Figures and tables

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Load packages

```
source("scripts/packages.R")
```

```
## Importing fonts may take a few minutes, depending on the number of fonts and the speed of the system
## Continue? [y/n]
```

1 Load data

```
load("data/ads_imgs_vids.RData") %>%
    suppressWarnings()
```

2 Main text

2.1 General descriptives

```
# Subset to those without missings
ads_imgs_vids <- filter(ads_imgs_vids, !is.na(pg_party_family_name) & !(pg_party_family_name %in%
    c("no family")) & !is.na(only_women) & !is.na(parlgov_id) & !is.na(faces_any_fem))
dim(ads_imgs_vids)
```

```
## [1] 62747    21
```

```
# Share of ads with image
mean(ads_imgs_vids$is_img) %>%
    round(2)
```

```
## [1] 0.44
```

```
# Share of ads with video
mean(ads_imgs_vids$is_video) %>%
    round(2)
```

```
## [1] 0.48
```

```
# Share of ads without image and video
mean(ads_imgs_vids$is_img == 0 & ads_imgs_vids$is_video == 0) %>%
    round(2)
```

```
## [1] 0.08
```

```r
# Share of images with one or more faces
mean(filter(ads_imgs_vids, is_img == 1)$nfaces > 0) %>%
    round(2)
```

```
## [1] 0.49
```

```r
# Share of images with one faces (of images with one or more)
mean(filter(ads_imgs_vids, is_img == 1 & nfaces > 0)$nfaces == 1) %>%
    round(2)
```

```
## [1] 0.73
```

```r
# Share of images with women
mean(filter(ads_imgs_vids, is_img == 1 & nfaces > 0)$faces_any_fem) %>%
    round(2)
```

```
## [1] 0.48
```

```r
# Share of images with men
mean(filter(ads_imgs_vids, is_img == 1 & nfaces > 0)$faces_any_mal) %>%
    round(2)
```

```
## [1] 0.66
```

```r
# Share of ads only seen by women
mean(ads_imgs_vids$only_women) %>%
    round(2)
```

```
## [1] 0.17
```

2.2 Figure 1b: Example ad with data from the Facebook Ad Library: Demograhpic audience composition

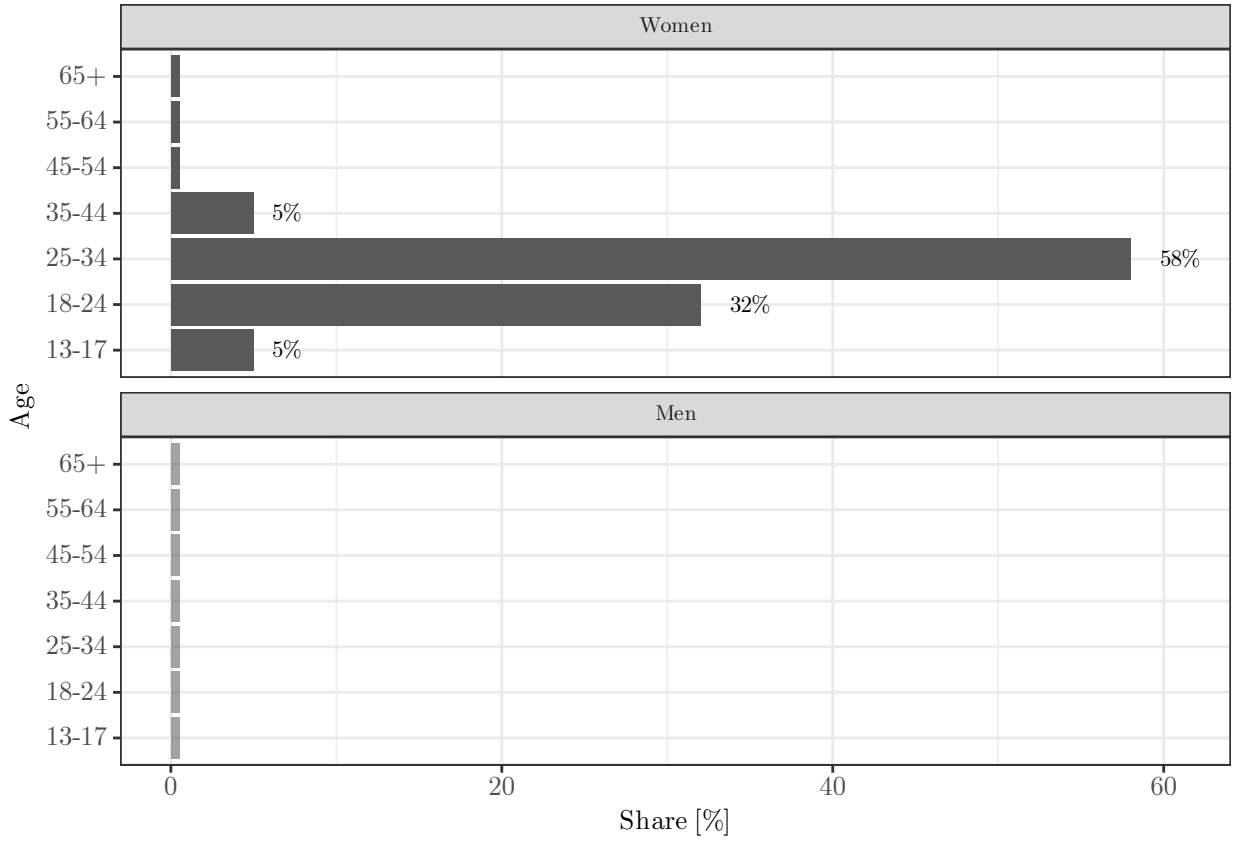
```r
# ads_imgs_vids %>% filter(id == 274917136782587)

example <- data.frame(Gender = c("Men", "Women", "Unknown", "Men", "Women", "Unknown", "Men", "Women",
           age = c("13-17", "13-17", "13-17", "18-24", "18-24", "18-24", "25-34", "25-34", "25-34", "35-

           label = c(NA,5,NA,NA,32,NA,NA,58,NA,NA,5,NA,NA,NA,NA,NA,NA,NA,NA,NA),
           Share = c(.5,5,.5,.5,32,.5,.5,58,.5,.5,5,.5,.5,.5,.5,.5,.5,.5,.5,.5),
           dist = c(3,7,3,3,35,3,3,61,3,3,7,3,3,3,3,3,3,3,3,3))
example$Gender <- factor(example$Gender, levels = c("Unknown", "Women", "Men"))

ggplot(example %>% filter(Gender != "Unknown"), aes(y = Share, x = age)) +
  geom_bar(stat = "identity", position = "dodge", aes(alpha = ifelse(Gender == "Women", NA, 0.6))) +
  geom_text(aes(y = dist, label = str_c(label, "%"), family = "LM Roman 10"),
            position = position_dodge(width = 1), size =3) +
  theme_bw() +
```

```
  theme(text = element_text(family = "LM Roman 10", size = 10),
        axis.title = element_text(size = 10),
        axis.text = element_text(size = 10),
        legend.position = c(0.8, 0.8)) +
  scale_fill_manual(values = c("#F8766D", "#00BA38", "#619CFF"), labels = c("Unknown", "Women", "Men"),
  ylab("Share [%]") + guides(alpha = F) +  coord_flip() + xlab("Age") +
  facet_wrap(~Gender, ncol = 1)
```

```
## Warning: A numeric ‘legend.position‘ argument in ‘theme()‘ was deprecated in ggplot2
## 3.5.0.
## i Please use the ‘legend.position.inside‘ argument of ‘theme()‘ instead.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```

```
## Warning: The ‘<scale>‘ argument of ‘guides()‘ cannot be ‘FALSE‘. Use "none" instead as
## of ggplot2 3.3.4.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```

```
## Warning: Removed 10 rows containing missing values or values outside the scale range
## (‘geom_text()‘).
```



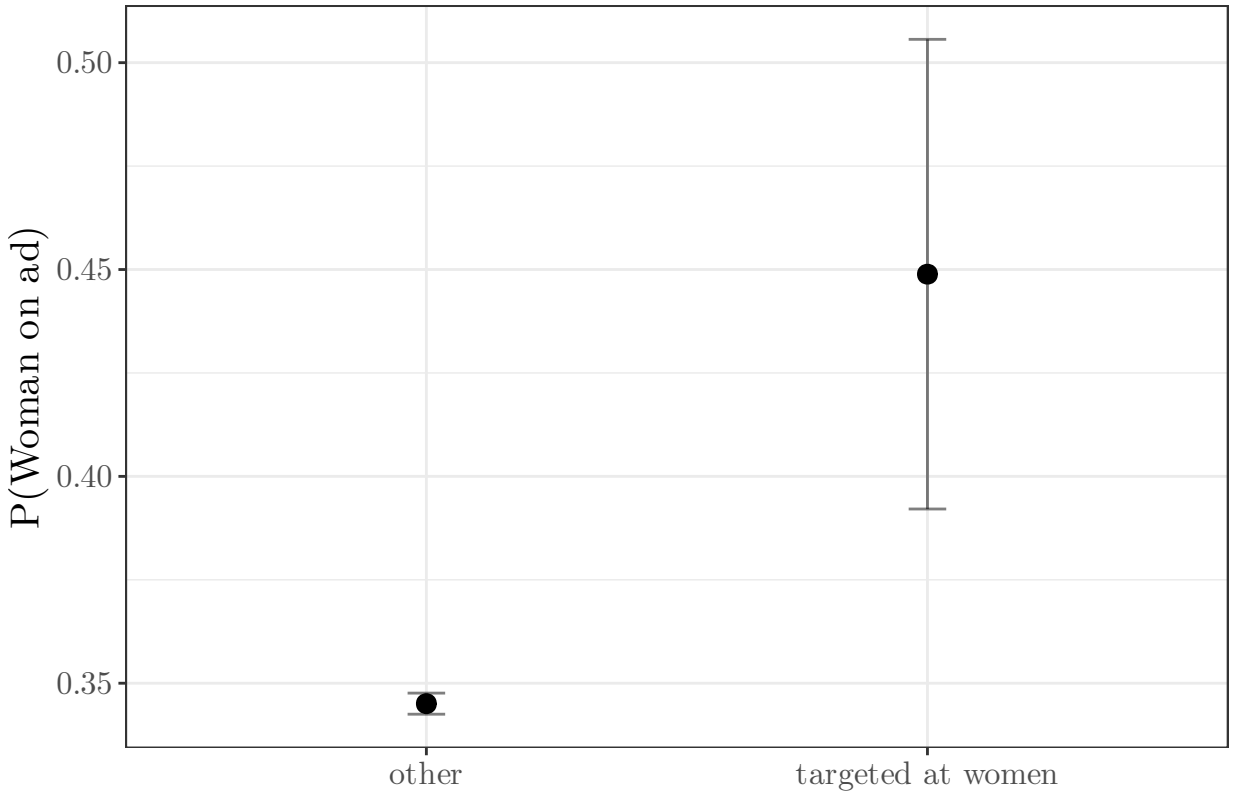
```
ggsave("plots/figure1b_example_ad_audience_composition.pdf", device = cairo_pdf, width = 4, height = 3)
```

```
## Warning: Removed 10 rows containing missing values or values outside the scale range
## (`geom_text()`).
```

