Supplementary material
The role of policy and party information in direct-democratic campaigns

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Accepted for publication at the International Journal for Public Opinion Research, June 2019

```
knitr::opts_chunk$set(include=TRUE, echo=TRUE,
                      warning=FALSE, error=TRUE, message=FALSE,
                      fig.align="center", dpi=300,
                      dev='png')

rm(list = ls())

if (!require('pacman', quietly=T)) install.packages('pacman')
```

```
## Warning: package 'pacman' was built under R version 3.5.3
```

```
#### Setup
pacman::p_load('tidyverse','cjoint','lubridate',
               'readxl','rtf','knitr', 'kableExtra',
               'poliscidata','purrr','magrittr')

`%!in%` <- compose(`!`, `%in%`)

# Data and material available at https://doi.org/10.7910/DVN/LAMWDB
load('campaigndata.RData')
source("amce2.R") # adapted amce-function from cjoint, stores underl. models
source("plotamce.R") # adapted plot-function from cjoint, stores plot data
```

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1 Overview

The data was collected within a project of the University of Bern (CH) on the survey plattform Qualtrics, which provided access to online panels for recruiting respondents. The survey was conducted during the time frame of March to May 2017. The Swiss National Science Foundation funded the project within the National Research Programme 71 "Managing Energy Consumption".

The study was conducted in Switzerland in the three largest national languages German, French and Italian, and the population considered were all residents of Switzerland at least 18 years old and able to respond to the survey in one of these languages. The sample was provided by Qualtrics and recruitment followed quotas by age, gender and language region to approximate the Swiss population.

For this survey, three waves with a coupled panel and crosssectional design were conducted. In the first wave, only one survey was conducted. In the second and third wave, participants of the first wave were re-invited for a panel version including other modules of interest, while additional crosssections with new respondents repeated the same survey as in the first wave, notably the conjoint module which is analyzed in the following.

For the single data sets of the corresponding survey parts, the *n* responses are as follows:

- cross-section 1: 2'891 completed
- cross-section 2: 1'020 completed
- cross-section 3: 925 completed

For the first cross-section, 32'402 respondents were invited and 5'634 started the survey. For the second cross-section, 9'925 respondents were invited and 2'382 started the survey. For the third cross-section, Qualtrics partnered with two different panel providers, for which the first partner provided 198 completed responses (3'492 invites, 384 starts). For the second partner, which provided 727 completed responses, invites and starts are not available due to a different process for accessing the survey. Quotas to reach a representative sample were applied together for both sources of respondents in this cross-section.

For the panel of this project, the 2'891 respondents of the first cross-section wave were re-invited in wave 2 and 3 to answer further questions and experiments. In the second wave, 1'841 respondents answered to the call. Out of those, 1'253 respondents also completed the third wave. Therefore:

- panel 1: 2'891 completed
- panel 2: 1'841 completed
- panel 3: 1'253 completed

The quota for Italian speakers was oversampled to reach a higher count of Italian speakers, however finding enough italian speakers over the course of the survey with several waves and restrictions to not reach the same respondents for another part of the survey (with exception of panel participants) proved difficult for the panel provider. The data is therefore only representative for the German and French part of Switzerland. The responses have been weighted by language, age and gender to represent the population.

In the third cross-section, a fifth of the sample (n = 196) did randomly not receive the party cue to test for possible differences of the experimental setup. This fifth is not included in the conjoint analysis (due to a different experimental setup). The results of this subsample did not vary in a meaningful way from the remainder of the sample.

1.1 Model

The analyses presented in the article are based on the `cjoint` package for R by Barari et al. (2017). The model formula for the estimation of the AMCE including interaction effects have been presented in detail in Hainmüller et al. (2014).

Barari, Soubhik, Elissa Berwick, Jens Hainmueller, Daniel J. Hopkins, Sean Liu, Anton Strezhnev and Teppei Yamamoto. 2017. Package 'cjoint', https://cran.r-project.org/web/packages/cjoint/cjoint.pdf (28 June 2018).

Hainmueller, Jens, Daniel J. Hopkins and Teppei Yamamoto. 2014. Causal Inference in Conjoint Analysis: Understanding Multidimensional Choices via Stated Preference Experiments. *Political Analysis* 22(01): 1–30. https://www.cambridge.org/core/product/identifier/S1047198700013589/type/journal_article (December 13, 2017).

1.2 Setup

The conjoint module was introduced with the following text in German, French and Italian. An overview of the conjoint table and layout is provided in the Annex of the manuscript.

1.2.1 German

Wie möchten Sie die Energiestrategie 2050 umsetzen?

Bei der Energiestrategie 2050 geht es um die Frage, wie der Bund in den nächsten Jahrzehnten den angestrebten Ausstieg aus der Kernenergie und die verstärkte Förderung der erneuerbaren Energien umsetzen soll. Diese Ziele können auf unterschiedliche Art und Weise angegangen werden – neben der vorgelegten Änderung des Energiegesetzes auch mit anderen Massnahmen.

Im Moment fördert der Bund die erneuerbare Energieproduktion, indem er die Einspeisung von erneuerbarem Strom subventioniert (Einspeisevergütung). Finanziert wird diese Einspeisevergütung über eine Energieabgabe (sogenannter Netzzuschlag) auf den allgemeinen Stromverbrauch, d.h., wer mehr Strom verbraucht, zahlt entsprechend mehr. Andere Ansätze zur Förderung von erneuerbarer Energie wären beispielsweise die Unterstützung des Baus von Anlagen zur erneuerbaren Stromproduktion oder Steuererleichterungen für Unternehmen, welche erneuerbaren Strom produzieren. Neben einer Lenkungsabgabe sind auch Steuererhöhungen für Private und Unternehmen denkbar, um diese Massnahmen zu finanzieren. Nicht zuletzt besteht die Möglichkeit, eine Lenkungsabgabe mit einer Rückverteilung der Einnahmen an die Bevölkerung zu kombinieren, sodass ein tieferer Stromverbrauch gefördert wird, ohne die Stromproduktion zu subventionieren.

In der Folge werden wir Ihnen jeweils zwei Varianten energiepolitischer Massnahmen präsentieren, welche sich in verschiedenen Aspekten unterscheiden. Falls Sie sich für eine Variante entscheiden müssten, welche würden Sie jeweils bevorzugen? Insgesamt folgen fünf Gegenüberstellungen.

Um den angestrebten Ausstieg aus der Kernenergie und die verstärkte Förderung der erneuerbaren Energien umzusetzen, sind verschiedene Massnahmen in verschiedenen Kombinationen möglich.

Welche dieser zwei Varianten bevorzugen Sie?

1.2.2 French

Comment souhaiteriez-vous mettre en oeuvre la Stratégie énergétique 2050?

En ce qui concerne la Stratégie énergétique 2050, il s'agit de la question, comment la Confédération doit mettre en oeuvre, dans les prochaines décennies, la sortie visée de l'énergie nucléaire et le renforcement de la promotion des énergies renouvelables. Cet objectif peut être abordé de différentes manières, avec non seulement la modification proposée de la loi sur l'énergie (LEne), mais aussi d'autres mesures.

En ce moment, la Confédération encourage la production d'énergie renouvelable en subventionnant l'injection d'électricité renouvelable (rétribution du courant injecté). Cette rétribution est financée par une taxe sur l'énergie (le supplément sur les coûts de transport du réseau à haute tension) sur la consommation générale d'électricité. Donc, celui qui consomme plus d'électricité doit payer plus. D'autres approches pour promouvoir les énergies renouvelables seraient par exemple le soutien à la construction d'installations productrices d'électricité renouvelable ou des allègements fiscaux accordés aux entreprises productrices d'électricité renouvelable. Mis à part la taxe d'incitation, des augmentations d'impôts pour les particuliers et les entreprises sont aussi envisageables afin de financer ces mesures. Enfin, il existe la possibilité de combiner une taxe d'incitation avec une redistribution des recettes à la population afin de promouvoir une baisse de la consommation d'électricité sans subventionner la production d'électricité.

Par la suite, nous allons à chaque fois vous présenter deux variantes de mesures de politique énergétique, qui se différencient sur différents aspects. Si vous deviez vous décider pour une des deux variantes, laquelle choisiriez-vous? Au total, cinq comparaisons vont vous être proposées.

Afin de mettre en oeuvre la sortie visée de l'énergie nucléaire et le renforcement de la promotion des énergie renouvelables, différentes mesures scindées en plusieurs variantes sont possibles.

Laquelle de ces deux variantes préférez-vous?

1.2.3 Italian

Lei come vorrebbe implementare la Strategia energetica 2050?

La Strategia energetica 2050 affronta la questione di come la Confederazione dovrebbe implementare nei prossimi decenni l'uscita dal nucleare e la maggior promozione di energie rinnovabili. Questi obiettivi possono essere affrontati in diversi modi - oltre alla modifica della legge federale sull'energia, anche con altre misure.

Al momento, il Consiglio Federale promuove la produzione di energie rinnovabili in quanto sovvenziona l'immissione in rete di energia elettrica rinnovabile (rimunerazione per l'immissione in rete di energia elettrica). Questa rimunerazione è finanziata attraverso una tassa sull'energia (il cosiddetto rimborso di rete) sul consumo totale di energia elettrica; perciò chi consuma più elettricità paga anche di più. Altre soluzioni per la promozione di energie rinnovabili sono per esempio la sovvenzione per la costruzione di impianti destinati alla produzione di energia elettrica rinnovabile oppure un'agevolazione fiscale per le aziende che producono energia elettrica rinnovabile. Oltre alla tassa d'incentivazione, è immaginabile anche un aumento delle imposte per i privati e le aziende, in modo da poter finanziare queste misure. Non da ultimo, c'è la possibilità di combinare una tassa d'incentivazione con una ridistribuzione dei proventi alla popolazione, cosicché venga incentivato un consumo minore di elettricità senza sovvenzionare la produzione di energia elettrica.

