Trait Sexual Desire-Linked Subjective Sexual Arousal to Erotic and Non-Erotic Stimuli: Gender, Relationship Status, and Gender-Specificity

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:

Vásquez-Amézquita, M., Leongómez, J. D., Martínez-González, M. B., & Chivers, M. L. (in prep). *Trait Sexual Desire-Linked Subjective Sexual Arousal to Erotic and Non-Erotic Stimuli: Gender, Relationship Status, and Gender-Specificity*

Data available from the Open Science Framework (OSF): https://doi.org/10.17605/OSF.IO/3V2E7. All analyses were planned by Milena Vásquez-Amézquita and Juan David Leongómez. This document and its underlying code were created in `R Markdown` by Juan David Leongómez using LaTeX.

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).

Linear mixed models were fitted using `lmerTest` (Kuznetsova et al., 2017), assumptions were performed using `performance` (Lüdecke et al., 2021), contrasts and interactions were explored using `emmeans` (Lenth, 2023), and interactions were investigated using the package `interactions` (Long, 2019).

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 5, at the end of the document.

```
library(readxl)
library(ltm)
library(car)
library(tidyverse)
library(ggpubr)
library(tidyquant)
library(performance)
library(kableExtra)
library(psych)
library(scales)
library(lmerTest)
library(emmeans)
library(berryFunctions)
library(bestNormalize)
library(effectsize)
#library(interactions)
#library(MetBrewer)
```

```
#library(ggpmisc)
#library(effectsize)
#library(rstatix)
```

1.2 Define color palettes

Individual color palettes for figures by gender, stimuli sex, or relationship type.

```
# Palette to color figures by gender
color.Gender <- c("red","black")
# Palette to color figures by stimuli sex
color.StimuliSex <- c("#54278F","#FC4E2A")
# Palette to color figures by relationship type
color.Relationship <- c("#2171B5","#DD3497")



# Palette to color figures by dimension type
#color.Dimension <- c("#54278F","#41AB5D","#0570B0")
```

1.3 Custom functions

1.3.1 `pval.lev`

This function takes p-values and formats them in LaTeX, highlighting significant results in bold.

```
# Version 1 for LaTeX format
pval.lev <- function(pvals) {
  ifelse(pvals < 0.0001, "\\textbf{< 0.0001}",
         ifelse(pvals < 0.001, "\\textbf{< 0.001}",
                ifelse(pvals < 0.05, paste0("\\textbf{", round(pvals, 4), "}"),
                       round(pvals, 2))))
}


# Version 2 without LaTeX format
pval.lev2 <- function(pvals) {
  ifelse(pvals < 0.0001, "< 0.0001",
         ifelse(pvals < 0.001, "< 0.001",
                ifelse(pvals < 0.05, paste0("= ", round(pvals, 4)),
                       paste0("= ", round(pvals, 2)))))
}
```

1.3.2 `pval.stars`

This function takes p-values and adds starts to represent significance levels.

```
pval.stars <- function(pvals) {
  ifelse(pvals < 0.0001, "****",
         ifelse(pvals < 0.001, "***",
                ifelse(pvals < 0.01, "**",
                       ifelse(pvals < 0.05, "*", NA))))
}
```

1.3.3 `corr.stars`

This function creates a correlation matrix, and displays significance (function `corr.stars` modified from http://myowelt.blogspot.com/2008/04/beautiful-correlation-tables-in-r.html).

```
corr.stars <- function(x) {
  require(Hmisc)
  x <- as.matrix(x)
  R <- rcorr(x)$r
  p <- rcorr(x)$P
  # define notions for significance levels; spacing is important.
  mystars <- ifelse(p < .001,
                    paste0("\\textbf{", round(R, 2), "***}"),
                    ifelse(p < .01,
                           paste0("\\textbf{", round(R, 2), "**}"),
                           ifelse(p < .05,
                                  paste0("\\textbf{", round(R, 2), "*}"),
                                  ifelse(p < .10,
                                         paste0(round(R, 2), "$^{\\dagger}$"),
                                         format(round(R, 2), nsmall = 2)))))
  # build a new matrix that includes the correlations with their appropriate stars
  Rnew <- matrix(mystars,
                 ncol = ncol(x))
  diag(Rnew) <- paste(diag(R), " ",
                      sep = "")
  rownames(Rnew) <- colnames(x)
  colnames(Rnew) <- paste(colnames(x), "",
                          sep = "")
  # remove upper triangle
  Rnew <- as.matrix(Rnew)
  Rnew[upper.tri(Rnew, diag = TRUE)] <- ""
  Rnew <- as.data.frame(Rnew)
  # remove last column and return the matrix (which is now a data frame)
  Rnew <- cbind(Rnew[1:length(Rnew) - 1])
  return(Rnew)
}
```

1.3.4 summary.sig and summary.sig.boot

Functions to bold significant p values from summary model tables. It highlights significant p values, and formats the output in LaTeX, ready to be used with `kable`.

We used `summary` (regression-type tables of estimates) instead on ANOVA-type tables to display model results. This was because we needed to bootstrap estimates for the two models oh Hypothesis 2 (see section **??**). However, to obtain p-values that represent main effects and interactions, we used *sum-to-zero* contrasts (see e.g., Kaufman & Sweet, 1974; Keppel & Zedeck, 1989).

```
# Version 1 for models with no CIs
summary.sig <- function(mod, custom_caption) {
  modTab <- data.frame(summary(mod)$coefficients) |>
                    rownames_to_column() |>
    mutate_at("rowname", str_replace_all, ":", " × ") |>
    mutate_at("rowname", str_replace_all, "`", "") |>
    mutate("rowname" = str_replace_all(rowname,
                                       c("Gender1" = "Gender [Women]",
                                         "Relationship1" = "Relationship [Stable]",
                                         Dimension1 = "Dimension [Attractive person DSD]",
                                         Dimension2 = "Dimension [Partner DSD]"))) |>
    select(rowname, Estimate, Std..Error, df, t.value, Pr...t..) |>
    mutate(Pr...t.. = pval.lev(Pr...t..)) |>
    kable(digits = 2,
          booktabs = TRUE,
```

```
          align = c("l", rep("c", 5)),
          linesep = "",
          caption = custom_caption,
          col.names = c("Effect", "Estimate", "Std. Error", "$df$", "$t$", "$p$"),
          escape = FALSE) |>
    kable_styling(latex_options = c("HOLD_position", "scale_down")) |>
    footnote(general = paste0("Sexual desire was measured as the proportion of
                              each score divided by the maximum possible score
                              for each dimension.
                              $R^2_{conditional}$ = ",
                              round(r2_nakagawa(mod)$R2_conditional, 3),
                              ", $R^2_{marginal}$ = ",
                              round(r2_nakagawa(mod)$R2_marginal, 3),
                              ". Results are from linear mixed models for main
                              effects and interactions between sexual desire (SD) dimensions,
                              sex, and Stimuli sex.
                              Gender = participants gender (women, men);
                              Stimuli sex = sex of stimuli (female, male);
                              Attractive person DSD = Dyadic sexual desire toward an
                              attractive person;
                              Partner DSD = Dyadic sexual desire toward a partner.
                              \\\\textit{Sum-to-zero} contrasts were used to display
                              \\\\textit{p}-values that represent main effects and interactions
                              in an ANOVA-type manner (i.e. the intercept is the grand mean of
                              all cells, and estimates are differences between each category
                              mean and the mean of all categories).
                              \\\\textit{Single} was used as reference category
                              for relationship status, \\\\textit{Men} for gender,
                              and \\\\textit{Solitary} for  sexual desire dimension.
                              Contrasted levels are in square brackets.
                              Significant effects are in bold."),
             escape = FALSE,
             threeparttable = TRUE,
             footnote_as_chunk = TRUE)
    return(modTab)
}

# Version 2 for models with bootstrap CIs
summary.sig.boot <- function(mod, modCI, custom_caption) {
  modTab <- left_join(data.frame(summary(mod)$coefficients) |>
                        rownames_to_column(),
                      data.frame(modCI) |>
                        rownames_to_column(),
                      by = "rowname") |>
    mutate_at("rowname", str_replace_all, ":", " × ") |>
    mutate_at("rowname", str_replace_all, "`", "") |>
    mutate("rowname" = str_replace_all(rowname,
                                     c("`Solitary sexual desire (C)`" =
                                         "Solitary SD (C)",
                                       "`Dyadic sexual desire (Attractive person) (C)`" =
                                         "Attractive person DSD (C)",
                                       "`Dyadic sexual desire (Partner) (C)`" =
                                         "Partner DSD (C)",
                                       "Relationship1" = "Relationship [Stable]",
                                       "Stimuli sex1" = "Stimuli sex [Female]",
                                       "Gender1" = "Gender [Women]"))) |>
```

```
    select(rowname, Estimate, X2.5.., X97.5.., Std..Error, df, t.value, Pr...t..) |>
    mutate(Pr...t.. = pval.lev(Pr...t..)) |>
    kable(digits = 2,
          booktabs = TRUE,
          align = c("l", rep("c", 7)),
          linesep = "",
          caption = custom_caption,
          col.names = c("Effect", "Estimate", "Lower 95\\% CI", "Upper 95\\% CI",
                        "Std. Error", "$df$", "$t$", "$p$"),
          escape = FALSE) |>
    kable_styling(latex_options = c("HOLD_position", "scale_down")) |>
    footnote(general = paste0("$R^2_{conditional}$ = ",
                              round(r2_nakagawa(mod)$R2_conditional, 3),
                              ", $R^2_{marginal}$ = ",
                              round(r2_nakagawa(mod)$R2_marginal, 3),
                              ". Results are from linear mixed models for main
                              effects and interactions between sexual desire (SD) dimensions,
                              sex, and Stimuli sex.
                              Confidence intervales were calculated as the 2.5 and 97.5
                              percentiles from bootstrap (1000 simulations).
                              Continuous variables were centered and scaled
                              (represented as \\\\textbf{(C)} in variable names).
                              Gender = participants gender (women, men);
                              Stimuli sex = sex of stimuli (female, male);
                              Solitary SD = Solitary Sexual Desire;
                              Attractive person DSD = Dyadic Sexual Desire toward an
                              Attractive person;
                              Partner DSD = Dyadic Sexual Desire toward partner.
                              \\\\textit{Sum-to-zero} contrasts were used to display
                              \\\\textit{p}-values that represent main effects and interactions
                              in an ANOVA-type manner (i.e. the intercept is the grand mean of
                              all cells, and estimates are differences between each category
                              mean and the mean of all categories).
                              As reference categories
                              \\\\textit{Single} was used for relationship status,
                              \\\\textit{Men} for gender,
                              and \\\\textit{Male} for stimuli sex.
                              Contrasted levels are in square brackets.
                              Significant effects are in bold."),
             escape = FALSE,
             threeparttable = TRUE,
             footnote_as_chunk = TRUE)
    return(modTab)
}
```