2.3 Figure 2: Predicted probabilities for the tailoring to women

```
# Import data from Stata to reproduce plots in ggplot2

margins <- read_dta("stata-output/margins.dta") %>%
    select(c(starts_with("_marg"), starts_with("_ci")))
margins$targeted <- c("other", "targeted at women") %>%
    as.factor()
names(margins) <- str_remove_all(names(margins), "_")

ggplot(margins, (aes(x = targeted))) + geom_point(aes(y = margin), size = 3) + geom_errorbar(aes(ymin =
    ymax = ciub), width = 0.075, size = 0.5, alpha = 0.5) + ylab("P(Woman on ad)") +
    xlab("") + theme_bw() + theme(text = element_text(family = "LM Roman 10", size = 15))
```

```
## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use `linewidth` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```



```
ggsave("plots/figure2_marginsplot.pdf", device = cairo_pdf, width = 4 * 2^0.5, height = 4)
```

3 SM A: Descriptives

Prepare data frame for targeting and tailoring vars

```
# Calculate the share of ads targeted at women for each party
targeting <- ads_imgs_vids %>%
    dplyr::group_by(parlgov_id) %>%
    dplyr::summarise(n_ads = n(), targeting = mean(only_women, na.rm = T))

# Calculate the share of ads with women for targeted and non-targeted ads for
# each party (tailoring)
tailoring <- ads_imgs_vids %>%
    dplyr::group_by(parlgov_id) %>%
    dplyr::group_by(parlgov_id, only_women) %>%
    filter(!is.na(only_women)) %>%
    dplyr::summarise(any_fem_mean = mean(faces_any_fem, na.rm = T), nfaces_mean = mean(nfaces,
        na.rm = T)) %>%
    pivot_wider(id_cols = c(parlgov_id), names_from = only_women, values_from = any_fem_mean) %>%
    dplyr::rename(yes = `TRUE`, no = `FALSE`) %>%
    mutate(tailoring = yes - no) %>%
    filter(!is.na(tailoring))
```

```
## `summarise()` has grouped output by 'parlgov_id'. You can override using the
## `.groups` argument.
```

```
# Merge targeting and tailoring
tail_targ <- merge(targeting, tailoring, by = "parlgov_id", all = T)

# Add party info from ParlGov
parties <- read.csv("data/view_party.csv", encoding = "UTF-8") %>%
    dplyr::rename(id = party_id) %>%
    merge(info_id <- read.csv("data/info_id.csv") %>%
        filter(table_variable == "party_family") %>%
        select(c(id, name)) %>%
        dplyr::rename(family_id = id, party_family_name = name), by = "family_id")
names(parties) <- names(parties) %>%
    str_c("parlgov_", .)

# Merge tailoring and targeting variables
tail_targ <- merge(tail_targ, parties, by = "parlgov_id", all.x = T)

# Calculate the average age and gender of the audience for each party
age_gender_targeting <- ads_imgs_vids %>%
    group_by(parlgov_id) %>%
    dplyr::summarise(audience_avg_age = mean(audience_avg_age, na.rm = T), fem_audience = mean(fem_audi
        na.rm = T), n_ads = n()) %>%
    merge(parties, by = "parlgov_id") %>%
    filter(parlgov_family_name != "no family")
```

3.1 Table with tailoring and targeting vars (Table A.1)

```
# Produce latex table
tail_targ %>%
    merge(select(age_gender_targeting, c(parlgov_id, audience_avg_age)), by = "parlgov_id") %>%
    select(c(parlgov_id, parlgov_party_name_short, parlgov_family_name_short, n_ads,
        targeting, tailoring, audience_avg_age, parlgov_country_name)) %>%
    mutate(audience_avg_age = round(audience_avg_age, 1)) %>%
    stargazer(summary = F, type = "latex", rownames = F, out = "tables/table_a1_tailoring_targeting.tex
```

```
##
## % Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac a
## % Date and time: Mon, Jan 27, 2025 - 13:53:11
## \begin{table}[!htbp] \centering
##   \caption{}
##   \label{}
## \begin{tabular}{@{\extracolsep{5pt}} cccccccc}
## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
## parlgov\_id & parlgov\_party\_name\_short & parlgov\_family\_name\_short & n\_ads & targeting & tail
## \hline \\[-1.8ex]
## 1013 & OVP & chr & $199$ & $0.121$ & $$-$0.040$ & $44.600$ & Austria \\
## 1015 & PNL & lib & $165$ & $0.012$ & $0.798$ & $46.500$ & Romania \\
## 1029 & SP & soc & $499$ & $0$ & $$ & $41.200$ & Belgium \\
## 1030 & SVP & spec & $1$ & $0$ & $$ & $44.500$ & Italy \\
## 1045 & TS-LK & con & $39$ & $0$ & $$ & $41.800$ & Lithuania \\
## 1062 & VIHR & eco & $62$ & $0$ & $$ & $32.900$ & Finland \\
## 1072 & SNS & right & $89$ & $0$ & $$ & $40.500$ & Slovakia \\
## 1110 & PVV\textbar VLD & lib & $505$ & $0.008$ & $$-$0.037$ & $43.200$ & Belgium \\
## 1118 & KOK & con & $886$ & $0.003$ & $0.971$ & $49.400$ & Finland \\
## 1120 & PSD & soc & $142$ & $0.007$ & $0.589$ & $44.400$ & Romania \\
## 113 & ERe & lib & $11$ & $0.182$ & $0.500$ & $48.700$ & Estonia \\
## 1137 & EK & soc & $12$ & $0$ & $$ & $33.100$ & Estonia \\
## 1154 & MP & eco & $55$ & $0$ & $$ & $25.900$ & Sweden \\
## 118 & PCE\textbar IU & com & $16$ & $0$ & $$ & $47.600$ & Spain \\
## 1192 & PSC-CDH & chr & $176$ & $0.074$ & $$-$0.143$ & $34.700$ & Belgium \\
## 1206 & CU & chr & $24$ & $0$ & $$ & $38.300$ & Netherlands \\
## 1234 & CSV & chr & $80$ & $0.013$ & $0.709$ & $33.800$ & Luxembourg \\
## 1245 & KDU-CSL & chr & $150$ & $0.267$ & $0.377$ & $40.400$ & Czech Republic \\
## 1277 & LSDP & soc & $41$ & $0$ & $$ & $49$ & Lithuania \\
## 1284 & SNP & soc & $3$ & $0$ & $$ & $36.800$ & United Kingdom \\
## 1292 & DL\textbar VAS & com & $111$ & $0$ & $$ & $27.400$ & Finland \\
## 1338 & PASOK & soc & $51$ & $0.078$ & $0.160$ & $45.600$ & Greece \\
## 1361 & PNV & chr & $69$ & $0$ & $$ & $40.400$ & Spain \\
## 1378 & PS & soc & $143$ & $0.014$ & $0.230$ & $41.600$ & Belgium \\
## 1384 & HNS & lib & $18$ & $0$ & $$ & $43.300$ & Croatia \\
## 1409 & VVD & lib & $97$ & $0$ & $$ & $38.200$ & Netherlands \\
## 1418 & DF & right & $24$ & $0$ & $$ & $47.400$ & Denmark \\
## 1421 & TT-LDP & con & $99$ & $0$ & $$ & $33.600$ & Lithuania \\
## 1429 & Gruene & eco & $181$ & $0.050$ & $0.253$ & $28.300$ & Austria \\
## 1432 & KDH & chr & $16$ & $0$ & $$ & $45.300$ & Slovakia \\
## 1436 & LN & right & $60$ & $0$ & $$ & $45$ & Italy \\
## 1448 & SDE\textbar M & soc & $59$ & $0.288$ & $0.262$ & $40.600$ & Estonia \\
```

```
## 1461 & C & agr & $408$ & $0.150$ & $0.049$ & $39.900$ & Sweden \\
## 1463 & KD & chr & $6$ & $0$ & $$ & $56.300$ & Finland \\
## 1465 & HSS & agr & $6$ & $0$ & $$ & $48.600$ & Croatia \\
## 1493 & SPH & soc & $40$ & $0.025$ & $0.385$ & $34.600$ & Croatia \\
## 1520 & PCTVL & soc & $11$ & $0$ & $$ & $46.500$ & Latvia \\
## 1521 & Fi & spec & $39$ & $0.077$ & $0.611$ & $34.700$ & Sweden \\
## 1546 & SD & right & $99$ & $0$ & $$ & $46.500$ & Sweden \\
## 1556 & Lab & soc & $557$ & $0.005$ & $$-$0.146$ & $42.100$ & United Kingdom \\
## 1573 & Green & eco & $11$ & $0$ & $$ & $30.800$ & Ireland \\
## 1575 & DISY & con & $36$ & $0$ & $$ & $34.800$ & Cyprus \\
## 1582 & AR\textbar ADR & con & $22$ & $0$ & $$ & $40.800$ & Luxembourg \\
## 1591 & MSZP & soc & $160$ & $0$ & $$ & $42.100$ & Hungary \\
## 1592 & SYRIZA & com & $22$ & $0$ & $$ & $41.300$ & Greece \\
## 1594 & AGL-Gr & eco & $336$ & $0$ & $$ & $37.600$ & Belgium \\
## 1597 & IRL & con & $34$ & $0$ & $$ & $39.700$ & Estonia \\
## 1605 & V & lib & $425$ & $0.026$ & $0.122$ & $41.500$ & Denmark \\
## 161 & Ecolo & eco & $67$ & $0.090$ & $0.205$ & $37.600$ & Belgium \\
## 1620 & MH & con & $42$ & $0$ & $$ & $46$ & Slovakia \\
## 1629 & Sd & soc & $169$ & $0$ & $$ & $41.100$ & Denmark \\
## 1644 & SF & eco & $127$ & $0.039$ & $0.254$ & $43.700$ & Denmark \\
## 1666 & V & con & $77$ & $0$ & $$ & $37.300$ & Latvia \\
## 1727 & CDU+CSU & chr & $9,423$ & $0.0001$ & $$-$0.274$ & $35.600$ & Germany \\
## 1759 & OLaNO & con & $49$ & $0.102$ & $0.082$ & $34.300$ & Slovakia \\
## 196 & SZ & eco & $15$ & $0.400$ & $0$ & $33.900$ & Czech Republic \\
## 1970 & DK & soc & $183$ & $0.022$ & $0.291$ & $52.300$ & Hungary \\
## 2 & TOP09 & con & $42$ & $0$ & $$ & $26$ & Czech Republic \\
## 200 & SP\textbar P & agr & $21$ & $0$ & $$ & $38.200$ & Finland \\
## 2091 & ANEL & right & $111$ & $0$ & $$ & $37.900$ & Greece \\
## 2109 & 50+ & lib & $1$ & $0$ & $$ & $63.400$ & Netherlands \\
## 2154 & FdI-CN & con & $115$ & $0$ & $$ & $46.800$ & Italy \\
## 220 & Smer & soc & $32$ & $0.062$ & $0.367$ & $47.600$ & Slovakia \\
## 2217 & SF & com & $18$ & $0.056$ & $$-$0.706$ & $41.200$ & Ireland \\
## 2253 & AfD & right & $29$ & $0$ & $$ & $45.900$ & Germany \\
## 2255 & NEOS & lib & $121$ & $0.008$ & $0.650$ & $30.100$ & Austria \\
## 2256 & Pi & spec & $71$ & $0.056$ & $0.086$ & $38.600$ & Luxembourg \\
## 2261 & Pi & spec & $178$ & $0$ & $$ & $33.900$ & Czech Republic \\
## 2263 & ANO & lib & $33$ & $0$ & $$ & $37.600$ & Czech Republic \\
## 2337 & ZaAB & soc & $9$ & $0.111$ & $0.375$ & $43.800$ & Slovenia \\
## 2341 & SYM & soc & $50$ & $0.020$ & $0.837$ & $45.500$ & Cyprus \\
## 2346 & TP & soc & $26$ & $0$ & $$ & $36.200$ & Greece \\
## 235 & CDA & chr & $16$ & $0$ & $$ & $51.900$ & Netherlands \\
## 2375 & C-PC & lib & $5,370$ & $0.162$ & $0.014$ & $43.800$ & Spain \\
## 2380 & Vox & right & $20$ & $0.100$ & $$-$0.222$ & $44$ & Spain \\
## 2395 & PMP & chr & $30$ & $0$ & $$ & $46.100$ & Romania \\
## 256 & PA-PTB & com & $11$ & $0$ & $$ & $40.400$ & Belgium \\
## 2600 & K & right & $177$ & $0$ & $$ & $36.500$ & Poland \\
## 2612 & ZiZi & right & $2$ & $0$ & $$ & $39.300$ & Croatia \\
## 2623 & SR & right & $15$ & $0$ & $$ & $35.800$ & Slovakia \\
## 2625 & Razem & soc & $98$ & $0.153$ & $$-$0.118$ & $43.300$ & Poland \\
## 2647 & ALDE & lib & $82$ & $0.183$ & $$-$0.045$ & $45.100$ & Romania \\
## 2659 & MM & con & $401$ & $0$ & $$ & $44.300$ & Hungary \\
## 2668 & LMS & soc & $37$ & $0$ & $$ & $41.500$ & Slovenia \\
## 2670 & L & com & $26$ & $0$ & $$ & $45.200$ & Slovenia \\
## 2717 & JKP & con & $37$ & $0.054$ & $$-$0.086$ & $43.600$ & Latvia \\
```

