

# Relationship between subjective sexual arousal to erotic and non-erotic stimuli and sexual desire

Code and analyses

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21 February, 2023

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## Descripción

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., Martínez-González, M. B., & Leongómez, J. D. (in prep). *Relationship between subjective sexual arousal to erotic and non-erotic stimuli and sexual desire*.

Data available from the Open Science Framework (OSF): <https://doi.org/10.XXXXXX/OSF.IO/XX XXX>. 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 L<sup>A</sup>T<sub>E</sub>X.

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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., 2022), and most figures were created or modified using `ggplot2` (Wickham, 2016). Tables were created using `knitr::kable` and `kableExtra` (Zhu, 2020).

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, 2022), and interactions were plotted using the package `interactions` (Long, 2019).

Used packages also include `osfr` (Wolen et al., 2020) to download and open data files directly from the Open Science Framework ([OSF](#)), using the `osf_retrieve_file` and `osf_download` functions.

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 4, at the end of the document.

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

## 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("#bd3106", "#5b7314")
# Palette to color figures by stimuli sex
color.StimuliSex <- c("#454b87", "#d9700e")
# Palette to color figures by relationship type
color.Relationship <- c("#b39e05", "#a513d6")
# Palette to color figures by dimension type
color.Dimension <- c("#582310", "#318f49", "#0cb4bb")
```

## 1.3 Custom functions

### 1.3.1 pval.lev

This function takes p-values and formats them in L<sup>A</sup>T<sub>E</sub>X, highlighting significant results in bold.

```
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))))
}

```

### 1.3.2 pval.stars

This function takes p-values and formats them in L<sup>A</sup>T<sub>E</sub>X, highlighting significant results in bold.

```

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 L<sup>A</sup>T<sub>E</sub>X, 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 3.2). 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)$coefficients) |>
    rownames_to_column() |>
    mutate_at("rowname", str_replace_all, ":" , " \times ") |>
    mutate_at("rowname", str_replace_all, "`", "") |>
    mutate("rowname" = str_replace_all(rowname,
      c("Gender1" = "Gender [Women]",
        "Relationship1" = "Relationship [Stable]",
        Dimension1 = "Dimension [Attractive person DSD]",
        Dimension2 = "Dimension [Partner DSD]")) |>
    select(rownames, Estimate, Std..Error, df, t.value, Pr....) |>
    mutate(Pr....t... = pval.lev(Pr....t...)) |>
    kable(digits = 2,
      booktabs = TRUE,
      align = c("l", rep("c", 5)),
      linesep = "\n",
      caption = custom_caption,
      col.names = c("Effect",
        "Estimate",
        "Std. Error",
        "$df$",
        "$t$",
        "$p$"),
      escape = FALSE) |>
    kable_styling(latex_options = c("HOLD_position", "scale_down")) |>
    footnote(general = paste0("\$R^2_{conditional}\$ = ",
      round(r2_nakagawa(mod)$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 Stimulus sex.
      Gender = participants gender (women, men);
      Stimulus 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; see
      \\\cite{kaufmanContrastCodingLeast1974,keppelDataAnalysisResearch1989}.
      \\\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)$coefficients) |>
    rownames_to_column(),
    data.frame(modCI) |>
    rownames_to_column(),
    by = "rowname") |>
  #mutate_at("rowname", str_replace, " sexual desire", "") |>
  mutate_at("rowname", str_replace_all, ":" , " × ") |>
  mutate_at("rowname", str_replace_all, `^`, "") |>
  mutate("rowname" = str_replace_all(rowname,
    c(`^`Solitary sexual desire (C)`^` =
      "Solitary SD (C)",
      `^`Dyadic sexual desire (Attractive person) (C)`^` =
      "Attractive person DSD (C)",
      `^`Dyadic sexual desire (Partner) (C)`^` =
      "Partner DSD (C)",
      "Relationship1" = "Relationship [Stable]",
      "Stimulus sex1" = "Stimulus sex [Female]",
      "Gender1" = "Gender [Women]")))) |>
  select(rowname, Estimate, X2.5.., X97.5.., Std..Error, df, t.value, Pr....t...) |>
  mutate(Pr....t... = pval.lev(Pr....t...)) |>
  kable(digits = 2,
    booktabs = TRUE,
    align = c("l", rep("c", 7)),
    linesep = "",
    caption = custom_caption,
    col.names = c("Effect",
      "Estimate",
      "Lower 95\\% CI",
      "Upper 95\\% CI",
      "Std. Error",
      "$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 Stimulus sex.
    Confidence intervals 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);
Stimulus 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 stimulus 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 L<sup>A</sup>T<sub>E</sub>X, 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,
        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)
}

```

```

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 least 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("(.)", "\U001", 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(Contenido_Estimulo = factor(Contenido_Estimulo)) |>
  mutate(Sexo = factor(Sexo)) |>
  mutate(Sexo_Estimulo = factor(Sexo_Estimulo)) |>
  mutate(PrefSex = factor(PrefSex)) |>
  mutate(EstRel = factor(EstRel)) |>
  # Recode factor levels
  mutate(Contenido_Estimulo = recode_factor(Contenido_Estimulo,
                                             Erotico = "Erotic",
                                             No_erotico = "Non-erotic")) |>
  mutate(Sexo = recode_factor(Sexo,
                             Femenino = "Women",
                             Masculino = "Men")) |>
  mutate(Sexo_Estimulo = recode_factor(Sexo_Estimulo,
                                         Femenino = "Female",
                                         Masculino = "Male")) |>
  mutate(PrefSex = recode_factor(PrefSex,
                                 Hombre = "Male",
                                 Mujer = "Female")) |>
  # 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` = TipeRel,
         `Age at first intercourse` = Primera.ExpSex,
         `Consented to first intercourse` = ConExpSex,
         `Number of sexual partners` = Numero.Parejas,
         `Pronography 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.,
         `Stimulus code` = Codigo_Estimulo,
         `Stimulus sex` = Sexo_Estimulo,
```

```
`Stimulus content` = Contenido_Estimulo,  
`Subjective sexual attractiveness` = Atractivo,  
`Subjective sexual arousal` = Excitacion) |>  
# 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 año" = "Single",  
    "Soltero/contactos sexuales en un año" = "Single")) |>  
filter(Relationship != "Non-stable") |>  
droplevels()
```

## 2 Descriptives

### 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.

```
# 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", "l", rep("c", 6)),
  linesep = "\n",
  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", "repeat_header"),
  repeat_header_continued = "\\textit{(Continued on Next Page...)}",
  font_size = 8.2) |>
collapse_rows(columns = 1:3, valign = "middle") |>
footnote(general = "Because for \\\\[Subjective sexual attractiveness] and
```

```
\textit{Subjective sexual arousal} there 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
MGSS sexual satisfaction (General)	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
	Men	Stable	70	26.43	4.54	29.00	12.00	30.00
		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
		Stable	105	27.53	8.50	30.00	0.00	38.00

(Continued on Next Page...)

**Table S1.** Descriptive statistics the participants by gen (continued)

Measured characteristic	Gender	Relationship status	n	Mean	SD	Median	Min	Max
Dyadic sexual desire (Partner)	Women	Single	76	21.33	10.91	23.00	0.00	38.00
		Stable	72	31.35	5.33	32.00	15.00	38.00
	Men	Single	67	25.81	9.40	28.00	0.00	38.00

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

\end{ThreePartTable}

### 2.1.2 Figure S1. 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))

# Fig S1 (created as 3 separate panels to use a different number of panels per row)
fs1a <- 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()

fs1b <- ggplot(datp |>
  filter(Variable %in% c("MGH-SFQ (total)",
                        "MGSS sexual satisfaction\n(General)",
                        "MGSS sexual satisfaction\n(Partner)")),
  aes(Value,
      fill = Gender,
```

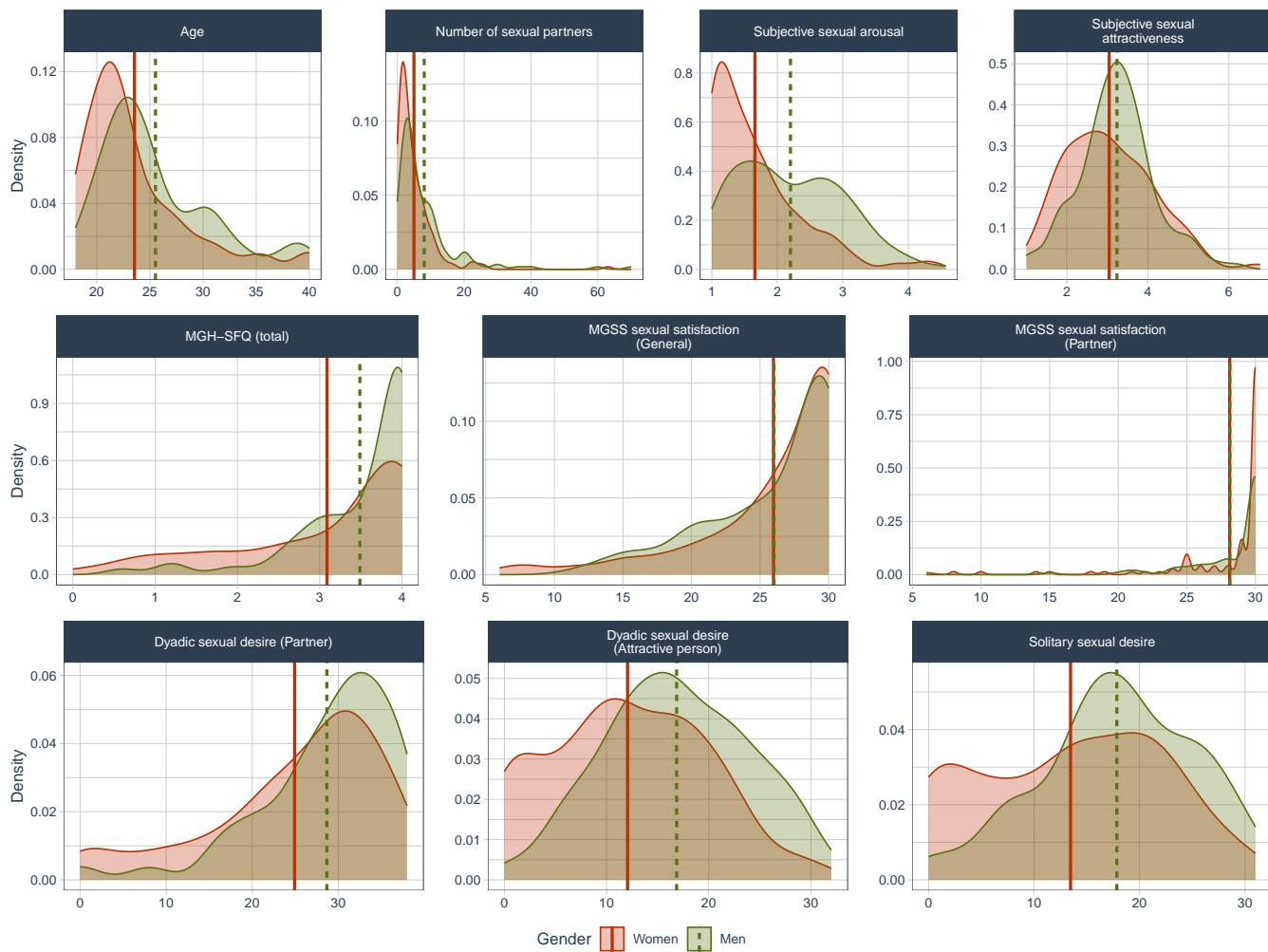
```

