INSTITUTO DE SOCIOLOGÍA
FACULTAD DE CIENCIAS SOCIALES

# Guía N°1

Análisis de Datos Multinivel - SOL3051

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Table 1

| | Modelo 1 | Modelo 2 | Modelo 3 | Modelo 4 | Modelo 5 | Modelo 6 |
|---|---|---|---|---|---|---|
| Intercepto | $0.43^{***}$ | $0.34^{**}$ | $0.46^{***}$ | $0.41^{***}$ | $0.08$ | $0.61^{*}$ |
| | $(0.09)$ | $(0.12)$ | $(0.13)$ | $(0.08)$ | $(0.41)$ | $(0.24)$ |
| Mujer (Ref.= Hombre) | $-0.03$ | $-0.03$ | $-0.03$ | $-0.02$ | $-0.02$ | $-0.02$ |
| | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ |
| Edad | $0.00$ | $-0.00$ | $-0.00$ | $0.00$ | $0.00$ | $0.09^{*}$ |
| | $(0.01)$ | $(0.01)$ | $(0.01)$ | $(0.01)$ | $(0.01)$ | $(0.04)$ |
| Nivel educacional (en años) | $-0.01^{***}$ | $-0.01^{**}$ | $-0.01^{**}$ | $-0.01^{***}$ | $-0.01^{***}$ | $-0.01^{***}$ |
| | $(0.00)$ | $(0.00)$ | $(0.00)$ | $(0.00)$ | $(0.00)$ | $(0.00)$ |
| Empleado (Ref.= Desempleado) | $-0.06^{**}$ | $-0.06^{***}$ | $-0.06^{***}$ | $-0.05^{*}$ | $-0.05^{*}$ | $-0.04^{*}$ |
| | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ |
| Casado (Ref.= Otro) | $0.05^{**}$ | $0.05^{**}$ | $0.05^{**}$ | $0.05^{**}$ | $0.05^{**}$ | $0.05^{**}$ |
| | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ | $(0.02)$ |
| Ideología política | $-0.07^{***}$ | $-0.05^{***}$ | $-0.07^{***}$ | $-0.07^{***}$ | $-0.07^{***}$ | $-0.07^{***}$ |
| | $(0.00)$ | $(0.01)$ | $(0.02)$ | $(0.00)$ | $(0.00)$ | $(0.00)$ |
| Presidencia Izquierda (Ref. = Otra) | | | $-0.42$ | | | |
| | | | $(0.25)$ | | | |
| Ideología política x Presidencia Izquierda (Ref. = Otra) | | | $0.07^{*}$ | | | |
| | | | $(0.03)$ | | | |
| Participación laboral femenina | | | | | $0.61$ | |
| | | | | | $(0.73)$ | |
| Índice Freedom House | | | | | | $-0.08$ |
| | | | | | | $(0.09)$ |
| Edad x Índice Freedom House | | | | | | $-0.04^{**}$ |
| | | | | | | $(0.01)$ |
| AIC | 52879.32 | 52533.14 | 52538.58 | 52805.69 | 52805.82 | 52812.29 |
| BIC | 52957.31 | 52626.73 | 52647.77 | 52899.27 | 52907.20 | 52921.47 |
| -2*log-likelihood | $-26429.66$ | $-26254.57$ | $-26255.29$ | $-26390.84$ | $-26389.91$ | $-26392.14$ |
| Num.obs | 18012 | 18012 | 18012 | 18012 | 18012 | 18012 |
| Num. grupos: Países | 19 | 19 | 19 | 19 | 19 | 19 |
| Var: Países (Intercepto) | 0.14 | 0.24 | 0.22 | 0.10 | 0.11 | 0.10 |
| Var: Residual | 1.09 | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 |
| Var: Países Ideología | | 0.00 | 0.00 | | | |
| Cov: Países (Intercepto), Ideología | | $-0.02$ | $-0.01$ | | | |
| Var: Países Edad | | | | 0.00 | 0.00 | 0.00 |
| Cov: Países (Intercepto), Edad | | | | 0.00 | 0.00 | 0.00 |

Nota: Celdas contienen coeficientes de regresión con errores estándares entre paréntesis. $^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Fuente: Elaboración propia en base a LAPOP 2008.

