run CircE Analysis

The bulk of the code for this process has been pulled out into a separate <code>sem\_funcs.R</code> file, which is loaded at the beginning of the analysis. This file contains the functions used to run the circumplex analysis and compile the results into a single table.

```
step_one_test(data, model_type, scales = c("PAQ1", "PAQ2", "PAQ3", "PAQ4", "PAQ5", "PAQ6", "PAQ6", "PAQ7", "PAQ8"), m = 3) ) is the function used to run the circumplex analysis for a single model for a single language. It takes the data for that language, the model_type (one of Circumplex, Equal comm., Equal ang., or Unconstrained), the names of the scales, and the number of betas for the fourier series correlation function (we're using m=3 by default). It then runs the analysis and returns a list of the results, including a list of the desired results (res_list) and the model object (res_model).
```

run\_all\_models(data, datasource, language, m) is the function used to run the circumplex analysis for all four models for a single language. It takes the data for that language, the name of the data source (e.g. SATP), the language code, and the number of betas for the fourier series correlation function (m). It then runs the analysis for each of the four models and returns a list of the results, including a list of the four results and a table combining the results from all four models.

First, we run the circumplex analysis for the English data. This is done separately from the other languages to set up the results data table.

```
# Run the models for English
satp_eng <- satp[satp$Language == "eng", ]
circe_satp_eng <- run_all_models(satp_eng, "SATP", "eng", m = 3)</pre>
```

Then, we run the circumplex analysis for each of the other languages. This is done in a loop, with each language being run separately. The results for each language are then added to the results table.

Within each loop, we check for any errors in execution and append these to a list of errors to inspect later.

```
languages <- unique(satp$Language) # Get a list of all the languages
full_table <- circe_satp_eng$res_table # Start with the English results
for (lang in languages) {
    if (lang == "eng") {
       next # Skip English, we've already done it
   print("========"")
   print(lang)
   print("======"")
   lang_data <- satp[satp$Language == lang, ] # Filter to just the language we want</pre>
   pass_on_error <- FALSE
    errors <- list()
    tryCatch(
     lang_res <- run_all_models(lang_data, "SATP", lang, m = 3),</pre>
     error = function(e) {
       pass_on_error <<- TRUE</pre>
       errors[lang] <<- e
   )
    if (pass_on_error) {
     next
    # lang_res <- run_all_models(lang_data, "SATP", lang, m = 3) # Run the models
   full_table <- rbind(full_table, lang_res$res_table) # Add the results to the table
}
# Catching any errors
for (name in names(errors)) {
 print("======= Error in: =======")
 print(errors[name])
```

### 1.2.2. SEM Analysis Results

Below is the table of results for the circumplex analysis of the sound scape survey translations. The table includes the results for each of the four models for each language. The results are presented in the order of the models, with the unconstrained model first, followed by the equal spacing model, the equal communality model, and the circumplex model. The results for each model include the  $\chi^2$  test, CFI, GFI, SRMR, RMSEA, MCSC, and GDIFF. These results are saved to a CSV file for later use.

Importantly, this table also reports the derived angles for each scale for the unconstrained and Equal comm. models. These angles will be carried over and used in the next stage of the analysis, where we will validate

the survey instrument by correlating the survey responses with the acoustic indices using the Structural Summary Method (SSM).