            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()

fs1c <- 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(fs1a, fs1b, fs1c,
          common.legend = TRUE,
          legend = "bottom",
          nrow = 3)

```



**Figure S1.** 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 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)
<b>Women</b>									
Age									
Number of sexual partners	<b>0.24**</b>								
MGH-SFQ (total)	-0.05	-0.07							
MGSS sexual satisfaction (General)	<b>-0.21*</b>	0.02	<b>0.46***</b>						
MGSS sexual satisfaction (Partner)	-0.16 <sup>†</sup>	-0.14	<b>0.32***</b>	<b>0.73***</b>					
Subjective sexual attractiveness	0.11	<b>0.18*</b>	-0.04	<b>-0.22*</b>	-0.18 <sup>†</sup>				
Subjective sexual arousal	0.00	<b>0.17*</b>	-0.13 <sup>†</sup>	-0.18 <sup>†</sup>	-0.16 <sup>†</sup>	<b>0.54***</b>			
Solitary sexual desire	-0.14 <sup>†</sup>	<b>0.28***</b>	0.05	-0.06	-0.18 <sup>†</sup>	<b>0.31***</b>	<b>0.33***</b>		
Dyadic sexual desire (Attractive person)	0.06	<b>0.32***</b>	<b>-0.17*</b>	-0.04	-0.17 <sup>†</sup>	<b>0.34***</b>	<b>0.36***</b>	<b>0.44***</b>	
Dyadic sexual desire (Partner)	0.00	<b>0.21**</b>	<b>0.43***</b>	<b>0.44***</b>	<b>0.27**</b>	0.13 <sup>†</sup>	0.04	<b>0.31***</b>	0.13 <sup>†</sup>
<b>Men</b>									
Age									
Number of sexual partners	<b>0.23**</b>								
MGH-SFQ (total)	0.04	0.02							
MGSS sexual satisfaction (General)	<b>-0.24*</b>	-0.08	<b>0.36***</b>						
MGSS sexual satisfaction (Partner)	-0.13	-0.01	0.10	<b>0.63***</b>					
Subjective sexual attractiveness	0.10	-0.05	-0.08	-0.10	-0.02				
Subjective sexual arousal	<b>0.2*</b>	0.07	0.05	-0.14	-0.09	<b>0.46***</b>			
Solitary sexual desire	-0.16 <sup>†</sup>	0.00	0.09	0.10	0.17	<b>0.26**</b>	0.11		
Dyadic sexual desire (Attractive person)	0.12	<b>0.29***</b>	0.03	-0.13	-0.08	<b>0.25**</b>	<b>0.43***</b>	<b>0.25**</b>	
Dyadic sexual desire (Partner)	0.11	0.07	<b>0.36***</b>	<b>0.55***</b>	<b>0.22*</b>	0.14	<b>0.24**</b>	<b>0.17*</b>	<b>0.2*</b>
<b>All participants</b>									
Age									
Number of sexual partners	<b>0.26***</b>								
MGH-SFQ (total)	0.02	0.01							
MGSS sexual satisfaction (General)	<b>-0.22**</b>	-0.03	<b>0.42***</b>						
MGSS sexual satisfaction (Partner)	<b>-0.14*</b>	-0.07	<b>0.24***</b>	<b>0.69***</b>					
Subjective sexual attractiveness	<b>0.12*</b>	0.08	-0.03	<b>-0.18*</b>	-0.12				
Subjective sexual arousal	<b>0.15**</b>	<b>0.17**</b>	0.01	<b>-0.15*</b>	-0.12 <sup>†</sup>	<b>0.5***</b>			
Solitary sexual desire	-0.09	<b>0.17**</b>	0.11 <sup>†</sup>	0.00	-0.05	<b>0.31***</b>	<b>0.3***</b>		
Dyadic sexual desire (Attractive person)	<b>0.14*</b>	<b>0.33***</b>	-0.04	-0.07	-0.12 <sup>†</sup>	<b>0.32***</b>	<b>0.45***</b>	<b>0.42***</b>	
Dyadic sexual desire (Partner)	0.08	<b>0.16**</b>	<b>0.43***</b>	<b>0.46***</b>	<b>0.25***</b>	<b>0.15**</b>	<b>0.18**</b>	<b>0.3***</b>	<b>0.21***</b>

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_ConsistenciaInternacional.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 ( $\alpha$  or Tau-equivalent reliability:  $\rho_T$ ) 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  $\alpha$  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	$\alpha$	2.5%CI	97.5%CI
MGH-SFQ	Men	5	139	0.82	0.71	0.88
	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	0.87	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 ( $\alpha$ ) coefficients were computed. MGH-SFQ is reported by gender, because one item was answered only by men.

### 3 Hypothesis tests

#### 3.1 Hypothesis1: Sexual desire by gender, relationship type and sexual desire dimension

Interaction between relationship type, sexual desire dimension, and gender as predictors of sexual desire. To test this hypothesis, we modeled the effects of Relationship type, Sexual desire dimension, and Gender on the scores of sexual desire.

##### 3.1.1 Filter data

Create data frame selecting only relevant variables, and summarizing per sexual desire dimension for each participant (three rows per participant).

```

dat.comp <- dat |>
  #mutate(`Relationship status` = factor(`Relationship status`)) |>
  select(Participant, Gender,
         `Stimulus code`,
         `Solitary sexual desire`,
         `Dyadic sexual desire (Attractive person)` ,
         `Dyadic sexual desire (Partner)` ,

```

```

Relationship,) |>
group_by(Participant, Gender, Relationship) |>
summarise(`Solitary sexual desire` =
  mean(`Solitary sexual desire`),
  `Dyadic sexual desire (Attractive person)` =
  mean(`Dyadic sexual desire (Attractive person)`),
  `Dyadic sexual desire (Partner)` =
  mean(`Dyadic sexual desire (Partner)`)) |>
pivot_longer(cols = `Solitary sexual desire`:`Dyadic sexual desire (Partner)`,
  names_to = "Dimension",
  values_to = "Sexual desire") |>
mutate(Participant = factor(Participant)) |>
#mutate("Stimulus code" = factor(`Stimulus code`)) |>
mutate(Dimension = factor(Dimension))

```

### 3.1.2 Fit model

We modelled the effects of relationship type, sexual desire dimension, and Gender on the scores of sexual desire as a linear mixed effect model, with random intercepts per participant.

```

options(contrasts = c("contr.sum", "contr.poly"))

m1 <- lmer(`Sexual desire` ~ Gender * Relationship * Dimension +
  (1 | Participant),
  data = dat.comp)

```

Although it would be ideal to also include random slopes between sexual desire dimensions for each participant, and random intercepts per stimulus (Barr et al., 2013; see also DeBruine & Barr, 2021), this would require to use raw values, instead of averages per participant (i.e. including the sexual desire rating given to each stimulus). Although this was attempted, such model does not converge.

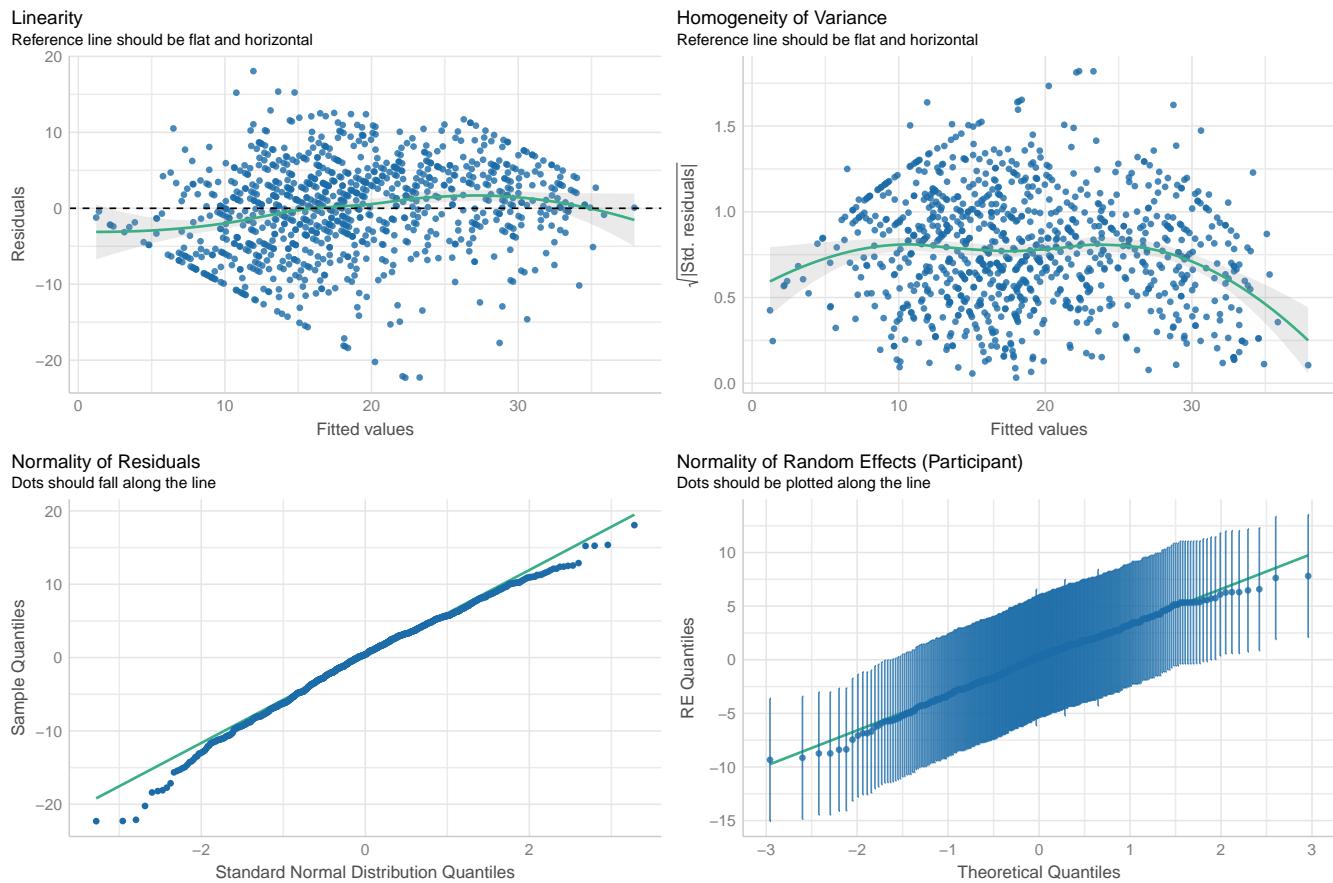
**3.1.2.1 Model assumptions** Most model assumptions were checked using the `check_model` function from the `performance` package (Lüdecke et al., 2021), and reported in Fig. S2. These assumptions do not include collinearity, as the function plots *VIF* instead of the recommended Generalized Variance Inflation Factors (*GVIF*) and the most comparable  $GVIF^{1/(2 \times df)}$  (Fox & Monette, 1992). Instead, *GVIF* and  $GVIF^{1/(2 \times df)}$  values are reported in Table S4.

**3.1.2.1.1 Figure S2. Model assumptions** This figure includes most assumptions: linearity, homogeneity of variance, and normality of both residuals and random effects.

```

check_model(m1,
  check = c("pp_check", "linearity", "homogeneity", "qq", "reqq"))

```



**Figure S2.** Model assumptions. Plots represent linearity, homogeneity of variance, and normality of both residuals and random effects (as QQ plots), respectively.

**3.1.2.1.2 Table S4. Collinearity** Given the presence of interactions, that all predictors are categorical, and the absence of random slopes, *VIF* and *GVIF* values would be expected to be high.

```
data.frame(vif(m1)) |>
  rownames_to_column() |>
  mutate_at("rowname", str_replace_all, ":" , " × ") |>
  mutate_at("rowname", str_replace_all, "`", "") |>
  kable(digits = 2,
    booktabs = TRUE,
    align = c("l", rep("c", 3)),
    linesep = "",
    caption = "Variance inflation factors for the model of hypothesis 1b",
    col.names = c(" ",
      "$GVIF$",
      "$df$",
      "$GVIF^{{\{1\}}}/{\{(2 \times df)\}}$"),
    escape = FALSE) |>
  kable_styling(latex_options = "HOLD_position")
```

**Table S4.** Variance inflation factors for the model of hypothesis 1b

	GVIF	df	$GVIF^{1/(2 \times df)}$
Gender	1.01	1	1.00
Relationship	1.02	1	1.01
Dimension	1.06	2	1.01
Gender × Relationship	1.02	1	1.01
Gender × Dimension	1.06	2	1.01
Relationship × Dimension	1.06	2	1.01
Gender × Relationship × Dimension	1.06	2	1.01

**3.1.2.2 Table S5. Regression-type table for the interaction between Relationship type, Sexual desire dimension, and Gender** This tables summarizes the results of the model.