# Referencias

# Código de R

```
knitr::opts_chunk$set(echo = F,
                      warning = F,
                      error = F,
                      message = F)
if (! require("pacman")) install.packages("pacman")

pacman::p_load(tidyverse,
               sjmisc,
               sjPlot,
               summarytools,
               effectsize,
               lme4,
               easystats,
               influence.ME,
               performance,
               broom,
               sjlabelled,
               here,
               texreg,
               ggeffects,
               misty,
               optimx,
               naniar,
               ggdist)

options(scipen=999)
rm(list = ls())

miles <- function(x) {
  format(round(as.numeric(x),0), big.mark = ".")
}

decimales <- function(x) {
  format(round(as.numeric(x), 2), decimal.mark = ",")
}

custom_extract <- function(model) {
  tr <- extract(model)

  # Identificar índices a conservar (excluyendo "R$^2$", "s_idios" y "s_i
```

```
  gof_indices <- which(!(tr@gof.names %in% c("R$^2$", "s_idios", "s_id"))

  # Actualizar gof, gof.names y gof.decimal simultáneamente
  tr@gof.names <- tr@gof.names[gof_indices]
  tr@gof <- tr@gof[gof_indices]
  tr@gof.decimal <- tr@gof.decimal[gof_indices]

  return(tr)
}
# set theme

theme_set(theme_ggdist())

load(file = here("input/data/morgan2013.RData"))

names(morgan2013)
glimpse(morgan2013)

# seleccionar ----

db <- morgan2013 %>%
  select(country, ID, trustgov, sex = female, age, educ, employed, marrie
         race, ideology = left, leftpres, FLP, fhouse) %>%
  sjlabelled::remove_all_labels() %>%
  janitor::clean_names() %>%
  as_tibble()

# filtrar: no -----

# recodificar y transformar ----

# trust
sjmisc::descr(db$in_trust)

# sexo
frq(db$sex)

db$sex <- car::recode(db$sex,
                      recodes= c("0='Hombre';1='Mujer'"),
                      levels = c("Hombre","Mujer"),
                      as.factor = T)
```

```r
# edad
sjmisc::descr(db$age)
frq(db$age)

db$age_f <- car::recode(db$age,
                        recodes = c("1='Tramo 1';
                                    2='Tramo 2';
                                    3='Tramo 3';
                                    4='Tramo 4';
                                    5='Tramo 5';
                                    6='Tramo 6'"),
                        levels = c("Tramo 1",
                                   "Tramo 2",
                                   "Tramo 3",
                                   "Tramo 4",
                                   "Tramo 5",
                                   "Tramo 6"),
                        as.factor = T
)

# educ
sjmisc::descr(db$educ)

# employed
frq(db$employed)

db$employed <- car::recode(db$employed,
                        recodes= c("0='Desempleado';1='Empleado'"),
                        levels = c("Desempleado","Empleado"),
                        as.factor = T)
# married
frq(db$married)

db$married <- car::recode(db$married,
                        recodes= c("0='No';1='Sí'"),
                        levels = c("No","Sí"),
                        as.factor = T)

# race
frq(db$race)
```

```r
db$married <- car::recode(db$married,
                          recodes= c("0='Otro';1='Blanco'"),
                          levels = c("No","Sí"),
                          as.factor = T)

# ideology
frq(db$ideology)

# left
frq(db$leftpres)

db$leftpres <- car::recode(db$leftpres,
                          recodes= c("0='No';1='Sí'"),
                          levels = c("No","Sí"),
                          as.factor = T)


# flp
sjmisc::descr(db$flp)

# fhouse
sjmisc::descr(db$fhouse)

# id
sjmisc::descr(db$id)

# country
frq(db$country)

# casos perdidos -----

colSums(is.na(db))

n_miss(db)

prop_miss(db)*100

miss_var_summary(db)

miss_var_table(db)