```
## 2724 & UP & com & $395$ & $0.094$ & $0.014$ & $39.100$ & Spain \\
## 2729 & BP & spec & $131$ & $0$ & $$ & $49.800$ & United Kingdom \\
## 2730 & CUK & spec & $548$ & $0$ & $$ & $49.700$ & United Kingdom \\
## 2737 & +EU & lib & $13$ & $0$ & $$ & $34.400$ & Italy \\
## 2740 & WIO & soc & $59$ & $0.085$ & $0.778$ & $31.800$ & Poland \\
## 2750 & KU & chr & $18$ & $0$ & $$ & $35.600$ & Slovakia \\
## 2751 & PS & lib & $279$ & $0$ & $$ & $38$ & Slovakia \\
## 276 & HDZ & chr & $57$ & $0$ & $$ & $40.700$ & Croatia \\
## 280 & FF & con & $58$ & $0.086$ & $0.442$ & $37.800$ & Ireland \\
## 282 & KD & chr & $209$ & $0.029$ & $0.340$ & $48.700$ & Sweden \\
## 306 & En-O & com & $92$ & $0$ & $$ & $39.500$ & Denmark \\
## 310 & Greng & eco & $161$ & $0.311$ & $$-$0.028$ & $32.500$ & Luxembourg \\
## 311 & Plaid & spec & $23$ & $0$ & $$ & $37.600$ & United Kingdom \\
## 318 & Lab & soc & $17$ & $0$ & $$ & $32$ & Ireland \\
## 345 & D66 & lib & $93$ & $0$ & $$ & $36$ & Netherlands \\
## 357 & SP & com & $241$ & $0$ & $$ & $51.700$ & Netherlands \\
## 360 & AD & eco & $20$ & $0$ & $$ & $39.300$ & Malta \\
## 363 & SSO & con & $62$ & $0$ & $$ & $39.300$ & Czech Republic \\
## 376 & NLA & lib & $542$ & $0$ & $$ & $37.300$ & Denmark \\
## 382 & PD & soc & $241$ & $0$ & $$ & $43.900$ & Italy \\
## 395 & SSDP & soc & $108$ & $0.009$ & $0.290$ & $42.100$ & Finland \\
## 403 & LMP & eco & $93$ & $0.032$ & $$-$0.122$ & $41.200$ & Hungary \\
## 417 & ERa/EKR & con & $10$ & $0$ & $$ & $35$ & Estonia \\
## 437 & Fi+KDNP & con & $304$ & $0$ & $$ & $49.200$ & Hungary \\
## 438 & Pp & con & $22$ & $0.045$ & $0.333$ & $43.400$ & Belgium \\
## 457 & DL & com & $32$ & $0$ & $$ & $28.800$ & Luxembourg \\
## 465 & S & com & $29$ & $0$ & $$ & $52.800$ & Italy \\
## 467 & GP & eco & $101$ & $0$ & $$ & $35$ & United Kingdom \\
## 47 & ND & chr & $102$ & $0.010$ & $$-$0.158$ & $35.700$ & Greece \\
## 50 & FPO & right & $154$ & $0$ & $$ & $37.500$ & Austria \\
## 501 & N-VA & con & $156$ & $0.006$ & $0.781$ & $38.200$ & Belgium \\
## 512 & PO & con & $579$ & $0.009$ & $0.457$ & $44.700$ & Poland \\
## 520 & BNG & spec & $7$ & $0$ & $$ & $40.800$ & Spain \\
## 528 & PiS & con & $102$ & $0.010$ & $$-$0.535$ & $42.400$ & Poland \\
## 543 & FDP & lib & $1,512$ & $0.364$ & $0.009$ & $36.800$ & Germany \\
## 558 & SPD & soc & $8,121$ & $0.522$ & $$-$0.005$ & $39.200$ & Germany \\
## 572 & AKEL & com & $181$ & $0$ & $$ & $40.700$ & Cyprus \\
## 581 & DP & lib & $62$ & $0$ & $$ & $44.400$ & Lithuania \\
## 585 & RKP-SFP & lib & $67$ & $0$ & $$ & $46.700$ & Finland \\
## 590 & KF & con & $176$ & $0.011$ & $0.828$ & $42.300$ & Denmark \\
## 596 & FI-PdL & con & $25$ & $0$ & $$ & $45.400$ & Italy \\
## 600 & Jobbik & right & $91$ & $0.011$ & $0.867$ & $43.900$ & Hungary \\
## 645 & AP-P & con & $3,384$ & $0.530$ & $0.042$ & $48.600$ & Spain \\
## 657 & M & con & $306$ & $0.029$ & $$-$0.192$ & $47.400$ & Sweden \\
## 659 & Lib & lib & $4,985$ & $0.421$ & $$-$0.017$ & $35$ & United Kingdom \\
## 701 & LSAP & soc & $147$ & $0$ & $$ & $39.100$ & Luxembourg \\
## 706 & ZL-SD & soc & $366$ & $0$ & $$ & $41.300$ & Slovenia \\
## 723 & CVP\textbar CD&V & chr & $346$ & $0$ & $$ & $38.800$ & Belgium \\
## 742 & PvdA & soc & $69$ & $0.014$ & $0.735$ & $43.100$ & Netherlands \\
## 749 & Fobe & spec & $1$ & $0$ & $$ & $39.200$ & Denmark \\
## 756 & GL & eco & $98$ & $0$ & $$ & $32.200$ & Netherlands \\
## 757 & ERC & spec & $447$ & $0.011$ & $0.363$ & $43.400$ & Spain \\
## 772 & B90/Gru & eco & $5,971$ & $0.027$ & $$-$0.189$ & $34.200$ & Germany \\
## 773 & Con & con & $2,082$ & $0.021$ & $$-$0.492$ & $46.600$ & United Kingdom \\
```

```
## 789 & CSSD & soc & $2,113$ & $0.155$ & $0.044$ & $44.600$ & Czech Republic \\
## 791 & PDS\textbar Li & com & $910$ & $0.003$ & $0.022$ & $38.200$ & Germany \\
## 829 & ODS & con & $37$ & $0$ & $$ & $38.200$ & Czech Republic \\
## 851 & DIKO & con & $46$ & $0$ & $$ & $49.600$ & Cyprus \\
## 865 & Pi & spec & $13$ & $0$ & $$ & $37.700$ & Germany \\
## 882 & V & com & $131$ & $0.328$ & $0.215$ & $38.900$ & Sweden \\
## 892 & FP & lib & $110$ & $0$ & $$ & $38.400$ & Sweden \\
## 902 & PSOE & soc & $18$ & $0$ & $$ & $34.800$ & Spain \\
## 904 & SAP & soc & $575$ & $0.626$ & $0.311$ & $43.500$ & Sweden \\
## 915 & MR & lib & $286$ & $0$ & $$ & $25.500$ & Belgium \\
## 94 & KESK & agr & $1$ & $0$ & $$ & $42.900$ & Finland \\
## 945 & EDEK & soc & $108$ & $0$ & $$ & $40.300$ & Cyprus \\
## 967 & DP & lib & $38$ & $0$ & $$ & $36.800$ & Luxembourg \\
## 969 & FDF & lib & $185$ & $0$ & $$ & $45$ & Belgium \\
## 973 & SPO & soc & $813$ & $0.048$ & $0.106$ & $40.700$ & Austria \\
## 984 & PN & con & $46$ & $0$ & $$ & $39.600$ & Malta \\
## 990 & PvdD & spec & $29$ & $0$ & $$ & $42.400$ & Netherlands \\
## 993 & VB & right & $167$ & $0.006$ & $$-$0.193$ & $37.700$ & Belgium \\
## \hline \\[-1.8ex]
## \end{tabular}
## \end{table}
```

3.2 Summary statistics (Table A.2)

```
# Make var factor
ads_imgs_vids$pg_party_family_name <- factor(ads_imgs_vids$pg_party_family_name,
    levels = c("Communist/Socialist", "Green/Ecologist", "Social democracy", "Christian democracy",
        "Liberal", "Conservative", "Right-wing", "Special issue", "Agrarian"))

# Prepare summary statistics for party families
sum_stats <- ads_imgs_vids %>%
    filter(!(pg_party_family_name %in% c("Special issue", "Agrarian", "Communist/Socialist"))) %>%
    dplyr::group_by(pg_party_family_name) %>%
    dplyr::summarize(`Number of ads` = dplyr::n() %>%
        comma(), `Unique parties` = unique(parlgov_id) %>%
        length, `Unique countries` = unique(country) %>%
        length, `Ads with text only [%]` = round(mean(!is_img & !is_video) * 100,
        1), `Ads with images [%]` = round(mean(is_img) * 100, 1), `  - Ads targeted at women [%]` = rou
        1) * 100, 1), `  - Avg. women audience [%]` = round(mean(fem_audience[is_img] *
        100, na.rm = T), 1), `  - Avg. audience age [y]` = round(mean(audience_avg_age[is_img],
        na.rm = T), 1), `  - Any woman [%]` = mean(faces_any_fem[is_img] * 100) %>%
        round(1), `  - Only women [%]` = mean(faces_all_fem[is_img] * 100) %>%
        round(1), `  - With faces [%]` = round(mean(nfaces[is_img] > 0, na.rm = T) *
        100, 1), `    - Avg. number of faces` = mean(nfaces[is_img & nfaces > 0],
        na.rm = T) %>%
        round(1), `    - Avg. age of faces [y]` = mean(faces_age_mean[is_img & nfaces >
        0], na.rm = T) %>%
        round(1), `Ads with videos [%]` = round(mean(is_video) * 100, 1), `  - Ads targeted at women [%
        1) * 100, 1), `  - Avg. women audience [%] ` = round(mean(fem_audience[is_video] *
        100, na.rm = T), 1), `  - Avg. audience age [y] ` = round(mean(audience_avg_age[is_video],
        na.rm = T), 1), `  - Any woman [%] ` = mean(faces_any_fem[is_video] * 100) %>%
        round(1), `  - Only women [%] ` = mean(faces_all_fem[is_video] * 100) %>%
```