```
summary.sig(m1, "Sexual desire by relationship type, sexual desire dimension and gender")
```

**Table S5.** Sexual desire by relationship type, sexual desire dimension and gender

Effect	Estimate	Std. Error	df	t	p
(Intercept)	18.98	0.33	319.63	57.04	< 0.0001
Gender [Women]	-2.13	0.33	319.63	-6.40	< 0.0001
Relationship [Stable]	0.13	0.33	319.63	0.39	0.7
Dimension [Attractive person DSD]	-4.38	0.31	636.25	-14.10	< 0.0001
Dimension [Partner DSD]	7.54	0.31	637.61	24.19	< 0.0001
Gender [Women] × Relationship [Stable]	-0.44	0.33	319.63	-1.31	0.19
Gender [Women] × Dimension [Attractive person DSD]	-0.16	0.31	636.25	-0.51	0.61
Gender [Women] × Dimension [Partner DSD]	0.07	0.31	637.61	0.22	0.82
Relationship [Stable] × Dimension [Attractive person DSD]	-1.35	0.31	636.25	-4.34	< 0.0001
Relationship [Stable] × Dimension [Partner DSD]	2.80	0.31	637.61	8.97	< 0.0001
Gender [Women] × Relationship [Stable] × Dimension [Attractive person DSD]	-0.10	0.31	636.25	-0.33	0.75
Gender [Women] × Relationship [Stable] × Dimension [Partner DSD]	0.59	0.31	637.61	1.90	0.06

Note:  $R^2_{conditional} = 0.569$ ,  $R^2_{marginal} = 0.383$ . Results are from linear mixed models for main effects and interactions between sexual desire (SD) dimensions, sex, and Stimulus sex. Gender = participants gender (women, men); Stimulus sex = sex of stimuli (female, male); Attractive person DSD = Dyadic sexual desire toward an attractive person; Partner DSD = Dyadic sexual desire toward a partner. Sum-to-zero contrasts were used to display 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; see [?, ?]). Single was used as reference category for relationship status, Men for gender, and Solitary for sexual desire dimension. Contrasted levels are in square brackets. Significant effects are in bold.

**3.1.2.3 Post-hoc comparisons** Because only the main effect of (sexual desire) dimension, and the interaction between relationship (type) and dimension are significant, we explored the interaction by estimated marginal means, as well as comparing the three relationship types for each sexual desire dimension.

Table of estimated marginal means and contrasts between sexual desire dimension. All estimated marginal means and contrasts were calculated using the `emmeans` function from the `emmeans` package (Lenth, 2022).

¡¡¡AGREGAR COLUMNA DF (EN TODAS LAS TABLAS DE CONTRASTES)!!!! Hecho!

```
emms.m1a <- emmeans(m1, ~ Dimension,
                      adjust = "bonferroni",
                      lmer.df = "satterthwaite")

emms.m1a.tab <- tibble(data.frame(emms.m1a)) |>
  mutate("Sexual desire" = emmean)

t.m1a <- contr.stars(emms.m1a) |>
  mutate(p.value = pval.lev(p.value)) |>
  mutate(group1 = recode_factor(group1,
```

```

    "Dyadic sexual desire Attractive person" =
      "Dyadic sexual desire (Attractive person)",
    "Dyadic sexual desire Partner" =
      "Dyadic sexual desire (Partner))" ) |>
  mutate(group2 = recode_factor(group2,
    "Dyadic sexual desire Attractive person" =
      "Dyadic sexual desire (Attractive person)",
    "Dyadic sexual desire Partner" =
      "Dyadic sexual desire (Partner))"

merge(emms.m1a.tab, t.m1a, by = 0, all = TRUE) |>
  select(-c(1,8,16)) |>
  mutate(Dimension = recode_factor(Dimension ,
    "Dyadic sexual desire (Attractive person)" =
      "Dyadic (Attractive person)",
    "Dyadic sexual desire (Partner)" =
      "Dyadic (Partner)",
    "Solitary sexual desire" =
      "Solitary")) |>
  mutate(group1 = recode_factor(group1,
    "Dyadic sexual desire (Attractive person)" =
      "Dyadic (Attractive person)",
    "Dyadic sexual desire (Partner)" =
      "Dyadic (Partner)",
    "Solitary sexual desire" =
      "Solitary")) |>
  mutate(group2 = recode_factor(group2,
    "Dyadic sexual desire (Attractive person)" =
      "Dyadic (Attractive person)",
    "Dyadic sexual desire (Partner)" =
      "Dyadic (Partner)",
    "Solitary sexual desire" =
      "Solitary")) |>
  unite(Contrast, group1, group2, sep = " - ") |>
  mutate_at("Contrast", str_replace_all, "NA - NA", " ") |>
  kable(digits = 2,
    booktabs = TRUE,
    align = c("l", rep("c", 5), "l", rep("c", 5)),
    linesep = "",
    caption = "Estimated marginal means for the three dimensions of sexual desire",
    col.names = c("Dimension",
      "EMM",
      "$SE$",
      "$df$",
      "$2.5\\% CI$",
      "$97.5\\% CI$",
      "Contrast",
      "Difference",
      "$SE$",
      "$df$",
      "$t$",
      "$p$"),
    escape = FALSE) |>
  add_header_above(c(" " = 6, "Contrasts" = 6)) |>
  kable_styling(latex_options = c("HOLD_position", "scale_down")) |>
  footnote(general = "EMM = estimated marginal mean."

```

```
Degrees of freedom ($df$) were calculated
using the Satterthwaite approximation.
Bonferroni Confidence level adjustment was used.",
threeparttable = TRUE,
footnote_as_chunk = TRUE,
escape = FALSE)
```

**Table S6.** Estimated marginal means for the three dimensions of sexual desire

Dimension	EMM	SE	df	2.5%CI	97.5%CI	Contrasts					
						Contrast	Difference	SE	df	t	p
Dyadic (Attractive person)	14.60	0.45	808.08	13.51	15.69	Dyadic (Attractive person) - Dyadic (Partner)	-11.92	0.54	637.15	-22.10	< 0.0001
Dyadic (Partner)	26.52	0.46	811.74	25.42	27.61	Dyadic (Attractive person) - Solitary	-1.22	0.54	635.79	-2.28	0.0232
Solitary	15.82	0.45	808.08	14.73	16.91	Dyadic (Partner) - Solitary	10.69	0.54	637.15	19.83	< 0.0001

Note: EMM = estimated marginal mean. Degrees of freedom (df) were calculated using the Satterthwaite approximation. Bonferroni Confidence level adjustment was used.

### 3.1.2.3.1 Table S6. Estimated marginal means and contrasts between relationship status types for the three dimensions of sexual desire.

### 3.1.2.3.2 Table S7. Estimated marginal means and contrasts between relationship status types for the three dimensions of sexual desire

Table of estimated marginal means and contrasts between relationship status for each sexual desire dimension. All estimated marginal means and contrasts were calculated using the emmeans function from the emmeans package (Lenth, 2022).

```
emms.m1b <- emmeans(m1, ~ Relationship | Dimension,
                      adjust = "bonferroni",
                      lmer.df = "satterthwaite")

emms.m1b.tab <- tibble(data.frame(emms.m1b)) |>
  mutate("Sexual desire" = emmean)

t.m1b <- contr.stars(emms.m1b) |>
  mutate(p.value = pval.lev(p.value))

t.m1b.f <- t.m1b |>
  insertRows(2, new = NA) |>
  insertRows(4, new = NA)

merge(emms.m1b.tab, t.m1b.f, by = 0, all = TRUE) |>
  select(-c(1,3,9,12,18)) |>
  unite(Contrast, group1, group2, sep = " - ") |>
  mutate_at("Contrast", str_replace_all, "NA - NA", " ") |>
  kable(digits = 2,
        booktabs = TRUE,
        align = c("l", rep("c", 5), "l", rep("c", 5)),
        linesep = "",
        caption = "Estimated marginal means for the three dimensions of sexual desire by relationship status",
        col.names = c("Relationship",
                     "EMM",
                     "$SE$",
                     "$df$",
                     "$2.5\\% CI$",
                     "$97.5\\% CI$",
                     "Contrast",
                     "Difference",
                     "$SE$",
                     "SE"))
```

```

    "$df$",
    "$t$",
    "$p$"),
  escape = FALSE) |>
pack_rows(group_label = "Dyadic sexual desire (Attractive person)",
  start_row = 1,
  end_row = 2,
  bold = TRUE) |>
pack_rows(group_label = "Dyadic sexual desire (Partner)",
  start_row = 3,
  end_row = 4,
  hline_before = TRUE,
  bold = TRUE) |>
pack_rows(group_label = "Solitary sexual desire",
  start_row = 5,
  end_row = 6,
  hline_before = TRUE,
  bold = TRUE) |>
add_header_above(c(" " = 6, "Contrasts" = 6)) |>
kable_styling(latex_options = c("HOLD_position", "scale_down")) |>
footnote(general = "EMM = estimated marginal mean.
Degrees of freedom ($df$) were calculated
using the Satterthwaite approximation.
Bonferroni Confidence level adjustment was used.",
threeparttable = TRUE,
footnote_as_chunk = TRUE,
escape = FALSE)

```

**Table S7.** Estimated marginal means for the three dimensions of sexual desire by relationship status

Relationship	EMM	SE	df	2.5%CI	97.5%CI	Contrasts						
						Contrast	Difference	SE	df	t	p	
<b>Dyadic sexual desire (Attractive person)</b>												
Stable	13.38	0.62	808.08	12.00	14.76	Stable - Single	-2.43	0.91	808.08	-2.68	<b>0.0076</b>	
Single	15.82	0.67	808.08	14.31	17.32							
<b>Dyadic sexual desire (Partner)</b>												
Stable	29.44	0.62	808.08	28.06	30.82	Stable - Single	5.85	0.91	811.74	6.41	< 0.0001	
Single	23.59	0.67	814.77	22.08	25.10							
<b>Solitary sexual desire</b>												
Stable	14.50	0.62	808.08	13.12	15.89	Stable - Single	-2.64	0.91	808.08	-2.90	<b>0.0038</b>	
Single	17.14	0.67	808.08	15.64	18.64							

Note: EMM = estimated marginal mean. Degrees of freedom (df) were calculated using the Satterthwaite approximation. Bonferroni Confidence level adjustment was used.

### 3.1.3 Figure S3. Differences among the three dimensions of sexual desire

This figure summarizes the results of hypothesis 1.