Di seguito Le presenteremo, di volta in volta, due varianti riguardo delle misure di politica energetica. Queste

varianti si differenziano in alcuni aspetti. Se Lei dovesse optare per una variante, quale preferirebbe? Complessivamente seguiranno cinque confronti.

Per implementare l'uscita dal nucleare e la maggior promozione di energie rinnovabili, diverse misure in diverse combinazioni sono possibili.

Quale di queste due varianti preferisce?

1.3 Data

Data insights, unweighted. The data represented in this chapter are the three cross-section waves, which will later be used for the conjoint models.

1.3.1 Age

Repartition by age groups over the three cross-sections. The figure shows an overrepresentation of the age group of 25 to 34 years in the first wave, which is however corrected in the second and third wave.

```
waves %>%
  group_by(wave) %>%
  summarise(tot = n()) %>%
  full_join(waves, by="wave") %>%
  group_by(wave, tot, agecat) %>%
  summarise(rel = n()) %>%
  mutate(rel = rel/tot) %>%
  filter(!is.na(agecat)) %>%
  ggplot() +
  geom_bar(aes(y = rel, x = agecat), stat="identity") +
  facet_wrap(~wave) +
  coord_flip() +
  scale_y_continuous(labels=scales::percent_format()) +
  labs(title = 'Age category repartition per wave',
       x = 'Age category', y = 'Wave / Relative frequency') +
  theme_minimal()
```

1.3.2 Gender

Repartition by gender over the three waves. While the first wave was responded by essentially equal shares of men and women, the second and third wave both have an underrepresentation of women, which is corrected by weights in the following analyses.

```
waves %>%
  filter(!is.na(female)) %>%
  group_by(wave, female) %>%
  summarise(count = n())
```

```
## # A tibble: 6 x 3
```

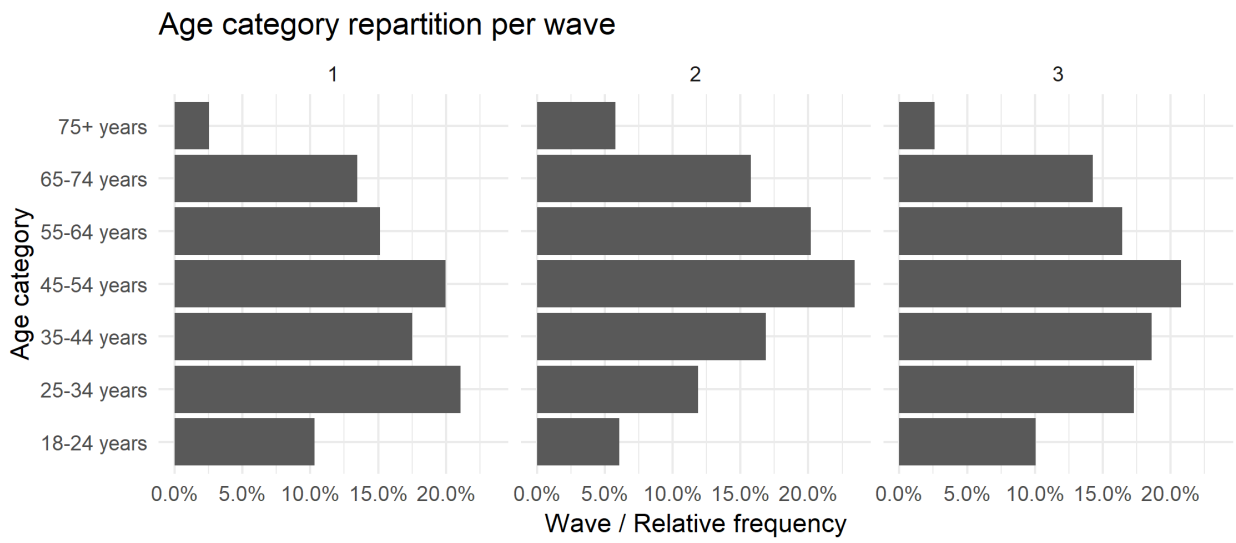

Figure 1: Repartition of age categories over the three survey waves.

```
## # Groups:   wave [3]
##    wave female count
##   <dbl>  <dbl> <int>
## 1     1      0  1447
## 2     1      1  1445
## 3     2      0   560
## 4     2      1   460
## 5     3      0   510
## 6     3      1   415
```

1.3.3 Parties

Repartition by party preference in the three waves. In all three waves, notably the Christian democrats are underrepresented compared to the national election results of 2015. Given that this party has since lost constantly in support, this might be reflected in the data. However, no correction is made for party preference in the experiment which relies on randomization.

```
waves %>%
  group_by(wave) %>%
  summarise(tot = n()) %>%
  full_join(waves, by="wave") %>%
  group_by(wave, tot, party.lab) %>%
  summarise(rel = n()) %>%
  mutate(rel = rel/tot) %>%
  filter(!is.na(party.lab)) %>%
  ggplot() +
```

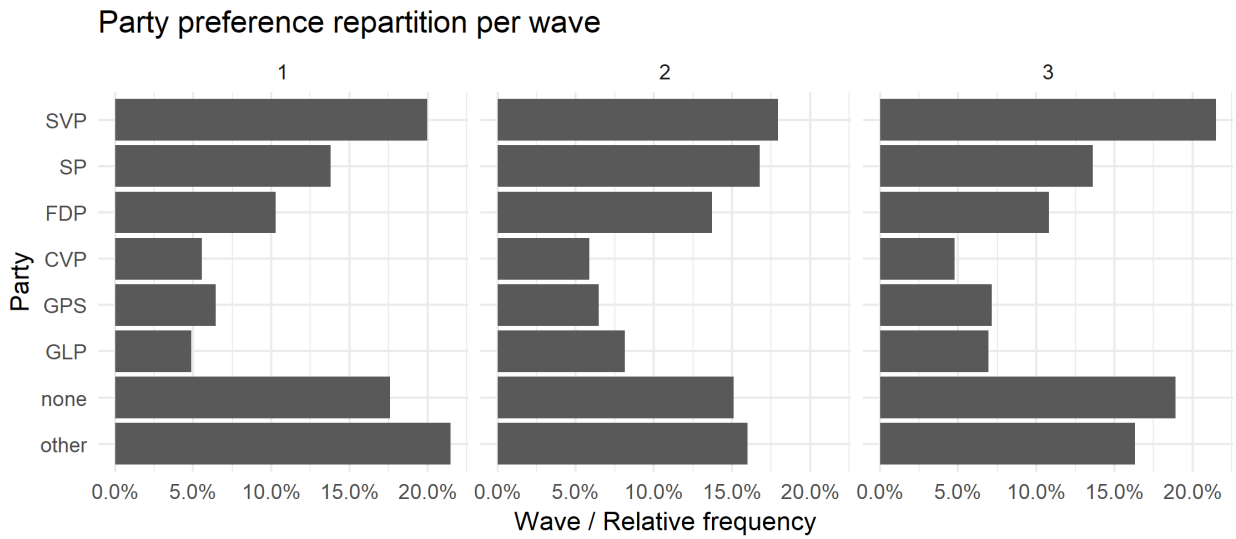

Figure 2: Repartition of party preference over the three survey waves.

```
  geom_bar(aes(y = rel, x = forcats::fct_rev(party.lab)), stat="identity") +
  facet_wrap(~wave) +
  coord_flip() +
  scale_y_continuous(labels=scales::percent_format()) +
  labs(title = 'Party preference repartition per wave',
       x = 'Party', y = 'Wave / Relative frequency') +
  theme_minimal()
```

1.3.4 Political interest

Repartition by political interest in the three waves, where one is "very high interest" and 4 is "not at all interested". Respondents with very high interest are most represented in the second wave of the cross-section, while the "rather not interested" are stronger represented in wave 1 and 3.

```
waves %>%
  group_by(wave) %>%
  summarise(tot = n()) %>%
  full_join(waves, by="wave") %>%
  group_by(wave, tot, interest) %>%
  summarise(rel = n()) %>%
  mutate(rel = rel/tot) %>%
  filter(!is.na(interest)) %>%
  ggplot() +
  geom_bar(aes(y = rel, x = interest), stat="identity") +
  facet_wrap(~wave) +
  coord_flip() +
```