```
        round(1), `  - With faces [%] ` = round(mean(nfaces[is_video] > 0, na.rm = T) *
        100, 1), `    - Avg. number of faces ` = mean(nfaces[is_video & nfaces >
        0], na.rm = T) %>%
        round(1), `    - Avg. age of faces [y] ` = mean(faces_age_mean[is_video &
        nfaces > 0], na.rm = T) %>%
        round(1), ) %>%
    t %>%
    as.data.frame()

# Prepare summary statistics for all parties, and add to other columns
sum_stats <- ads_imgs_vids %>%
    mutate(pg_party_family_name = "All") %>%
    dplyr::group_by(pg_party_family_name) %>%
    dplyr::summarize(`Number of ads` = dplyr::n() %>%
        comma(), `Unique parties` = unique(parlgov_id) %>%
        length, `Unique countries` = unique(country) %>%
        length, `Ads with text only [%]` = round(mean(!is_img & !is_video) * 100,
        1), `Ads with images [%]` = round(mean(is_img) * 100, 1), `  - Ads targeted at women [%]` = rou
        1) * 100, 1), `  - Avg. women audience [%]` = round(mean(fem_audience[is_img] *
        100, na.rm = T), 1), `  - Avg. audience age [y]` = round(mean(audience_avg_age[is_img],
        na.rm = T), 1), `  - Any woman [%]` = mean(faces_any_fem[is_img] * 100) %>%
        round(1), `  - Only women [%]` = mean(faces_all_fem[is_img] * 100) %>%
        round(1), `  - With faces [%]` = round(mean(nfaces[is_img] > 0, na.rm = T) *
        100, 1), `    -- Avg. number of faces` = mean(nfaces[is_img & nfaces > 0],
        na.rm = T) %>%
        round(1), `    -- Avg. age of faces [y]` = mean(faces_age_mean[is_img & nfaces >
        0], na.rm = T) %>%
        round(1), `Ads with videos [%]` = round(mean(is_video) * 100, 1), `  - Ads targeted at women [%
        1) * 100, 1), `  - Avg. women audience [%] ` = round(mean(fem_audience[is_video] *
        100, na.rm = T), 1), `  - Avg. audience age [y] ` = round(mean(audience_avg_age[is_video],
        na.rm = T), 1), `  - Any woman [%] ` = mean(faces_any_fem[is_video] * 100) %>%
        round(1), `  - Only women [%] ` = mean(faces_all_fem[is_video] * 100) %>%
        round(1), `  - With faces [%] ` = round(mean(nfaces[is_video] > 0, na.rm = T) *
        100, 1), `    - Avg. number of faces ` = mean(nfaces[is_video & nfaces >
        0], na.rm = T) %>%
        round(1), `    - Avg. age of faces [y] ` = mean(faces_age_mean[is_video &
        nfaces > 0], na.rm = T) %>%
        round(1), ) %>%
    t %>%
    as.data.frame() %>%
    cbind(sum_stats)


names(sum_stats) <- sum_stats[1, ]
sum_stats <- sum_stats[-1, ]
sum_stats
```

```
##                                 All Green/Ecologist Social democracy
## Number of ads                62,747           7,298           15,077
## Unique parties                  158              14               33
## Unique countries                 25              13               24
## Ads with text only [%]          8.4             0.1              1.8
## Ads with images [%]            43.5            32.5             66.9
```

```
##   - Ads targeted at women [%]    16.5             5.4             23.3
##   - Avg. women audience [%]      52.7            58.3             53.7
##   - Avg. audience age [y]        40.6            35.9             40.8
##   - Any woman [%]                23.5            23.8             36.2
##   - Only women [%]               16.8            14.6             27.5
##   - With faces [%]               49.4            48.4             59.8
##     -- Avg. number of faces       1.7             1.4              1.8
##     -- Avg. age of faces [y]     36.7            33.9             37.8
## Ads with videos [%]              48.1            67.4             31.4
##   - Ads targeted at women [%]     5.3             0.5             18.2
##   - Avg. women audience [%]      50.7            57.2             50.3
##   - Avg. audience age [y]        38.1            33.6             41.1
##   - Any woman [%]                37.4            49.4             35.0
##   - Only women [%]                9.3             1.4             11.4
##   - With faces [%]                 62            72.8             63.9
##     - Avg. number of faces        1.1             1.1              1.3
##     - Avg. age of faces [y]      35.3            31.2             40.2
##                               Christian democracy Liberal Conservative
## Number of ads                              10,921  15,000        9,274
## Unique parties                                16      23           29
## Unique countries                              13      17           18
## Ads with text only [%]                       0.1    22.2         15.6
## Ads with images [%]                         10.9    44.8         47.6
##   - Ads targeted at women [%]                3.5    15.0         20.8
##   - Avg. women audience [%]                 44.9    49.1         59.4
##   - Avg. audience age [y]                   40.4    38.2         45.3
##   - Any woman [%]                           26.7    12.4         15.1
##   - Only women [%]                          16.3     7.9         12.4
##   - With faces [%]                          61.2    36.6         44.9
##     -- Avg. number of faces                  1.7     2.0          1.4
##     -- Avg. age of faces [y]                36.6    35.2         36.0
## Ads with videos [%]                         89.0    33.0         36.8
##   - Ads targeted at women [%]                0.0    11.5          2.5
##   - Avg. women audience [%]                 51.7    45.0         51.5
##   - Avg. audience age [y]                   35.7    37.1         47.2
##   - Any woman [%]                           29.0    33.6         43.5
##   - Only women [%]                           8.1     3.9         25.3
##   - With faces [%]                          38.7    69.3         91.3
##     - Avg. number of faces                   0.8     1.2          0.9
##     - Avg. age of faces [y]                 31.0    34.8         37.0
##                               Right-wing
## Number of ads                      1,038
## Unique parties                        13
## Unique countries                      12
## Ads with text only [%]               7.0
## Ads with images [%]                 57.6
##   - Ads targeted at women [%]        0.2
##   - Avg. women audience [%]         39.3
##   - Avg. audience age [y]           39.9
##   - Any woman [%]                   12.4
##   - Only women [%]                   2.0
##   - With faces [%]                  65.2
##     -- Avg. number of faces          1.8
##     -- Avg. age of faces [y]        38.7
```

```
## Ads with videos [%]                  35.4
##   - Ads targeted at women [%]         0.3
##   - Avg. women audience [%]          29.9
##   - Avg. audience age [y]            40.5
##   - Any woman [%]                    42.0
##   - Only women [%]                    5.4
##   - With faces [%]                   83.1
##     - Avg. number of faces            1.5
##     - Avg. age of faces [y]         38.1
```

```
# Write latex table
stargazer(sum_stats, type = "latex", digits = 1, out = "tables/table_a2_summary_statistics.tex",
    summary = F)
```

```
##
## % Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac a
## % Date and time: Mon, Jan 27, 2025 - 13:53:12
## \begin{table}[!htbp] \centering
##   \caption{}
##   \label{}
## \begin{tabular}{@{\extracolsep{5pt}} cccccccc}
## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
##  & All & Green/Ecologist & Social democracy & Christian democracy & Liberal & Conservative & Right-w
## \hline \\[-1.8ex]
## Number of ads & 62,747 & 7,298 & 15,077 & 10,921 & 15,000 & 9,274 & 1,038 \\
## Unique parties & 158 & 14 & 33 & 16 & 23 & 29 & 13 \\
## Unique countries & 25 & 13 & 24 & 13 & 17 & 18 & 12 \\
## Ads with text only [\%] & 8.4 &  0.1 &  1.8 &  0.1 & 22.2 & 15.6 &  7.0 \\
## Ads with images [\%] & 43.5 & 32.5 & 66.9 & 10.9 & 44.8 & 47.6 & 57.6 \\
##   - Ads targeted at women [\%] & 16.5 &  5.4 & 23.3 &  3.5 & 15.0 & 20.8 &  0.2 \\
##   - Avg. women audience [\%] & 52.7 & 58.3 & 53.7 & 44.9 & 49.1 & 59.4 & 39.3 \\
##   - Avg. audience age [y] & 40.6 & 35.9 & 40.8 & 40.4 & 38.2 & 45.3 & 39.9 \\
##   - Any woman [\%] & 23.5 & 23.8 & 36.2 & 26.7 & 12.4 & 15.1 & 12.4 \\
##   - Only women [\%] & 16.8 & 14.6 & 27.5 & 16.3 &  7.9 & 12.4 &  2.0 \\
##   - With faces [\%] & 49.4 & 48.4 & 59.8 & 61.2 & 36.6 & 44.9 & 65.2 \\
##     -- Avg. number of faces & 1.7 & 1.4 & 1.8 & 1.7 & 2.0 & 1.4 & 1.8 \\
##     -- Avg. age of faces [y] & 36.7 & 33.9 & 37.8 & 36.6 & 35.2 & 36.0 & 38.7 \\
## Ads with videos [\%] & 48.1 & 67.4 & 31.4 & 89.0 & 33.0 & 36.8 & 35.4 \\
##   - Ads targeted at women [\%]  & 5.3 &  0.5 & 18.2 &  0.0 & 11.5 &  2.5 &  0.3 \\
##   - Avg. women audience [\%]  & 50.7 & 57.2 & 50.3 & 51.7 & 45.0 & 51.5 & 29.9 \\
##   - Avg. audience age [y]  & 38.1 & 33.6 & 41.1 & 35.7 & 37.1 & 47.2 & 40.5 \\
##   - Any woman [\%]  & 37.4 & 49.4 & 35.0 & 29.0 & 33.6 & 43.5 & 42.0 \\
##   - Only women [\%]  & 9.3 &  1.4 & 11.4 &  8.1 &  3.9 & 25.3 &  5.4 \\
##   - With faces [\%]  & 62 & 72.8 & 63.9 & 38.7 & 69.3 & 91.3 & 83.1 \\
##     - Avg. number of faces  & 1.1 & 1.1 & 1.3 & 0.8 & 1.2 & 0.9 & 1.5 \\
##     - Avg. age of faces [y]  & 35.3 & 31.2 & 40.2 & 31.0 & 34.8 & 37.0 & 38.1 \\
## \hline \\[-1.8ex]
## \end{tabular}
## \end{table}
```

3.3 Distribution of gender ratio of ad target groups (Figure A.1)

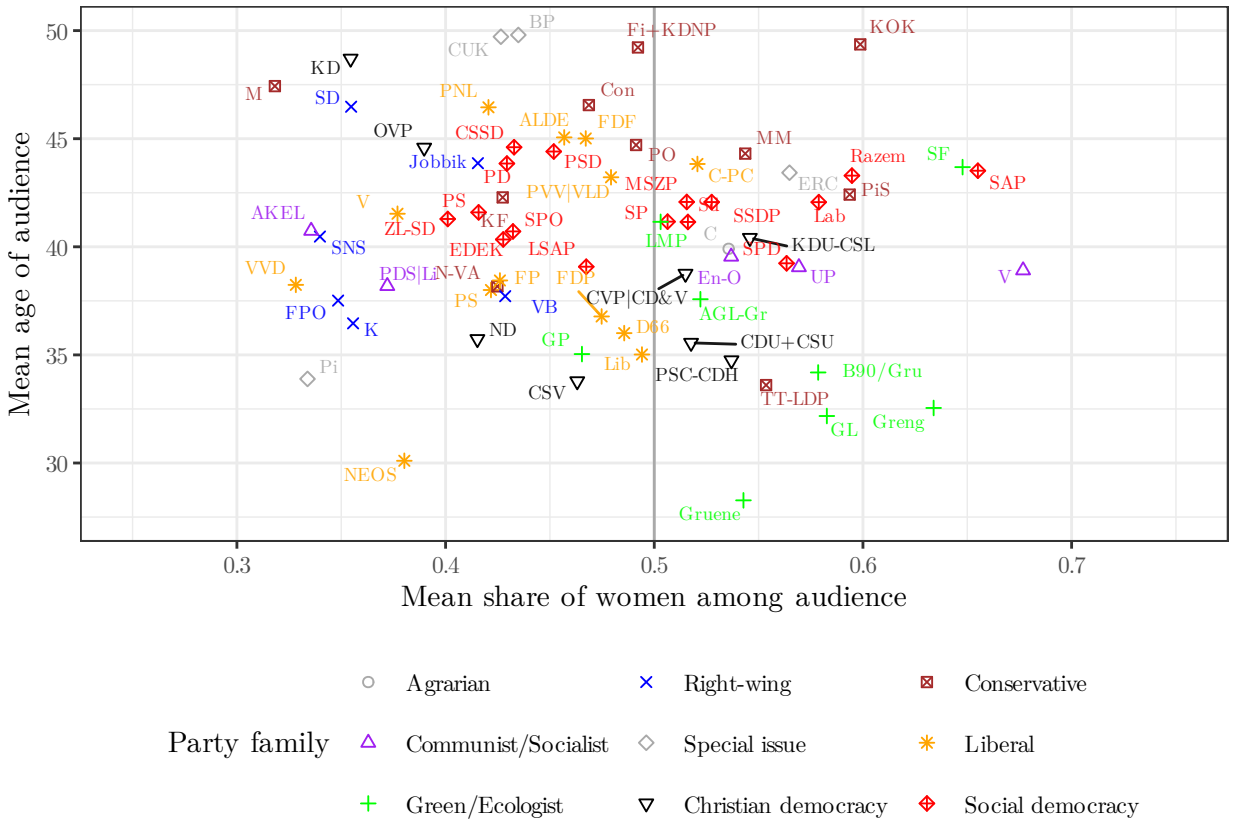
```
# Filter data for median
filtered_data <- age_gender_targeting %>%
    filter(n_ads >= summary(age_gender_targeting$n_ads)["Median"])