```

# Figure Dimension main effect
h1a <- ggplot(dat.comp, aes(x = Dimension, y = `Sexual desire`, color = Dimension)) +
  geom_violin() +
  geom_jitter(alpha = 0.3, width = 0.1) +
  scale_color_manual(values = color.Dimension) +
  scale_fill_manual(values = color.Dimension) +
  geom_errorbar(data = emms.m1a.tab,
                mapping = aes(ymin = lower.CL, ymax = upper.CL),
                colour = "black", width = 0.1) +

```

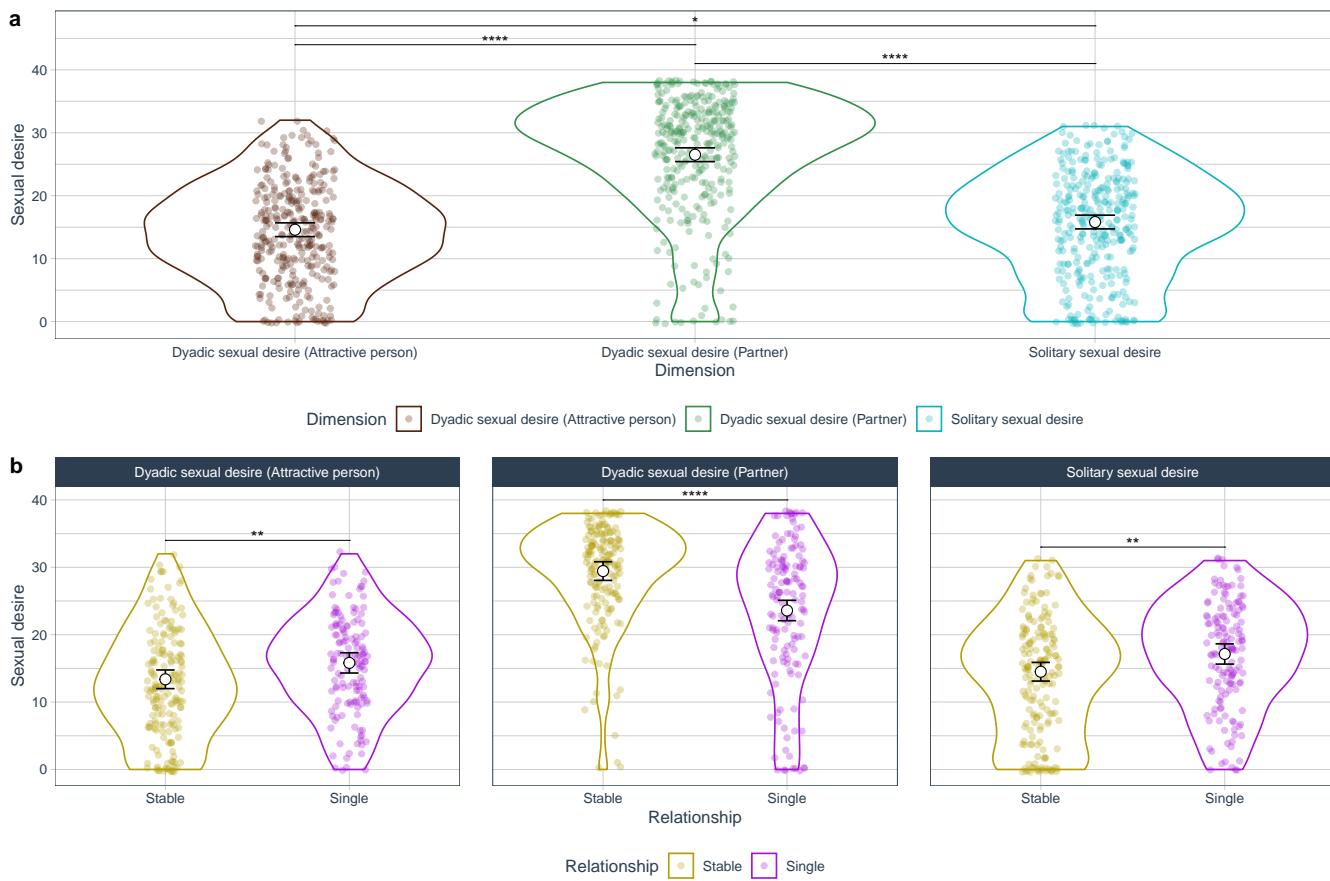
```

geom_point(data = emms.m1a.tab,
            position = position_dodge(0.1),
            shape = 21, size = 3,
            color = "black", fill = "white") +
stat_pvalue_manual(t.m1a,
                    label = "p.signif",
                    y.position = c(44, 47, 41),
                    tip.length = 0) +
theme_tq()

# Figure Relationship × Dimension interaction
h1b <- ggplot(dat.comp, aes(x = Relationship, y = `Sexual desire`, color = Relationship)) +
  geom_violin() +
  geom_jitter(alpha = 0.3, width = 0.1) +
  scale_color_manual(values = color.Relationship) +
  scale_fill_manual(values = color.Relationship) +
  facet_wrap(~Dimension) +
  geom_errorbar(data = emms.m1b.tab,
                mapping = aes(ymin = lower.CL, ymax = upper.CL),
                colour = "black", width = 0.1) +
  geom_point(data = emms.m1b.tab,
            position = position_dodge(0.1),
            shape = 21, size = 3,
            color = "black", fill = "white") +
  stat_pvalue_manual(t.m1b,
                    label = "p.signif",
                    y.position = c(34, 40, 33),
                    tip.length = 0) +
  theme_tq()

# Full figure for hypothesis 1 (a and b)
p1f <- ggarrange(h1a, h1b,
                  labels = "auto",
                  legend = "bottom",
                  nrow = 2)
p1f

```



**Figure S3.** Differences among the three dimensions of sexual desire (Solitary sexual desire, Dyadic sexual desire (Partner), dyadic sexual desire (Attractive person)). (a) Simple comparison between dimensions of sexual desire (for detailed results, see Table S6); (b) Interaction between relationship type and sexual desire dimension (see Table S5; for detailed results, see Table S7). White dots and black bars represent estimated marginal means and 95% CI. In all cases, significant effects are represented with lines and stars: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , \*\*\*\* $p < 0.0001$ .

### 3.2 Hypothesis 2

Data

```
dat.fin <- dat |>
  mutate(`Solitary sexual desire (C)` =
    scale(`Solitary sexual desire`,
          center = TRUE, scale = FALSE)) |>
  mutate(`Dyadic sexual desire (Attractive person) (C)` =
    scale(`Dyadic sexual desire (Attractive person)`,
          center = TRUE, scale = FALSE)) |>
  mutate(`Dyadic sexual desire (Partner) (C)` =
    scale(`Dyadic sexual desire (Partner)`,
          center = TRUE, scale = FALSE))
```

#### 3.2.1 Hypothesis 2a: Erotic

**3.2.1.1 Filter data** Create data frame selecting only relevant variables, and summarizing per sexual desire dimension for each participant (three rows per participant).

```
dat.ero <- dat.fin |>
  filter(`Stimulus content` == "Erotic") |>
  select(Participant, `Stimulus code`,
```

```

`Subjective sexual arousal`,
Relationship,
Gender,
`Stimulus sex`,
`Solitary sexual desire (C)`,
`Dyadic sexual desire (Attractive person) (C)`,
`Dyadic sexual desire (Partner) (C)` , ) |>
  mutate_if(is.character, factor)

```

### 3.2.1.2 Fit model

We modelled the effects of XXXXX.

```

options(contrasts = c("contr.sum", "contr.poly"))

m2a <- lmer(`Subjective sexual arousal` ~
  Relationship * Gender * `Stimulus sex` * `Solitary sexual desire (C)` +
  Relationship * Gender * `Stimulus sex` * `Dyadic sexual desire (Attractive person) (C)` +
  Relationship * Gender * `Stimulus sex` * `Dyadic sexual desire (Partner) (C)` +
  (1 | `Stimulus code`) +
  (1 + `Stimulus sex` | Participant),
  data = dat.ero,
  control = lmerControl(optimizer = "bobyqa"))

```

Although it would be ideal to XXXXX.

**3.2.1.2.1 Model assumptions** Most model assumptions were checked using the `check_model` function from the `performance` package (Lüdecke et al., 2021), and reported in Fig. S4. These assumptions do not include collinearity, as the function plots *VIF* instead of the recommended Generalized Variance Inflation Factors (*GVIF*) and the most comparable  $GVIF^{1/(2 \times df)}$  (Fox & Monette, 1992). Instead, *GVIF* and  $GVIF^{1/(2 \times df)}$  values are reported in Table S8.

Figure S4. Model assumptions

This figure includes most assumptions: linearity, homogeneity of variance, and normality of both residuals and random effects.

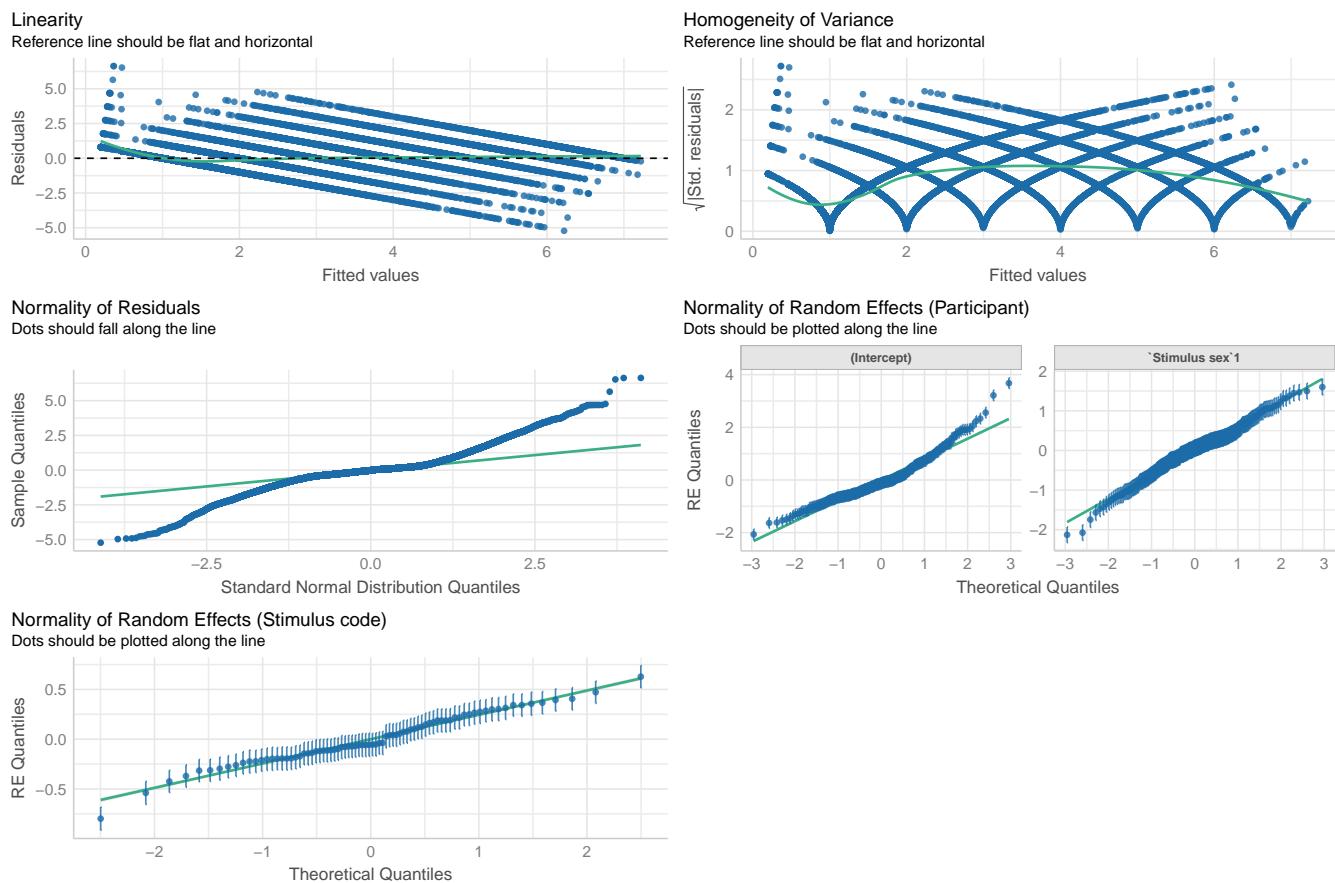
```

check_distribution(m2a)

## # Distribution of Model Family
##
## Predicted Distribution of Residuals
##
## Distribution Probability
##      cauchy        44%
##      tweedie       31%
##      normal        22%
##
## Predicted Distribution of Response
##
##                  Distribution Probability
##      poisson (zero-infl.)        53%
##      beta-binomial        19%
##      neg. binomial (zero-infl.)    19%

check_model(m2a,
            check = c("linearity", "homogeneity", "qq", "reqq"))

```



**Figure S4.** Model assumptions. Plots represent linearity, homogeneity of variance, and normality of both residuals and random effects (as QQ plots), respectively.

Table S8. Collinearity

Given the presence of interactions, that all predictors are categorical, and the absence of random slopes, *VIF* and *GVIF* values would be expected to be high.