1.3.5 `emms.sig`

Function to create a table of estimated marginal means and contrasts at three levels of a covariate, representing significance levels from `emmeans::emmeans` outputs. The function highlights significant p values, and formats the output in LaTeX, ready to be used with `kable`.

```
# Version 1, for interactions
emms.sig <- function(low.i, mid.i, hi.i) {
  emm.low <- data.frame(low.i[[1]])
  emm.mid <- data.frame(mid.i[[1]])
  emm.hi <- data.frame(hi.i[[1]])
  con.low <- data.frame(low.i[[2]])
```

```
  con.mid <- data.frame(mid.i[[2]])
  con.hi <- data.frame(hi.i[[2]])

  low.tab <- merge(emm.low, con.low, by = 0, all = TRUE)
  mid.tab <- merge(emm.mid, con.mid, by = 0, all = TRUE)
  hi.tab <- merge(emm.hi, con.hi, by = 0, all = TRUE)

  tab <- bind_rows(low.tab, mid.tab, hi.tab) |>
    select(-c(1,3,6,10:13)) |>
    mutate(p.value = pval.lev(p.value)) |>
    kable(digits = 2,
          booktabs = TRUE,
          align = c("l", rep("c", 4), "l", rep("c", 2)),
          linesep = "",
          caption = paste0("Estimated marginal means and contrasts for ",
                           low.i[[1]]@misc$pri.vars[1],
                           " at different levels of ",
                           low.i[[1]]@misc$by.vars),
          col.names = c(low.i[[1]]@misc$pri.vars[1],
                        "EMM", "$SE$", "$2.5\\% CI$", "$97.5\\% CI$", "Contrast", "$z$", "$p$"),
          escape = FALSE) |>
  pack_rows(group_label = paste0(low.i[[1]]@misc$by.vars, " = Mean - SD"),
            start_row = 1,
            end_row = 2,
            bold = TRUE) |>
  pack_rows(group_label = paste0(low.i[[1]]@misc$by.vars, " = Mean"),
            start_row = 3,
            end_row = 4,
            hline_before = TRUE,
            bold = TRUE) |>
  pack_rows(group_label = paste0(low.i[[1]]@misc$by.vars, " = Mean + SD"),
            start_row = 5,
            end_row = 6,
            hline_before = TRUE,
            bold = TRUE) |>
  add_header_above(c(" " = 5, "Contrasts" = 3)) |>
  kable_styling(latex_options = "HOLD_position") |>
  footnote(general = paste0("EMM = estimated marginal mean.
           Significant effects are in bold.
           Continuous variables were centered and scaled (in this case, ",
           low.i[[1]]@misc$by.vars, ").
           An asymptotic method was used to avoid extreme computation
           times (hence, no degrees of freedom are included, and
           $z$ rather than $t$ statistics are reported).
           For contrasts, Tukey adjustment was used."),
           threeparttable = TRUE,
           footnote_as_chunk = TRUE,
           escape = FALSE)

  return(tab)
}

# Version 2, for triple interactions
emms.sig2 <- function(low.i, mid.i, hi.i) {
  emm.low <- data.frame(low.i[[1]])
  emm.mid <- data.frame(mid.i[[1]])
```

```
  emm.hi <- data.frame(hi.i[[1]])
  con.low <- data.frame(low.i[[2]])
  con.mid <- data.frame(mid.i[[2]])
  con.hi <- data.frame(hi.i[[2]])

  low.tab <- merge(emm.low, con.low, by = 0, all = TRUE)
  mid.tab <- merge(emm.mid, con.mid, by = 0, all = TRUE)
  hi.tab <- merge(emm.hi, con.hi, by = 0, all = TRUE)

  tab <- bind_rows(low.tab, mid.tab, hi.tab) |>
    select(-c(1,4,7,11:14)) |>
    mutate(p.value = pval.lev(p.value)) |>
    kable(digits = 2,
          booktabs = TRUE,
          align = c("l", "l", rep("c", 4), "l", rep("c", 2)),
          linesep = "",
          caption = paste0("Estimated marginal means and contrasts for ",
                           low.i[[1]]@misc$pri.vars[1], " and ",
                           low.i[[1]]@misc$pri.vars[2],
                           " at different levels of ",
                           low.i[[1]]@misc$by.vars),
          col.names = c(low.i[[1]]@misc$pri.vars[1],
                        low.i[[1]]@misc$pri.vars[2],
                        "EMM", "$SE$", "$2.5\\% CI$", "$97.5\\% CI$", "Contrast", "$z$", "$p$"),
          escape = FALSE) |>
  pack_rows(group_label = paste0(low.i[[1]]@misc$by.vars, " = Mean - SD"),
            start_row = 1,
            end_row = 6,
            bold = TRUE) |>
  pack_rows(group_label = paste0(low.i[[1]]@misc$by.vars, " = Mean"),
            start_row = 7,
            end_row = 12,
            hline_before = TRUE,
            bold = TRUE) |>
  pack_rows(group_label = paste0(low.i[[1]]@misc$by.vars, " = Mean + SD"),
            start_row = 13,
            end_row = 18,
            hline_before = TRUE,
            bold = TRUE) |>
  add_header_above(c(" " = 6, "Contrasts" = 3)) |>
  kable_styling(latex_options = c("HOLD_position", "scale_down")) |>
  footnote(general = paste0("EMM = estimated marginal mean.
           Significant effects are in bold.
           Continuous variables were centered and scaled (in this case, ",
           low.i[[1]]@misc$by.vars, ")
           An asymptotic method was used to avoid extreme computation
           times (hence, no degrees of freedom are included, and
           $z$ rather than $t$ statistics are reported).
           For contrasts, Tukey adjustment was used."),
           threeparttable = TRUE,
           footnote_as_chunk = TRUE,
           escape = FALSE)

  return(tab)
}
```

1.3.6 `contr.stars`

Function to create a data frame of model contrasts, representing significance levels from an `emmeans::emmeans` output. These data frames are formatted to be called by the `ggpubr::stat_pvalue_manual` function used in model figures.

```
contr.stars <- function(emms){
  require(emmeans)
  x <- as.data.frame(contrast(emms, interaction = "pairwise"))
  x <- separate(x,
                col = 1,
                into = c("group1", "group2"),
                sep = " - ",
                remove = TRUE)
  x$p.signif <- ifelse(x$p.value < 0.0001, "****",
                           ifelse(x$p.value < 0.001, "***",
                                  ifelse(x$p.value < 0.01, "**",
                                         ifelse(x$p.value < 0.05, "*", NA))))
  x <- x |>
    mutate_at("group1", str_replace_all, "[()]", "") |>
    mutate_at("group2", str_replace_all, "[()]", "")
  return(x)
}
```