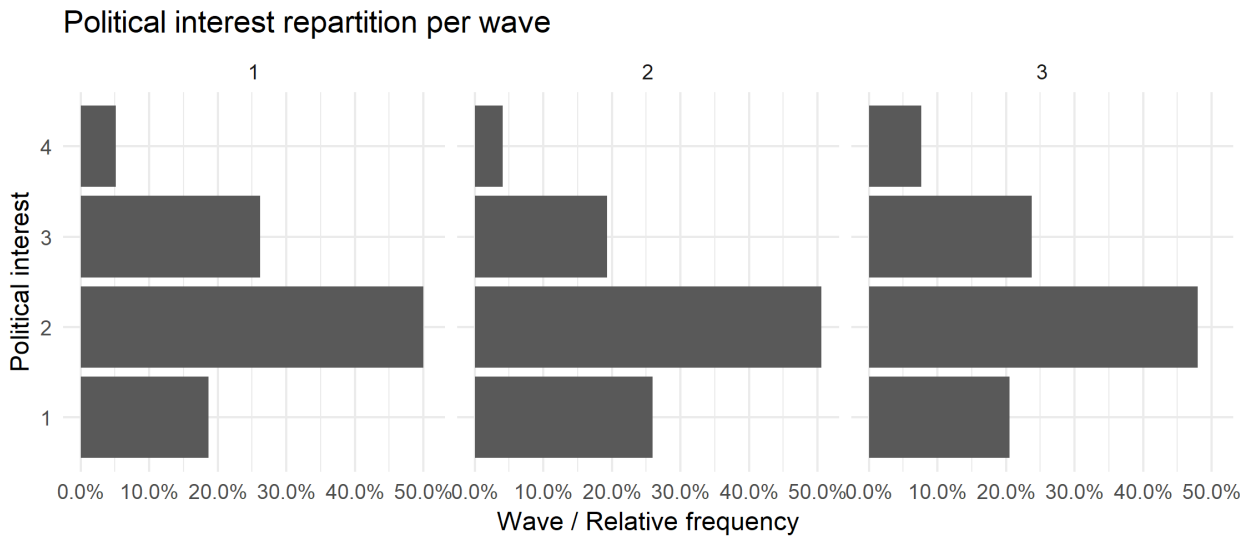

Figure 3: Repartition of political interest over the three survey waves.

```
  scale_y_continuous(labels=scales::percent_format()) +
  labs(title = 'Political interest repartition per wave',
       x = 'Political interest', y = 'Wave / Relative frequency') +
  theme_minimal()
```

2 Analysis

The full code of the analysis in R is provided on the next pages together with the results/output.

2.1 Illustrate the campaign

Based on data from Heidelberger 2017, the campaign is illustrated through paid and earned media. This is completed with the time of data collection in the three waves of the cross-section survey.

```
paid <- read_excel('Basisdatensatz_20170521_Energiestrategie.xlsx',
                   sheet = "DATEN")
paid <- paid %>% rowwise() %>%
  mutate(Monat = ifelse(nchar(Monat)<2, paste0('0', Monat), as.character(Monat)),
         Tag = ifelse(nchar(Tag)<2, paste0('0', Tag), as.character(Tag)),
         date = ymd_hms(paste0(Jahr, Monat, Tag, ' 12:00:00')))

earned <- read_excel('Artikel_20170521_Energiestrategie.xlsx',
                   sheet = "153.1")
earned <- earned %>%
  mutate(date = ymd_hms(paste0(Erscheinungsdatum, ' 12:00:00')))
```

```
waves$source <- 'Survey responses'
paid$source <- 'Paid media'
earned$source <- 'Earned media'

ggplot() +
  geom_histogram(data=waves, aes(ymd_hms(date)), binwidth=86400) +
  geom_histogram(data=paid, aes(date), binwidth=86400) +
  geom_histogram(data=earned, aes(date), binwidth=86400) +
  facet_wrap(~source, ncol=1, scales = "free") +
  geom_vline(xintercept = ymd_hms('2017-05-21 00:00:00')) +
  scale_x_datetime(date_breaks = '1 months',
                   limits = c(ymd_hms('2017-03-01 00:00:00'),
                              ymd_hms('2017-05-24 00:00:00'))) +
  annotate('text', ymd_hms('2017-05-21 18:00:00'), Inf,
                    hjust = 0, vjust = 1, label = 'Vote') +
  labs(title = 'Campaign and survey waves',
       subtitle = 'Illustration of the campaign by paid and earned media.',
       x = 'Date', y = 'Count') +
  theme_minimal()
```

```
ggsave('img/campaign.png',
       dpi=300,
       units=c('cm'),
       width=21, height=15)
```

2.2 Illustrating changing decisions

Based on the panel study conducted alongside the cross-section survey, we were able to track how respondents wanted to vote during the campaign. The following figures are weighted by gender, age and language.

```
panel %>%
  filter(!is.na(decision)) %>%
  group_by(wave) %>%
  summarise(sample.n = n()) %>%
  full_join(panel, by = 'wave') %>%
  filter(!is.na(decision)) %>%
  group_by(wave, sample.n, decision) %>%
  mutate(one = 1) %>%
  summarise(ratio = sum(one * w.weight)) %>%
  mutate(ratio = ratio / sample.n) %>%
  assign("panel.dec", ., envir = .GlobalEnv) %>%
  ggplot(aes(reorder(wave, -wave), ratio, fill = decision)) +
```

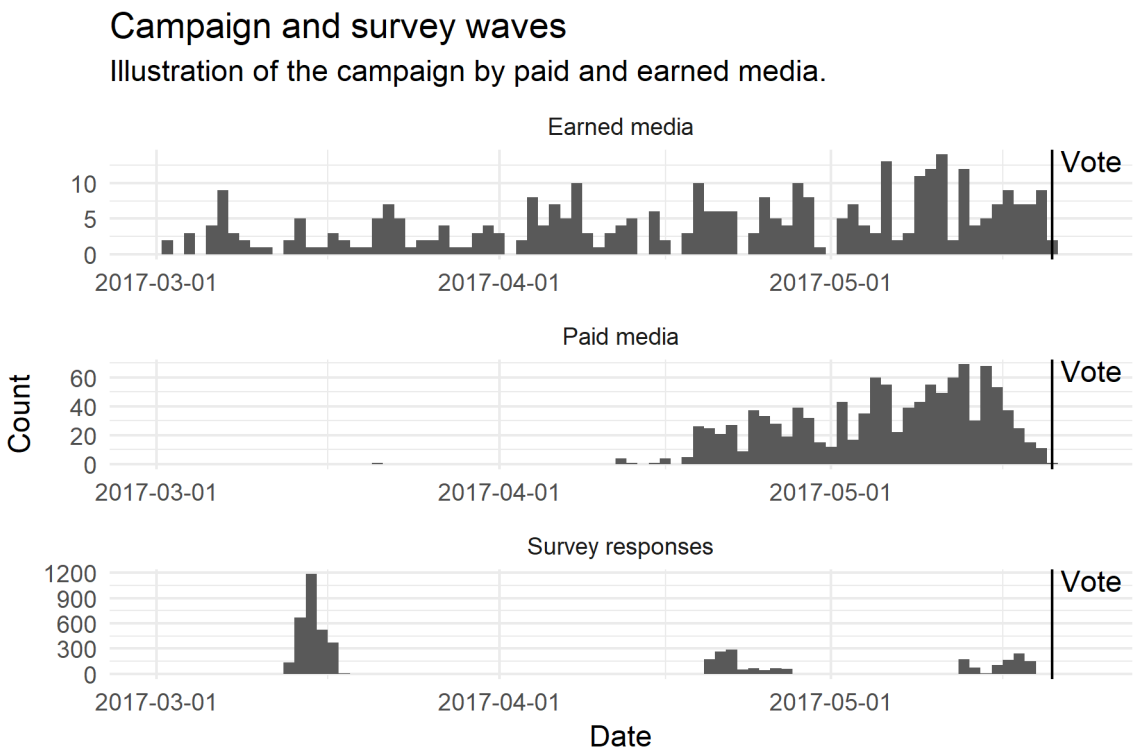

Figure 4: Survey waves compared to the media presence of the issue at stake prior to the vote (May 21th 2017). Figure used in the manuscript as Fig. 1.

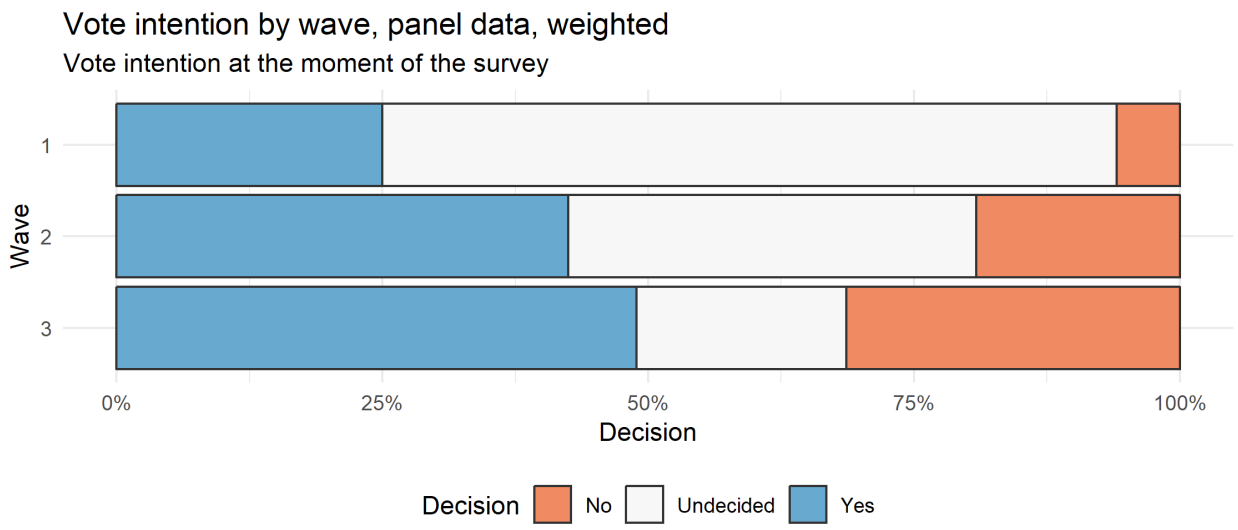

Figure 5: Vote intentions over the course of the campaign, shares.

```
  geom_bar(stat='identity', position = 'fill', color = 'grey20') +
  coord_flip() +
  scale_y_continuous(labels=scales::percent_format()) +
  scale_fill_brewer(palette='RdBu') +
  labs(title = 'Vote intention by wave, panel data, weighted',
       subtitle = 'Vote intention at the moment of the survey',
       x = 'Wave', y = 'Decision', fill = 'Decision') +
  theme_minimal() +
  theme(legend.position='bottom')
```

```
panel.dec
```

```
## # A tibble: 9 x 4
## # Groups:   wave, sample.n [3]
##    wave sample.n decision   ratio
##   <dbl>    <int> <fct>      <dbl>
## 1     1     2711 No        0.0596
## 2     1     2711 Undecided 0.692
## 3     1     2711 Yes       0.251
## 4     2     1830 No        0.198
## 5     2     1830 Undecided 0.396
## 6     2     1830 Yes       0.438
## 7     3     1244 No        0.327
## 8     3     1244 Undecided 0.206
## 9     3     1244 Yes       0.510
```