```
write.csv(full_table, here(output_dir, "sem-fit-ipsatized.csv"))
if (is_html) {
   kable(full_table, digits = 5, align = "c") %>%
        kableExtra::kable_styling(
          bootstrap_options = c(
            "striped", "hover", "condensed", "responsive", "bordered"
} else {
   kableExtra::kbl(
      full_table[, ! colnames(full_table) %in% c(
        'Dataset', 'Model Type', 'RMSEA.L', 'RMSEA.U', 'GDIFF', scales
        )],
      format = "latex",
      row.names = FALSE,
      booktabs = T,
      digits = 5,
      align = "c",
     longtable = TRUE,
     linesep = c("", "", "", "\\addlinespace")
   kableExtra::kable_classic_2()
}
```

Language	n	m	ChiSq	df	p	CFI	GFI	AGFI	SRMR	MCSC	RN
eng	864	3	75.855189055029	10	3.24229532111531e-12	0.988	0.981	0.932	0.037	-0.936	0
eng	864	3	370.055528785066	17	0	0.934	0.907	0.803	0.052	-0.898	0
eng	864	3	534.252188046965	17	0	0.903	0.869	0.723	0.099	-0.919	0
eng	864	3	830.648940930941	24	0	0.848	0.811	0.717	0.111	-0.92	0
arb	809	3	44.0444222102112	10	$3.23173722305281\mathrm{e}\text{-}06$	0.99	0.99	0.964	0.018	-0.825	0
arb	809	3	119.261928856334	17	0	0.971	0.969	0.934	0.044	-0.849	0
$\operatorname{arb}$	809	3	527.624555746401	17	0	0.857	0.863	0.71	0.179	-0.85	0
arb	809	3	649.442216172646	24	0	0.825	0.837	0.755	0.18	-0.834	(
$\operatorname{cmn}$	1832	3	172.220795767266	10	0	0.982	0.978	0.921	0.023	-0.989	0
$\operatorname{cmn}$	1832	3	366.933848618136	17	0	0.96	0.954	0.903	0.044	-0.988	0
$\operatorname{cmn}$	1832	3	1542.17621055718	17	0	0.827	0.828	0.636	0.288	-0.956	0
$\operatorname{cmn}$	1832	3	1716.87022466114	24	0	0.808	0.813	0.719	0.284	-0.959	0
deu	810	3	23.373842792726	10	0.00944767599528051	0.997	0.996	0.986	0.009	-1	0
deu	810	3	316.718936400525	17	0	0.943	0.915	0.82	0.059	-0.998	0
deu	810	3	403.258868716265	17	0	0.926	0.893	0.773	0.133	-0.983	0
deu	810	3	766.612033890909	24	0	0.859	0.813	0.719	0.137	-0.97	0
ell	810	3	71.4809335919041	10	$2.29338770196819 \mathrm{e}\text{-}11$	0.981	0.981	0.932	0.026	-0.996	0
ell	810	3	246.732675808593	17	0	0.928	0.934	0.86	0.079	-1	0
ell	810	3	445.382177926038	17	0	0.866	0.884	0.754	0.126	-0.947	0
ell	810	3	595.981810321126	24	0	0.82	0.849	0.773	0.143	-0.931	0
$\operatorname{fra}$	891	3	41.4589598217322	10	$9.3567026955288\mathrm{e}\text{-}06$	0.993	0.991	0.968	0.017	-0.954	0

fra         891         3         367.314599675967         17         0         0.914         0.934         0.084         0.084         0.095         0           fra         891         3         267.55298715169         17         0         0.94         0.935         0.86         0.124         0.939         0           hrv         864         3         58.929907664599         10         5.79625847318965-09         0.991         0.986         0.95         0.014         0.914         0           hrv         864         3         1934.2010574866         17         0         0.743         0.715         0.306         0.95         0.014         0.914         0.08           hrv         864         3         1934.2010574896         17         0         0.699         0.075         0.513         0.214         0.835         0.614         0.801         0.31         0.214         0.833         0.932         0.914         0.022         0.950         0.059         0.053         0.921         0.914         0.03         0.923         0.924         0.756         0.634         0.285         0.933         0.934         0.935         0.934         0.935         0.934         0.935												
fra         891         3         625.064878799758         24         0         0.857         0.855         0.782         0.138         -0.925         0           hrv         864         3         58.920907564549         10         5.79625847318965e-09         0.994         0.966         0.935         0.065         -0.895         0           hrv         864         3         1394.2010574866         17         0         0.743         0.715         0.396         0.201         -0.877         0           hrv         864         3         1688.56505488852         24         0         0.743         0.715         0.396         0.201         -0.877         0           ind         891         3         3151.87566703313         17         0         0.984         0.833         0.646         0.21         -0.928         0           ind         891         3         1177.1409333812         24         0         0.742         0.833         0.646         0.22         -0.933         0           ita         810         3         58.381584144373         10         7.32599136910039e0         0.989         0.986         0.986         0.986         0.986         0.986	$\operatorname{fra}$	891	3	357.314599675967	17	0	0.919	0.913	0.816	0.098	-0.965	(
bry         864         3         58.920907564549         10         5.79625847318965e09         0.991         0.986         0.95         0.014         -0.914         0           hry         864         3         290.700218409579         17         0         0.949         0.96         0.843         0.065         0.895         0           hry         864         3         1368.56505488852         24         0         0.689         0.675         0.513         0.214         -0.873         0           ind         891         3         315.187566703331         17         0         0.933         0.923         0.937         0.078         0.995         0.955         0.055         ind         891         3         315.187566703331         17         0         0.84         0.833         0.646         0.21         -0.928         0         ind         891         3         375.1875670733358         10         0         0.944         0.933         0.923         0.034         0.958         0.06         ind         0.021         1.928         0         0         0.944         0.932         0.086         0.060         0.034         0.958         0         0.023         0.958         0<	$\operatorname{fra}$	891	3	267.552998715169	17	0	0.94	0.934	0.86	0.124	-0.939	0