1.3.7 `prob.dist.tab`

Function to create a table of the probability of a model for each distribution family, using the `check_distribution` function, from the `performance` package (Lüdecke et al., 2021). Values are sorted descending, first for probabilities according to the residual distribution, and then for probabilities according to the response variable. While 18 distribution families are tested, only families with at least one probability (either residual or response variable) higher than 10% are shown in the table.

```
prob.dist.tab <- function(mod){
  # Calculate probabilities for each distribution family
  tibble(check_distribution(mod)) |>
    arrange(desc(p_Response)) |>
    arrange(desc(p_Residuals)) |>
  # Select only distribution families with at leat a 10% probability
  filter(p_Residuals > 0.1 | p_Response > 0.1) |>
  # Transform probabilities to percentages
  mutate(p_Residuals = paste0(round(p_Residuals*100, 2), "\\%")) |>
  mutate(p_Response = paste0(round(p_Response*100, 2), "\\%")) |>
  # Capitalise first letter of each family distribution
  mutate(Distribution = sub("(.)", "\\U\\1", Distribution, perl = TRUE)) |>
  # Create table
  kable(booktabs = TRUE,
        align = c("l", "c", "c"),
        row.names = FALSE,
        caption = "Distributional family for the model",
        col.names = c("Family",
                      "Residuals",
                      "Response"),
        escape = FALSE) |>
  kable_styling(latex_options = "HOLD_position") |>
  # Bold highest probability
  row_spec(1, background = "#c4c4c4") |>
  footnote(general = "Only families with at least one probability higher than
  10\\\\% are shown, but a total of 18 distribution families were tested.
```

```
  The most likely distribution is highlighted.",
           threeparttable = TRUE,
           footnote_as_chunk = TRUE,
           escape = FALSE)
}
```

1.4 Load and wrangle data

Change necessary variables to factor, sort levels, and rename variables

```
# Load data
dat <- read.csv("Data/BD_Heterosexuales_Vertical_BIG.csv") |>
  # Remove rows with missing values for Solitary sexual desire (SD_solitario)
  drop_na(SD_solitario) |>
  # Change variables to factor and sort their levels
  mutate_at(c("Contenido_Estimulo", "Sexo", "Sexo_Estimulo", "PrefSex", "EstRel", "Escolaridad",
              "Religion","TiempoRP"), as.factor) |>
  # Rename variables to English
  rename(Participant = Participante,
         Age = EdadParticipante,
         `Preferred sex` = PrefSex,
         Gender = Sexo,
         `Contraceptive uso` = Anticoncep,
         `Last period` = UltimoPer,
         `Period day` = Dia_ciclo,
         Education = Escolaridad,
         Location = Residencia,
         `Location (other)` = Residencia_3_TEXT,
         `Medical history` = AntMed,
         `Sexual orientation` = OS,
         `Relationship status` = EstRel,
         `Relationship duration` = TiempoRP,
         `Partner gender` = SexPareja,
         `Relationship type` = TipoRel,
         `Age at first intercourse` = Primera.ExpSex,
         `Consented to first intercourse` = ConExpSex,
         `Number of sexual partners` = Numero.Parejas,
         `Pornography consumed last month` = Pornografia_ultimo_mes,
         Relationship = TieneRelacion,
         `MGH-SFQ (total)` = MGH.SFQ_Total,
         `Dyadic sexual desire (Partner)` = SD_Diadico_pareja,
         `Solitary sexual desire` = SD_solitario,
         `Dyadic sexual desire (Attractive person)` = SD_Diadico_p_atractiva,
         `MGSS sexual satisfaction (General)` = Satisfaccion.Sexual..MGSS_general.,
         `MGSS sexual satisfaction (Partner)` = Satisfaccion.Sexual..MGSS_Pareja.,
         `Stimuli code` = Codigo_Estimulo,
         `Stimuli sex` = Sexo_Estimulo,
         `Stimuli content` = Contenido_Estimulo,
         `Subjective sexual attractiveness` = Atractivo,
         `Subjective sexual arousal` = Excitacion) |>
  # Recode factor levels
  mutate(`Stimuli content` = recode_factor(`Stimuli content`,
                                           Erotico = "Erotic",
                                           No_erotico = "Non-erotic")) |>
  mutate(Gender = recode_factor(Gender,
                                Femenino = "Women",
                                Masculino = "Men")) |>
```

```
mutate(`Stimuli sex` = recode_factor(`Stimuli sex`,
                                     Femenino = "Female",
                                     Masculino = "Male")) |>
mutate(`Preferred sex` = recode_factor(`Preferred sex`,
                                       Hombre = "Male",
                                       Mujer = "Female")) |>
mutate(Education = recode(Education,
                          "Bachillerato" = "High school",
                          "Universitario" = "University",
                          "Postgrado" = "Postgraduate")) |>
mutate(Religion = recode(Religion,
                         "1" = "Religious",
                         "0" = "Non-religious")) |>
mutate(`Pornography consumed last month` = recode(`Pornography consumed last month`,
                                                  "Nunca" = "None",
                                                  "Una o dos veces" = "1-2 times",
                                                  "Tres a cinco veces" = "3-5 times",
                                                  "Mas de 5 veces" = "5 times or more")) |>
# Recode relationship duration
#mutate(`Relationship duration` = replace_na(`Relationship duration`, "Single"))
mutate(`Relationship duration` = recode(`Relationship duration`,
                             "Sin pareja actual"  = "Single",
                             "Menor a 6 meses" = "Less that 6 months",
                             "Entre 6 meses y 2 anos" = "Between 6 months and 2 years",
                             "Entre 2 y 5 anos" = "Between 2 and 5 years",
                             "MÃ¡s de 5 anos" = "More than 5 years"),
       `Relationship duration` = replace_na(`Relationship duration`, "Single")) |>
# Recode relationship type
mutate(Relationship = recode(`Relationship status`,
                             "Exclusiva/No viven juntos" = "Stable",
                             "Exclusiva/Matrimonio" = "Stable",
                             "No exclusiva" = "Non-stable",
                             "Soltero/sin contactos sexuales en un ano" = "Single",
                             "Soltero/contactos sexuales en un ano" = "Single")) |>
# Relevel factors
mutate(Education = fct_relevel(Education,
                               c("High school", "University", "Postgraduate")),
       `Pornography consumed last month` = fct_relevel(`Pornography consumed last month`,
                               c("None", "1-2 times",
                                 "3-5 times", "5 times or more")),
       `Relationship duration` = fct_relevel(`Relationship duration`,
                               c("Single", "Less that 6 months",
                                 "Between 6 months and 2 years",
                                 "Between 2 and 5 years",
                                 "More than 5 years"))) |>
mutate(`Stimuli content` = as.factor(`Stimuli content`),
       `Stimuli sex` = as.factor(`Stimuli sex`)) |>
# Filter participants in non-stable relationships
filter(Relationship != "Non-stable") |>
droplevels()
```

2 Descriptives

2.0.1 Figure S1. Demographic chacarteristics of the sample

Number of participants by demographic category.

```
# Get number of participant for each combination of demographic chacarteristic
dat.demog <- dat |>
  select(Participant, Gender, Relationship, Education, Religion,
         `Pornography consumed last month`) |>
  group_by(Participant) |>
  filter(row_number() == 1) |>
  ungroup() |>
  group_by(Gender, Relationship, Education, Religion,
         `Pornography consumed last month`) |>
  rename(Porn = `Pornography consumed last month`) |>
  tally() |>
  drop_na(Religion) |>
  ungroup()

# Create separate tables by gender
dat.demog.W <- filter(dat.demog, Gender == "Women")
dat.demog.M <- filter(dat.demog, Gender == "Men")

# Women
samp.w <- ggballoonplot(dat.demog.W, x = "Education", y = "Porn", size = "n",
              fill = "n",
              facet.by = c("Relationship", "Religion")) +
  scale_fill_viridis_c(option = "C", limits = c(1, max(dat.demog$n))) +
  scale_size_continuous(range = c(1, 7), limits = c(1, max(dat.demog$n))) +
  guides(fill = guide_legend(face = "italic"),
         size = guide_legend(face = "italic")) +
  labs(title = "Women", y = "Pornography consumed last month") +
  geom_text(aes(label = n),
            size = 3, nudge_x = 0.3, nudge_y = 0.1) +
  geom_text(aes(label = paste0("\n(",
                               percent(n/sum(dat.demog$n), accuracy = 0.1),
                               ")")),
            size = 2.5, nudge_x = 0.3, nudge_y = -0.05) +
  theme_tq() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1),
        axis.text.y = element_text(angle = 45, vjust = 0.5))

# Men
samp.m <- ggballoonplot(dat.demog.M, x = "Education", y = "Porn", size = "n",
              fill = "n",
              facet.by = c("Relationship", "Religion")) +
  scale_fill_viridis_c(option = "C", limits = c(1, max(dat.demog$n))) +
  scale_size_continuous(range = c(1, 7), limits = c(1, max(dat.demog$n))) +
  guides(fill = guide_legend(face = "italic"),
         size = guide_legend(face = "italic")) +
  labs(title = "Men", y = NULL) +
  geom_text(aes(label = n),
            size = 3, nudge_x = 0.3, nudge_y = 0.1) +
  geom_text(aes(label = paste0("\n(",
                               percent(n/sum(dat.demog$n), accuracy = 0.1),
                               ")")),
            size = 2.5, nudge_x = 0.3, nudge_y = -0.05) +
```

```
  theme_tq() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1),
        axis.text.y = element_text(angle = 45, vjust = 0.5))

# Full plot
ggarrange(samp.w, samp.m,
          widths = c(1.1, 1),
          common.legend = TRUE,
          legend = "bottom")
```