```
data.frame(vif(m2a)) |>
  rownames_to_column() |>
  mutate_at("rowname", str_replace_all, ":", " × ") |>
  mutate_at("rowname", str_replace_all, "`", "") |>
  kable(digits = 2,
    booktabs = TRUE,
    align = c("l", "c"),
    linesep = "\n",
    caption = "Variance inflation factors for the model of hypothesis 2a",
    col.names = c(" ",
                 "$VIF$"),
    escape = FALSE) |>
  kable_styling(latex_options = "HOLD_position")
```

**Table S8.** Variance inflation factors for the model of hypothesis 2a

	VIF
Relationship	1.83
Gender	1.82
Stimulus sex	1.39
Solitary sexual desire (C)	1.76
Dyadic sexual desire (Attractive person) (C)	1.71
Dyadic sexual desire (Partner) (C)	2.13
Relationship × Gender	1.84
Relationship × Stimulus sex	1.84
Gender × Stimulus sex	1.83
Relationship × Solitary sexual desire (C)	1.70
Gender × Solitary sexual desire (C)	1.64
Stimulus sex × Solitary sexual desire (C)	1.76
Relationship × Dyadic sexual desire (Attractive person) (C)	1.65
Gender × Dyadic sexual desire (Attractive person) (C)	1.54
Stimulus sex × Dyadic sexual desire (Attractive person) (C)	1.71
Relationship × Dyadic sexual desire (Partner) (C)	1.94
Gender × Dyadic sexual desire (Partner) (C)	2.04
Stimulus sex × Dyadic sexual desire (Partner) (C)	2.13
Relationship × Gender × Stimulus sex	1.84
Relationship × Gender × Solitary sexual desire (C)	1.72
Relationship × Stimulus sex × Solitary sexual desire (C)	1.73
Gender × Stimulus sex × Solitary sexual desire (C)	1.70
Relationship × Gender × Dyadic sexual desire (Attractive person) (C)	1.69
Relationship × Stimulus sex × Dyadic sexual desire (Attractive person) (C)	1.68
Gender × Stimulus sex × Dyadic sexual desire (Attractive person) (C)	1.63
Relationship × Gender × Dyadic sexual desire (Partner) (C)	2.12
Relationship × Stimulus sex × Dyadic sexual desire (Partner) (C)	2.04
Gender × Stimulus sex × Dyadic sexual desire (Partner) (C)	2.09
Relationship × Gender × Stimulus sex × Solitary sexual desire (C)	1.74
Relationship × Gender × Stimulus sex × Dyadic sexual desire (Attractive person) (C)	1.70
Relationship × Gender × Stimulus sex × Dyadic sexual desire (Partner) (C)	2.12

```
m2aCI <- confint(m2a,
  method = "boot", #define bootstrap as the method for computing CIs
  nsim = 4, #number of simulations
  FUN = fixef, #to obtain only estimates for fixed effects
  parallel = "multicore", #parallel computation
  ncpus = detectCores()-1, #number of computational cores to run in parallel
  .progress = "txt", #show progress bar
  seed = 2023) #to ensure reproducibility and allow cache to work
```

### 3.2.1.2.2 Bootstrap confidence intervals

```
## =====
```

### 3.2.1.2.3 Table S9. Regression-type table for the interaction between Relationship type, Sexual desire dimension, and Gender

This table summarizes the results of the model.

```
summary.sig.boot(mod = m2a,
  modCI = m2aCI,
  custom_caption = "Subjective sexual arousal in response to erotic stimuli, by relationship type, sexual desire dimension, and gender")
```

**Table S9.** Subjective sexual arousal in response to erotic stimuli, by relationship type, gender, stimulus sex, and the three dimensions of sexual desire dimension

Effect	Estimate	Lower 95% CI	Upper 95% CI	Std. Error	df	t	p
(Intercept)	2.14	1.97	2.17	0.07	376.07	32.43	< 0.0001
Relationship [Stable]	0.05	0.04	0.06	0.06	304.00	0.77	0.44
Gender [Women]	-0.23	-0.23	-0.06	0.06	304.00	-3.90	< 0.001
Stimulus sex [Female]	0.46	0.43	0.51	0.05	360.27	8.50	< 0.0001
Solitary sexual desire (C)	0.02	0.01	0.04	0.01	304.00	2.53	0.0119
Dyadic sexual desire (Attractive person) (C)	0.03	0.02	0.04	0.01	304.00	4.74	< 0.0001
Dyadic sexual desire (Partner) (C)	0.00	-0.01	0.00	0.01	304.00	0.36	0.72
Relationship [Stable] × Gender [Women]	0.01	-0.09	0.07	0.06	304.00	0.16	0.88
Relationship [Stable] × Stimulus sex [Female]	0.02	-0.09	0.03	0.05	304.00	0.45	0.65
Gender [Women] × Stimulus sex [Female]	-0.81	-0.90	-0.68	0.05	304.00	-17.66	< 0.0001
Relationship [Stable] × Solitary sexual desire (C)	0.00	0.00	0.00	0.01	304.00	-0.44	0.66
Gender [Women] × Solitary sexual desire (C)	0.01	0.00	0.01	0.01	304.00	1.22	0.22
Stimulus sex [Female] × Solitary sexual desire (C)	-0.01	-0.01	0.00	0.01	304.00	-1.05	0.3
Relationship [Stable] × Dyadic sexual desire (Attractive person) (C)	0.01	0.00	0.01	0.01	304.00	1.13	0.26
Gender [Women] × Dyadic sexual desire (Attractive person) (C)	0.00	-0.01	0.00	0.01	304.00	-0.29	0.77
Stimulus sex [Female] × Dyadic sexual desire (Attractive person) (C)	0.02	0.00	0.02	0.01	304.00	2.86	0.0045
Relationship [Stable] × Dyadic sexual desire (Partner) (C)	0.00	-0.01	0.01	0.01	304.00	-0.51	0.61
Gender [Women] × Dyadic sexual desire (Partner) (C)	-0.01	-0.01	0.00	0.01	304.00	-1.60	0.11
Stimulus sex [Female] × Dyadic sexual desire (Partner) (C)	0.01	0.01	0.01	0.01	304.00	1.75	0.08
Relationship [Stable] × Gender [Women] × Stimulus sex [Female]	0.00	-0.10	0.09	0.05	304.00	0.04	0.97
Relationship [Stable] × Gender [Women] × Solitary sexual desire (C)	0.00	0.00	0.01	0.01	304.00	0.36	0.72
Relationship [Stable] × Stimulus sex [Female] × Solitary sexual desire (C)	0.00	0.00	0.00	0.01	304.00	-0.46	0.65
Gender [Women] × Stimulus sex [Female] × Solitary sexual desire (C)	0.00	-0.01	0.00	0.01	304.00	-0.12	0.91
Relationship [Stable] × Gender [Women] × Dyadic sexual desire (Attractive person) (C)	-0.01	-0.01	0.00	0.01	304.00	-1.29	0.2
Relationship [Stable] × Stimulus sex [Female] × Dyadic sexual desire (Attractive person) (C)	0.01	0.01	0.02	0.01	304.00	1.90	0.06
Gender [Women] × Stimulus sex [Female] × Dyadic sexual desire (Attractive person) (C)	-0.02	-0.03	-0.02	0.01	304.00	-4.33	< 0.0001
Relationship [Stable] × Gender [Women] × Dyadic sexual desire (Partner) (C)	0.01	0.01	0.02	0.01	304.00	2.20	0.0285
Relationship [Stable] × Stimulus sex [Female] × Dyadic sexual desire (Partner) (C)	-0.01	-0.01	-0.01	0.01	304.00	-2.11	0.0357
Gender [Women] × Stimulus sex [Female] × Dyadic sexual desire (Partner) (C)	-0.01	-0.01	0.00	0.01	304.00	-1.08	0.28
Relationship [Stable] × Gender [Women] × Stimulus sex [Female] × Solitary sexual desire (C)	0.00	0.00	0.01	0.01	304.00	0.78	0.44
Relationship [Stable] × Gender [Women] × Stimulus sex [Female] × Dyadic sexual desire (Attractive person) (C)	0.00	-0.01	0.00	0.01	304.00	-0.06	0.95
Relationship [Stable] × Gender [Women] × Stimulus sex [Female] × Dyadic sexual desire (Partner) (C)	0.00	-0.01	0.00	0.01	304.00	-0.61	0.54

Note:  $R^2_{conditional} = 0.749$ ,  $R^2_{marginal} = 0.385$ . Results are from linear mixed models for main effects and interactions between sexual desire (SD) dimensions, sex, and Stimulus sex. Confidence intervals were calculated as the 2.5 and 97.5 percentiles from bootstrap (1000 simulations). Continuous variables were centered and scaled (represented as (C) in variable names). Gender = participants gender (women, men); Stimulus 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. *Sum-to-zero* contrasts were used to display 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 *Single* was used for relationship status, *Men* for gender, and *Male* for stimulus sex. Contrasted levels are in square brackets. Significant effects are in bold.

### 3.2.1.2.4 Post-hoc comparisons

#### 3.2.1.3 Figure S5. Subjective sexual arousal to erotic stimuli: Main effects and interactions

This figure summarizes the results of hypothesis 2a.

```
# Figure main effect of Solitary sexual desire on Subjective sexual arousal
h2a.1 <- ggplot(m2a@frame, aes(x = `Solitary sexual desire (C)` , y = predict(m2a))) +
  geom_jitter(alpha = 0.01) +
  geom_smooth(method = "lm") +
  labs(y = "Subjective sexual\narousal") +
  theme_tq()

# Figure main effect of Dyadic sexual desire (Attractive person) on Subjective sexual arousal
h2a.2 <- ggplot(m2a@frame, aes(x = `Dyadic sexual desire (Attractive person) (C)` ,
  y = predict(m2a))) +
  geom_jitter(alpha = 0.01) +
  geom_smooth(method = "lm") +
  labs(y = " ") +
  theme_tq()

# Figure interaction between Stimulus sex and gender
## Calculate estimated marginal means
emms.m2a <- emmeans(m2a, ~ factor(`Stimulus sex`) | Gender,
  adjust = "bonferroni") #asymptotic degrees of freedom
emms.m2a.tab <- tibble(data.frame(emms.m2a)) |>
  rename("Stimulus sex" = Stimulus.sex) |>
  mutate("Subjective sexual arousal" = emmean)
t.m2a <- contr.stars(emms.m2a) |>
  mutate(p.value = pval.lev(p.value))
m2a.dat <- m2a@frame |>
  mutate(`Subjective sexual arousal` = predict(m2a))
```

```

## plot
h2a.3 <- ggplot(m2a.dat, aes(x = `Stimulus sex`,
                               y = `Subjective sexual arousal`,
                               color = `Stimulus sex`)) +
  geom_violin() +
  geom_jitter(alpha = 0.01, width = 0.1) +
  scale_color_manual(values = color.StimuliSex) +
  scale_fill_manual(values = color.StimuliSex) +
  facet_wrap(~Gender) +
  geom_errorbar(data = emms.m2a.tab,
                mapping = aes(ymin = asymp.LCL, ymax = asymp.UCL),
                colour = "black", width = 0.1) +
  geom_point(data = emms.m2a.tab,
             shape = 21, size = 3,
             color = "black", fill = "white") +
  stat_pvalue_manual(t.m2a,
                     label = "p.signif",
                     y.position = c(7.4, 7.8),
                     tip.length = 0) +
  labs(y = "Subjective sexual\narousal") +
  ylim(c(0, 8.5)) +
  theme_tq() +
  theme(legend.position = "none")

# Figure interaction between Stimulus sex and Dyadic sexual desire (Attractive person)
h2a.4 <- interact_plot(m2a, pred = "Dyadic sexual desire (Attractive person) (C)",
                       modx = "Stimulus sex",
                       interval = TRUE,
                       colors = color.StimuliSex,
                       y.label = "Subjective sexual\narousal") +
  theme_tq()

