Colombian trans wellbeing

Code and analyses

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Description

This document contains all code, and step by step explanations for all analyses, figures and tables (including supplementary figures and tables) for:

Reyes-Rodríguez, M. F., & Leongómez, J. D. (in prep). *Colombian trans wellbeing*

Data are available on the Open Science Framework (OSF): https://doi.org/10.XXXX/OSF.IO/XXXXX . The analyses were designed by Maria Fernanda Reyes-Rodríguez and Juan David Leongómez. This document and its underlying code were created in R Markdown by Juan David Leongómez using R and LaTeX, ensuring full reproducibility.

Contents

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1 Preliminaries

1.1 Load packages

This file was created using `knitr` (Xie, 2014), mostly using `tidyverse` (Wickham et al., 2019) syntax. As such, data wrangling was mainly done using packages such as `dplyr` (Wickham et al., 2023), and most figures were created or modified using `ggplot2` (Wickham, 2016). Tables were created using `knitr::kable` and `kableExtra` (Zhu, 2021).

Multi-model inference and model averaging was achieved using `MuMIn` (Bartoń, 2024), and model assumptions were performed using `performance` (Lüdecke et al., 2021).

All packages used in this file can be directly installed from the Comprehensive R Archive Network (CRAN). For a complete list of packages used to create this file, and their versions, see section 2, at the end of the document.

```
library(ltm)
library(psych)        # For statistical functions (e.g., Cronbach's alpha)
library(MuMIn)        # For model selection and averaging
library(performance)  # For model performance metrics
library(readr)        # For reading data files
library(scales)       # For percent formatting
library(knitr)
library(kableExtra)
library(tidyverse)    # For data manipulation and piping
```

1.2 Load data

Load raw CSV data

```
data_RAW <- read_csv("data/data.csv")
```

1.2.1 Define PANAS Subscales (Positive & Negative Affect)

XXXXXXX

```
# List of PANAS Positive Affect (PANAS_P) items
PANAS_P <- c("PANASB_1", "PANASB_3", "PANASB_5", "PANASB_9",
             "PANASB_10", "PANASB_12", "PANASB_14", "PANASB_16",
             "PANASB_17", "PANASB_19")

# List of PANAS Negative Affect (PANAS_N) items
PANAS_N <- c("PANASB_2", "PANASB_4", "PANASB_6", "PANASB_7",
             "PANASB_8", "PANASB_11", "PANASB_13", "PANASB_15",
             "PANASB_18", "PANASB_20")
```