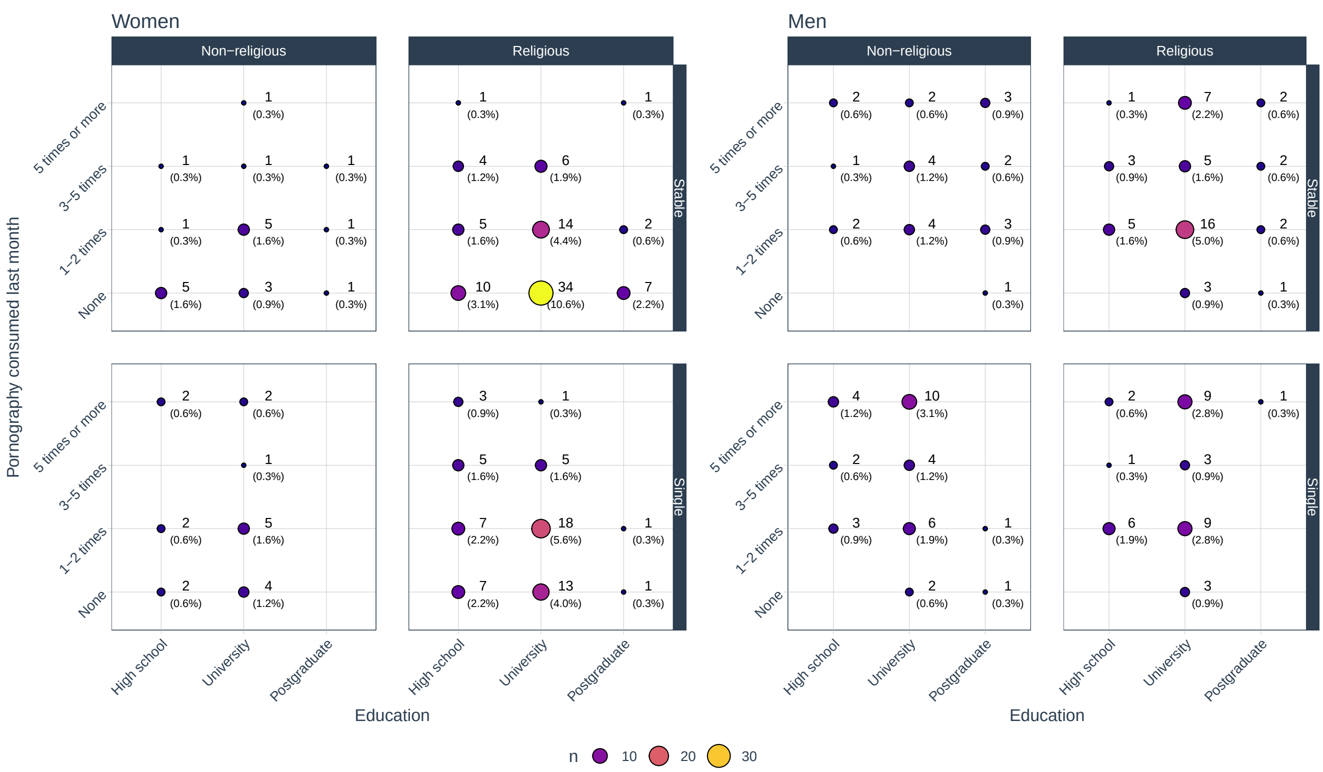

Figure S1. Number of participants by gender (left = women, rigth = men), Relationship (stable = top panels, single = bottom panels), Religion (non-religious = left panels by gender, religious = right panels by gender), Education (X axis), and pornography consumed during the last month (Y axis). The number of participants for each combination of these five variables is displayed as numbers (percentage in brackets), as well as by the color and size of the bubbles .

2.1 Descriptive statistics of the participants by gender

Calculate mean values per participant for relevant, numeric variables.

```
# Summarize relevant variables by participant
dat.desc <- dat |>
  select(Participant, Gender, Age, Relationship, `Number of sexual partners`,
         `MGH-SFQ (total)`,
         `MGSS sexual satisfaction (General)`, `MGSS sexual satisfaction (Partner)`,
         `Subjective sexual attractiveness`, `Subjective sexual arousal`,
         `Solitary sexual desire`,
         `Dyadic sexual desire (Attractive person)`, `Dyadic sexual desire (Partner)`) |>
  group_by(Participant, Gender, Relationship) |>
  summarize_if(is.numeric, mean, na.rm = TRUE)
```

2.1.1 Table S1. Descriptive statistics of the participants by gender

Table of descriptives by gender.

```r
# Table of descriptives by gender and relationship status
describeBy(dat.desc ~ Relationship + Gender,
           mat=TRUE,
           digits=2)  |>
  rownames_to_column("Measured characteristic") |>
  select(1,3:4,6:9,12:13) |>
  slice(-(1:12)) |>
  select(1,3,2,4:9) |>
  # Remove numbers included to differentiate repeated row names (now on column 1)
  mutate("Measured characteristic" = str_replace_all(`Measured characteristic`,
                                                    c("1" = "", "2" = "", "3" = "", "4" = ""))) |>
  # Create table
  kable(digits = 2,
        booktabs = TRUE,
        align = c("l", "l", rep("c", 7)),
        linesep = "",
        caption = "Descriptive statistics the participants by gender
        and relationship status",
        col.names = c("Measured characteristic", "Gender", "Relationship status",
                      "$n$", "Mean", "$SD$", "Median", "Min", "Max"),
        longtable = TRUE,
        escape = FALSE) |>
  kable_styling(latex_options = c("HOLD_position"),
                font_size = 8.2) |>
  collapse_rows(columns = 1:3, valign = "middle") |>
  footnote(general = "Because for \\\\textit{Subjective sexual attractiveness} and
           \\\\textit{Subjective sexual arousal} there are are multiple within-subject
           observations, descriptives are calculated from mean values per participant.",
           threeparttable = TRUE,
           footnote_as_chunk = TRUE,
           escape = FALSE)
```

Table S1. *Descriptive statistics the participants by gender and relationship status*

Measured characteristic	Gender	Relationship status	n	Mean	SD	Median	Min	Max
Age	Women	Stable	105	24.51	5.58	23.00	18.00	40.00
		Single	79	22.27	3.84	21.00	18.00	36.00
	Men	Stable	72	26.72	5.64	25.00	19.00	40.00
		Single	67	24.24	4.58	23.00	18.00	39.00
Number of sexual partners	Women	Stable	103	4.41	3.77	3.00	1.00	22.00
		Single	76	5.74	8.85	3.00	0.00	63.00
	Men	Stable	72	8.72	11.36	5.00	1.00	70.00
		Single	66	7.30	8.06	4.00	0.00	40.00
MGH-SFQ (total)	Women	Stable	104	3.31	0.96	3.75	0.00	4.00
		Single	79	2.80	1.23	3.50	0.00	4.00
	Men	Stable	72	3.59	0.62	3.90	0.60	4.00
		Single	67	3.38	0.83	3.80	0.60	4.00
	Women	Stable	100	25.88	5.67	28.00	6.00	30.00
		Single	10	26.90	3.11	27.00	22.00	30.00
		Stable	70	26.43	4.54	29.00	12.00	30.00