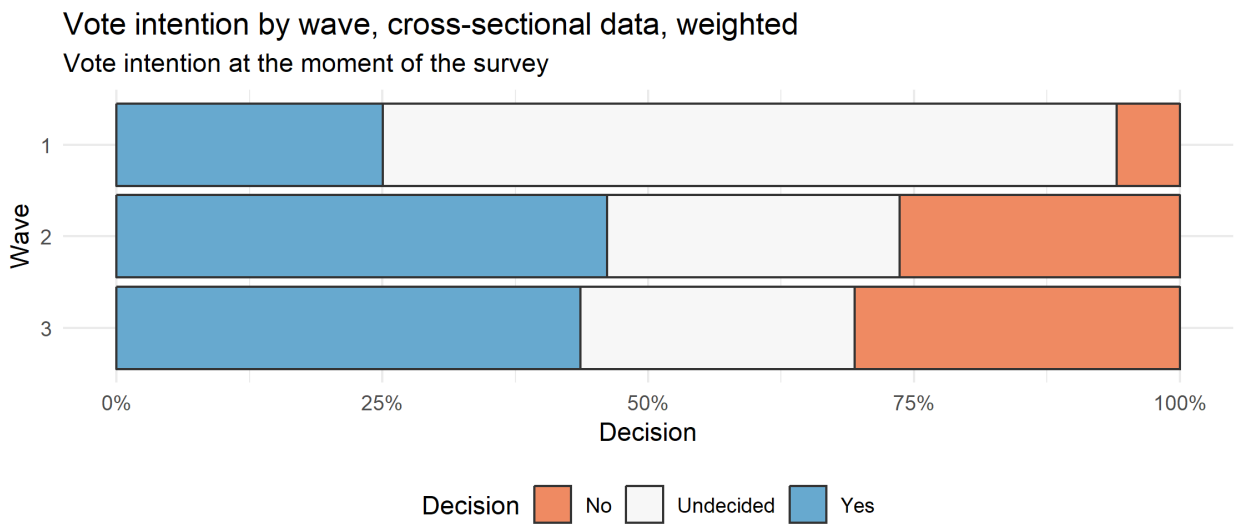

Figure 6: Vote intentions over the course of the campaign, shares.

```
waves %>%
  filter(!is.na(decision)) %>%
  group_by(wave) %>%
  mutate(one = 1) %>%
  summarise(sample.n = sum(one * w.weight)) %>%
  full_join(waves, by='wave') %>%
  filter(!is.na(decision)) %>%
  group_by(wave, sample.n, decision) %>%
  mutate(one = 1) %>%
  summarise(ratio = sum(one * w.weight)) %>%
  mutate(ratio = ratio / sample.n) %>%
  assign("wave.dec", ., envir = .GlobalEnv) %>%
  ggplot(aes(reorder(wave, -wave), ratio, fill = decision)) +
  geom_bar(stat='identity', position = 'fill', color = 'grey20') +
  coord_flip() +
  scale_y_continuous(labels=scales::percent_format()) +
  scale_fill_brewer(palette='RdBu') +
  labs(title = 'Vote intention by wave, cross-sectional data, weighted',
       subtitle = 'Vote intention at the moment of the survey',
       x = 'Wave', y = 'Decision', fill = 'Decision') +
  theme_minimal() +
  theme(legend.position='bottom')
```

```
wave.dec
```

```
## # A tibble: 9 x 4
```

```
## # Groups:   wave, sample.n [3]
##    wave sample.n decision   ratio
##   <dbl>    <dbl> <fct>      <dbl>
## 1     1    2720. No        0.0594
## 2     1    2720. Undecided 0.690
## 3     1    2720. Yes       0.250
## 4     2     837. No        0.263
## 5     2     837. Undecided 0.275
## 6     2     837. Yes       0.461
## 7     3     833. No        0.306
## 8     3     833. Undecided 0.258
## 9     3     833. Yes       0.437
```

```
# Only those who participated until the end
panel %>%
  filter(!is.na(decision) & wave == 3) %>%
  select(respondent.id) %>%
  left_join(panel, by="respondent.id") %>%
  group_by(wave) %>%
  mutate(one = 1) %>%
  summarise(sample.n = sum(one * w.weight)) %>%
  left_join(panel, by='wave') %>%
  filter(!is.na(decision)) %>%
  group_by(wave, sample.n, decision) %>%
  mutate(one = 1) %>%
  summarise(ratio = sum(one * w.weight)) %>%
  mutate(ratio = ratio / sample.n) %>%
  ggplot(aes(reorder(wave, -wave), ratio, fill = decision)) +
  geom_bar(stat='identity', position = 'fill', color = 'grey20') +
  coord_flip() +
  scale_y_continuous(labels=scales::percent_format()) +
  scale_fill_brewer(palette='RdBu') +
  labs(title = 'Vote intention by wave, panel data, weighted',
       subtitle = paste0('Vote intention at the moment of the survey.',
                         'Only three-times respondents included'),
       x = 'Wave', y = 'Decision', fill = 'Decision') +
  theme_minimal() +
  theme(legend.position='bottom')
```

```
rm(panel.dec, wave.dec)
```

The alluvial plot shows how respondents changed (or did not change, in most cases) vote intention over the three waves. Dropouts are also represented by "missing" links to the next wave, i.e., the lowering height of the bar chart also represents panel mortality.

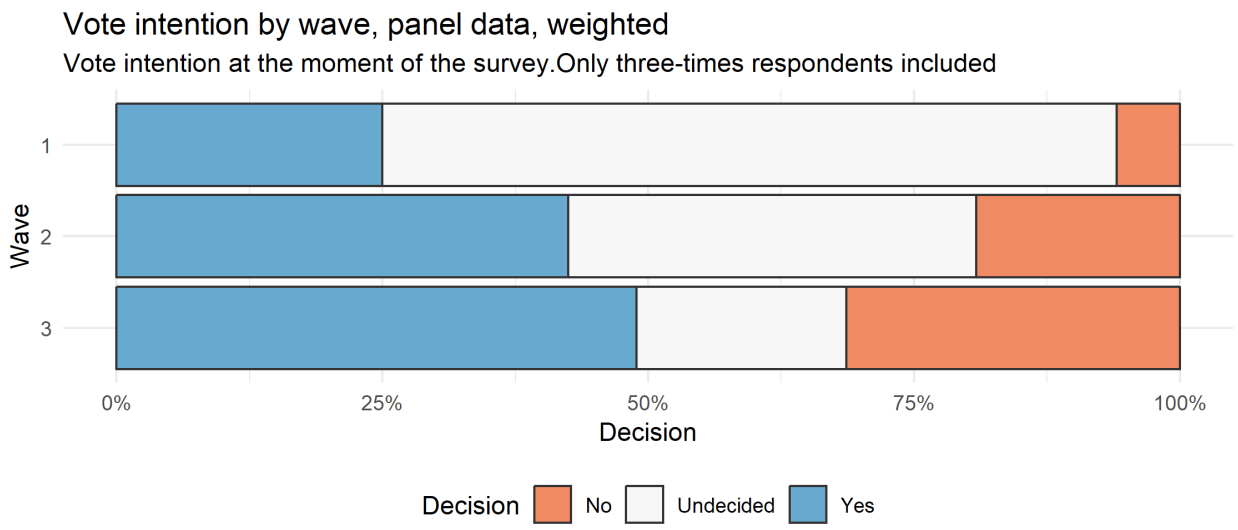

Figure 7: Vote intentions over the course of the campaign, shares.

```
pacman::p_load('ggalluvial')

panel$decision <- recode_factor(panel$dec,
                                '0' = 'No',
                                '3' = 'Undecided',
                                '1' = 'Yes',
                                .default = NA_character_)

panel %>%
  filter(!is.na(decision)) %>%
  ggplot(aes(x = wave, stratum = decision, alluvium = respondent.id,
             y = w.weight,
             fill = decision, label = decision)) +
  geom_flow(color="grey40") +
  geom_stratum(alpha = .5, na.rm = T) +
  geom_text(stat = "stratum", size = 3) +
  theme(legend.position = "none") +
  scale_x_continuous(breaks = 1:3, labels = c("1", "2", "3")) +
  scale_fill_brewer(type = "qual", palette = "RdBu") +
  labs(title = 'Vote intention by wave, panel data, weighted',
       subtitle = 'Vote intention at the moment of the survey',
       x = 'Wave', y = 'Count') +
  theme_minimal() +
  theme(legend.position = 'none')
```