# Figure interaction between Stimulus sex, gender and Dyadic sexual desire (Attractive person)
h2a.5 <- interact_plot(m2a, pred = "Dyadic sexual desire (Attractive person) (C)",
                       mod2 = "Gender",
                       modx = "Stimulus sex",
                       interval = TRUE,
                       colors = color.StimuliSex,
                       y.label = " ",
                       mod2.labels = c("Women", "Men")) +
  theme_tq()

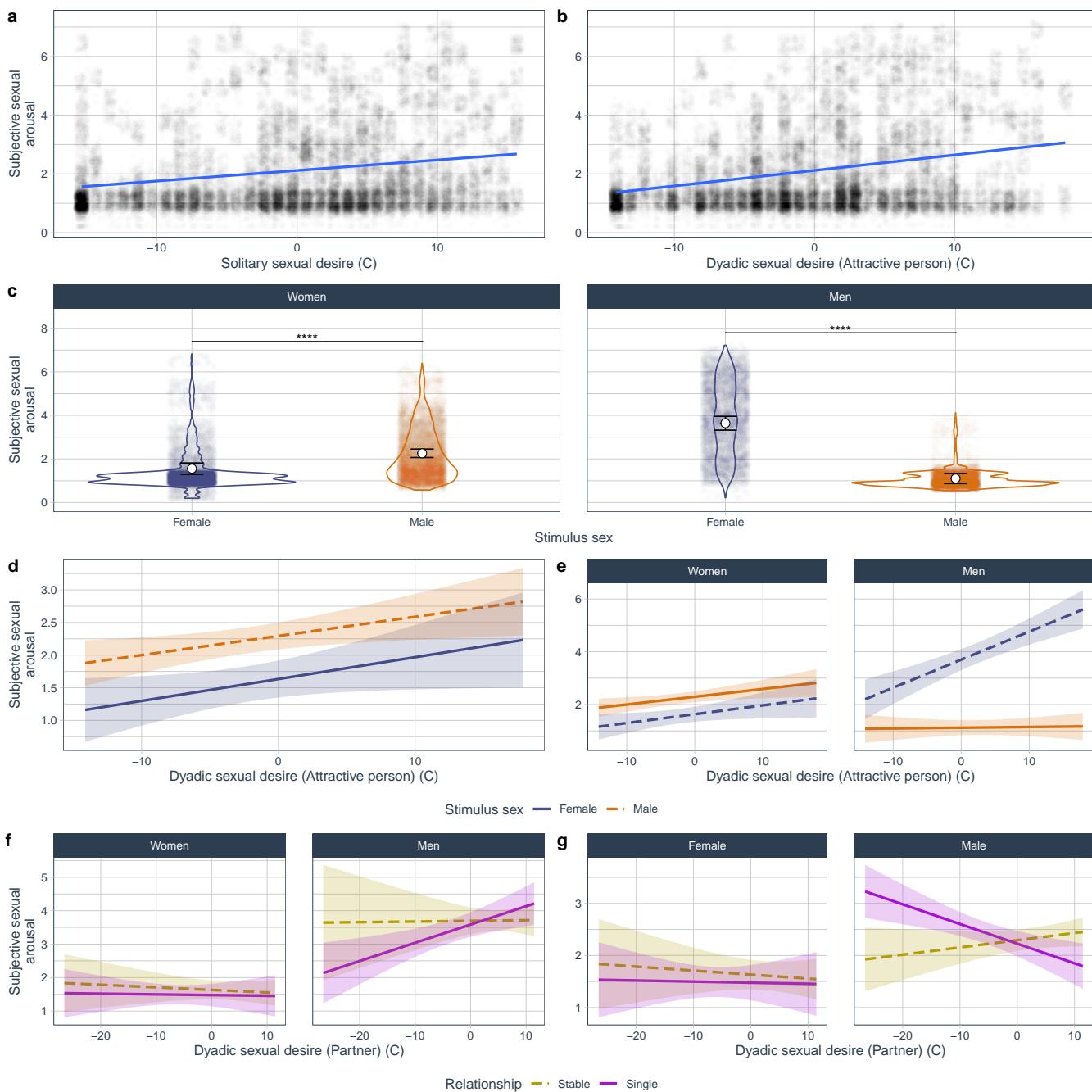
# Figure interaction between Relationship, gender and Dyadic sexual desire (Partner)
h2a.6 <- interact_plot(m2a, pred = "Dyadic sexual desire (Partner) (C)",
                       mod2 = "Gender",
                       modx = "Relationship",
                       interval = TRUE,
                       colors = color.Relationship,
                       y.label = "Subjective sexual\narousal",
                       mod2.labels = c("Women", "Men")) +
  theme_tq()

# Figure interaction between Relationship, Stimulus sex and Dyadic sexual desire (Partner)
h2a.7 <- interact_plot(m2a, pred = "Dyadic sexual desire (Partner) (C)",
                       mod2 = "Stimulus sex",
                       modx = "Relationship",

```

```
interval = TRUE,
colors = color.Relationship,
y.label = " ",
mod2.labels = c("Female", "Male")) +
theme_tq()

# Full figure for hypothesis 2a
p2af <- ggarrange(ggarrange(ggarrange(h2a.1, h2a.2,
                                         nrow = 1,
                                         labels = "auto"),
                               h2a.3,
                               labels = c(" ", "c"),
                               nrow = 2),
                     ggarrange(ggarrange(h2a.4, h2a.5,
                                         nrow = 1,
                                         labels = c("d", "e"),
                                         common.legend = TRUE,
                                         legend = "bottom"),
                               ggarrange(h2a.6, h2a.7,
                                         nrow = 1,
                                         labels = c("f", "g"),
                                         common.legend = TRUE,
                                         legend = "bottom"),
                                         ncol = 1),
                     nrow = 2,
                     ncol = 1)
p2af
```



**Figure S5.** Subjective sexual arousal to erotic stimuli: Significant main effects and interactions of model 2A. **(a)** Main effect of Solitary sexual desire on Subjective sexual arousal; **(b)** main effect of Dyadic sexual desire (Attractive person) on Subjective sexual arousal; **(c)** interaction between Stimulus sex and gender (significant effects of stimulus sex by participant gender are represented with lines and stars: \*\*\* $p < 0.0001$ . White dots and black bars represent estimated marginal means and 95% CI, calculated from 1000 bootstrapped simulations); **(d)** interaction between Stimulus sex and Dyadic sexual desire (Attractive person); **(e)** interaction between Stimulus sex, gender and Dyadic sexual desire (Attractive person); **(f)** interaction between Relationship, gender and Dyadic sexual desire (Partner); **(g)** interaction between Relationship, Stimulus sex and Dyadic sexual desire (Partner). For detailed results of the model, see Table S9). *Women* and *Men* refer to the gender of the participants and *Female* and *Male* to the sex of the stimuli. To better represent the associations between predictor variables and subjective sexual arousal within the model (i.e. when including all other effects), in all cases the Y axis represents values predicted by the model instead of raw values.

### 3.2.2 Hypothesis 2b: Non-erotic

**3.2.2.1 Filter data** Create data frame selecting only relevant variables, and summarizing per sexual desire dimension for each participant (three rows per participant).

```
dat.nero <- dat.fin |>
  filter(`Stimulus content` == "Non-erotic")
```

**3.2.2.2 Fit model** We modelled the effects of XXXXX.

```
options(contrasts = c("contr.sum", "contr.poly"))

m2b <- lmer(`Subjective sexual arousal` ~
  Relationship * Gender * `Stimulus sex` * `Solitary sexual desire (C)` +
  Relationship * Gender * `Stimulus sex` * `Dyadic sexual desire (Attractive person) (C)` +
  Relationship * Gender * `Stimulus sex` * `Dyadic sexual desire (Partner) (C)` +
  (1 | `Stimulus code`) +
  (1 + `Stimulus sex` | Participant),
  data = dat.nero)

## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, :
## Model failed to converge with max|grad| = 0.0032345 (tol = 0.002, component 1)
```

**3.2.2.2.1 Model assumptions** Most model assumptions were checked using the `check_model` function from the `performance` package (Lüdecke et al., 2021), and reported in Fig. S6. These assumptions do not include collinearity, as the function plots *VIF* instead of the recommended Generalized Variance Inflation Factors (*GVIF*) and the most comparable  $GVIF^{1/(2 \times df)}$  (Fox & Monette, 1992). Instead, *GVIF* and  $GVIF^{1/(2 \times df)}$  values are reported in Table S10.

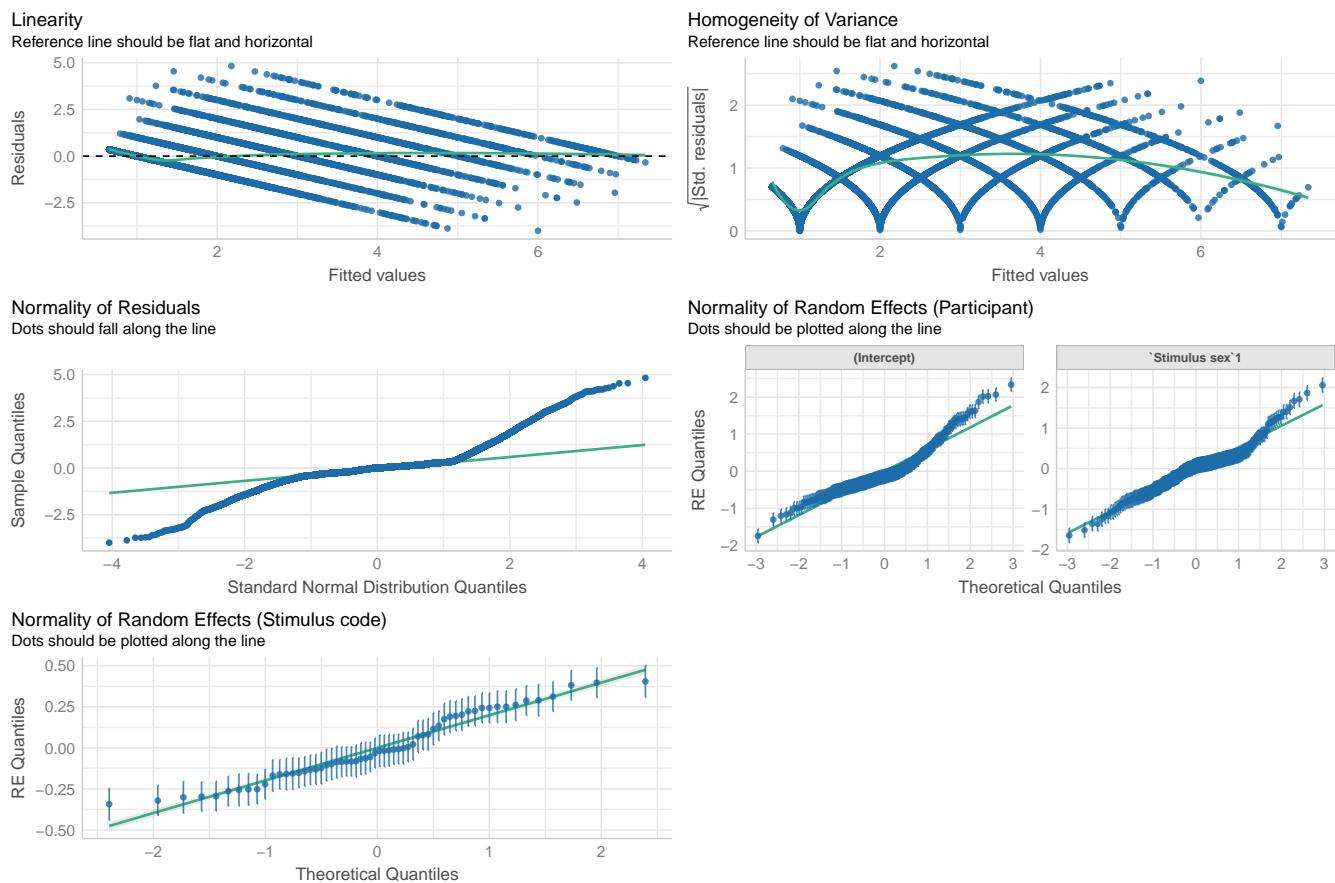
Figure S6. Model assumptions

This figure includes most assumptions: linearity, homogeneity of variance, and normality of both residuals and random effects.