MGSS sexual satisfaction (General)	Men	Single	12	23.58	5.14	24.50	14.00	29.00
MGSS sexual satisfaction (Partner)	Women	Stable	100	28.13	4.20	30.00	8.00	30.00
		Single	10	28.10	2.13	29.00	25.00	30.00
	Men	Stable	70	28.49	3.48	30.00	6.00	30.00
		Single	12	26.08	4.85	27.50	15.00	30.00
Subjective sexual attractiveness	Women	Stable	105	2.94	1.11	2.78	1.00	5.49
		Single	79	3.19	1.06	3.11	1.44	6.77
	Men	Stable	72	3.27	0.94	3.24	1.11	6.20
		Single	67	3.20	0.90	3.18	1.09	5.72
Subjective sexual arousal	Women	Stable	105	1.59	0.68	1.39	1.00	4.21
		Single	79	1.75	0.71	1.52	1.00	4.39
	Men	Stable	72	2.24	0.83	2.07	1.00	4.57
		Single	67	2.16	0.78	2.05	1.00	4.09
Solitary sexual desire	Women	Stable	105	11.53	8.59	12.00	0.00	29.00
		Single	79	16.03	8.35	17.00	0.00	31.00
	Men	Stable	72	17.47	7.51	17.50	0.00	31.00
		Single	67	18.25	7.10	19.00	1.00	31.00
Dyadic sexual desire (Attractive person)	Women	Stable	105	10.55	7.64	10.00	0.00	30.00
		Single	79	14.06	7.39	15.00	0.00	32.00
	Men	Stable	72	16.21	7.44	15.50	0.00	32.00
		Single	67	17.57	6.66	17.00	2.00	30.00
Dyadic sexual desire (Partner)	Women	Stable	105	27.53	8.50	30.00	0.00	38.00
		Single	76	21.33	10.91	23.00	0.00	38.00
	Men	Stable	72	31.35	5.33	32.00	15.00	38.00
		Single	67	25.81	9.40	28.00	0.00	38.00

Note: Because for *Subjective sexual attractiveness* and *Subjective sexual arousal* there are are multiple within-subject observations, descriptives are calculated from mean values per participant.

2.1.2 Figure S2. Distribution of participants' measured variables by gender

Kernel density distributions by gender.

```
# Convert dat.desc to long format
datp <- dat.desc |>
  pivot_longer(cols = Age:`Dyadic sexual desire (Partner)`,
               names_to = "Variable",
               values_to = "Value") |>
  mutate(Variable = str_wrap(Variable, width = 30))

# Figure created as 3 separate panels (to use a different number of panels per row)
fs2a <- ggplot(datp |>
                 filter(Variable %in% c("Age",
                                        "Number of sexual partners",
                                        "Subjective sexual\nattractiveness",
                                        "Subjective sexual arousal")),
               aes(Value,
                   fill = Gender,
                   colour = Gender)) +
        geom_density(alpha = 0.3) +
        geom_vline(data = datp |>
                     filter(Variable %in% c("Age",
```

```
                                          "Number of sexual partners",
                                          "Subjective sexual\nattractiveness",
                                          "Subjective sexual arousal")) |>
                    group_by(Variable, Gender) |>
                    summarise(mean = mean(Value, na.rm =TRUE)),
                  size = 1,
                  aes(xintercept = mean, color = Gender, linetype = Gender)) +
        scale_color_manual(values = color.Gender) +
        scale_fill_manual(values = color.Gender) +
        facet_wrap(~ Variable,
                  scales = "free",
                  ncol = 4) +
        labs(y = "Density",
             x = NULL) +
        theme_tq()

fs2b <- ggplot(datp |>
                 filter(Variable %in% c("MGH-SFQ (total)",
                                       "MGSS sexual satisfaction\n(General)",
                                       "MGSS sexual satisfaction\n(Partner)")),
             aes(Value,
                 fill = Gender,
                 colour = Gender)) +
        geom_density(alpha = 0.3) +
        geom_vline(data = datp |>
                    filter(Variable %in% c("MGH-SFQ (total)",
                                          "MGSS sexual satisfaction\n(General)",
                                          "MGSS sexual satisfaction\n(Partner)")) |>
                    group_by(Variable, Gender) |>
                    summarise(mean = mean(Value, na.rm =TRUE)),
                  size = 1,
                  aes(xintercept = mean, color = Gender, linetype = Gender)) +
        scale_color_manual(values = color.Gender) +
        scale_fill_manual(values = color.Gender) +
        facet_wrap(~ Variable,
                  scales = "free",
                  ncol = 3) +
        labs(y = "Density",
             x = NULL) +
        theme_tq()

fs2c <- ggplot(datp |>
                 filter(Variable %in% c("Solitary sexual desire",
                                       "Dyadic sexual desire\n(Attractive person)",
                                       "Dyadic sexual desire (Partner)")),
             aes(Value,
                 fill = Gender,
                 colour = Gender)) +
        geom_density(alpha = 0.3) +
        geom_vline(data = datp |>
                    filter(Variable %in% c("Solitary sexual desire",
                                          "Dyadic sexual desire\n(Attractive person)",
                                          "Dyadic sexual desire (Partner)")) |>
                    group_by(Variable, Gender) |>
                    summarise(mean = mean(Value, na.rm =TRUE)),
                  size = 1,
```

```
                 aes(xintercept = mean, color = Gender, linetype = Gender)) +
        scale_color_manual(values = color.Gender) +
        scale_fill_manual(values = color.Gender) +
        facet_wrap(~ Variable,
                   scales = "free",
                   ncol = 3) +
        labs(y = "Density",
             x = NULL) +
        theme_tq()

# Full plot
ggarrange(fs2a, fs2b, fs2c,
          common.legend = TRUE,
          legend = "bottom",
          nrow = 3)
```

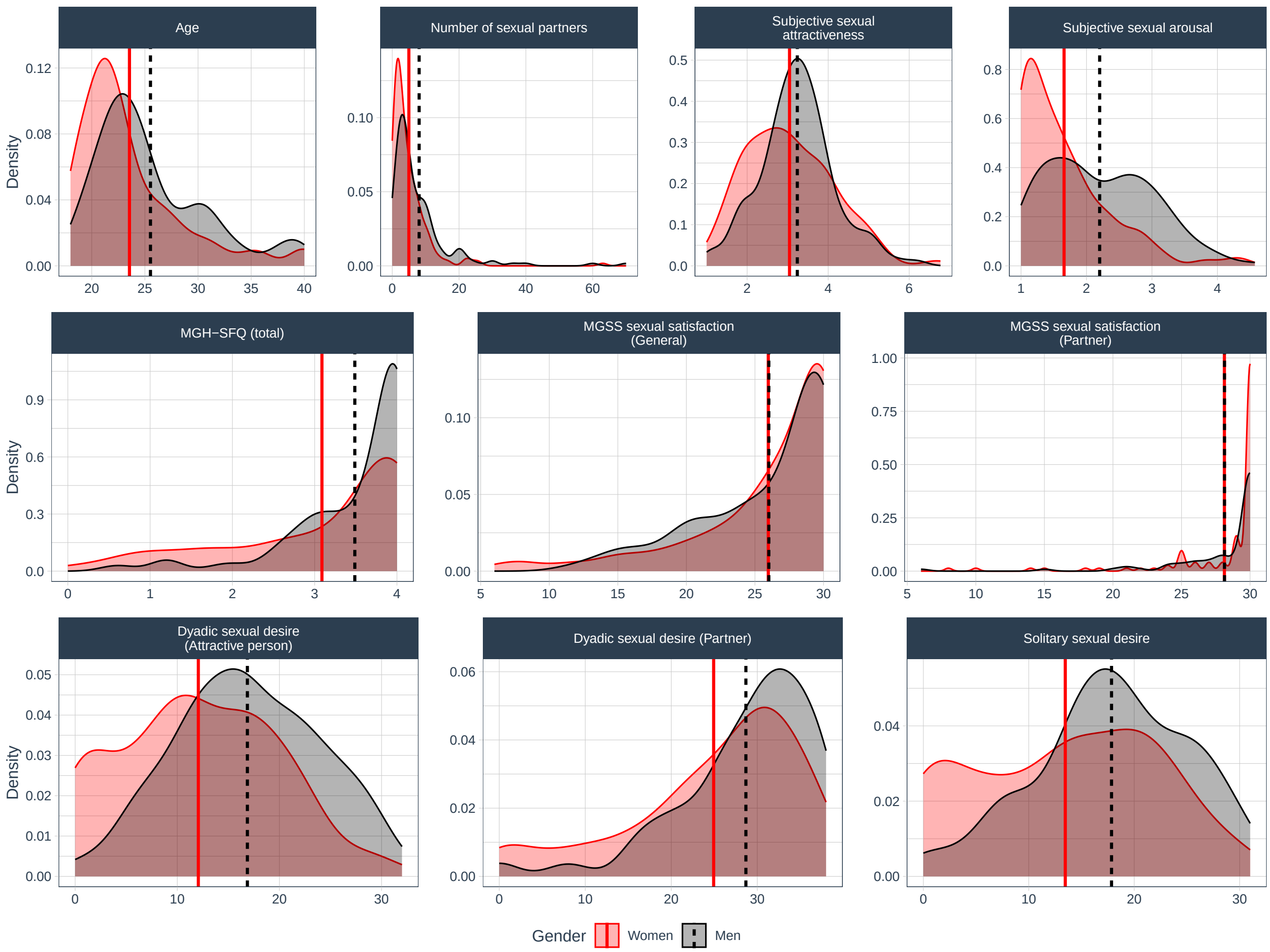

Figure S2. Distribution of measured variables by gender. Coloured vertical lines represent mean values by gender. Detailed descriptives are found in Table S1. Because for *Subjective sexual attractiveness* and *Subjective sexual arousal* there are are multiple within-subject observations, densities calculated from mean values per participant.