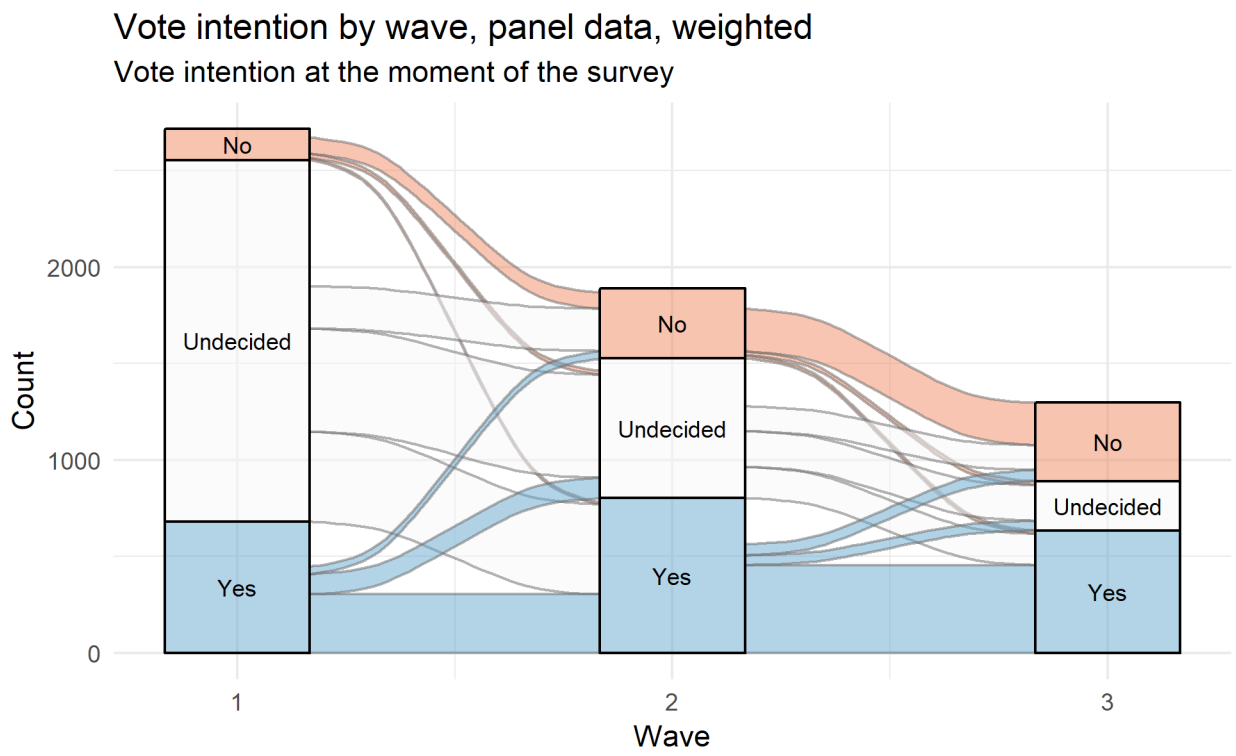

Figure 8: Vote intentions over the course of the campaign, alluvial plot. Figure used in the manuscript as Fig. 2.

```
ggsave('img/vote_intention_alluvial.png',
       dpi=300,
       units=c('cm'),
       width=21, height=11)
```

```
panel %>%
  filter(!is.na(decision) & wave == 3) %>%
  select(respondent.id) %>%
  left_join(panel, by="respondent.id") %>%
  mutate(decision = if_else(!is.na(decision), decision, factor("Undecided"))) %>%
  ggplot(aes(x = wave, stratum = decision, alluvium = respondent.id,
             y = w.weight,
             fill = decision, label = decision)) +
  geom_flow(color="grey40") +
  geom_stratum(alpha = .5, na.rm = F) +
  geom_text(stat = "stratum", size = 3) +
  theme(legend.position = "none") +
  scale_x_continuous(breaks = 1:3, labels = c("1", "2", "3")) +
  scale_fill_brewer(type = "qual", palette = "RdBu") +
  labs(title = paste0('Vote intention by wave, panel data, weighted,',
                      ' only resp. of third wave'),
       subtitle = 'Vote intention at the moment of the survey',
       x = 'Wave', y = 'Count') +
  theme_minimal() +
  theme(legend.position = 'none')
```

2.3 Model 1: Support by wave

The conjoint models are estimated based on Hainmueller et al. (2014). Please refer to the extensive package description on CRAN and their paper for further details on the analysis.

Model 1 includes an interaction with the wave of the response, i.e., the conjoint basically represents the three cross-sections by presenting the ACIE for each wave.

2.3.1 Setup of the model design

```
polcj$Costs <- factor(polcj$Costs,
                      levels=c("none","+8 CHF","+15 CHF","+23 CHF","+30 CHF"))
polcj$Nuclear.Power.Plants <- factor(polcj$Nuclear.Power.Plants,
                      levels=c("no run-time limit","60 years run-time limit",
                               "switch off"))
polcj$Party.Position <- factor(polcj$Party.Position,
                      levels=c("grand coalition vs. far right",
```

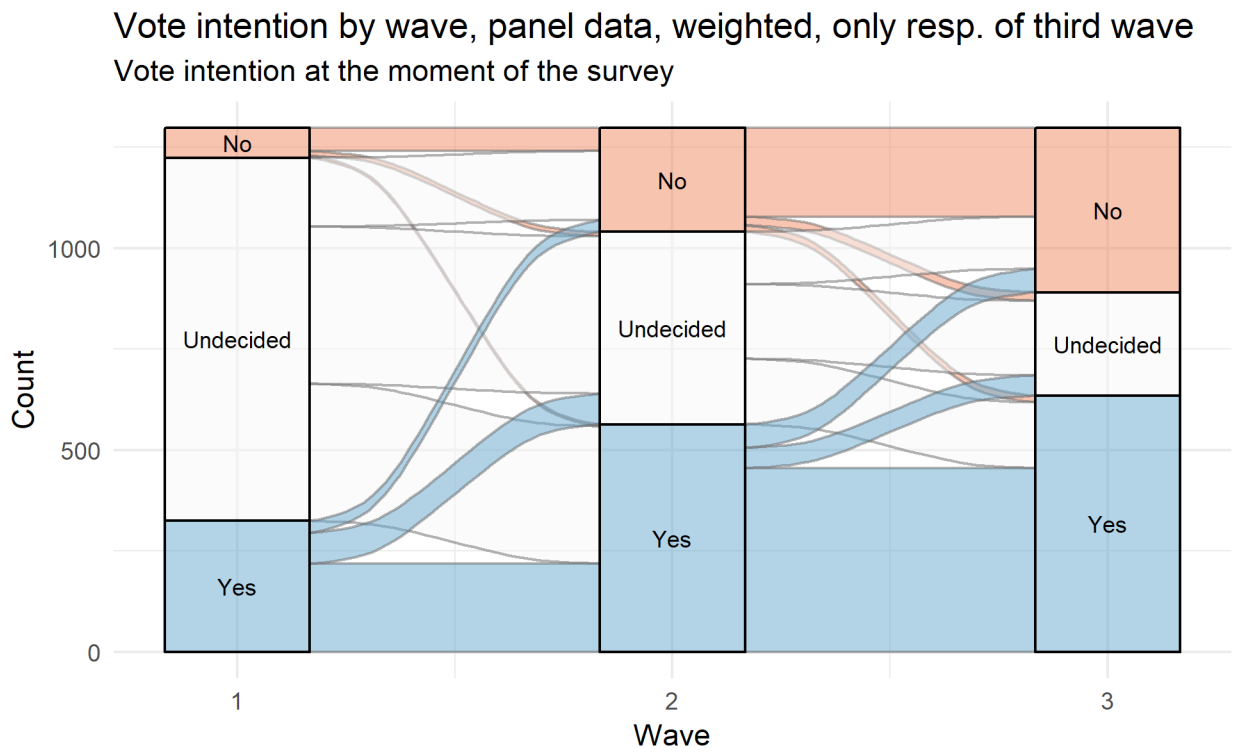

Figure 9: Vote intentions over the course of the campaign, alluvial plot. Figure focused just on respondents of the third wave with a full record..

```
                                "middle-left vs. right",
                                "left-green vs. middle-right"))
polcj$Source.of.Funding <- factor(polcj$Source.of.Funding,
                        levels=c("tax on electricity",
                                "tax on non-renewable electricity",
                                "value added tax",
                                "income and revenue tax"))
polcj$Energy.Source.Priority <- as.factor(polcj$Energy.Source.Priority)
polcj$Exceptions <- as.factor(polcj$Exceptions)
polcj$Policy.Measure <- as.factor(polcj$Policy.Measure)

cjPolAttr <- list()
cjPolAttr$Costs <- levels(polcj$Costs)
cjPolAttr$Energy.Source.Priority <- levels(polcj$Energy.Source.Priority)
cjPolAttr$Policy.Measure <- levels(polcj$Policy.Measure)
cjPolAttr$Source.of.Funding <- levels(polcj$Source.of.Funding)
cjPolAttr$Nuclear.Power.Plants <- levels(polcj$Nuclear.Power.Plants)
cjPolAttr$Exceptions <- levels(polcj$Exceptions)
cjPolAttr$Party.Position <- levels(polcj$Party.Position)

cjPolConst <- list()
cjPolConst[[1]] <- list()
cjPolConst[[1]][["Policy.Measure"]] <- c("redistribution")
cjPolConst[[1]][["Source.of.Funding"]] <- c("income and revenue tax", "value added tax")
cjPolConst[[2]] <- list()
cjPolConst[[2]][["Exceptions"]] <- c("industry")
cjPolConst[[2]][["Source.of.Funding"]] <- c("income and revenue tax", "value added tax")

cjPolMargW <- list()
cjPolMargW$Source.of.Funding <- c(1/4, 1/4, 1/4, 1/4)
cjPolMargW$Policy.Measure <- c(26/100, 27/100, 18/100, 27/100)
cjPolMargW$Energy.Source.Priority <- c(1/2, 1/2)
cjPolMargW$Costs <- c(1/5, 1/5, 1/5, 1/5, 1/5)
cjPolMargW$Exceptions <- c(4/10, 6/10)
cjPolMargW$Nuclear.Power.Plants <- c(1/3, 1/3, 1/3)
cjPolMargW$Party.Position <- c(1/3, 1/3, 1/3)

design <- makeDesign(type='constraints', attribute.levels=cjPolAttr,
                            constraints=cjPolConst, level.probs=cjPolMargW)
rm(cjPolAttr, cjPolConst, cjPolMargW)
```