1.3 Internal consistency

1.3.1 Calculate Cronbach's Alpha for Different Scales

To measure the internal consistency of these tests, we used standardized Cronbach's alpha (α or Tau-equivalent reliability: ρ_T) coefficients, using the function `cronbach.alpha` from the package `ltm` (Rizopoulos, 2006).

```
# Compute Cronbach's alpha for the Self-Efficacy (EAG) scale
alpha_EAG <- data_RAW |>
  mutate(across(where(is.numeric), ~ na_if(., 99))) |>  # Replace 99 with NA (missing values)
  select(starts_with("EAG_")) |>  # Select all columns starting with "EAG_"
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)  # Compute Cronbach's alpha

# Compute Cronbach's alpha for the Life-Satisfaction (SWLS) scale
alpha_SWLS <- data_RAW |>
  mutate(across(where(is.numeric), ~ na_if(., 99))) |>  # Replace 99 with NA
  select(starts_with("SWLS_")) |>  # Select all columns starting with "SWLS_"
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Compute Cronbach's alpha for the Resilience (EBR) scale
alpha_EBR <- data_RAW |>
```

```
  mutate(across(where(is.numeric), ~ na_if(., 99))) |>  # Replace 99 with NA
  select(starts_with("EBR_")) |>  # Select all columns starting with "EBR_"
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Compute Cronbach's alpha for the Depression (EBD) scale (after recoding responses)
alpha_EBD <- data_RAW |>
  mutate(across(where(is.numeric), ~ na_if(., 99))) |>  # Replace 99 with NA
  select(starts_with("EBD_")) |>  # Select all columns starting with "EBD_"
  mutate(across(everything(), ~ ifelse(is.na(.x), NA, .x - 1))) |>  # Adjust values
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Compute Cronbach's alpha for the Social Support (MOS2) scale
alpha_MOS2 <- data_RAW |>
  mutate(across(where(is.numeric), ~ na_if(., 99))) |>  # Replace 99 with NA
  select(starts_with("MOS2_")) |>  # Select all columns starting with "MOS2_"
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Compute Cronbach's alpha for PANAS Positive Affect (PANAS_P)
alpha_PANAS_P <- data_RAW |>
  mutate(across(where(is.numeric), ~ na_if(., 99))) |>  # Replace 99 with NA
  select(all_of(PANAS_P)) |>  # Select PANAS_P variables
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Compute Cronbach's alpha for PANAS Negative Affect (PANAS_N)
alpha_PANAS_N <- data_RAW |>
  mutate(across(where(is.numeric), ~ na_if(., 99))) |>  # Replace 99 with NA
  select(all_of(PANAS_N)) |>  # Select PANAS_N variables
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Compute Cronbach's alpha for Community Cohesion (PCPS3) scale
alpha_PCPS3 <- data_RAW |>
  mutate(across(where(is.numeric), ~ na_if(., 99))) |>  # Replace 99 with NA
  select(starts_with("PCPS3_")) |>  # Select all columns starting with "PCPS3_"
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)
```

1.3.2 Table S1. Internal consistency of measured scales

The internal consistency of the measured scales was generally strong, with Cronbach's α values ranging from 0.767 to 0.977. In particular, the Social Support (MOS2) and Self-Efficacy (EAG) scales exhibited excellent internal consistency, while the Depression (EBD) and Community Cohesion (PCPS3) scales had acceptable reliability, suggesting a slightly lower but still adequate level of internal consistency.

```
tibble(
  Scale = c("Self-Efficacy$^1$",
            "Life-Satisfaction$^2$",
            "Resilience$^3$",
            "Depression$^4$",
            "Social Support$^5$",
            "PANAS Positive$^6$",
            "PANAS Negative$^6$",
```

```
          "Community Cohesion$^x$"),
p = c(alpha_EAG$p, alpha_SWLS$p, alpha_EBR$p, alpha_EBD$p, alpha_MOS2$p,
      alpha_PANAS_P$p, alpha_PANAS_N$p, alpha_PCPS3$p),
n = c(alpha_EAG$n, alpha_SWLS$n, alpha_EBR$n, alpha_EBD$n, alpha_MOS2$n,
      alpha_PANAS_P$n, alpha_PANAS_N$n, alpha_PCPS3$n),
alpha = c(alpha_EAG$alpha, alpha_SWLS$alpha, alpha_EBR$alpha, alpha_EBD$alpha,
          alpha_MOS2$alpha, alpha_PANAS_P$alpha, alpha_PANAS_N$alpha, alpha_PCPS3$alpha),
ci2.5 = c(alpha_EAG$ci[1], alpha_SWLS$ci[1], alpha_EBR$ci[1], alpha_EBD$ci[1],
          alpha_MOS2$ci[1], alpha_PANAS_P$ci[1], alpha_PANAS_N$ci[1], alpha_PCPS3$ci[1]),
ci97.5 = c(alpha_EAG$ci[2], alpha_SWLS$ci[2], alpha_EBR$ci[2], alpha_EBD$ci[2],
           alpha_MOS2$ci[2], alpha_PANAS_P$ci[2], alpha_PANAS_N$ci[2], alpha_PCPS3$ci[2])) |>
mutate(across(starts_with("ci"), round, 3)) |>
unite(col = "CI", ci2.5:ci97.5, sep = " - ") |>
kable(digits = 3,
      booktabs = TRUE,
      linesep = "",
      align = c("l", rep("c", 4)),
      caption = "Internal consistency of measured scales",
      col.names = c("Variable", "Items", "$n$", "$\\alpha$", "$95\\% CI$"),
      escape = FALSE) |>
kable_styling(latex_options = "HOLD_position") |>
footnote(
  general = "95\\\\% confidence intervals were calculated with 1,000 bootstrap samples.
        Standardized Cronbach's alpha ($\\\\alpha$) coefficients were computed.
        $^1$\\\\cite{EAG};
        $^2$\\\\cite{EBR};
        $^3$\\\\cite{EBD};
        $^4$\\\\cite{MOS};
        $^5$\\\\cite{PANAS};
        $^6$\\\\cite{PANAS}",
  threeparttable = TRUE, footnote_as_chunk = TRUE, escape = FALSE
)
```