lnrv         864         3         290.700218409879         17         0         0.949         0.926         0.843         0.065         -0.897         0           lnrv         864         3         1394.2010574866         17         0         0.743         0.715         0.396         0.201         -0.877         0           ind         891         3         319.68968523882         10         1.72085370703234e-05         0.993         0.992         0.971         0.022         -0.959         0           ind         891         3         732.26607387979         17         0         0.84         0.833         0.646         0.21         -0.958         0           ind         891         3         732.266073879797         17         0         0.84         0.833         0.646         0.21         -0.958         0           ind         810         3         215.22603324551         17         0         0.944         0.932         0.866         0.09         0.952         0           ita         810         3         26.802863303843         10         0.0027999807460734         0.96         0.96         0.96         0.95         0.96         0.96         0<	$\operatorname{fra}$	891	3	625.064878799758	24	0	0.857	0.855	0.782	0.138	-0.925	0
lnrv         864         3         290.700218409879         17         0         0.949         0.926         0.843         0.065         -0.897         0           lnrv         864         3         1394.2010574866         17         0         0.743         0.715         0.396         0.201         -0.877         0           ind         891         3         319.68968523882         10         1.72085370703234e-05         0.993         0.992         0.971         0.022         -0.959         0           ind         891         3         732.26607387979         17         0         0.84         0.833         0.646         0.21         -0.958         0           ind         891         3         732.266073879797         17         0         0.84         0.833         0.646         0.21         -0.958         0           ind         810         3         215.22603324551         17         0         0.944         0.932         0.866         0.09         0.952         0           ita         810         3         26.802863303843         10         0.0027999807460734         0.96         0.96         0.96         0.95         0.96         0.96         0<	hrv	864	3	58.920907564549	10	5.79625847318965e-09	0.991	0.986	0.95	0.014	-0.914	0
hrv         864         3         1304.201674866         17         0         0.743         0.715         0.366         0.214         -0.877         0           hrv         864         3         1688.56505488852         24         0         0.689         0.675         0.513         0.214         -0.873         0           ind         891         3         315.187566703313         17         0         0.933         0.992         0.971         0.022         -0.959         0           ind         891         3         732.266073879797         17         0         0.84         0.833         0.616         0.21         -0.928         0           ita         810         3         55.381584144373         10         7.32599136910039e-09         0.985         0.946         0.03         -0.952         0           ita         810         3         53.31584144373         10         7.32599136910039e-09         0.985         0.946         0.03         -0.952         0           ita         810         3         933.149067661957         24         0         0.847         0.831         0.616         0.152         0.902         0           jpn         917<												
bry         864         3         1688.56505488852         24         0         0.689         0.675         0.513         0.214         -0.873         0           ind         891         3         33 39.9618968523582         1         0         0.933         0.992         0.971         0.022         -0.955         0           ind         891         3         315187566703313         17         0         0.84         0.833         0.937         0.078         -0.905         0           ind         891         3         31518714373         17         0         0.84         0.833         0.646         0.21         -0.928         0           ita         810         3         58.381584144373         10         7.325991509100390-09         0.989         0.985         0.946         0.03         -0.952         0           ita         810         3         251.280293245251         17         0         0.944         0.932         0.866         0.069         0.952         0           ita         810         3         268.028563303843         10         0.0027979907460734         0.96         0.96         0.96         0.96         0.015         -0.944												
ind         891         3         315187566703313         17         0         0.933         0.923         0.831         0.672         0.21         0.928         0           ind         891         3         177.14093335817         24         0         0.742         0.756         0.634         0.258         0           ita         810         3         558.381584144373         10         7.32599136910039c-09         0.989         0.985         0.946         0.03         -0.958         0           ita         810         3         251.280203245251         17         0         0.944         0.932         0.856         0.069         -0.952         0           ita         810         3         933.149067661957         24         0         0.847         0.781         0.671         0.168         -0.903         0           jpn         917         3         26.8028563303843         10         0.00279799807460734         0.996         0.996         0.086         0.015         0.914         0           jpn         917         3         760.8382742792         17         0         0.892         0.996         0.786         0.087         0.048         0.087						0						0
ind         891         3         315187566703313         17         0         0.933         0.923         0.831         0.672         0.21         0.928         0           ind         891         3         177.14093335817         24         0         0.742         0.756         0.634         0.258         0           ita         810         3         558.381584144373         10         7.32599136910039c-09         0.989         0.985         0.946         0.03         -0.958         0           ita         810         3         251.280203245251         17         0         0.944         0.932         0.856         0.069         -0.952         0           ita         810         3         933.149067661957         24         0         0.847         0.781         0.671         0.168         -0.903         0           jpn         917         3         26.8028563303843         10         0.00279799807460734         0.996         0.996         0.086         0.015         0.914         0           jpn         917         3         760.8382742792         17         0         0.892         0.996         0.786         0.087         0.048         0.087	ind	891	3	39 9618968523582	10	1 72085370703234e-05	0 993	0 992	0.971	0.022	-0.959	0