2.2 Correlations between measured variables

Correlation between numeric variables for women, men, and all participants combined, are reported in Table S2.

2.2.1 Table S2. Correlations between measured variables

Correlation matrix table.

```
# Correlations for women
dat.corr.W <- dat.desc |>
  ungroup() |>
  filter(Gender == "Women") |>
  select(Age:`Dyadic sexual desire (Partner)`) |>
  corr.stars() |>
  rownames_to_column(var = " ")

# Correlations for men
dat.corr.M <- dat.desc |>
  ungroup() |>
  filter(Gender == "Men") |>
  select(Age:`Dyadic sexual desire (Partner)`) |>
  corr.stars() |>
  rownames_to_column(var = " ")

# Correlations for all participants combined
dat.corr.All <- dat.desc |>
  ungroup() |>
  select(Age:`Dyadic sexual desire (Partner)`) |>
  corr.stars() |>
  rownames_to_column(var = " ")

# Full formated table
bind_rows(dat.corr.W, dat.corr.M, dat.corr.All) |>
  kable(digits = 2,
        booktabs = TRUE,
        align = c("l", rep("c", 9)),
        linesep = "",
        caption = "Correlations between measured variables",
        escape = FALSE) |>
  pack_rows(group_label = "Women",
            start_row = 1, end_row = 10,
            bold = TRUE) |>
  pack_rows(group_label = "Men",
            start_row = 11, end_row = 20,
            hline_before = TRUE,
            bold = TRUE) |>
  pack_rows(group_label = "All participants",
            start_row = 21, end_row = 30,
            hline_before = TRUE,
            bold = TRUE) |>
  kable_styling(latex_options = c("HOLD_position", "scale_down")) |>
  column_spec(2:10, width = "2.2cm") |>
  footnote(general = paste0("Values represent Pearson correlation coefficients ($r$). ",
                            "For significance, $^{\\\\dagger}p$ < 0.1, *$p$ < 0.05, ",
                            "**$p$ < 0.01, ***$p$ < 0.001. ",
                            "Significant correlations are in bold."),
           threeparttable = TRUE,
           footnote_as_chunk = TRUE,
           escape = FALSE) |>
  landscape()
```

Table S2. *Correlations between measured variables*

	Age	Number of sexual partners	MGH-SFQ (total)	MGSS sexual satisfaction (General)	MGSS sexual satisfaction (Partner)	Subjective sexual attractiveness	Subjective sexual arousal	Solitary sexual desire	Dyadic sexual desire (Attractive person)
Women									
Age									
Number of sexual partners	**0.24****								
MGH-SFQ (total)	-0.05	-0.07							
MGSS sexual satisfaction (General)	**-0.21***	0.02	**0.46*****						
MGSS sexual satisfaction (Partner)	-0.16†	-0.14	**0.32*****	**0.73*****					
Subjective sexual attractiveness	0.11	**0.18***	-0.04	**-0.22***	-0.18†				
Subjective sexual arousal	0.00	**0.17***	-0.13†	-0.18†	-0.16†	**0.54*****			
Solitary sexual desire	-0.14†	**0.28*****	0.05	-0.06	-0.18†	**0.31*****	**0.33*****		
Dyadic sexual desire (Attractive person)	0.06	**0.32*****	**-0.17***	-0.04	-0.17†	**0.34*****	**0.36*****	**0.44*****	
Dyadic sexual desire (Partner)	0.00	**0.21****	**0.43*****	**0.44*****	**0.27****	0.13†	0.04	**0.31*****	0.13†
Men									
Age									
Number of sexual partners	**0.23****								
MGH-SFQ (total)	0.04	0.02							
MGSS sexual satisfaction (General)	**-0.24***	-0.08	**0.36*****						
MGSS sexual satisfaction (Partner)	-0.13	-0.01	0.10	**0.63*****					
Subjective sexual attractiveness	0.10	-0.05	-0.08	-0.10	-0.02				
Subjective sexual arousal	**0.2***	0.07	0.05	-0.14	-0.09	**0.46*****			
Solitary sexual desire	-0.16†	0.00	0.09	0.10	0.17	**0.26****	0.11		
Dyadic sexual desire (Attractive person)	0.12	**0.29*****	0.03	-0.13	-0.08	**0.25****	**0.43*****	**0.25****	
Dyadic sexual desire (Partner)	0.11	0.07	**0.36*****	**0.55*****	**0.22***	0.14	**0.24****	**0.17***	**0.2***
All participants									
Age									
Number of sexual partners	**0.26*****								
MGH-SFQ (total)	0.02	0.01							
MGSS sexual satisfaction (General)	**-0.22****	-0.03	**0.42*****						
MGSS sexual satisfaction (Partner)	**-0.14***	-0.07	**0.24*****	**0.69*****					
Subjective sexual attractiveness	**0.12***	0.08	-0.03	**-0.18***	-0.12				
Subjective sexual arousal	**0.15****	**0.17****	0.01	**-0.15***	-0.12†	**0.5*****			
Solitary sexual desire	-0.09	**0.17****	0.11†	0.00	-0.05	**0.31*****	**0.3*****		
Dyadic sexual desire (Attractive person)	**0.14***	**0.33*****	-0.04	-0.07	-0.12†	**0.32*****	**0.45*****	**0.42*****	
Dyadic sexual desire (Partner)	0.08	**0.16****	**0.43*****	**0.46*****	**0.25*****	**0.15****	**0.18****	**0.3*****	**0.21*****

Note: Values represent Pearson correlation coefficients (r). For significance, $^{\dagger}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. Significant correlations are in bold.

2.3 Internal consistency

Six variables were calculated from multiple items (1. MGH-SFQ, 2. Dyadic sexual desire (Partner), 3. Solitary sexual desire, 4. Dyadic sexual desire (Attractive person), 5. MGSS sexual satisfaction (General) and 6. MGSS sexual satisfaction (Partner)).

Data by item, for each participant, is included in the following data base, loaded as `dat.reli`:

```
dat.reli <- read_excel("Data/BD_ConsistenciaInterna.xlsx")  |>
  mutate(Sex = recode_factor(Sex,
                             "2" = "Women",
                             "1" = "Men")) |>
  rename(Gender = Sex) |>
  filter(Participante != 122)
```

Participant 122 was excluded because they did not respond the psychological 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).

Importantly, given that for MGH-SFQ one item was answered only by men, the internal consistency of this variable was measured independently for each gender.

```
# MGH-SFQ for men
MGH.m <- dat.reli |>
  filter(Gender == "Men" ) |>
  select(3:7) |>
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# MGH-SFQ for women
MGH.w <- dat.reli |>
  filter(Gender == "Women" ) |>
  select(3:5,7) |>
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Dyadic sexual desire (Partner)
DSD.p <- dat.reli |>
  select(9:13) |>
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Solitary sexual desire
SSD.p <- dat.reli |>
  select(15:18) |>
  drop_na() |>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# Dyadic sexual desire (Attractive person)
DSD.a <- dat.reli |>
  select(20:23) |>
  drop_na()|>
  cronbach.alpha(CI = TRUE, standardized = TRUE)

# MGSS sexual satisfaction (General)
MGSS.g <- dat.reli |>
  select(26:30) |>
  drop_na()|>
  cronbach.alpha(CI = TRUE, standardized = TRUE)
```

```
# MGSS sexual satisfaction (Partner)
MGSS.p <- dat.reli |>
  select(32:36) |>
  drop_na()|>
  cronbach.alpha(CI = TRUE, standardized = TRUE)
```