```

```r
vis_miss(db) + theme(axis.text.x = element_text(angle=80))

db <- na.omit(db)

# Null model
model_0 <- lmer(in_trust ~ 1 + (1 | country),
                data = db, REML = T)

performance::icc(model_0, by_group = T)
## ICC Country = 0.11

# Influence test
inf_m0 <- influence(model_0, group = "country")

# D cook
cooks.distance(inf_m0, parameters = 1, sort = T) # cut point is 4/19

n_country <- length(unique(db$country))

plot(inf_m0, which="cook",
     cutoff=(4/n_country), sort=TRUE,
     xlab="Distancia de Cook",
     ylab="País", width=60, height=40)

# no obs influyentes

# Modelo 1: Indicadores N1
model_1 <- lmer(in_trust ~ 1 + sex + age + educ + employed + married +
                race + ideology + (1 | country),
                data = db,
                REML = T)

# Modelo 2: Pendiente aleatoria ideology
model_2 <- lmer(in_trust ~ 1 + sex + age + educ + employed + married +
                race + ideology + (1 + ideology| country),
                data = db,
                REML = T)

# Modelo 3: Interaccion ideology y leftpres
model_3 <- lmer(in_trust ~ 1 + sex + age + educ + employed + married +
                race + ideology + leftpres + ideology*leftpres +
```

```
                (1 + ideology| country),
                data = db,
                REML = T)

# Modelo 4: Pendiente aleatoria edad
model_4 <- lmer(in_trust ~ 1 + sex + age + educ + employed + married +
                race + ideology + (1 + age| country),
                data = db,
                REML = T)

# Modelo 5: Pendiente aleatoria edad + flp
model_5 <- lmer(in_trust ~ 1 + sex + age + educ + employed + married +
                race + ideology + flp + (1 + age| country),
                data = db,
                REML = T)

# Modelo 6: Pendiente aleatoria edad + flp
model_6 <- lmer(in_trust ~ 1 + sex + age + educ + employed + married +
                race + ideology + age*fhouse + (1 + age| country),
                data = db,
                REML = T)


ccoef <- list(
  "(Intercept)" = "Intercepto",
  sexMujer = "Mujer (Ref.= Hombre)",
  age = "Edad",
  educ = "Nivel educacional (en años)",
  employedEmpleado = "Empleado (Ref.= Desempleado)",
  marriedSí = "Casado (Ref.= Otro)",
  ideology = "Ideología política",
  leftpresSí = "Presidencia Izquierda (Ref. = Otra)",
  "ideology:leftpresSí" = "Ideología política x Presidencia Izquierda (Re
  flp = "Participación laboral femenina",
  fhouse = "Índice Freedom House",
  "age:fhouse" = "Edad x Índice Freedom House"
)


texreg::texreg(list(model_1, model_2, model_3, model_4, model_5, model_6)
               custom.model.names = c("Modelo 1",
```

```
                                  "Modelo 2",
                                  "Modelo 3",
                                  "Modelo 4",
                                  "Modelo 5",
                                  "Modelo 6"),
          caption = NULL,
          stars = c(0.05, 0.01, 0.001),
          custom.coef.map = ccoef,
          custom.note = "\\item Nota: Celdas contienen coeficientes
          threeparttable = T,
          leading.zero = T,
          float.pos = "h!",
          use.packages = F,
          booktabs = TRUE,
          scalebox = 0.7,
          custom.gof.names = c("AIC",
                               "BIC",
                               "-2*log-likelihood",
                               "Num.obs",
                               "Num. grupos: Países",
                               "Var: Países (Intercepto)",
                               "Var: Residual",
                               "Var: Países Ideología",
                               "Cov: Países (Intercepto), Ideología"
                                "Var: Países Edad",
                               "Cov: Países (Intercepto), Edad"
                               ))
```