ind         891         3         732,26673879797         17         0         0.84         0.833         0.646         0.21         -0.928         0           ind         891         3         1177.14003335817         24         0         0.742         0.756         0.634         0.258         -0.933         0           ita         810         3         58.381584144373         10         7.32599136910039e-09         0.989         0.985         0.946         0.03         -0.958         0           ita         810         3         660.36653177006         17         0         0.944         0.932         0.861         0.069         -0.952         0           ita         810         3         660.36653177006         17         0         0.847         0.831         0.651         0.168         -0.903         0           jpn         917         3         26.028663303843         10         0.00279799807460734         0.996         0.996         0.966         0.966         0.966         0.966         0.966         0.078         0.015         -0.044         0         jpn         917         3         760.838278422792         17         0         0.809         0.831												(
ind         891         3         1177.14093335817         24         0         0.742         0.756         0.634         0.258         -0.933         0           ita         810         3         55.831584144373         10         7.32599136910039e-09         0.989         0.985         0.946         0.03         -0.958         0           ita         810         3         251.280293245251         17         0         0.944         0.932         0.856         0.069         -0.952         0           ita         810         3         933.149067661957         24         0         0.784         0.781         0.671         0.168         -0.902         0           jpn         917         3         26.8028563303843         10         0.00279799807460734         0.996         0.986         0.015         -0.944         0           jpn         917         3         760.838278422792         17         0         0.890         0.831         0.642         0.184         -0.895         0           kor         810         3         229454591678388         10         5.085936594873e-06         0.992         0.991         0.964         0.012         -0.996         0												0
ita         810         3         58.381584144373         10         7.32599136910039e-09         0.989         0.985         0.946         0.03         -0.958         0           ita         810         3         251.280293245251         17         0         0.944         0.932         0.856         0.069         -0.952         0           ita         810         3         660.36653177066         17         0         0.847         0.835         0.661         0.155         -0.902         0           jpn         917         3         26.8028563303843         10         0.00279799807460734         0.996         0.996         0.986         0.015         -0.944         0           jpn         917         3         26.8028563303843         10         0.00279799807460734         0.996         0.996         0.986         0.015         -0.994         0           jpn         917         3         760.838278422792         17         0         0.892         0.899         0.757         0.635         0.196         -0.996         0           kor         810         3         220.342708701949         17         0         0.86         0.846         0.674         0.224												
ita         810         3         251.280293245251         17         0         0.944         0.932         0.856         0.069         -0.952         0           ita         810         3         660.36653177006         17         0         0.847         0.835         0.651         0.155         -0.903         0           jpn         917         3         26.8028563303843         10         0.00279799807460734         0.996         0.996         0.986         0.015         -0.944         0           jpn         917         3         26.8028563303843         10         0.00279799807460734         0.996         0.996         0.986         0.015         -0.944         0           jpn         917         3         760.838278422792         17         0         0.809         0.831         0.642         0.184         -0.994         0           kor         810         3         229.454591678388         10         5.085936594873e-06         0.992         0.99         0.964         0.012         -0.996         0           kor         810         3         605.83286625951         17         0         0.864         0.841         0.721         0.228         0.999						7 325001360100306-00						
ita         810         3         660.36653177006         17         0         0.847         0.835         0.651         0.155         -0.903         0           ita         810         3         933.149067661957         24         0         0.784         0.781         0.671         0.168         -0.902         0           jpn         917         3         26.802856330843         10         0.00279799807460734         0.996         0.996         0.098         0.087         -0.994         0           jpn         917         3         760.838278422792         17         0         0.892         0.896         0.078         0.094         0.994         0												