2.3.2 Model formula and GOF

```
baselines <- list()
baselines$Costs <- 'none'
baselines$Energy.Source.Priority <- 'renewable energy and large hydro power'
baselines$Policy.Measure <- 'feed-in tariff'
baselines$Source.of.Funding <- 'tax on electricity'
baselines$Nuclear.Power.Plants <- 'no run-time limit'
baselines$Exceptions <- 'no exceptions'
baselines$Party.Position <- 'grand coalition vs. far right'

polcj.na <- polcj %>%
  filter(!is.na(qs.id) & !is.na(support)) %>%
  filter(is.na(tr.cj.party) | tr.cj.party==1) %>%
  mutate(wave = as.factor(wave))

m1 <- amce2(
  formula = support ~
    Source.of.Funding*wave + Policy.Measure*wave +
    Energy.Source.Priority*wave + Costs*wave +
    Exceptions*wave + Nuclear.Power.Plants*wave +
    Party.Position*wave,
  respondent.id = 'qs.id',
  respondent.varying = 'wave',
  data = polcj.na,
  design = design,
  baselines = baselines,
  na.ignore = T,
  weights = 'w.weight'
)

fit.svyglm(m1$lmer.full)

p.support <- plot.amce2(m1, plot.display = 'interaction')
```

```
p.support.d <- p.support$data
p.support.d$facet <- recode_factor(p.support.d$facet,
                                   'Conditional on\nwave = 1' = 'Wave 1',
                                   'Conditional on\nwave = 2' = 'Wave 2',
                                   'Conditional on\nwave = 3' = 'Wave 3'
)

p.support.d$x <- c(10,11,12,13,14,15,16,17,18,19,20,21,22,1,2,3,4,5,6,7,8,9,
```

```
                    23,24,25,26,27,28,29,30)
```

2.3.3 Plot model 1

```
ggplot(p.support.d) +
  geom_hline(yintercept = 0, size = 0.5, color = 'black',
             linetype = 'dotted') +
  geom_pointrange(aes(y = pe, ymin = lower, ymax = upper,
                      x = reorder(printvar, -x)),
                  size=0.4,
                  position=position_dodge(width=0.95)) +
  ylim(-9,6) + coord_flip() +
  facet_grid(~facet) +
  labs(title='Preferences for the energy policy',
       subtitle=paste0('Average marginal component effects',
                       ' of policy design by wave'),
       y='Change in the support for the policy',
       x='') +
  theme_minimal() +
  theme(axis.text.y = element_text(hjust = 0),
        legend.position='none')
```

```
ggsave('img/support_waves.png',
       dpi=300,
       units=c('cm'),
       width=21, height=18)
```

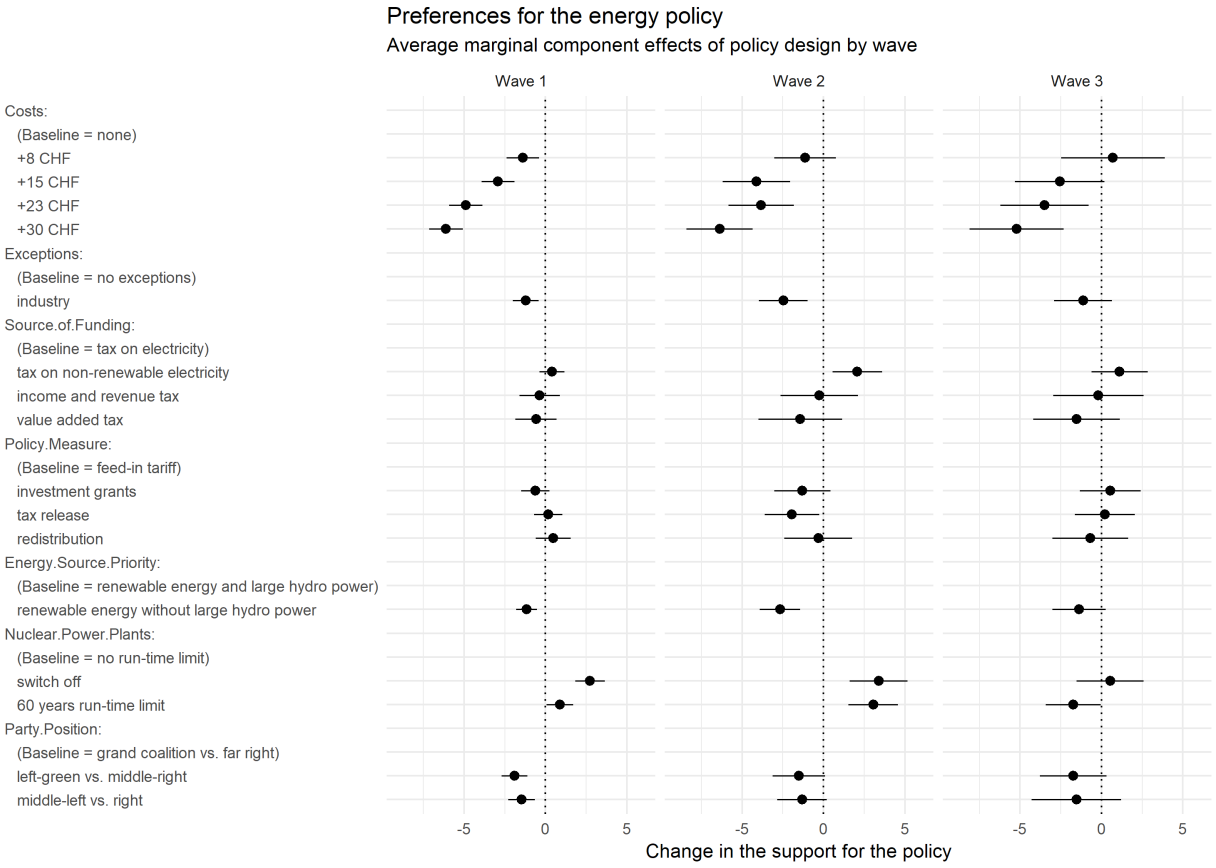

Figure 10: Support by survey wave. Figure used in the manuscript as Fig. 3.

Table 1: Baselines for all AMCE models.

	Attribute Level
Costs	none
Energy.Source.Priority	renewable energy and large hydro power
Policy.Measure	feed-in tariff
Source.of.Funding	tax on electricity
Nuclear.Power.Plants	no run-time limit
Exceptions	no exceptions
Party.Position	grand coalition vs. far right

2.3.4 Table of model 1

```
kable(as.matrix(baselines), caption="Baselines for all AMCE models. \n",
      col.names=c('Attribute Level'))
```

```
options(knitr.kable.NA="")
m1out <- cbind(summary(m1)$amce[,c(1:4,7)],
      summary(m1)$wave1amce[c(8:11,7,12:16,4:6,1:3),c(3:4,7)],
      summary(m1)$wave2amce[c(8:11,7,12:16,4:6,1:3),c(3:4,7)],
      summary(m1)$wave3amce[c(8:11,7,12:16,4:6,1:3),c(3:4,7)])
colnames(m1out) <- c("Attribute", "Level",
                           "AMCE", "SE", "",
                           "Wave 1", "SE", "",
                           "Wave 2", "SE", "",
                           "Wave 3", "SE", "")

kable(m1out, digits=2, caption="Results of model 1.\n") %>%
  kable_styling(font_size = 7)
```

Table 2: Results of model 1.