# Define breaks, labels, and colors for party families
women_party_family <- c("agr", "com", "eco", "right", "spec", "chr", "con", "lib",
    "soc")
party_labels <- c("Agrarian", "Communist/Socialist", "Green/Ecologist", "Right-wing",
    "Special issue", "Christian democracy", "Conservative", "Liberal", "Social democracy")
party_shapes <- 1:9
party_colors <- c("dark grey", "purple", "green", "blue", "dark grey", "black", "brown",
    "orange", "red")

# Plot
ggplot(filtered_data) + geom_vline(xintercept = 0.5, color = "dark grey") + geom_point(aes(x = fem_audi
    y = audience_avg_age, color = parlgov_family_name_short, shape = parlgov_family_name_short)) +
    ylim(27.5, 50) + xlim(0.25, 0.75) + theme_bw() + theme(legend.position = "bottom",
    text = element_text(family = "LM Roman 10")) + scale_shape_manual(breaks = women_party_family,
    values = party_shapes, labels = party_labels, guide = guide_legend(nrow = 3,
        title = "Party family")) + scale_color_manual(breaks = women_party_family,
    values = party_colors, labels = party_labels, guide = guide_legend(nrow = 3,
        title = "Party family")) + xlab("Mean share of women among audience") + ylab("Mean age of audie
    new_scale_color() + scale_color_manual(breaks = women_party_family, values = party_colors,
    guide = FALSE) + geom_text_repel(aes(x = fem_audience, y = audience_avg_age,
    label = parlgov_party_name_short, color = parlgov_family_name_short), family = "LM Roman 10",
    max.overlaps = 20, size = 2.5, force_pull = 10, force = 0.5, box.padding = 0.2,
    label.padding = 0.1, label.size = 0.15, label.r = 0.075, alpha = 0.9)
```

```
## Warning in geom_text_repel(aes(x = fem_audience, y = audience_avg_age, label =
## parlgov_party_name_short, : Ignoring unknown parameters: ‘label.padding‘,
## ‘label.size‘, and ‘label.r‘
```

```
## Warning: The ‘guide‘ argument in ‘scale_*()‘ cannot be ‘FALSE‘. This was deprecated in
## ggplot2 3.3.4.
## i Please use "none" instead.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```

```
## Warning: Removed 8 rows containing missing values or values outside the scale range
## (‘geom_point()‘).
```

```
## Warning: Removed 8 rows containing missing values or values outside the scale range
## (‘geom_text_repel()‘).
```




```
sum(age_gender_targeting$n_ads)
```

```
## [1] 62747
```

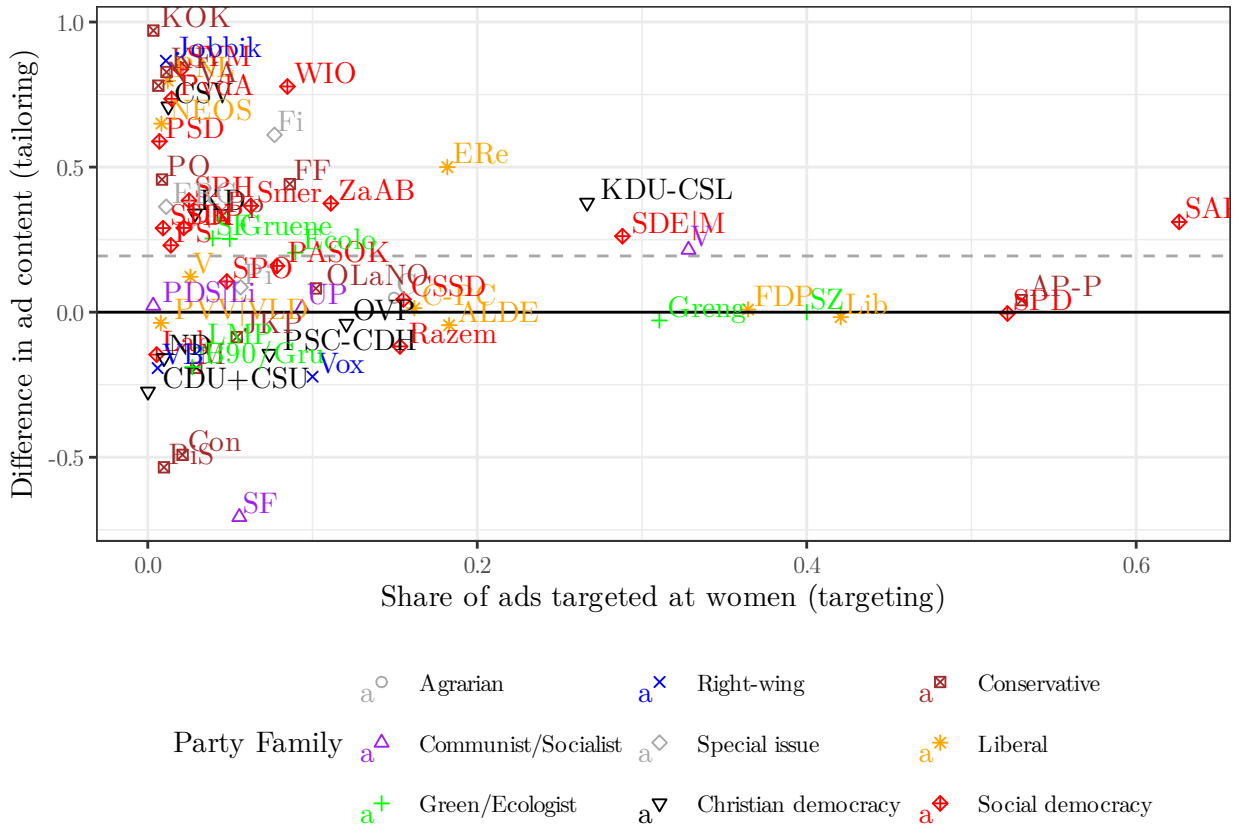
```
ggsave("plots/figure_a1_gender_ratio.pdf", device = cairo_pdf, width = 4 * 2^0.5,
    height = 4)
```

```
## Warning: Removed 8 rows containing missing values or values outside the scale range
## (`geom_point()`).
## Removed 8 rows containing missing values or values outside the scale range
## (`geom_text_repel()`).
```

3.4 Tailoring and targeting by party (Figure A.2)

```
# Filter data
filtered_tail_targ <- tail_targ %>%
    filter(!is.na(tailoring) & parlgov_family_name_short != "none")

# Define party family attributes
women_party_family <- c("agr", "com", "eco", "right", "spec", "chr", "con", "lib",
    "soc")
party_labels <- c("Agrarian", "Communist/Socialist", "Green/Ecologist", "Right-wing",
    "Special issue", "Christian democracy", "Conservative", "Liberal", "Social democracy")
party_shapes <- 1:9
```

```
party_colors <- c("dark grey", "purple", "green", "blue", "dark grey", "black", "brown",
    "orange", "red")

# Plot
ggplot(filtered_tail_targ) + geom_hline(aes(yintercept = mean(tail_targ$tailoring,
    na.rm = TRUE)), linetype = 2, color = "darkgrey") + geom_point(aes(x = targeting,
    y = tailoring, color = parlgov_family_name_short, shape = parlgov_family_name_short)) +
    geom_hline(yintercept = 0) + geom_text(aes(x = targeting, y = tailoring, label = parlgov_party_name,
    color = parlgov_family_name_short), family = "LM Roman 10", hjust = -0.1, vjust = -0.1) +
    theme_bw() + theme(legend.position = "bottom", text = element_text(family = "LM Roman 10")) +
    scale_shape_manual(breaks = women_party_family, values = party_shapes, labels = party_labels,
        guide = guide_legend(nrow = 3, title = "Party Family")) + scale_color_manual(breaks = women_par
    values = party_colors, labels = party_labels, guide = guide_legend(nrow = 3,
        title = "Party Family")) + new_scale_color() + scale_color_manual(breaks = women_party_family,
    values = party_colors, guide = FALSE) + xlab("Share of ads targeted at women (targeting)") +
    ylab("Difference in ad content (tailoring)")
```