2.3.1 Table S3. Internal consistency of construct variables

Table of Cronbach's α for construct variables.

```
# Create table
tibble(Variable = c("MGH-SFQ", "MGH-SFQ",
                    "MGSS sexual satisfaction (General)",
                    "MGSS sexual satisfaction (Partner)",
                    "Dyadic sexual desire (Partner)",
                    "Solitary sexual desire",
                    "Dyadic sexual desire (Attractive person)"),
       Gender = c("Men", "Women", rep(" ", 5)),
       p = c(MGH.m$p,
             MGH.w$p,
             MGSS.g$p,
             MGSS.p$p,
             DSD.p$p,
             SSD.p$p,
             DSD.a$p),
       n = c(MGH.m$n,
             MGH.w$n,
             MGSS.g$n,
             MGSS.p$n,
             DSD.p$n,
             SSD.p$n,
             DSD.a$n),
       alpha = c(MGH.m$alpha,
                 MGH.w$alpha,
                 MGSS.g$alpha,
                 MGSS.p$alpha,
                 DSD.p$alpha,
                 SSD.p$alpha,
                 DSD.a$alpha),
       ci2.5 = c(MGH.m$ci[1],
                 MGH.w$ci[1],
                 MGSS.g$ci[1],
                 MGSS.p$ci[1],
                 DSD.p$ci[1],
                 SSD.p$ci[1],
                 DSD.a$ci[1]),
       ci97.5 = c(MGH.m$ci[2],
                  MGH.w$ci[2],
                  MGSS.g$ci[2],
                  MGSS.p$ci[2],
                  DSD.p$ci[2],
                  SSD.p$ci[2],
                  DSD.a$ci[2])) |>
  kable(digits = 2,
        booktabs = TRUE,
        align = c("l", "l", rep("c", 5)),
```

```
       linesep = "",
       caption = "Internal consistency of measured variables",
       escape = FALSE,
       col.names = c("Variable", "Gender",
                     "Items",
                     "$n$",
                     "$\\alpha$",
                     "$2.5\\% CI$",
                     "$97.5\\% CI$")) |>
  collapse_rows(columns = 1, valign = "middle") |>
  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.
          MGH-SFQ is reported by gender, because one item was answered only by men.",
          threeparttable = TRUE,
          footnote_as_chunk = TRUE,
          escape = FALSE)
```

Table S3. *Internal consistency of measured variables*

Variable	Gender	Items	n	α	$2.5\% CI$	$97.5\% CI$
MGH-SFQ	Men	5	139	0.82	0.71	0.89
	Women	4	181	0.86	0.82	0.90
MGSS sexual satisfaction (General)		5	188	0.92	0.88	0.94
MGSS sexual satisfaction (Partner)		5	187	0.91	0.85	0.95
Dyadic sexual desire (Partner)		5	309	0.90	0.88	0.92
Solitary sexual desire		4	314	0.91	0.89	0.93
Dyadic sexual desire (Attractive person)		4	320	0.89	0.87	0.91

Note: 95% confidence intervals were calculated with 1,000 bootstrap samples. Standardized Cronbach's alpha (α) coefficients were computed. MGH-SFQ is reported by gender, because one item was answered only by men.

3 Controlling the effects of Relationship Duration and MGSS sexual satisfaction (Partner) on sexual desire dimensions

To ensure that the three sexual desire dimensions were not influenced by Relationship Duration or MGSS sexual satisfaction (Partner), we standardized the scores using a two-step process.

1. Modeling the relationships: we performed linear regressions where each sexual desire dimension was predicted using Relationship Duration and MGSS sexual satisfaction (Partner). This allowed us to estimate their effects.
2. Removing the effects: we extracted the residuals from each regression model, which represent the variation in sexual desire that is independent of Relationship Duration and MGSS sexual satisfaction (Partner). These residuals were then standardized to ensure comparability across participants.

Additionally, MGSS sexual satisfaction (Partner) was mean-centered before analysis.

```
# Select only participants in stable relationships
dat_ctl <- dat |>
  group_by(Participant) |>  # Group by participant
  slice_head() |>           # Select the first observation per participant
  filter(Relationship == "Stable") |>  # Retain only stable relationships
```

```
  ungroup()

# Fit linear models to predict each dimension of sexual desire
# based on relationship duration and partner sexual satisfaction

ctl_SSD <- lm(`Solitary sexual desire` ~
                `Relationship duration` + `MGSS sexual satisfaction (Partner)`,
              data = dat_ctl)

ctl_PD <- lm(`Dyadic sexual desire (Partner)` ~
               `Relationship duration` + `MGSS sexual satisfaction (Partner)`,
              data = dat_ctl)

ctl_APD <- lm(`Dyadic sexual desire (Attractive person)` ~
                `Relationship duration` + `MGSS sexual satisfaction (Partner)`,
              data = dat_ctl)

# Prepare a dataset with relevant variables, removing missing values
dat_tl_PD_fin <- dat_ctl |>
  select(Participant, `Dyadic sexual desire (Partner)`,
         `MGSS sexual satisfaction (Partner)`) |>
  drop_na()

# Fit a model to predict Dyadic Sexual Desire (Partner) using partner satisfaction only
ctl_PD_fin <- lm(`Dyadic sexual desire (Partner)` ~ `MGSS sexual satisfaction (Partner)`,
                 data = dat_tl_PD_fin)

# Adjust the Dyadic Sexual Desire (Partner) scores by replacing them with their residuals
dat_ctl <- dat_tl_PD_fin |>
  mutate(`Dyadic sexual desire (Partner)` = mean(`Dyadic sexual desire (Partner)`) +
           resid(ctl_PD_fin))

# Update the original dataset with the adjusted scores
dat <- dat |>
  mutate(`Dyadic sexual desire (Partner)` = as.numeric(`Dyadic sexual desire (Partner)`)) |>
  rows_update(dat_ctl |> select(-`MGSS sexual satisfaction (Partner)`),
              by = "Participant", unmatched = "ignore")
```

---

4 Hypothesis tests

4.1 Hypothesis 1: All dimensions of trait sexual desire (TSD) will be higher in men than in women, and the differences will be stronger or weaker according to relationship status

We tested whether relationship type and gender interact as predictors of sexual desire (H1a: Solitary TSD; H1b: Dyadic TSD toward an attractive person; H1c: Dyadic TSD toward a partner). To examine this hypothesis, we modeled the effects of relationship type and gender on each of the three TSD scores.

However, models using the original TSD scores did not meet the assumption of normally distributed residuals. To address this, we applied an ordered normalization transformation to each TSD variable. We then fitted and compared models predicting both the original (as a proportion, to make scores comparable) and transformed (normalized) TSD dimensions. In all three cases, models using the normalized variables provided a better fit, so all inferences are based on these models.

4.1.1 Data

A data frame was created with one row per participant, where sexual desire variables were normalized as proportions. An ordered quantile normalization transformation (Peterson & Cavanaugh, 2020) was then applied using the `orderNorm` function from the `bestNormalize` package (Peterson, 2021), and the transformed values were added as new variables.

```
# Process the dataset and create transformed variables
dat_m1 <- dat |>
  # Group the data by participant
  group_by(Participant) |>
  # Select only the first (top) observation for each participant
  slice_head() |>
  # Remove the grouping structure to avoid unintended behavior in later operations
  ungroup() |>
  # Create new proportion variables by normalizing each sexual desire measure
  mutate("Solitary sexual desire (proportion)" =
          `Solitary sexual desire` / 31,
         "Dyadic sexual desire: Attractive person (proportion)" =
           `Dyadic sexual desire (Attractive person)` / 32,
         "Dyadic sexual desire: Partner (proportion)" =
           `Dyadic sexual desire (Partner)` / 38)

# Apply ordered normalization transformations to the proportion variables
trs_SSD <- orderNorm(dat_m1$`Solitary sexual desire (proportion)`)
trs_DSDat <- orderNorm(dat_m1$`Dyadic sexual desire: Attractive person (proportion)`)
trs_DSDpt <- orderNorm(dat_m1$`Dyadic sexual desire: Partner (proportion)`)

# Add the transformed variables back into the dataset
dat_m1 <- dat_m1 |>
  mutate("Solitary sexual desire (normalized)" =
           predict(trs_SSD),  # Transformed solitary sexual desire
         "Dyadic sexual desire: Attractive person (normalized)" =
           predict(trs_DSDat),  # Transformed dyadic sexual desire (attractive person)
         "Dyadic sexual desire: Partner (normalized)" =
           predict(trs_DSDpt))  # Transformed dyadic sexual desire (partner)
```

4.1.2 Hypothesis 1a: Solitary TSD

4.1.2.1 Model the effects of relationship type and gender on Solitary TSD We fitted models with both the original (proportion; `m1a_prop`) and transformed (normalized; `m1a_norm`) TSD scores, and performed posterior predictive checks (PPCs). As shown elsewhere (e.g., Gabry et al., 2019), if simulated data from one model are more similar to the observed outcome, that model is likely to be preferred.

```
m1a_prop <- lm(`Solitary sexual desire (proportion)` ~ Gender * Relationship,
            data = dat_m1)

m1a_norm <- lm(`Solitary sexual desire (normalized)` ~ Gender * Relationship,
           data = dat_m1)
```