```
check_distribution(m2b)

## # Distribution of Model Family
##
## Predicted Distribution of Residuals
##
## Distribution Probability
##      cauchy      53%
##      normal      19%
##      tweedie     19%
##
## Predicted Distribution of Response
##
##                  Distribution Probability
##      poisson (zero-infl.)      38%
##      beta-binomial      22%
## neg. binomial (zero-infl.)      16%

check_model(m2b,
            check = c("linearity", "homogeneity", "qq", "reqq"))
```



**Figure S6.** Model assumptions. Plots represent linearity, homogeneity of variance, and normality of both residuals and random effects (as QQ plots), respectively.

Table S10. Collinearity

Given the presence of interactions, that all predictors are categorical, and the absence of random slopes, *VIF* and *GVIF* values would be expected to be high.

```
data.frame(vif(m2b)) |>
  rownames_to_column() |>
  mutate_at("rowname", str_replace_all, ":", " × ") |>
  mutate_at("rowname", str_replace_all, "\`", "") |>
  kable(digits = 2,
    booktabs = TRUE,
    align = c("l", "c"),
    linesep = "\n",
    caption = "Variance inflation factors for the model of hypothesis 2a",
    col.names = c(" ",
                 "$VIF$"),
    escape = FALSE) |>
  kable_styling(latex_options = "HOLD_position")
```

**Table S10.** Variance inflation factors for the model of hypothesis 2a

	VIF
Relationship	1.96
Gender	1.95
Stimulus sex	1.36
Solitary sexual desire (C)	1.88
Dyadic sexual desire (Attractive person) (C)	1.83
Dyadic sexual desire (Partner) (C)	2.28
Relationship × Gender	1.97
Relationship × Stimulus sex	1.97
Gender × Stimulus sex	1.96
Relationship × Solitary sexual desire (C)	1.82
Gender × Solitary sexual desire (C)	1.76
Stimulus sex × Solitary sexual desire (C)	1.88
Relationship × Dyadic sexual desire (Attractive person) (C)	1.77
Gender × Dyadic sexual desire (Attractive person) (C)	1.65
Stimulus sex × Dyadic sexual desire (Attractive person) (C)	1.83
Relationship × Dyadic sexual desire (Partner) (C)	2.08
Gender × Dyadic sexual desire (Partner) (C)	2.19
Stimulus sex × Dyadic sexual desire (Partner) (C)	2.28
Relationship × Gender × Stimulus sex	1.98
Relationship × Gender × Solitary sexual desire (C)	1.84
Relationship × Stimulus sex × Solitary sexual desire (C)	1.85
Gender × Stimulus sex × Solitary sexual desire (C)	1.82
Relationship × Gender × Dyadic sexual desire (Attractive person) (C)	1.81
Relationship × Stimulus sex × Dyadic sexual desire (Attractive person) (C)	1.80
Gender × Stimulus sex × Dyadic sexual desire (Attractive person) (C)	1.74
Relationship × Gender × Dyadic sexual desire (Partner) (C)	2.27
Relationship × Stimulus sex × Dyadic sexual desire (Partner) (C)	2.17
Gender × Stimulus sex × Dyadic sexual desire (Partner) (C)	2.23
Relationship × Gender × Stimulus sex × Solitary sexual desire (C)	1.86
Relationship × Gender × Stimulus sex × Dyadic sexual desire (Attractive person) (C)	1.82
Relationship × Gender × Stimulus sex × Dyadic sexual desire (Partner) (C)	2.28

```
m2bCI <- confint(m2b,
  method = "boot", #define bootstrap as the method for computing the confidence intervals
  nsim = 4, #number of simulations
  FUN = fixef, #to obtain only estimates for fixed effects
  parallel = "multicore", #parallel computation
  ncpus = detectCores()-1, #number of computational cores to run in parallel
  .progress = "txt", #show progress bar
  seed = 2023) #to ensure reproducibility and allow cache to work
```

### 3.2.2.2.2 Bootstrap confidence intervals

```
## =====
```

### 3.2.2.2.3 Table S11. Regression-type table for the interaction between Relationship type, Sexual desire dimension, and Gender

This table summarizes the results of the model.

```
summary.sig.boot(mod = m2b,
  modCI = m2aCI,
  custom_caption = "Subjective sexual arousal in response to non-erotic stimuli, by relation
```

**Table S11.** Subjective sexual arousal in response to non-erotic stimuli, by relationship type, gender, stimulus sex, and the three dimensions of sexual desire dimension

Effect	Estimate	Lower 95% CI	Upper 95% CI	Std. Error	df	t	p
(Intercept)	1.59	1.97	2.17	0.05	330.41	29.98	< 0.0001
Relationship [Stable]	0.02	0.04	0.06	0.05	304.09	0.49	0.63
Gender [Women]	-0.13	-0.23	-0.06	0.05	304.09	-2.87	<b>0.0043</b>
Stimulus sex [Female]	0.19	0.43	0.51	0.05	302.50	3.89	< 0.001
Solitary sexual desire (C)	0.00	0.01	0.04	0.01	304.09	0.05	0.96
Dyadic sexual desire (Attractive person) (C)	0.03	0.02	0.04	0.01	304.09	5.68	< 0.0001
Dyadic sexual desire (Partner) (C)	0.01	-0.01	0.00	0.01	304.09	1.03	0.3
Relationship [Stable] × Gender [Women]	-0.01	-0.09	0.07	0.05	304.09	-0.29	0.77
Relationship [Stable] × Stimulus sex [Female]	0.03	-0.09	0.03	0.04	304.07	0.85	0.39
Gender [Women] × Stimulus sex [Female]	-0.49	-0.90	-0.68	0.04	304.07	-12.14	< 0.0001
Relationship [Stable] × Solitary sexual desire (C)	0.00	0.00	0.00	0.01	304.09	-0.39	0.69
Gender [Women] × Solitary sexual desire (C)	0.01	0.00	0.01	0.01	304.09	2.49	<b>0.0133</b>
Stimulus sex [Female] × Solitary sexual desire (C)	-0.01	-0.01	0.00	0.00	304.07	-2.03	<b>0.0435</b>
Relationship [Stable] × Dyadic sexual desire (Attractive person) (C)	0.00	0.00	0.01	0.01	304.09	0.28	0.78
Gender [Women] × Dyadic sexual desire (Attractive person) (C)	-0.02	-0.01	0.00	0.01	304.09	-2.90	<b>0.004</b>
Stimulus sex [Female] × Dyadic sexual desire (Attractive person) (C)	0.02	0.00	0.02	0.00	304.07	3.86	< 0.001
Relationship [Stable] × Dyadic sexual desire (Partner) (C)	0.00	-0.01	0.01	0.01	304.09	0.07	0.94
Gender [Women] × Dyadic sexual desire (Partner) (C)	-0.01	-0.01	0.00	0.01	304.09	-1.44	0.15
Stimulus sex [Female] × Dyadic sexual desire (Partner) (C)	0.01	0.01	0.01	0.00	304.07	1.10	0.27
Relationship [Stable] × Gender [Women] × Stimulus sex [Female]	0.02	-0.10	0.09	0.04	304.07	0.41	0.68
Relationship [Stable] × Gender [Women] × Solitary sexual desire (C)	0.00	0.00	0.01	0.01	304.09	0.64	0.52
Relationship [Stable] × Stimulus sex [Female] × Solitary sexual desire (C)	0.00	0.00	0.00	0.00	304.07	0.21	0.83
Gender [Women] × Stimulus sex [Female] × Solitary sexual desire (C)	0.00	-0.01	0.00	0.00	304.07	0.23	0.82
Relationship [Stable] × Gender [Women] × Dyadic sexual desire (Attractive person) (C)	0.00	-0.01	0.00	0.01	304.09	-0.49	0.62
Relationship [Stable] × Stimulus sex [Female] × Dyadic sexual desire (Attractive person) (C)	0.00	0.01	0.02	0.00	304.07	0.58	0.56
Gender [Women] × Stimulus sex [Female] × Dyadic sexual desire (Attractive person) (C)	-0.03	-0.03	-0.02	0.00	304.07	-5.53	< 0.0001
Relationship [Stable] × Gender [Women] × Dyadic sexual desire (Partner) (C)	0.00	0.01	0.02	0.01	304.09	0.06	0.95
Relationship [Stable] × Stimulus sex [Female] × Dyadic sexual desire (Partner) (C)	0.00	-0.01	-0.01	0.00	304.07	-0.57	0.57
Gender [Women] × Stimulus sex [Female] × Dyadic sexual desire (Partner) (C)	-0.01	-0.01	0.00	0.00	304.07	-1.19	0.23
Relationship [Stable] × Gender [Women] × Stimulus sex [Female] × Solitary sexual desire (C)	0.00	0.00	0.01	0.00	304.07	0.11	0.91
Relationship [Stable] × Gender [Women] × Stimulus sex [Female] × Dyadic sexual desire (Attractive person) (C)	0.00	-0.01	0.00	0.00	304.07	0.48	0.63
Relationship [Stable] × Gender [Women] × Stimulus sex [Female] × Dyadic sexual desire (Partner) (C)	0.00	-0.01	0.00	0.00	304.07	-0.43	0.67

Note:  $R^2_{conditional} = 0.722$ ,  $R^2_{marginal} = 0.292$ . Results are from linear mixed models for main effects and interactions between sexual desire (SD) dimensions, sex, and Stimulus sex. Confidence intervals were calculated as the 2.5 and 97.5 percentiles from bootstrap (1000 simulations). Continuous variables were centered and scaled (represented as (C) in variable names). Gender = participants gender (women, men); Stimulus 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. *Sum-to-zero* contrasts were used to display 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 *Single* was used for relationship status, *Men* for gender, and *Male* for stimulus sex. Contrasted levels are in square brackets. Significant effects are in bold.

### 3.2.2.3 Figure S7. Subjective sexual arousal to non-erotic stimuli: Main effects and interactions

This figure summarizes the results of hypothesis 2b.