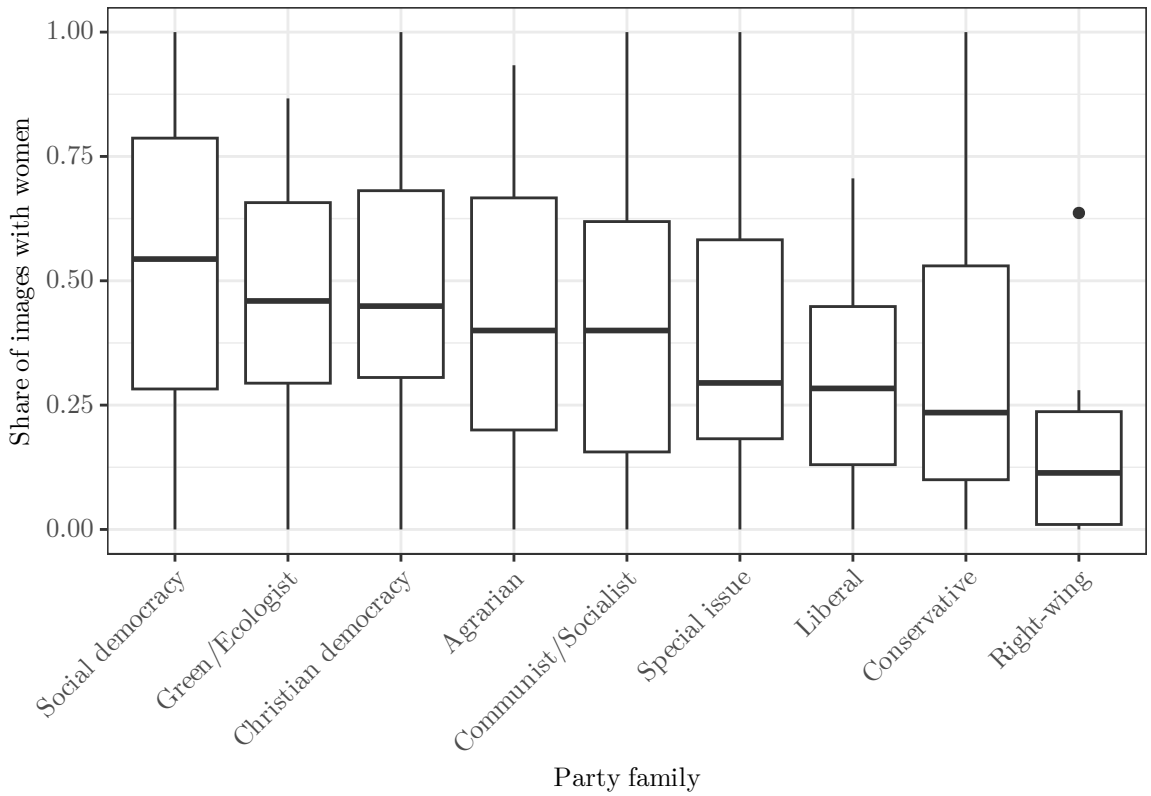



```
ggsave("plots/figure_a2_tailoring_targeting_party_family.pdf", device = cairo_pdf,
    width = 4 * 2^0.5, height = 4)
```

4 SM C: Automated face detection

4.1 Women on ad images by party family (Figure C.4)

```
# Add party info from ParlGov
parties <- read.csv("data/view_party.csv", encoding = "UTF-8") %>%
    dplyr::rename(id = party_id) %>%
    merge(info_id <- read.csv("data/info_id.csv") %>%
        filter(table_variable == "party_family") %>%
        select(c(id, name)) %>%
        dplyr::rename(family_id = id, party_family_name = name), by = "family_id")
names(parties) <- names(parties) %>%
    str_c("parlgov_", .)

# Aggregate share of images with women by party family
women_party_family <- aggregate(faces_any_fem ~ parlgov_id + parlgov_party_family_name,
    ads_imgs_vids %>%
        filter((nfaces > 0) & is_img == 1) %>%
        merge(parties, by = "parlgov_id"), mean) %>%
    filter(parlgov_party_family_name != "no family")

# Plot
ggplot(women_party_family) + geom_boxplot(aes(x = reorder(parlgov_party_family_name,
    -faces_any_fem, FUN = median), y = faces_any_fem)) + xlab("Party family") + ylab("Share of images w
    theme_bw() + theme(axis.text.x = element_text(angle = 45, hjust = 1), text = element_text(family =
    axis.title = element_text(size = 10), axis.text = element_text(size = 10), plot.margin = unit(c(1,
        0, 0, 1.5), "cm"))
```



```
ggsave("plots/figure_c4_women_ads_party_family.pdf", device = cairo_pdf, width = 4 *
    2^0.5, height = 4)
```

5 SM E

5.1 t-test (Table E.8)

```
# One-sample, one-tailed t-test
t.test(tailoring$tailoring, alternative = "greater")  # true mean is greater than 0 -> tailoring
```

```
##
##  One Sample t-test
##
## data:  tailoring$tailoring
## t = 4.2623, df = 63, p-value = 3.447e-05
## alternative hypothesis: true mean is greater than 0
## 95 percent confidence interval:
##  0.1178865       Inf
## sample estimates:
## mean of x
## 0.1937849
```

```
sd(tailoring$tailoring)
```

```
## [1] 0.3637155
```

6 SM F: Snapchat

```
load("data/snapchat_ads.RData")
```

6.1 Analyze Snapchat data

```
snap_ads$Gender %>%
    table(useNA = "always")
```

```
## .
##        FEMALE   MALE   <NA>
##    354     62     67      0
```

```
# Number of ads in sample
dim(snap_ads)  # 483
```

```
## [1] 483  15
```

```r
snap_ads$Gender[is.na(snap_ads$Gender)] <- ""

# Share of ads targeted
(snap_ads$Gender %>%
    table)/nrow(snap_ads)
```

```
## .
##              FEMALE      MALE
## 0.7329193 0.1283644 0.1387164
```

```r
# Share of women on images for ads targeted/not-targeted at women
snap_ads$faces_any_fem[snap_ads$Gender == "FEMALE"] %>%
    mean(na.rm = T)
```

```
## [1] 0.03225806
```

```r
snap_ads$faces_any_fem[snap_ads$Gender != "FEMALE"] %>%
    mean(na.rm = T)
```

```
## [1] 0.1567696
```

```r
table(snap_ads$faces_any_fem[snap_ads$Gender == "FEMALE"])
```

```
##
##  0  1
## 60  2
```

```r
table(snap_ads$faces_any_fem[snap_ads$Gender != "FEMALE"])
```

```
##
##   0   1
## 355  66
```

```r
# Number of parties
snap_ads$OrganizationName %>%
    unique %>%
    length
```

```
## [1] 27
```

```r
# Two-tailed z-test for difference in proportions

# Define the variables
p1 <- 2/62  # Proportion of targeted ads showing a woman
n1 <- 62  # Total number of targeted ads
p2 <- 66/421  # Proportion of non-targeted ads showing a woman
n2 <- 421  # Total number of non-targeted ads

# Calculate the pooled proportion
```

```r
p_pool <- (2 + 66)/(n1 + n2)

# Calculate the z-statistic
z <- (p1 - p2)/sqrt(p_pool * (1 - p_pool) * (1/n1 + 1/n2))

# Calculate the p-value for a two-tailed test
p_value <- 2 * (1 - pnorm(abs(z)))

# Output the results
cat("Z-statistic:", z, "\n")
```

```
## Z-statistic: -2.631731
```

```r
cat("P-value:", p_value, "\n")
```

```
## P-value: 0.008495105
```

7 SM H: Differences in text content

7.1 Figure H.6: Keyness plot for ES UP

```r
# ES, UP

# Subset to one party
subset_df <- filter(ads_imgs_vids, country %in% c("ES") & pg_party_name_short ==
    "UP")
subset_df$parlgov_id %>%
    unique  # 2724
```

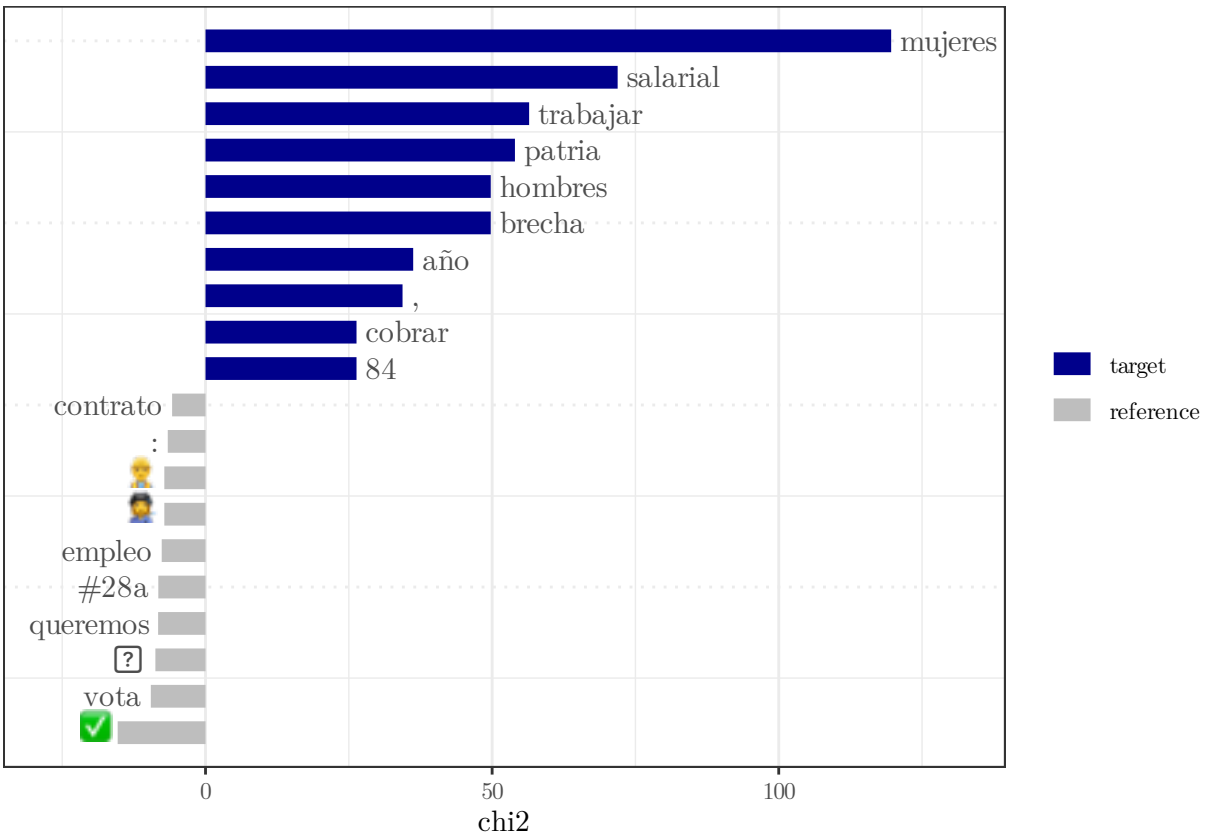
```
## [1] 2724
## 193 Levels: -1 2 41 47 50 94 113 118 161 179 191 196 200 211 219 220 235 ... 2776
```

```r
table(subset_df$fem_audience == 1)  # 23
```

```
##
## FALSE  TRUE
##   372    23
```

```r
# Plot keyness of words
textstat_keyness(dfm(tokens(subset_df$ad_creative_bodies)) %>%
    dfm_remove(stopwords("es")), target = subset_df$fem_audience == 1) %>%
    textplot_keyness(font = "LM Roman 10", n = 10)
```

```
## Warning: NA is replaced by empty string
```




```
ggsave("plots/figure_h6_keyness_ES_UP.png", width = 10, height = 4)
```

7.2 Figure H.7: Keyness plot for ES CPC

```
# ES, CPC

# Subset to one party
subset_df <- filter(ads_imgs_vids, country %in% c("ES") & pg_party_name_short ==
    "C-PC")
subset_df$parlgov_id %>%
    unique  # 2375
```