Table S1. *Internal consistency of measured scales*

Variable	Items	n	α	95%CI
Self-Efficacy[1]	10	223	0.905	0.875 — 0.926
Life-Satisfaction[2]	5	253	0.869	0.841 — 0.895
Resilience[3]	4	278	0.861	0.821 — 0.892
Depression[4]	7	223	0.767	0.71 — 0.813
Social Support[5]	19	195	0.977	0.971 — 0.982
PANAS Positive[6]	10	285	0.884	0.854 — 0.907
PANAS Negative[6]	10	282	0.827	0.793 — 0.867
Community Cohesion^x	3	281	0.769	0.699 — 0.826

Note: 95% confidence intervals were calculated with 1,000 bootstrap samples. Standardized Cronbach's alpha (α) coefficients were computed. [1]Baessler and Schwarzer, 1996; [2]Sinclair and Wallston, 2004; [3]Andresen et al., 1994; [4]Sherbourne and Stewart, 1991; [5]Watson et al., 1988; [6]Watson et al., 1988

2 Session info (for reproducibility)

```
# Display session information for reproducibility
# - Uses `pander()` for better formatting
# - `locale = FALSE` to exclude locale-specific info (reduces clutter)
library(pander)
pander(sessionInfo(), locale = FALSE)
```

R version 4.4.3 (2025-02-28)

Platform: x86_64-pc-linux-gnu

attached base packages: *stats*, *graphics*, *grDevices*, *utils*, *datasets*, *methods* and *base*

other attached packages: *pander(v.0.6.6)*, *lubridate(v.1.9.4)*, *forcats(v.1.0.0)*, *stringr(v.1.5.1)*, *dplyr(v.1.1.4)*, *purrr(v.1.0.4)*, *tidyr(v.1.3.1)*, *tibble(v.3.2.1)*, *ggplot2(v.3.5.1)*, *tidyverse(v.2.0.0)*, *kableExtra(v.1.4.0)*, *scales(v.1.3.0)*, *readr(v.2.1.5)*, *performance(v.0.13.0)*, *MuMIn(v.1.48.4)*, *psych(v.2.4.12)*, *ltm(v.1.2-0)*, *polycor(v.0.8-1)*, *msm(v.1.8.2)*, *MASS(v.7.3-64)* and *knitr(v.1.49)*