ita         810         3         933.149067661957         24         0         0.784         0.781         0.671         0.168         -0.902         0           jpn         917         3         26.8028563303843         10         0.00279799807460734         0.996         0.996         0.015         -0.944         0           jpn         917         3         460.259195572614         17         0         0.890         0.831         0.642         0.184         -0.895         0           jpn         917         3         760.83827842792         17         0         0.699         0.831         0.642         0.184         -0.895         0           kor         810         3         220.342708701949         17         0         0.952         0.941         0.875         0.084         -0.994         0           kor         810         3         260.583286625951         17         0         0.86         0.840         0.674         0.224         -0.999         0           kor         810         3         23.445459167395         24         0         0.824         0.814         0.721         0.228         -0.999         0           kor												
pn   917   3   26.8028563303843   10   0.00279799807460734   0.996   0.996   0.986   0.015   -0.944   0.996   0.996   0.996   0.996   0.997   0.994   0.996   0.997   0.998   0.999												
jpn         917         3         440.259195572614         17         0         0.892         0.896         0.78         0.087         -0.994         0           jpn         917         3         760.838278422792         17         0         0.809         0.831         0.642         0.184         -0.996         0           kor         810         3         1200.25366437214         24         0         0.699         0.757         0.635         0.196         -0.906         0           kor         810         3         42.9454591678388         10         5.085936594873e-06         0.992         0.99         0.964         0.012         -0.996         0           kor         810         3         26.583286625951         17         0         0.86         0.846         0.674         0.224         -0.999         0           kor         810         3         763.881376570395         24         0         0.984         0.814         0.721         0.228         -0.999         0           kor         810         3         1.3464127000124         10         0.00049684137665007         0.997         0.994         0.978         0.014         -0.943						0.00270700907460724						
jpn         917         3         760.838278422792         17         0         0.809         0.831         0.642         0.184         -0.895         0           jpn         917         3         1200.25366437214         24         0         0.699         0.757         0.635         0.196         -0.906         0           kor         810         3         42.9454591678388         10         5.085936594873e-06         0.992         0.99         0.964         0.012         -0.996         0           kor         810         3         220.342708701949         17         0         0.952         0.941         0.875         0.084         -0.994         0           kor         810         3         763.881376570395         24         0         0.824         0.814         0.721         0.228         -0.999         0           kor         810         3         3.4364127000124         10         0.00049684137665007         0.997         0.994         0.978         0.014         -0.945         0           nld         864         3         13.6952843         17         0         0.833         0.766         0.504         0.247         -0.901         0												
Spa												
kor         810         3         42.9454591678388         10         5.085936594873e-06         0.992         0.99         0.964         0.012         -0.996         0           kor         810         3         220.342708701949         17         0         0.952         0.941         0.875         0.084         -0.994         0           kor         810         3         605.83286625951         17         0         0.86         0.846         0.674         0.224         -0.999         0           kor         810         3         605.83286625951         17         0         0.86         0.846         0.674         0.224         -0.999         0           kor         810         3         763.881376570395         24         0         0.824         0.814         0.721         0.228         -0.999         0           nld         864         3         1314364127000124         10         0.00049684137665007         0.997         0.994         0.978         0.014         -0.945         0           nld         864         3         1505.2675819124         24         0         0.766         0.7         0.55         0.254         -0.81           p												
kor         810         3         220.342708701949         17         0         0.952         0.941         0.875         0.084         -0.994         0           kor         810         3         605.83286625951         17         0         0.86         0.846         0.674         0.224         -0.999         0           kor         810         3         763.881376570395         24         0         0.824         0.814         0.721         0.228         -0.999         0           nld         864         3         31.4364127000124         10         0.00049684137665007         0.997         0.994         0.978         0.014         -0.945         0           nld         864         3         1069.73153202843         17         0         0.967         0.943         0.879         0.056         -0.917         0           nld         864         3         1505.26755819124         24         0         0.766         0.7         0.55         0.254         -0.88         0           por         1890         3         703.273165383338         17         0         0.925         0.917         0.824         0.092         -0.889         0												
kor         810         3         605.83286625951         17         0         0.86         0.846         0.674         0.224         -0.999         0           kor         810         3         763.881376570395         24         0         0.824         0.814         0.721         0.228         -0.999         0           nld         864         3         31.4364127000124         10         0.00049684137665007         0.997         0.994         0.978         0.014         -0.945         0           nld         864         3         225.41010308231         17         0         0.967         0.943         0.879         0.056         -0.917         0           nld         864         3         1505.26755819124         24         0         0.766         0.7         0.55         0.254         -0.88         0           por         1890         3         98.279990399476         10         1.11022302462516e-16         0.995         0.989         0.96         0.018         8-0.898         0           por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0 <td></td>												