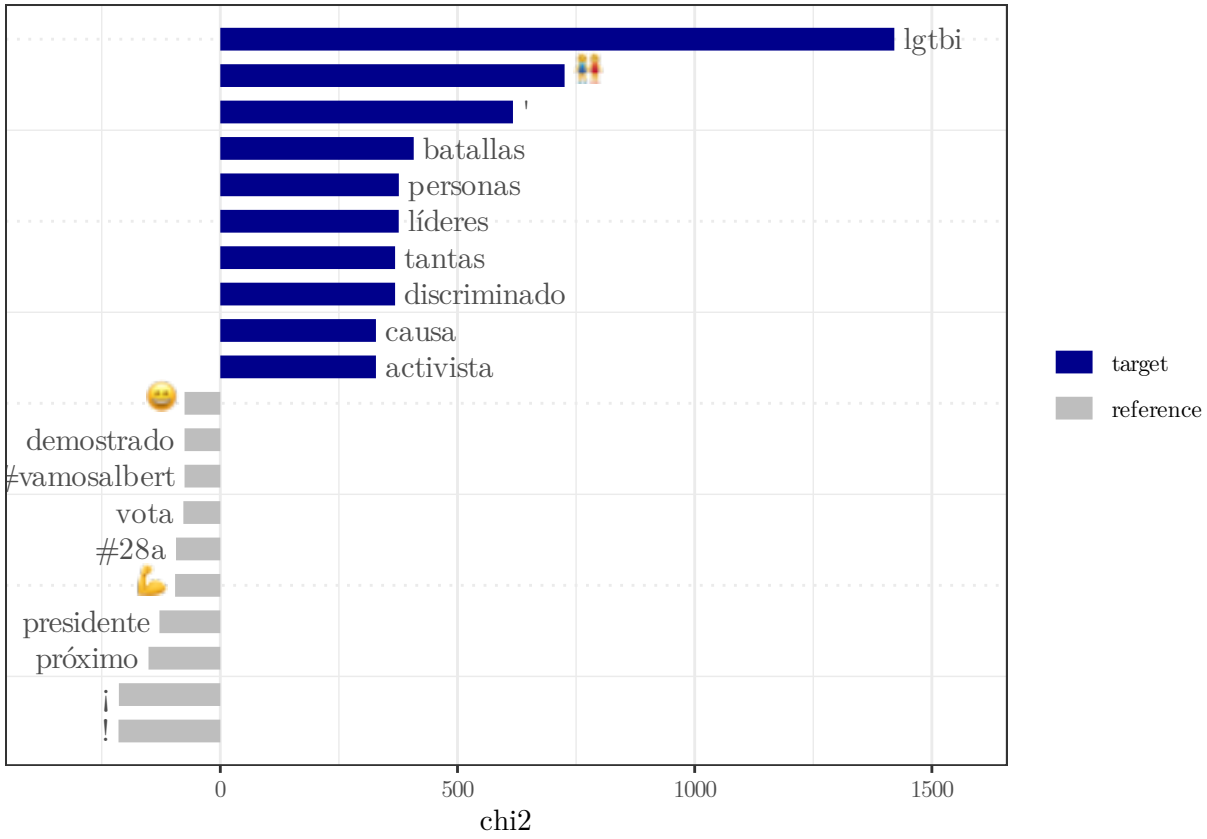
```
## [1] 2375
## 193 Levels: -1 2 41 47 50 94 113 118 161 179 191 196 200 211 219 220 235 ... 2776
```

```
table(subset_df$fem_audience == 1)  # 23
```

```
##
## FALSE  TRUE
##  4830   540
```

```
# Plot keyness of words
textstat_keyness(dfm(tokens(subset_df$ad_creative_bodies)) %>%
    dfm_remove(stopwords("es")), target = subset_df$fem_audience == 1) %>%
    textplot_keyness(font = "LM Roman 10", n = 10)
```

```
## Warning: NA is replaced by empty string
```




```
ggsave("plots/figure_h7_keyness_ES_C-PC.png", width = 10, height = 4)
```

7.3 Figure H.8: Keyness plot for DE B90/Gru

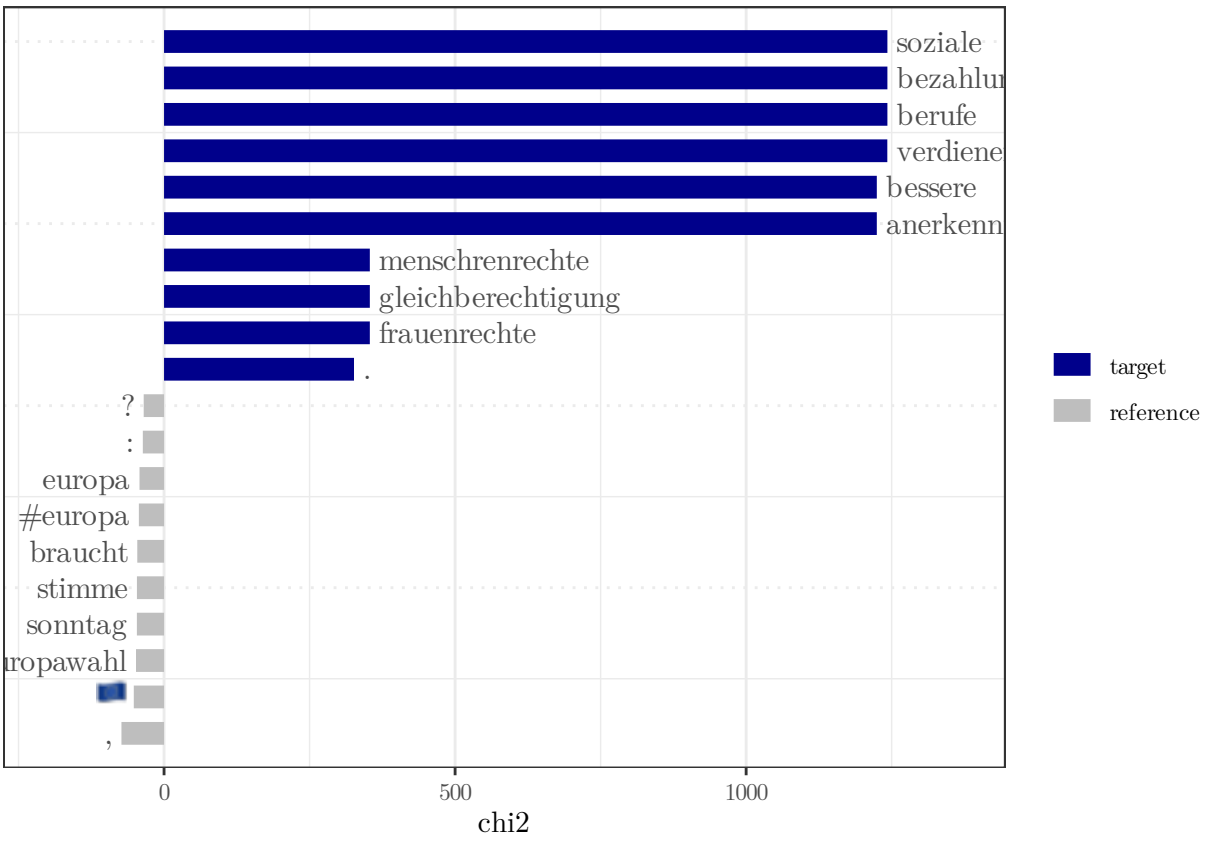
```
# DE, B90/Gru

# Subset to one party
subset_df <- filter(ads_imgs_vids, country %in% c("DE") & pg_party_name_short ==
    "B90/Gru")
subset_df$parlgov_id %>%
    unique  # 772
```

```
## [1] 772
## 193 Levels: -1 2 41 47 50 94 113 118 161 179 191 196 200 211 219 220 235 ... 2776
```

```r
table(subset_df$fem_audience == 1)  # 114
```

```
##
## FALSE  TRUE
##  5857   114
```

```r
# Plot keyness of words
textstat_keyness(dfm(tokens(subset_df$ad_creative_bodies)) %>%
    dfm_remove(stopwords("de")), target = subset_df$fem_audience == 1) %>%
    textplot_keyness(font = "LM Roman 10", n = 10)
```




```r
ggsave("plots/figure_h8_keyness_DE_B90-Gru.png", width = 10, height = 4)
```

7.4 Figure H.9: Keyness plot for GB Lib

```r
# GB, Lib

# Subset to one party
subset_df <- filter(ads_imgs_vids, country %in% c("GB") & pg_party_name_short ==
    "Lib")
subset_df$parlgov_id %>%
    unique  # 659
```

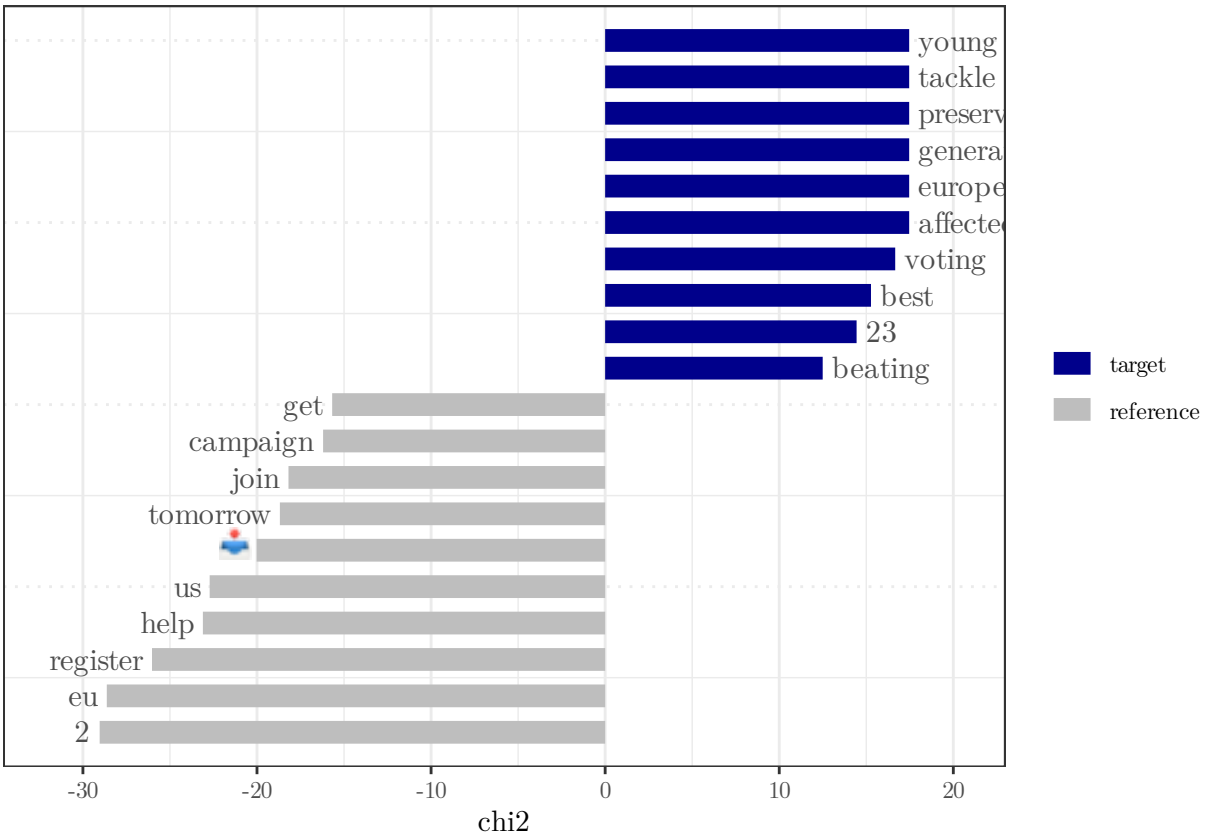
```
## [1] 659
## 193 Levels: -1 2 41 47 50 94 113 118 161 179 191 196 200 211 219 220 235 ... 2776
```

```
table(subset_df$fem_audience == 1)  # 1194
```

```
##
## FALSE  TRUE
##  3791  1194
```

```
# Plot keyness of words
textstat_keyness(dfm(tokens(subset_df$ad_creative_bodies)) %>%
    dfm_remove(stopwords("en")), target = subset_df$fem_audience == 1) %>%
    textplot_keyness(font = "LM Roman 10", n = 10)
```

```
## Warning: NA is replaced by empty string
```