loaded via a namespace (and not attached): *gtable(v.0.3.6)*, *xfun(v.0.51)*, *insight(v.1.1.0)*, *lattice(v.0.22-6)*, *tzdb(v.0.4.0)*, *vctrs(v.0.6.5)*, *tools(v.4.4.3)*, *generics(v.0.1.3)*, *stats4(v.4.4.3)*, *parallel(v.4.4.3)*, *pkgconfig(v.2.0.3)*, *Matrix(v.1.7-2)*, *lifecycle(v.1.0.4)*, *compiler(v.4.4.3)*, *munsell(v.0.5.1)*, *mnormt(v.2.1.1)*, *htmltools(v.0.5.8.1)*, *yaml(v.2.3.10)*, *crayon(v.1.5.3)*, *pillar(v.1.10.1)*, *admisc(v.0.37)*, *nlme(v.3.1-167)*, *tidyselect(v.1.2.1)*, *digest(v.0.6.37)*, *mvtnorm(v.1.3-3)*, *stringi(v.1.8.4)*, *bookdown(v.0.42)*, *splines(v.4.4.3)*, *fastmap(v.1.2.0)*, *grid(v.4.4.3)*, *archive(v.1.1.11)*, *colorspace(v.2.1-1)*, *expm(v.1.0-0)*, *cli(v.3.6.3)*, *magrittr(v.2.0.3)*, *survival(v.3.8-3)*, *withr(v.3.0.2)*, *bit64(v.4.6.0-1)*, *timechange(v.0.3.0)*, *rmarkdown(v.2.29)*, *bit(v.4.5.0.1)*, *hms(v.1.1.3)*, *evaluate(v.1.0.3)*, *viridisLite(v.0.4.2)*, *rlang(v.1.1.5)*, *Rcpp(v.1.0.14)*, *glue(v.1.8.0)*, *xml2(v.1.3.6)*, *svglite(v.2.1.3)*, *rstudioapi(v.0.17.1)*, *vroom(v.1.6.5)*, *R6(v.2.5.1)* and *systemfonts(v.1.2.1)*

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3 Supplementary references

Andresen, E. M., Malmgren, J. A., Carter, W. B., & Patrick, D. L. (1994). Screening for Depression in Well Older Adults: Evaluation of a Short Form of the CES-D. *American Journal of Preventive Medicine*, *10*(2), 77–84. https://doi.org/10.1016/S0749-3797(18)30622-6

Baessler, J., & Schwarzer, R. (1996). Evaluación de la autoeficacia: Adaptación española de la Escala de Autoeficacia general. [Measuring optimistic self-beliefs: A Spanish adaptation of the General Self-Efficacy Scale.] *Ansiedad y Estrés*, *2*(1), 1–8. https://psycnet.apa.org/record/1999-00958-001

Bartoń, K. (2024). *Mumin: Multi-model inference* [R package version 1.48.4]. https://CRAN.R-project.org/package=MuMIn

Lüdecke, D., Ben-Shachar, M. S., Patil, I., Waggoner, P., & Makowski, D. (2021). performance: An R package for assessment, comparison and testing of statistical models. *Journal of Open Source Software*, *6*(60), 3139. https://doi.org/10.21105/joss.03139

Rizopoulos, D. (2006). ltm: An R package for latent variable modeling and item response theory analyses. *Journal of Statistical Software*, *17*(5), 1–25. https://doi.org/10.18637/jss.v017.i05

Sherbourne, C. D., & Stewart, A. L. (1991). The MOS social support survey. *Social Science & Medicine*, *32*(6), 705–714. https://doi.org/10.1016/0277-9536(91)90150-B

Sinclair, V. G., & Wallston, K. A. (2004). The Development and Psychometric Evaluation of the Brief Resilient Coping Scale. *Assessment*, *11*(1), 94–101. https://doi.org/10.1177/1073191103258144

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Wickham, H. (2016). *Ggplot2: Elegant graphics for data analysis*. Springer-Verlag New York. https://ggplot2.tidyverse.org

Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., Grolemund, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T. L., Miller, E., Bache, S. M., Müller, K., Ooms, J., Robinson, D., Seidel, D. P., Spinu, V., … Yutani, H. (2019). Welcome to the tidyverse. *Journal of Open Source Software*, *4*(43), 1686. https://doi.org/10.21105/joss.01686

Wickham, H., François, R., Henry, L., Müller, K., & Vaughan, D. (2023). *Dplyr: A grammar of data manipulation* [R package version 1.1.3]. https://CRAN.R-project.org/package=dplyr

Xie, Y. (2014). Knitr: A comprehensive tool for reproducible research in R [ISBN 978-1466561595]. In V. Stodden, F. Leisch & R. D. Peng (Eds.), *Implementing reproducible computational research*. Chapman and Hall/CRC. https://doi.org/10.1201/9781315373461-1

Zhu, H. (2021). *Kableextra: Construct complex table with 'kable' and pipe syntax* [R package version 1.3.4]. https://CRAN.R-project.org/package=kableExtra