	Attribute	Level	AMCE	SE		Wave 1	SE		Wave 2	SE		Wave 3	SE	
8	Costs	+8 CHF	-1.01	0.49	*	-1.40	0.51	**	-1.13	0.97		0.70	1.63	
9	Costs	+15 CHF	-3.10	0.48	***	-2.91	0.52	***	-4.13	1.06	***	-2.56	1.40	
10	Costs	+23 CHF	-4.48	0.46	***	-4.90	0.52	***	-3.83	1.02	***	-3.49	1.38	*
11	Costs	+30 CHF	-6.01	0.48	***	-6.12	0.53	***	-6.39	1.04	***	-5.22	1.48	***
7	Energy.Source.Priority	renewable energy without large hydro power	-1.56	0.28	***	-1.17	0.33	***	-2.68	0.63	***	-1.37	0.84	
12	Exceptions	industry	-1.48	0.33	***	-1.21	0.40	**	-2.47	0.76	**	-1.13	0.90	
13	Nuclear.Power.Plants	switch off	2.50	0.39	***	2.74	0.46	***	3.40	0.91	***	0.53	1.05	
14	Nuclear.Power.Plants	60 years run-time limit	0.89	0.34	**	0.88	0.42	*	3.05	0.78	***	-1.73	0.86	*
15	Party.Position	left-green vs. middle-right	-1.80	0.35	***	-1.90	0.41	***	-1.51	0.82		-1.74	1.04	
16	Party.Position	middle-left vs. right	-1.39	0.37	***	-1.47	0.41	***	-1.31	0.78		-1.54	1.41	
4	Policy.Measure	investment grants	-0.55	0.37		-0.63	0.44		-1.30	0.88		0.55	0.95	
5	Policy.Measure	tax release	-0.26	0.37		0.16	0.45		-1.94	0.85	*	0.22	0.94	
6	Policy.Measure	redistribution	0.15	0.45		0.48	0.55		-0.32	1.07		-0.69	1.18	
1	Source.of.Funding	tax on non-renewable electricity	0.85	0.33	**	0.40	0.39		2.08	0.77	**	1.11	0.88	
2	Source.of.Funding	income and revenue tax	-0.30	0.53		-0.36	0.64		-0.26	1.21		-0.19	1.42	
3	Source.of.Funding	value added tax	-0.97	0.54		-0.58	0.65		-1.42	1.32		-1.53	1.35	

2.4 Model 2: Party ID

Model 2 includes an interaction with the party preference of the respondent and is computed simultaneously to model 1.

2.4.1 Model formula and GOF

```
polcj.na <- polcj %>%
  full_join(select(waves, qs.id, party.lab), by="qs.id") %>%
  filter(!is.na(qs.id) & !is.na(support) & !is.na(party.lab)) %>%
  filter(is.na(tr.cj.party) | tr.cj.party==1) %>%
  mutate(party.lab = as.factor(party.lab))

m2 <- amce2(
  formula = support ~
    Source.of.Funding*party.lab + Policy.Measure*party.lab +
    Energy.Source.Priority*party.lab + Costs*party.lab +
    Exceptions*party.lab + Nuclear.Power.Plants*party.lab +
    Party.Position*party.lab,
  respondent.id = 'qs.id',
  respondent.varying = 'party.lab',
  data = polcj.na,
  design = design,
  baselines = baselines,
  na.ignore = T,
  weights = 'w.weight'
)

fit.svyglm(m2$lmer.full)

p.support <- plot.amce2(m2, plot.display = 'interaction')
```

```
p.support.d <- p.support$data
p.support.d$facet <- recode_factor(
  p.support.d$facet,
  'Conditional on\nparty.lab = SVP' = 'SVP',
  'Conditional on\nparty.lab = SP' = 'SP',
  'Conditional on\nparty.lab = FDP' = 'FDP',
  'Conditional on\nparty.lab = CVP' = 'CVP',
  'Conditional on\nparty.lab = GPS' = 'GPS',
  'Conditional on\nparty.lab = GLP' = 'GLP',
  'Conditional on\nparty.lab = none' = 'none',
  'Conditional on\nparty.lab = other' = 'other')
```

```
p.support.d$x <- c(10,11,12,13,14,15,16,17,18,19,20,21,22,1,2,3,4,5,6,7,8,9,
                   23,24,25,26,27,28,29,30)
```

2.4.2 Plot model 2

```
p.support.d %>%
  filter(facet %!in% c("none", "other")) %>%
  ggplot() +
  geom_hline(yintercept = 0, size = 0.5, color = 'black',
             linetype = 'dotted') +
  geom_pointrange(aes(y = pe, ymin = lower, ymax = upper,
                      x = reorder(printvar, -x)),
                  size=0.4,
                  position=position_dodge(width=0.95)) +
  ylim(-13,14) + coord_flip() +
  facet_grid(~ facet) +
  labs(title='Preferences for the energy policy',
       subtitle=paste0('Average marginal component effects',
                       ' of policy design by party identification'),
       y='Change in the support for the policy',
       x='') +
  theme_minimal() +
  theme(axis.text.y = element_text(hjust = 0),
        legend.position='bottom')
```

```
ggsave('img/support_pid.png',
       dpi=300,
       units=c('cm'),
       width=32, height=18)
```

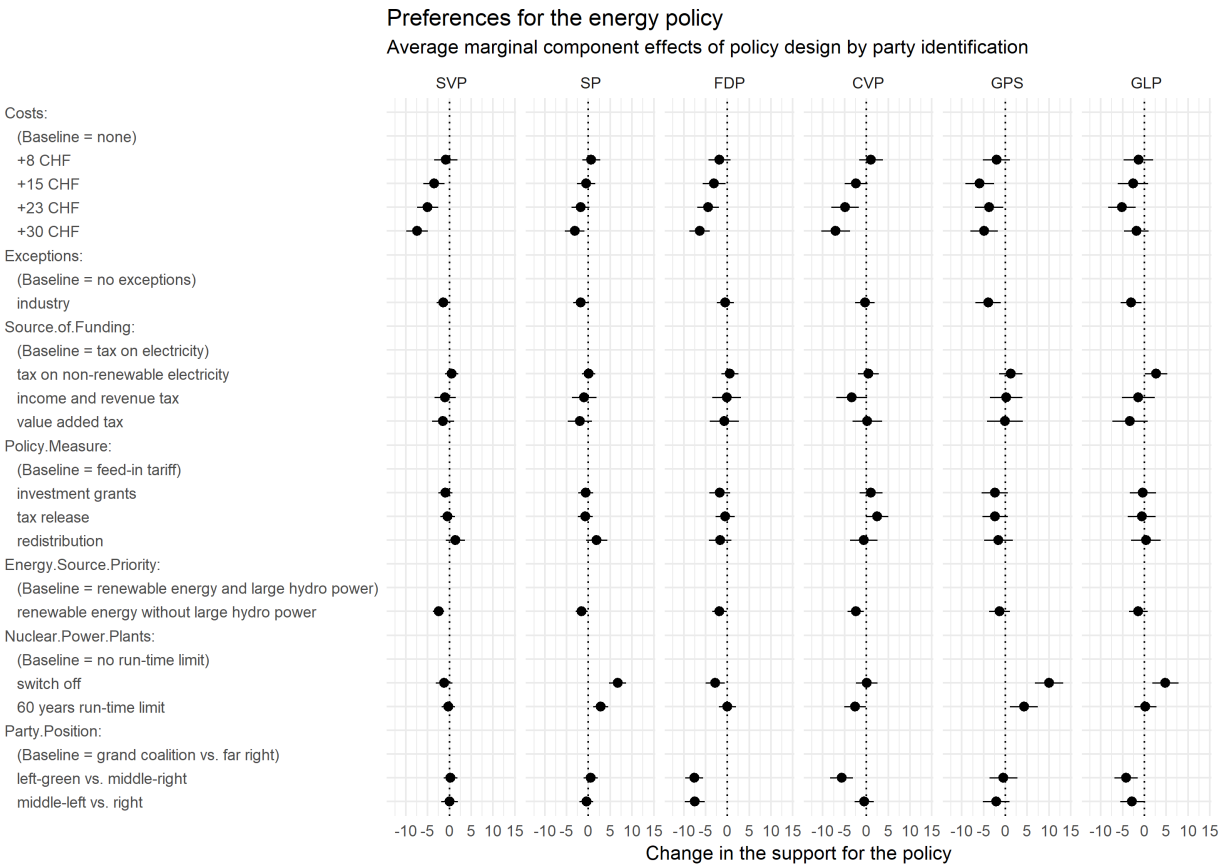

Figure 11: Support by party identity. Figure used in the manuscript as Fig. 4.

Table 3: Results of model 2, part A.

	Attribute	Level	AMCE	SE		SVP	SE		SP	SE		FDP	SE		CVP	SE	
8	Costs	+8 CHF	-1.01	0.49	*	-0.79	1.37		0.65	1.05		-1.81	1.30		1.07	1.39	
9	Costs	+15 CHF	-3.10	0.48	***	-3.53	1.24	**	-0.49	1.07		-3.06	1.34	*	-2.36	1.35	
10	Costs	+23 CHF	-4.48	0.46	***	-4.99	1.24	***	-1.81	1.03		-4.42	1.28	***	-4.91	1.61	**
11	Costs	+30 CHF	-6.01	0.48	***	-7.43	1.27	***	-3.13	1.14	**	-6.38	1.21	***	-7.05	1.67	***
7	Energy.Source.Priority	renewable energy without large hydro power	-1.56	0.28	***	-2.49	0.65	***	-1.53	0.69	*	-1.82	0.85	*	-2.45	0.95	**
12	Exceptions	industry	-1.48	0.33	***	-1.39	0.76		-1.72	0.91		-0.48	1.00		-0.32	1.14	
13	Nuclear.Power.Plants	switch off	2.50	0.39	***	-1.19	0.96		6.70	0.99	***	-2.81	1.11	*	0.04	1.27	
14	Nuclear.Power.Plants	60 years run-time limit	0.89	0.34	**	-0.24	0.79		2.85	0.88	**	-0.01	0.99		-2.59	1.27	*
15	Party.Position	left-green vs. middle-right	-1.80	0.35	***	0.25	0.80		0.51	0.81		-7.59	1.04	***	-5.68	1.35	***
16	Party.Position	middle-left vs. right	-1.39	0.37	***	0.05	0.99		-0.44	0.80		-7.45	1.16	***	-0.50	1.14	
4	Policy.Measure	investment grants	-0.55	0.37		-0.92	0.85		-0.65	0.88		-1.74	1.21		1.06	1.34	
5	Policy.Measure	tax release	-0.26	0.37		-0.40	0.84		-0.69	0.86		-0.51	1.13		2.50	1.31	
6	Policy.Measure	redistribution	0.15	0.45		1.35	1.12		1.89	1.23		-1.69	1.32		-0.59	1.63	
1	Source.of.Funding	tax on non-renewable electricity	0.85	0.33	**	0.54	0.78		0.04	0.80		0.57	0.99		0.49	1.22	
2	Source.of.Funding	income and revenue tax	-0.30	0.53		-0.99	1.24		-0.98	1.44		-0.17	1.67		-3.36	1.79	
3	Source.of.Funding	value added tax	-0.97	0.54		-1.46	1.28		-1.93	1.41		-0.68	1.72		0.22	1.72	