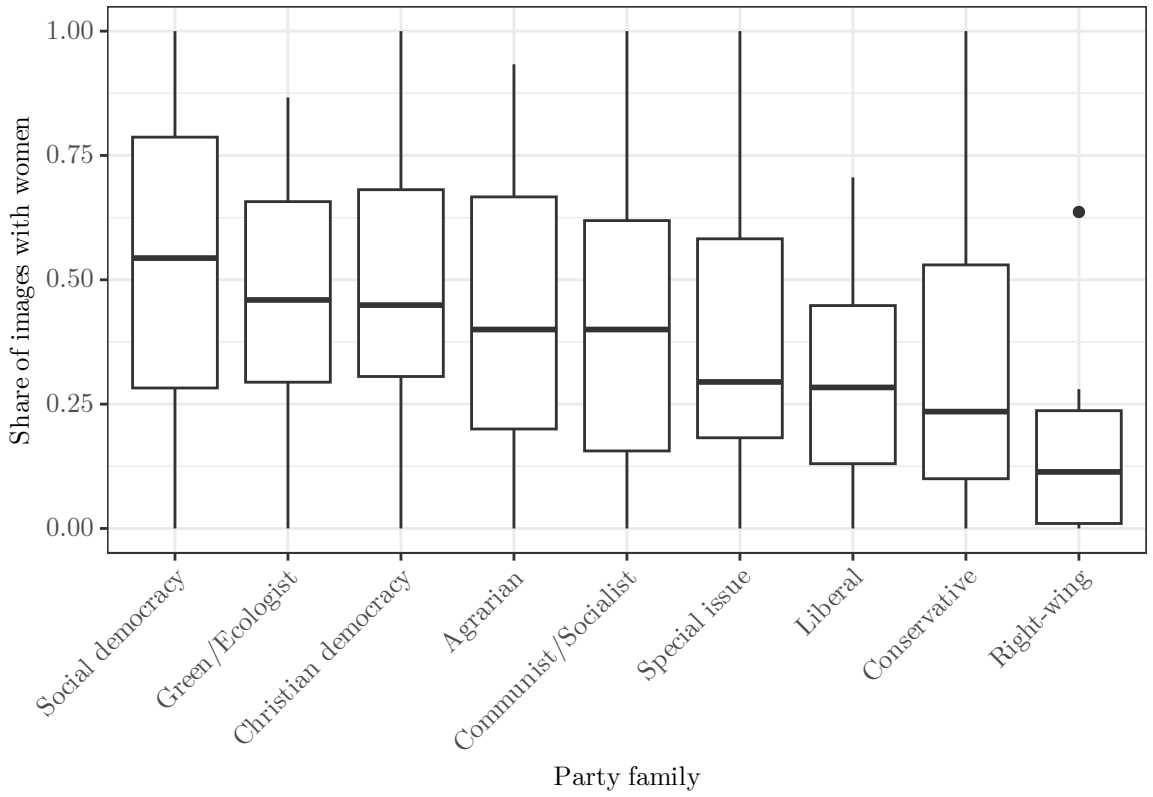



```
ggsave("plots/figure_h9_keyness_GB_Lib.png", width = 10, height = 4)
```

8 SM I: Heterogenous Effects

8.1 Women on ad images by party family (Figure I.10)

```r
# Add party info from ParlGov
parties <- read.csv("data/view_party.csv", encoding = "UTF-8") %>%
    dplyr::rename(id = party_id) %>%
    merge(info_id <- read.csv("data/info_id.csv") %>%
        filter(table_variable == "party_family") %>%
        select(c(id, name)) %>%
        dplyr::rename(family_id = id, party_family_name = name), by = "family_id")
names(parties) <- names(parties) %>%
    str_c("parlgov_", .)

# Aggregate share of images with women by party family
women_party_family <- aggregate(faces_any_fem ~ parlgov_id + parlgov_party_family_name,
    ads_imgs_vids %>%
        filter((nfaces > 0) & is_img == 1) %>%
        merge(parties, by = "parlgov_id"), mean) %>%
    filter(parlgov_party_family_name != "no family")

# Plot
ggplot(women_party_family) + geom_boxplot(aes(x = reorder(parlgov_party_family_name,
    -faces_any_fem, FUN = median), y = faces_any_fem)) + xlab("Party family") + ylab("Share of images w
    theme_bw() + theme(axis.text.x = element_text(angle = 45, hjust = 1), text = element_text(family =
    axis.title = element_text(size = 10), axis.text = element_text(size = 10), plot.margin = unit(c(1,
        0, 0, 1.5), "cm"))
```




```r
ggsave("plots/figure_i10_women_ads_party_family.pdf", device = cairo_pdf, width = 4 *
    2^0.5, height = 4)
```

9 Load data for marginsplot

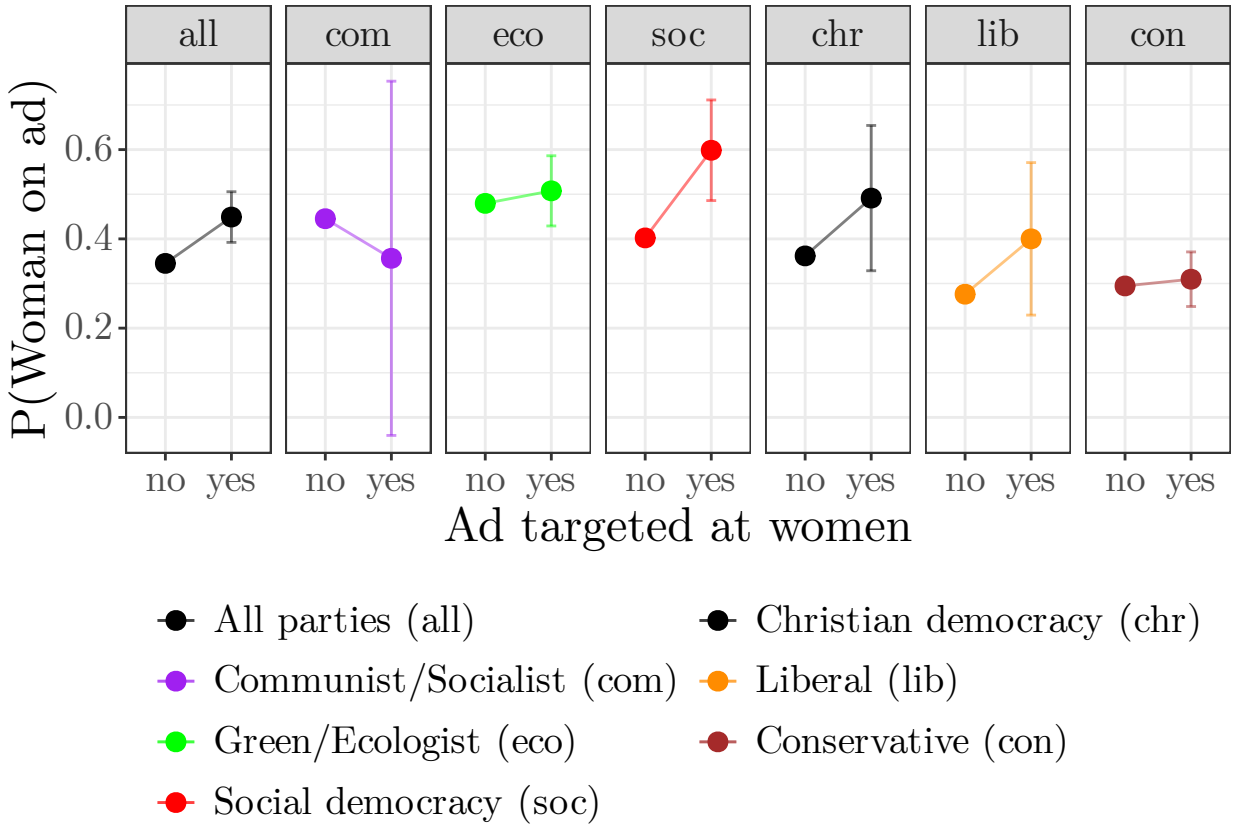
```
# Import data from Stata and reproduce plots in ggplot2
margins <- read_dta("stata-output/margins.dta") %>%
    select(c(starts_with("_marg"), starts_with("_ci")))
margins$targeted <- c("other", "targeted at women") %>%
    as.factor()
names(margins) <- str_remove_all(names(margins), "_")
```

Prepare data for all party families

```
# Make var factor
margins$targeted <- c("no", "yes") %>%
    as.factor()

all <- margins[, 1:3]
all$family <- "All parties"

# Load files, one each per party family
margins <- data.frame()
for (file in list.files("stata-output", full.names = T) %>%
    str_subset("[:upper:].*.dta")) {
    margins <- read_dta(file) %>%
        select(c(starts_with("_marg"), starts_with("_ci"))) %>%
        mutate(family = basename(file) %>%
            str_remove("\\.dta") %>%
            str_replace("_", " ")) %>%
        rbind(margins)

}

margins$family[margins$family == "Communist Socialist"] <- "Communist/Socialist"
margins$family[margins$family == "Green Ecologist"] <- "Green/Ecologist"

names(all) <- names(margins)

# Add the data for all party families (combined)
margins <- rbind(all, margins)

margins$family <- factor(margins$family, levels = c("All parties", "Communist/Socialist",
    "Green/Ecologist", "Social democracy", "Christian democracy", "Liberal", "Conservative"))
margins$family_full <- margins$family
margins <- margins %>%
    mutate(family = recode(family, `All parties` = "all", `Communist/Socialist` = "com",
        `Green/Ecologist` = "eco", `Social democracy` = "soc", `Christian democracy` = "chr",
        Liberal = "lib", Conservative = "con"))

margins$targeted <- c("no", "yes") %>%
    rep(nrow(margins)/2) %>%
    as.factor()
names(margins) <- str_remove_all(names(margins), "_")
```

9.1 Marginsplot for all party families (Figure I.11)

```
# Plot
ggplot(margins, (aes(x = targeted, group = family))) + geom_point(aes(y = margin,
    color = family), size = 3) + geom_errorbar(aes(ymin = cilb, ymax = ciub, color = family),
    width = 0.15, size = 0.5, alpha = 0.5) + geom_line(aes(y = margin, color = family),
    alpha = 0.5) + ylab("P(Woman on ad)") + xlab("Ad targeted at women") + theme_bw() +
    theme(text = element_text(family = "LM Roman 10", size = 18), legend.position = "bottom",
        legend.title = element_blank()) + scale_color_manual(values = c("black",
    "purple", "green", "red", "black", "dark orange", "brown"), breaks = c("all",
    "com", "eco", "soc", "chr", "lib", "con"), labels = c("All parties (all)", "Communist/Socialist (co
    "Green/Ecologist (eco)", "Social democracy (soc)", "Christian democracy (chr)",
    "Liberal (lib)", "Conservative (con)")) + guides(color = guide_legend(nrow = 4)) +
    facet_grid(~family, space = "free_x")
```




```
ggsave("plots/figure_i11_marginsplot_family.pdf", device = cairo_pdf, width = 5 *
    2^0.5, height = 5)
```