kor         810         3         763.881376570395         24         0         0.824         0.814         0.721         0.228         -0.999         0           nld         864         3         31.4364127000124         10         0.00049684137665007         0.997         0.994         0.978         0.014         -0.945         0           nld         864         3         225.41010308231         17         0         0.967         0.943         0.879         0.056         -0.917         0           nld         864         3         1069.73153202843         17         0         0.833         0.766         0.504         0.247         -0.901         0           nld         864         3         1505.26755819124         24         0         0.766         0.7         0.55         0.254         -0.88         0           por         1890         3         98.279990399476         10         1.11022302462516e-16         0.99         0.989         0.96         0.018         -0.898         0           por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0 <td></td>												
nld         864         3         31.4364127000124         10         0.00049684137665007         0.997         0.994         0.978         0.014         -0.945         0           nld         864         3         225.41010308231         17         0         0.967         0.943         0.879         0.056         -0.917         0           nld         864         3         1069.73153202843         17         0         0.833         0.766         0.504         0.247         -0.901         0           nld         864         3         1505.26755819124         24         0         0.766         0.7         0.55         0.254         -0.888         0           por         1890         3         98.279990399476         10         1.11022302462516e-16         0.99         0.989         0.96         0.018         -0.898         0           por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0           por         1890         3         2116.46532429089         24         0         0.771         0.783         0.675         0.232         -0.833         0     <	_											
nld         864         3         225.41010308231         17         0         0.967         0.943         0.879         0.056         -0.917         0           nld         864         3         1069.73153202843         17         0         0.833         0.766         0.504         0.247         -0.901         0           nld         864         3         1505.26755819124         24         0         0.766         0.7         0.55         0.254         -0.88         0           por         1890         3         98.279990399476         10         1.11022302462516e-16         0.99         0.989         0.96         0.018         -0.898         0           por         1890         3         703.273165383338         17         0         0.925         0.917         0.824         0.092         -0.869         0           por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0           por         1890         3         2116.46532429089         24         0         0.771         0.783         0.675         0.232         -0.833         0	KOr		3		24				0.721		-0.999	U
nld         864         3         1069.73153202843         17         0         0.833         0.766         0.504         0.247         -0.901         0           nld         864         3         1505.26755819124         24         0         0.766         0.7         0.55         0.254         -0.88         0           por         1890         3         98.279990399476         10         1.11022302462516e-16         0.99         0.989         0.96         0.018         -0.898         0           por         1890         3         703.273165383338         17         0         0.925         0.917         0.824         0.092         -0.869         0           por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0           por         1890         3         2116.46532429089         24         0         0.771         0.783         0.675         0.232         -0.833         0           spa         1647         3         117.438882600955         10         0         0.987         0.984         0.942         0.035         -0.93         0.03         -0.944<						0.00049684137665007						(
nld         864         3         1505.26755819124         24         0         0.766         0.7         0.55         0.254         -0.88         0           por         1890         3         98.279990399476         10         1.11022302462516e-16         0.99         0.989         0.96         0.018         -0.898         0           por         1890         3         703.273165383338         17         0         0.925         0.917         0.824         0.092         -0.869         0           por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0           por         1890         3         2116.46532429089         24         0         0.771         0.783         0.675         0.232         -0.833         0           spa         1647         3         117.438882600955         10         0         0.987         0.984         0.942         0.035         -0.984         0           spa         1647         3         489.9185395306         17         0         0.942         0.933         0.858         0.109         -0.983         0						0		0.943	0.879			0
por         1890         3         98.279990399476         10         1.11022302462516e-16         0.99         0.989         0.96         0.018         -0.898         0           por         1890         3         703.273165383338         17         0         0.925         0.917         0.824         0.092         -0.869         0           por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0           por         1890         3         2116.46532429089         24         0         0.771         0.783         0.675         0.232         -0.833         0           spa         1647         3         117.438882600955         10         0         0.987         0.984         0.942         0.035         -0.984         0           spa         1647         3         671.283195056481         17         0         0.92         0.91         0.809         0.063         -0.974         0           spa         1647         3         1049.9852694728         24         0         0.875         0.865         0.797         0.132         -0.991         0         swe <td></td>												