4.1.2.1.1 Figure S3. Posterior predictive checks (PPCs) PPCs were performed using the `check_model` function from the `performance` package (Lüdecke et al., 2021), and reported in Fig. S3.

```
ggarrange(plot(check_model(m1a_prop,
                           panel = FALSE,
                           check = "pp_check")$PP_CHECK,
               colors = c("red", "black")) +
            labs(title = "Original (proportion) Solitary TSD",
```

```
                subtitle = NULL) +
            theme_tq(),
          plot(check_model(m1a_norm,
                           panel = FALSE,
                           check = "pp_check")$PP_CHECK,
              colors = c("red", "black")) +
            labs(title = "Transformed (normalized) Solitary TSD",
                subtitle = NULL) +
            theme_tq(),
          labels = "auto",
          common.legend = TRUE,
          legend = "bottom")
```

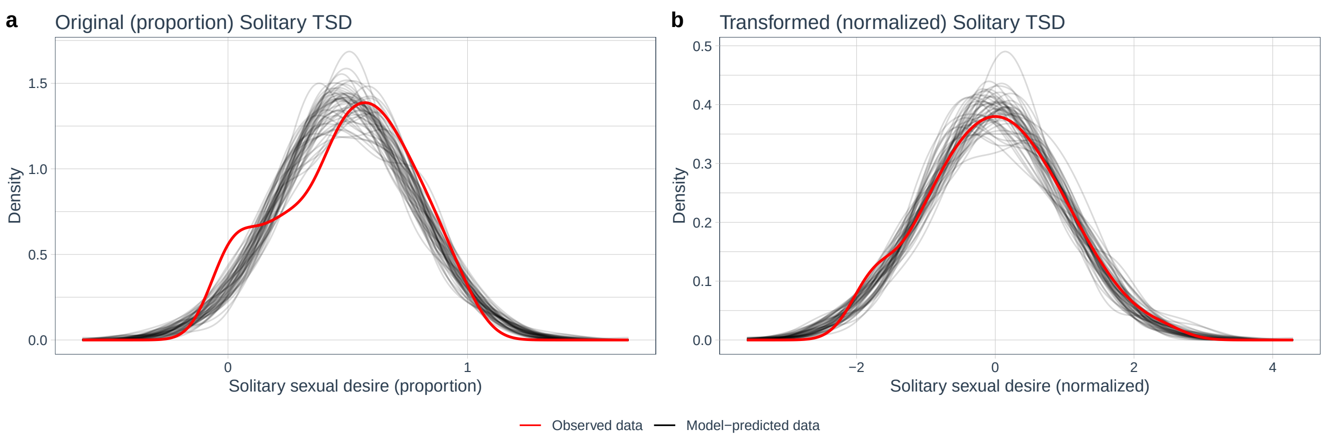

Figure S3. Posterior predictive check. **(a)** Original (proportion) Solitary TSD; **(b)** Transformed (normalized) Solitary TSD. In both panels, red lines represent the observed data, and thin black lines represent 50 iterations of simulated data from each model. In this case, simulated data from the normalized Solitary TSD model (panel b) are more similar to the observed outcome, so this model is preferred.

---

5 Session info (for reproducibility)

```
library(pander)
pander(sessionInfo(), locale = FALSE)
```

R version 4.4.2 (2024-10-31)

Platform: x86_64-pc-linux-gnu

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

other attached packages: *pander(v.0.6.5)*, *Hmisc(v.5.2-2)*, *effectsize(v.1.0.0)*, *bestNormalize(v.1.9.1)*, *berryFunctions(v.1.22.5)*, *emmeans(v.1.10.7)*, *lmerTest(v.3.1-3)*, *lme4(v.1.1-36)*, *Matrix(v.1.7-2)*, *scales(v.1.3.0)*, *psych(v.2.4.12)*, *kableExtra(v.1.4.0)*, *performance(v.0.13.0)*, *PerformanceAnalytics(v.2.0.8)*, *quantmod(v.0.4.26)*, *TTR(v.0.24.4)*, *xts(v.0.14.1)*, *zoo(v.1.8-12)*, *tidyquant(v.1.0.10)*, *ggpubr(v.0.6.0)*, *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)*, *readr(v.2.1.5)*, *tidyr(v.1.3.1)*, *tibble(v.3.2.1)*, *ggplot2(v.3.5.1)*, *tidyverse(v.2.0.0)*, *car(v.3.1-3)*, *carData(v.3.0-5)*, *ltm(v.1.2-0)*, *polycor(v.0.8-1)*, *msm(v.1.8.2)*, *MASS(v.7.3-64)*, *readxl(v.1.4.3)* and *knitr(v.1.49)*

loaded via a namespace (and not attached): *rstudioapi(v.0.17.1)*, *datawizard(v.1.0.0)*, *magrittr(v.2.0.3)*, *TH.data(v.1.1-3)*, *estimability(v.1.5.1)*, *farver(v.2.1.2)*, *nloptr(v.2.1.1)*, *rmarkdown(v.2.29)*, *vctrs(v.0.6.5)*, *minqa(v.1.2.8)*, *base64enc(v.0.1-3)*, *rstatix(v.0.7.2)*, *butcher(v.0.3.4)*, *htmltools(v.0.5.8.1)*, *curl(v.6.2.0)*, *broom(v.1.0.7)*, *cellranger(v.1.1.0)*, *Formula(v.1.2-5)*, *parallelly(v.1.42.0)*, *htmlwidgets(v.1.6.4)*, *sandwich(v.3.1-1)*, *admisc(v.0.37)*, *lifecycle(v.1.0.4)*, *iterators(v.1.0.14)*, *pkgconfig(v.2.0.3)*, *R6(v.2.5.1)*, *fastmap(v.1.2.0)*, *rbibutils(v.2.3)*, *future(v.1.34.0)*, *digest(v.0.6.37)*, *numDeriv(v.2016.8-1.1)*, *colorspace(v.2.1-1)*, *labeling(v.0.4.3)*, *timechange(v.0.3.0)*, *abind(v.1.4-8)*, *compiler(v.4.4.2)*, *rngtools(v.1.5.2)*, *withr(v.3.0.2)*, *doParallel(v.1.0.17)*, *htmlTable(v.2.4.3)*, *backports(v.1.5.0)*, *ggsignif(v.0.6.4)*, *lava(v.1.8.1)*, *tools(v.4.4.2)*, *foreign(v.0.8-88)*, *RobStatTM(v.1.0.11)*, *future.apply(v.1.11.3)*, *nnet(v.7.3-20)*, *glue(v.1.8.0)*, *quadprog(v.1.5-8)*, *nlme(v.3.1-167)*, *grid(v.4.4.2)*, *checkmate(v.2.3.2)*, *cluster(v.2.1.8)*, *see(v.0.10.0)*, *generics(v.0.1.3)*, *recipes(v.1.1.0)*, *gtable(v.0.3.6)*, *nortest(v.1.0-4)*, *tzdb(v.0.4.0)*, *class(v.7.3-23)*, *data.table(v.1.16.4)*, *hms(v.1.1.3)*, *xml2(v.1.3.6)*, *foreach(v.1.5.2)*, *pillar(v.1.10.1)*, *splines(v.4.4.2)*, *lattice(v.0.22-6)*, *survival(v.3.8-3)*, *tidyselect(v.1.2.1)*, *gridExtra(v.2.3)*, *reformulas(v.0.4.0)*, *bookdown(v.0.42)*, *svglite(v.2.1.3)*, *xfun(v.0.50)*, *expm(v.1.0-0)*, *hardhat(v.1.4.1)*, *timeDate(v.4041.110)*, *stringi(v.1.8.4)*, *yaml(v.2.3.10)*, *boot(v.1.3-31)*, *evaluate(v.1.0.3)*, *codetools(v.0.2-20)*, *cli(v.3.6.3)*, *rpart(v.4.1.24)*, *parameters(v.0.24.1)*, *xtable(v.1.8-4)*, *systemfonts(v.1.2.1)*, *Rdpack(v.2.6.2)*, *munsell(v.0.5.1)*, *Rcpp(v.1.0.14)*, *globals(v.0.16.3)*, *coda(v.0.19-4.1)*, *parallel(v.4.4.2)*, *gower(v.1.0.2)*, *bayestestR(v.0.15.2)*, *doRNG(v.1.8.6.1)*, *listenv(v.0.9.1)*, *viridisLite(v.0.4.2)*, *mvtnorm(v.1.3-3)*, *ipred(v.0.9-15)*, *prodlim(v.2024.06.25)*, *insight(v.1.0.2)*, *rlang(v.1.1.5)*, *cowplot(v.1.1.3)*, *multcomp(v.1.4-28)* and *mnormt(v.2.1.1)*

---

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