2.4.3 Table of model 2

```
m2out <- cbind(summary(m2)$amce[,c(1:4,7)],
               summary(m2)$partylab1amce[c(8:11,7,12:16,4:6,1:3),c(3:4, 7)],
               summary(m2)$partylab2amce[c(8:11,7,12:16,4:6,1:3),c(3:4, 7)],
               summary(m2)$partylab3amce[c(8:11,7,12:16,4:6,1:3),c(3:4, 7)],
               summary(m2)$partylab4amce[c(8:11,7,12:16,4:6,1:3),c(3:4, 7)])
colnames(m2out) <- c("Attribute", "Level",
                     "AMCE", "SE", "",
                     "SVP", "SE", "",
                     "SP", "SE", "",
                     "FDP", "SE", "",
                     "CVP", "SE", "")

kable(m2out, digits=2, caption="Results of model 2, part A.\n") %>%
  kable_styling(font_size = 7)
```

Table 4: Results of model 2, part B.

	Attribute	Level	AMCE	SE		GPS	SE		GLP	SE		none	SE		other	SE	
8	Costs	+8 CHF	-1.01	0.49	*	-2.04	1.57		-1.35	1.73		-1.60	0.97		-1.35	0.84	
9	Costs	+15 CHF	-3.10	0.48	***	-5.89	1.69	***	-2.61	1.76		-3.15	0.90	***	-4.35	0.98	***
10	Costs	+23 CHF	-4.48	0.46	***	-3.76	1.66	*	-5.17	1.61	**	-4.88	1.00	***	-5.43	0.86	***
11	Costs	+30 CHF	-6.01	0.48	***	-4.89	1.62	**	-1.84	1.45		-6.78	0.98	***	-6.88	0.93	***
7	Energy.Source.Priority	renewable energy without large hydro power	-1.56	0.28	***	-1.32	1.21		-1.38	1.09		-1.01	0.62		-0.86	0.56	
12	Exceptions	industry	-1.48	0.33	***	-3.93	1.48	**	-3.07	1.21	*	-1.49	0.71	*	-0.45	0.66	
13	Nuclear.Power.Plants	switch off	2.50	0.39	***	10.02	1.67	***	4.81	1.52	**	2.99	0.82	***	3.29	0.77	***
14	Nuclear.Power.Plants	60 years run-time limit	0.89	0.34	**	4.26	1.62	**	0.24	1.30		1.59	0.81	*	1.06	0.64	
15	Party.Position	left-green vs. middle-right	-1.80	0.35	***	-0.47	1.63		-4.20	1.35	**	-1.39	0.84		-1.20	0.67	
16	Party.Position	middle-left vs. right	-1.39	0.37	***	-2.08	1.55		-2.84	1.38	*	-0.35	0.80		-0.35	0.65	
4	Policy.Measure	investment grants	-0.55	0.37		-2.40	1.53		-0.35	1.52		-0.15	0.75		0.44	0.81	
5	Policy.Measure	tax release	-0.26	0.37		-2.36	1.50		-0.59	1.62		-0.56	0.81		0.89	0.81	
6	Policy.Measure	redistribution	0.15	0.45		-1.60	1.67		0.35	1.72		-0.38	0.96		0.18	0.92	
1	Source.of.Funding	tax on non-renewable electricity	0.85	0.33	**	1.22	1.37		2.71	1.32	*	0.97	0.70		0.51	0.66	
2	Source.of.Funding	income and revenue tax	-0.30	0.53		0.17	1.90		-1.42	1.92		0.60	1.15		0.77	1.06	
3	Source.of.Funding	value added tax	-0.97	0.54		-0.13	2.10		-3.30	2.08		1.23	1.24		-2.32	1.04	*

```
m2out <- cbind(summary(m2)$amce[,c(1:4,7)],
               summary(m2)$partylab5amce[c(8:11,7,12:16,4:6,1:3),c(3:4, 7)],
               summary(m2)$partylab6amce[c(8:11,7,12:16,4:6,1:3),c(3:4, 7)],
               summary(m2)$partylab7amce[c(8:11,7,12:16,4:6,1:3),c(3:4, 7)],
               summary(m2)$partylab8amce[c(8:11,7,12:16,4:6,1:3),c(3:4, 7)])
colnames(m2out) <- c("Attribute", "Level",
                     "AMCE", "SE", "",
                     "GPS", "SE", "",
                     "GLP", "SE", "",
                     "none", "SE", "",
                     "other", "SE", "")

kable(m2out, digits=2, caption="Results of model 2, part B.\n") %>%
  kable_styling(font_size = 7)
```

3 Session info

```
sessionInfo()
```

```
## R version 3.5.2 (2018-12-20)
## Platform: x86_64-w64-mingw32/x64 (64-bit)
## Running under: Windows 10 x64 (build 17763)
##
## Matrix products: default
##
## locale:
## [1] LC_COLLATE=German_Switzerland.1252  LC_CTYPE=German_Switzerland.1252
## [3] LC_MONETARY=German_Switzerland.1252 LC_NUMERIC=C
## [5] LC_TIME=German_Switzerland.1252
##
## attached base packages:
## [1] grid      stats     graphics  grDevices utils     datasets  methods
## [8] base
##
## other attached packages:
##  [1] ggalluvial_0.9.1  magrittr_1.5      poliscidata_2.2.3
##  [4] kableExtra_1.0.0  knitr_1.21        rtf_0.4-13
##  [7] readxl_1.2.0      lubridate_1.7.4   cjoint_2.1.0
## [10] survey_3.35       survival_2.43-3   Matrix_1.2-15
## [13] lmtest_0.9-36     zoo_1.8-4         sandwich_2.5-0
## [16] forcats_0.3.0     stringr_1.3.1     dplyr_0.8.0.1
## [19] purrr_0.2.5       readr_1.3.1       tidyr_0.8.2
## [22] tibble_2.0.1      ggplot2_3.1.0     tidyverse_1.2.1
## [25] pacman_0.5.1
##
## loaded via a namespace (and not attached):
##  [1] minqa_1.2.4         colorspace_1.3-2    rio_0.5.16
##  [4] htmlTable_1.13.1    base64enc_0.1-3     rstudioapi_0.9.0
##  [7] mice_3.3.0          fansi_0.4.0         xml2_1.2.0
## [10] splines_3.5.2       R.methodsS3_1.7.1   Formula_1.2-3
## [13] jsonlite_1.6        nloptr_1.2.1        broom_0.5.1
## [16] cluster_2.0.7-1     R.oo_1.22.0         shiny_1.2.0
## [19] compiler_3.5.2      httr_1.4.0          backports_1.1.3
## [22] assertthat_0.2.0    lazyeval_0.2.1      cli_1.0.1
## [25] later_0.7.5         acepack_1.4.1       htmltools_0.3.6
## [28] tools_3.5.2         gtable_0.2.0        glue_1.3.0
## [31] descr_1.1.4         Rcpp_1.0.0          carData_3.0-2
## [34] cellranger_1.1.0    gdata_2.18.0        nlme_3.1-137
```

```
## [37] xfun_0.4            lme4_1.1-19         openxlsx_4.1.0
## [40] rvest_0.3.2         mime_0.6            weights_1.0
## [43] gtools_3.8.1        pan_1.6             MASS_7.3-51.1
## [46] scales_1.0.0        ENmisc_1.2-7        hms_0.4.2
## [49] promises_1.0.1      parallel_3.5.2      RColorBrewer_1.1-2
## [52] yaml_2.2.0          curl_3.3            gridExtra_2.3
## [55] rpart_4.1-13        latticeExtra_0.6-28 stringi_1.2.4
## [58] plotrix_3.7-4       checkmate_1.9.0     caTools_1.17.1.1
## [61] zip_1.0.0           rlang_0.3.1         pkgconfig_2.0.2
## [64] bitops_1.0-6        evaluate_0.12       lattice_0.20-38
## [67] labeling_0.3        htmlwidgets_1.3     tidyselect_0.2.5
## [70] plyr_1.8.4          bookdown_0.9        R6_2.3.0
## [73] gplots_3.0.1        generics_0.0.2      Hmisc_4.1-1
## [76] mitml_0.3-7         pillar_1.3.1        haven_2.1.0
## [79] foreign_0.8-71      withr_2.1.2         abind_1.4-5
## [82] nnet_7.3-12         modelr_0.1.2        crayon_1.3.4
## [85] car_3.0-2           jomo_2.6-5          utf8_1.1.4
## [88] KernSmooth_2.23-15  rmarkdown_1.11      data.table_1.11.8
## [91] digest_0.6.18       webshot_0.5.1       xtable_1.8-3
## [94] httpuv_1.4.5.1      munsell_0.5.0       viridisLite_0.3.0
```