por         1890         3         703.273165383338         17         0         0.925         0.917         0.824         0.092         -0.869         0           por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0           por         1890         3         2116.46532429089         24         0         0.771         0.783         0.675         0.232         -0.833         0           spa         1647         3         117.438882600955         10         0         0.987         0.984         0.942         0.035         -0.984         0           spa         1647         3         671.283195056481         17         0         0.92         0.91         0.809         0.063         -0.974         0           spa         1647         3         489.9185395306         17         0         0.942         0.933         0.858         0.109         -0.983         0           swe         945         3         63.5433178668487         10         7.69214247853256e-10         0.99         0.986         0.95         0.016         -0.94         0	nld	864	3	1505.26755819124	24	0	0.766	0.7	0.55	0.254	-0.88	0
por         1890         3         1279.35636110687         17         0         0.862         0.857         0.697         0.217         -0.835         0           por         1890         3         2116.46532429089         24         0         0.771         0.783         0.675         0.232         -0.833         0           spa         1647         3         117.438882600955         10         0         0.987         0.984         0.942         0.035         -0.984         0           spa         1647         3         671.283195056481         17         0         0.92         0.91         0.809         0.063         -0.974         0           spa         1647         3         489.9185395306         17         0         0.942         0.933         0.858         0.109         -0.983         0           spa         1647         3         1049.9852694728         24         0         0.875         0.865         0.797         0.132         -0.991         0           swe         945         3         63.5433178668487         10         7.69214247853256e-10         0.99         0.986         0.95         0.016         -0.94         0	por					$1.11022302462516\mathrm{e}\text{-}16$				0.018	-0.898	0
por         1890         3         2116.46532429089         24         0         0.771         0.783         0.675         0.232         -0.833         0           spa         1647         3         117.438882600955         10         0         0.987         0.984         0.942         0.035         -0.984         0           spa         1647         3         671.283195056481         17         0         0.92         0.91         0.809         0.063         -0.974         0           spa         1647         3         489.9185395306         17         0         0.942         0.933         0.858         0.109         -0.983         0           spa         1647         3         1049.9852694728         24         0         0.875         0.865         0.797         0.132         -0.991         0           swe         945         3         63.5433178668487         10         7.69214247853256e-10         0.99         0.986         0.95         0.016         -0.94         0           swe         945         3         683.641662587339         17         0         0.878         0.85         0.682         0.134         -0.919         0	por					0						0
spa       1647       3       117.438882600955       10       0       0.987       0.984       0.942       0.035       -0.984       0         spa       1647       3       671.283195056481       17       0       0.92       0.91       0.809       0.063       -0.974       0         spa       1647       3       489.9185395306       17       0       0.942       0.933       0.858       0.109       -0.983       0         spa       1647       3       1049.9852694728       24       0       0.875       0.865       0.797       0.132       -0.991       0         swe       945       3       63.5433178668487       10       7.69214247853256e-10       0.99       0.986       0.95       0.016       -0.94       0         swe       945       3       326.094447246618       17       0       0.944       0.924       0.839       0.053       -0.946       0         swe       945       3       683.641662587339       17       0       0.878       0.85       0.682       0.134       -0.919       0         swe       945       3       893.001335390687       24       0       0.841       0.813	por					0						0
spa         1647         3         671.283195056481         17         0         0.92         0.91         0.809         0.063         -0.974         0           spa         1647         3         489.9185395306         17         0         0.942         0.933         0.858         0.109         -0.983         0           spa         1647         3         1049.9852694728         24         0         0.875         0.865         0.797         0.132         -0.991         0           swe         945         3         63.5433178668487         10         7.69214247853256e-10         0.99         0.986         0.95         0.016         -0.94         0           swe         945         3         326.094447246618         17         0         0.944         0.924         0.839         0.053         -0.946         0           swe         945         3         683.641662587339         17         0         0.878         0.85         0.682         0.134         -0.919         0           swe         945         3         893.001335390687         24         0         0.841         0.813         0.719         0.142         -0.928         0	por	1890	3	2116.46532429089	24	0	0.771	0.783	0.675	0.232	-0.833	0