```
# Figure main effect of Dyadic sexual desire (Attractive person) on Subjective sexual arousal
h2b.1 <- ggplot(m2b@frame, aes(x = `Dyadic sexual desire (Attractive person)` (C),
                                y = predict(m2b))) +
  geom_jitter(alpha = 0.01) +
  geom_smooth(method = "lm") +
  labs(y = "Subjective sexual arousal") +
  theme_tq()

# Figure interaction between Stimulus sex and gender
## Calculate estimated marginal means
emms.m2b <- emmeans(m2b, ~ factor(`Stimulus sex`) | Gender,
                      adjust = "bonferroni") #asymptotic degrees of freedom
emms.m2b.tab <- tibble(data.frame(emms.m2b)) |>
  rename("Stimulus sex" = Stimulus.sex) |>
  mutate("Subjective sexual arousal" = emmean)
t.m2b <- contr.stars(emms.m2b) |>
  mutate(p.value = pval.lev(p.value))
m2b.dat <- m2b@frame |>
  mutate(`Subjective sexual arousal` = predict(m2b))

## plot
h2b.2 <- ggplot(m2b.dat, aes(x = `Stimulus sex`,
                                y = `Subjective sexual arousal`,
                                color = `Stimulus sex`)) +
  geom_violin() +
  geom_jitter(alpha = 0.01, width = 0.1) +
  scale_color_manual(values = color.StimuliSex) +
  scale_fill_manual(values = color.StimuliSex) +
  facet_wrap(~Gender) +
```

```

geom_errorbar(data = emms.m2b.tab,
              mapping = aes(ymin = asymp.LCL, ymax = asymp.UCL),
              colour = "black", width = 0.1) +
geom_point(data = emms.m2b.tab,
            shape = 21, size = 3,
            color = "black", fill = "white") +
stat_pvalue_manual(t.m2b,
                   label = "p.signif",
                   y.position = c(5.8,7.8),
                   tip.length = 0) +
labs(y = " ") +
ylim(c(0, 8.5)) +
theme_tq() +
theme(legend.position = "none")

# Figure interaction between gender and Solitary sexual desire
h2b.3 <- interact_plot(m2b, pred = "Solitary sexual desire (C)",
                        modx = "Gender",
                        interval = TRUE,
                        colors = color.Gender,
                        y.label = "Subjective sexual\narousal") +
theme_tq()

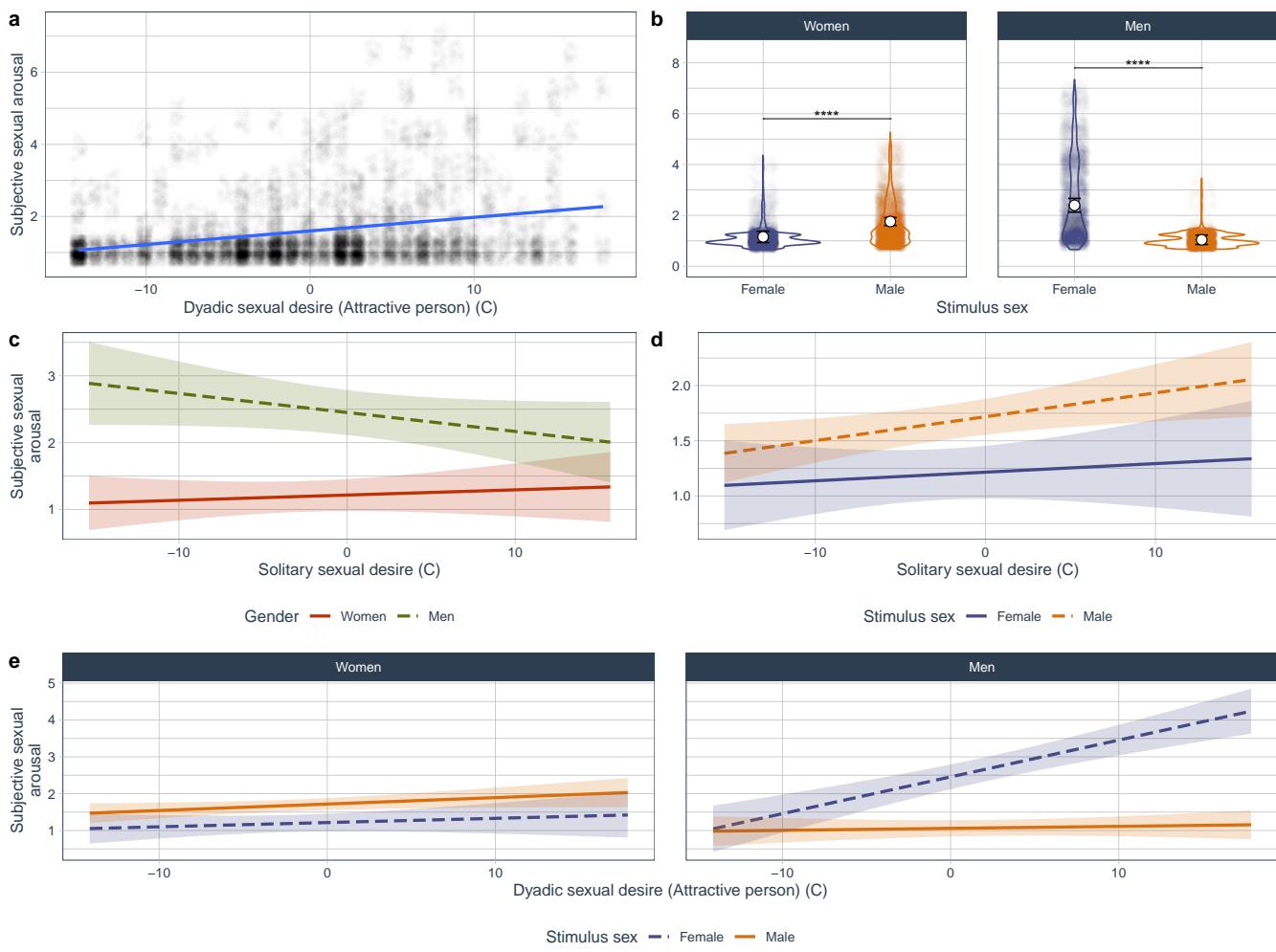
# Figure interaction between Stimulus sex and Solitary sexual desire
h2b.4 <- interact_plot(m2b, pred = "Solitary sexual desire (C)",
                        modx = "Stimulus sex",
                        interval = TRUE,
                        colors = color.StimuliSex,
                        y.label = " ") +
theme_tq()

# Figure interaction between Stimulus sex, gender and Dyadic sexual desire (Attractive person)
h2b.5 <- interact_plot(m2b, pred = "Dyadic sexual desire (Attractive person) (C)",
                        modx = "Stimulus sex",
                        mod2 = "Gender",
                        interval = TRUE,
                        colors = color.StimuliSex,
                        y.label = "Subjective sexual\narousal",
                        mod2.labels = c("Women", "Men")) +
theme_tq()

# Full figure for hypothesis 2b
p2bf <- ggarrange(ggarrange(ggarrange(h2b.1, h2b.2,
                                         nrow = 1,
                                         labels = "auto")),
                    ggarrange(h2b.3, h2b.4,
                              nrow = 1,
                              labels = c("c", "d"),
                              ncol = 2),
                    ggarrange(h2b.5,
                              labels = "e",
                              legend = "bottom"),
                    nrow = 3,
                    ncol = 1)

p2bf

```



**Figure S7.** Subjective sexual arousal to non-erotic stimuli: Significant main effects and interactions of model 2B. **(a)** Main effect of Dyadic sexual desire (Attractive person) on Subjective sexual arousal; **(b)** interaction between Stimulus sex and gender (significant effects of stimulus sex by participant gender are represented with lines and stars: \*\*\*\* $p < 0.0001$ . White dots and black bars represent estimated marginal means and 95% CI, calculated from 1000 bootstrapped simulations); **(c)** interaction between Gender and Solitary sexual desire; **(d)** interaction between Stimulus sex and Solitary sexual desire; **(e)** interaction between Stimulus sex, gender and Dyadic sexual desire (Attractive person). For detailed results of the model, see Table S11). *Women* and *Men* refer to the gender of the participants and *Female* and *Male* to the sex of the stimuli. To better represent the associations between predictor variables and subjective sexual arousal within the model (i.e. when including all other effects), in all cases the Y axis represents values predicted by the model instead of raw values.

## 4 Session info (for reproducibility)

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

R version 4.2.2 (2022-10-31 ucrt)

Platform: x86\_64-w64-mingw32/x64 (64-bit)

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

other attached packages: *pander(v.0.6.5)*, *Hmisc(v.4.7-2)*, *Formula(v.1.2-4)*, *survival(v.3.4-0)*, *lattice(v.0.20-45)*, *berryFunctions(v.1.21.14)*, *rstatix(v.0.7.1)*, *effectsize(v.0.8.2)*, *scales(v.1.2.1)*, *ggpmisc(v.0.5.2)*, *ggpp(v.0.5.0)*, *MetBrewer(v.0.2.0)*, *psych(v.2.2.9)*, *kableExtra(v.1.3.4)*, *performance(v.0.10.2)*, *emmeans(v.1.8.3)*, *interactions(v.1.1.5)*, *tidyquant(v.1.0.6)*, *quantmod(v.0.4.20)*, *TTR(v.0.24.3)*, *PerformanceAnalytics(v.2.0.4)*,

`xts(v.0.12.2), zoo(v.1.8-11), lubridate(v.1.9.0), timechange(v.0.2.0), ggpubr(v.0.5.0),forcats(v.0.5.2), stringr(v.1.5.0), dplyr(v.1.0.10), purrr(v.1.0.1), readr(v.2.1.3), tidyverse(v.1.3.2), tibble(v.3.1.8), ggplot2(v.3.4.0), tidyverse(v.1.3.2), lmerTest(v.3.1-3), lme4(v.1.1-31), Matrix(v.1.5-3), car(v.3.1-1), carData(v.3.0-5), ltm(v.1.2-0), polycor(v.0.8-1), msm(v.1.7), MASS(v.7.3-58.1), readxl(v.1.4.1) and knitr(v.1.41)`

**loaded via a namespace (and not attached):** `backports(v.1.4.1), jtools(v.2.2.1), systemfonts(v.1.0.4), splines(v.4.2.2), TH.data(v.1.1-1), digest(v.0.6.31), htmltools(v.0.5.4), fansi(v.1.0.3), checkmate(v.2.1.0), magrittr(v.2.0.3), cluster(v.2.1.4), googlesheets4(v.1.0.1), see(v.0.7.4), tzdb(v.0.3.0), modelr(v.0.1.10), sandwich(v.3.0-2), svglite(v.2.1.1), jpeg(v.0.1-10), colorspace(v.2.0-3), rvest(v.1.0.3), haven(v.2.5.1), xfun(v.0.36), crayon(v.1.5.2), jsonlite(v.1.8.4), glue(v.1.6.2), gtable(v.0.3.1), gargle(v.1.2.1), webshot(v.0.5.4), MatrixModels(v.0.5-1), Quandl(v.2.11.0), abind(v.1.4-5), SparseM(v.1.81), mvtnorm(v.1.1-3), DBI(v.1.1.3), Rcpp(v.1.0.9), htmlTable(v.2.4.1), viridisLite(v.0.4.1), xtable(v.1.8-4), foreign(v.0.8-83), htmlwidgets(v.1.6.1), datawizard(v.0.6.5), httr(v.1.4.4), RColorBrewer(v.1.1-3), ellipsis(v.0.3.2), pkgconfig(v.2.0.3), farver(v.2.1.1), nnet(v.7.3-18), deldir(v.1.0-6), dbplyr(v.2.3.0), utf8(v.1.2.2), tidyselect(v.1.2.0), labeling(v.0.4.2), rlang(v.1.0.6), munsell(v.0.5.0), celranger(v.1.1.0), tools(v.4.2.2), cli(v.3.6.0), generics(v.0.1.3), broom(v.1.0.2), evaluate(v.0.19), fastmap(v.1.1.0), yaml(v.2.3.6), fs(v.1.5.2), admisc(v.0.30), nlme(v.3.1-160), quantreg(v.5.94), xml2(v.1.3.3), compiler(v.4.2.2), rstudioapi(v.0.14), png(v.0.1-8), curl(v.5.0.0), ggsignif(v.0.6.4), reprex(v.2.0.2), stringi(v.1.7.12), highr(v.0.10), parameters(v.0.20.1), nloptr(v.2.0.3), vctrs(v.0.5.1), pillar(v.1.8.1), lifecycle(v.1.0.3), estimability(v.1.4.1), data.table(v.1.14.6), cowplot(v.1.1.1), insight(v.0.18.8), patchwork(v.1.1.2), latticeExtra(v.0.6-30), R6(v.2.5.1), bookdown(v.0.31), gridExtra(v.2.3), codetools(v.0.2-18), boot(v.1.3-28), assertthat(v.0.2.1), withr(v.2.5.0), mnormt(v.2.1.1), multcomp(v.1.4-20), mgcv(v.1.8-41), bayestestR(v.0.13.0), expm(v.0.999-7), parallel(v.4.2.2), hms(v.1.1.2), rpart(v.4.1.19), quadprog(v.1.5-8), grid(v.4.2.2), coda(v.0.19-4), minqa(v.1.2.5), rmarkdown(v.2.19), googledrive(v.2.0.0), base64enc(v.0.1-3), numDeriv(v.2016.8-1.1) and interp(v.1.1-3)`

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