spa         1647         3         489.9185395306         17         0         0.942         0.933         0.858         0.109         -0.983         0           spa         1647         3         1049.9852694728         24         0         0.875         0.865         0.797         0.132         -0.991         0           swe         945         3         63.5433178668487         10         7.69214247853256e-10         0.99         0.986         0.95         0.016         -0.94         0           swe         945         3         326.094447246618         17         0         0.944         0.924         0.839         0.053         -0.946         0           swe         945         3         683.641662587339         17         0         0.878         0.85         0.682         0.134         -0.919         0           swe         945         3         893.001335390687         24         0         0.841         0.813         0.719         0.142         -0.928         0           tur         918         3         107.188172969441         10         0         0.979         0.974         0.906         0.03         -0.905         0	spa					0						0
spa       1647       3       1049.9852694728       24       0       0.875       0.865       0.797       0.132       -0.991       0         swe       945       3       63.5433178668487       10       7.69214247853256e-10       0.99       0.986       0.95       0.016       -0.94       0         swe       945       3       326.094447246618       17       0       0.944       0.924       0.839       0.053       -0.946       0         swe       945       3       683.641662587339       17       0       0.878       0.85       0.682       0.134       -0.919       0         swe       945       3       893.001335390687       24       0       0.841       0.813       0.719       0.142       -0.928       0         tur       918       3       107.188172969441       10       0       0.979       0.974       0.906       0.03       -0.905       0         tur       918       3       358.886881929338       17       0       0.927       0.915       0.82       0.079       -0.915       0         tur       918       3       744.570406538834       17       0       0.844       0.835	spa											0
swe       945       3       63.5433178668487       10       7.69214247853256e-10       0.99       0.986       0.95       0.016       -0.94       0         swe       945       3       326.094447246618       17       0       0.944       0.924       0.839       0.053       -0.946       0         swe       945       3       683.641662587339       17       0       0.878       0.85       0.682       0.134       -0.919       0         swe       945       3       893.001335390687       24       0       0.841       0.813       0.719       0.142       -0.928       0         tur       918       3       107.188172969441       10       0       0.979       0.974       0.906       0.03       -0.905       0         tur       918       3       358.886881929338       17       0       0.927       0.915       0.82       0.079       -0.915       0         tur       918       3       744.570406538834       17       0       0.844       0.835       0.651       0.228       -0.867       0	$\operatorname{spa}$	1647		489.9185395306		0	0.942	0.933	0.858	0.109	-0.983	(
swe       945       3       326.094447246618       17       0       0.944       0.924       0.839       0.053       -0.946       0         swe       945       3       683.641662587339       17       0       0.878       0.85       0.682       0.134       -0.919       0         swe       945       3       893.001335390687       24       0       0.841       0.813       0.719       0.142       -0.928       0         tur       918       3       107.188172969441       10       0       0.979       0.974       0.906       0.03       -0.905       0         tur       918       3       358.886881929338       17       0       0.927       0.915       0.82       0.079       -0.915       0         tur       918       3       744.570406538834       17       0       0.844       0.835       0.651       0.228       -0.867       0	$\operatorname{spa}$	1647	3	1049.9852694728	24	0	0.875	0.865	0.797	0.132	-0.991	0
swe       945       3       683.641662587339       17       0       0.878       0.85       0.682       0.134       -0.919       0         swe       945       3       893.001335390687       24       0       0.841       0.813       0.719       0.142       -0.928       0         tur       918       3       107.188172969441       10       0       0.979       0.974       0.906       0.03       -0.905       0         tur       918       3       358.886881929338       17       0       0.927       0.915       0.82       0.079       -0.915       0         tur       918       3       744.570406538834       17       0       0.844       0.835       0.651       0.228       -0.867       0	swe	945	3	63.5433178668487	10	$7.69214247853256\mathrm{e}\text{-}10$	0.99	0.986	0.95	0.016	-0.94	0
swe     945     3     893.001335390687     24     0     0.841     0.813     0.719     0.142     -0.928     0       tur     918     3     107.188172969441     10     0     0.979     0.974     0.906     0.03     -0.905     0       tur     918     3     358.886881929338     17     0     0.927     0.915     0.82     0.079     -0.915     0       tur     918     3     744.570406538834     17     0     0.844     0.835     0.651     0.228     -0.867     0	swe	945	3	326.094447246618	17	0	0.944	0.924	0.839	0.053	-0.946	0
tur     918     3     107.188172969441     10     0     0.979     0.974     0.906     0.03     -0.905     0       tur     918     3     358.886881929338     17     0     0.927     0.915     0.82     0.079     -0.915     0       tur     918     3     744.570406538834     17     0     0.844     0.835     0.651     0.228     -0.867     0	swe	945	3	683.641662587339	17	0	0.878	0.85	0.682	0.134	-0.919	0
tur     918     3     358.886881929338     17     0     0.927     0.915     0.82     0.079     -0.915     0       tur     918     3     744.570406538834     17     0     0.844     0.835     0.651     0.228     -0.867     0	swe	945	3	893.001335390687	24	0	0.841	0.813	0.719	0.142	-0.928	0
tur 918 3 $744.570406538834$ 17 0 $0.844$ $0.835$ $0.651$ $0.228$ $-0.867$ 0	$\operatorname{tur}$	918	3	107.188172969441	10	0	0.979	0.974	0.906	0.03	-0.905	0
	$\operatorname{tur}$	918	3	358.886881929338	17	0	0.927	0.915	0.82	0.079	-0.915	0
tur 918 3 $1057.39307595611$ 24 0 $0.778$ $0.78$ $0.67$ $0.23$ $-0.834$ 0	$\operatorname{tur}$	918	3	744.570406538834	17	0	0.844	0.835	0.651	0.228	-0.867	0
	$\operatorname{tur}$	918	3	1057.39307595611	24	0	0.778	0.78	0.67	0.23	-0.834	0

## References