Effective Giving AI Persuasion Project - Complete Analysis Report

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1 Introduction

This report presents the complete analysis for the Effective Giving AI Persuasion Project. The analysis examines the effectiveness of AI-powered persuasive conversations compared to static messages and control conditions in promoting charitable giving to effective charities.

1.1 Project Overview

The study investigates whether AI-powered conversations can be more persuasive than static messages in encouraging donations to effective charities like the Against Malaria Foundation (AMF). The analysis includes:

- Sample descriptives and attrition analysis
- Average Treatment Effects (ATEs)
- Heterogeneity analysis using causal forests
- Persuasive strategy analysis
- AI accuracy assessment
- Comprehensive visualizations

2 Data and Setup

```
# Download and prepare data
source("download_data.R")
#download_osf_data_dir("6ya5n")
```

3 Sample Descriptives and Attrition Analysis

3.1 Attrition Analysis

```
d_all <- readr::read_csv("data/data_ai-eg-persuasion.csv") |>
  mutate(
    condition = factor(
      condition,
      levels = c('control', "static_treatment", "conv_treatment")
    )
  )

conv_errors <- c("R_7M4lCO8AvzFNtA2", "R_1DPc7kbjHlQHOVS", "R_5173KJIiwXvV5oJ")
```

```r
d_treated <- d_all |> filter(!is.na(condition))
d_itt <- d_treated |> filter(attn == 5)
d <- d_itt |> filter(Finished == 1) |>
  filter(!ResponseId %in% conv_errors)

ps_final <- d$ResponseId

nrow(d_all) #Total N
```

```
[1] 2270
```

```r
nrow(d_all) - nrow(d_treated) # withdrew before randomization
```

```
[1] 242
```

```r
nrow(d_treated) - nrow(d_itt) # failed attention check (but were randomized)
```

```
[1] 48
```

```r
nrow(d_itt) - nrow(d) #28 of ITT withdrew, 3 had technical issues with chatbot
```

```
[1] 31
```

```r
nrow(d) #final
```

```
[1] 1949
```

```r
## Is there differential attrition from ITT to analysis sample?
d_itt |> count(condition)
```

```
# A tibble: 3 x 2
  condition            n
  <fct>            <int>
1 control            654
2 static_treatment   660
3 conv_treatment     666
```

```r
d |> count(condition)
```

```
# A tibble: 3 x 2
  condition            n
  <fct>            <int>
1 control            641
2 static_treatment   649
3 conv_treatment     659
```

```r
attrition_matrix <- d_itt |> count(condition) |>
  left_join(d |> count(condition), by = "condition", suffix = c("_pre", "_post")) |>
  transmute(dropped = n_pre - n_post, stayed = n_post) |>
  as.matrix()
attrition_matrix
```

```
     dropped stayed
[1,]      13    641
[2,]      11    649
[3,]       7    659
```

```r
chisq.test(attrition_matrix)
```

```

	Pearson's Chi-squared test

data:  attrition_matrix
X-squared = 1.9442, df = 2, p-value = 0.3783
```

3.2 Sample Characteristics

```r
# Gender and age for total sample
d_all |>  count(gender)
```

```
# A tibble: 4 x 2
  gender     n
  <chr>  <int>
1 Man      987
2 Other     21
3 Woman   1097
4 <NA>     165
```

```r
d_all |>
  summarise(
    m_age = mean(age, na.rm = TRUE),
    sd_age = sd(age, na.rm = TRUE),
    min_age = min(age, na.rm = TRUE),
    max_age = max(age, na.rm = TRUE),
  ) |>
  as.data.frame()
```

```
     m_age   sd_age min_age max_age
1 42.73707 15.13187      18      83
```

```r
# for final sample
d |>  count(gender)
```

```
# A tibble: 4 x 2
  gender     n
  <chr>  <int>
1 Man      913
2 Other     21
3 Woman   1013
4 <NA>       2
```

```
d |>
  summarise(
    m_age = mean(age, na.rm = TRUE),
    sd_age = sd(age, na.rm = TRUE),
    min_age = min(age, na.rm = TRUE),
    max_age = max(age, na.rm = TRUE),
  ) |>
  as.data.frame()
```

```
     m_age   sd_age min_age max_age
1 42.62288 15.02506      18      83
```

4 Charity Descriptives

```
d_candid <- read_csv("data/guidestar_data.csv") |>
  janitor::clean_names()

pcs_population <- extract_unique_pcs_labels(d_candid$population_served)
pcs_subjects <- extract_unique_pcs_labels(d_candid$subject_area)
pcs_location <- extract_unique_pcs_labels(d_candid$where_we_work)

pop_hierarchy <- parse_hierarchy("data/pcs_pop_hierarchy.html", leaves_as_vec = FALSE)
subj_hierarchy <- parse_hierarchy("data/pcs_subj_hierarchy.html", leaves_as_vec = FALSE)

pop_hierarchy_df <- hierarchy_to_df(pop_hierarchy)
subj_hierarchy_df <- hierarchy_to_df(subj_hierarchy)


find_missing_with_match(pcs_population, pop_hierarchy_df)
```

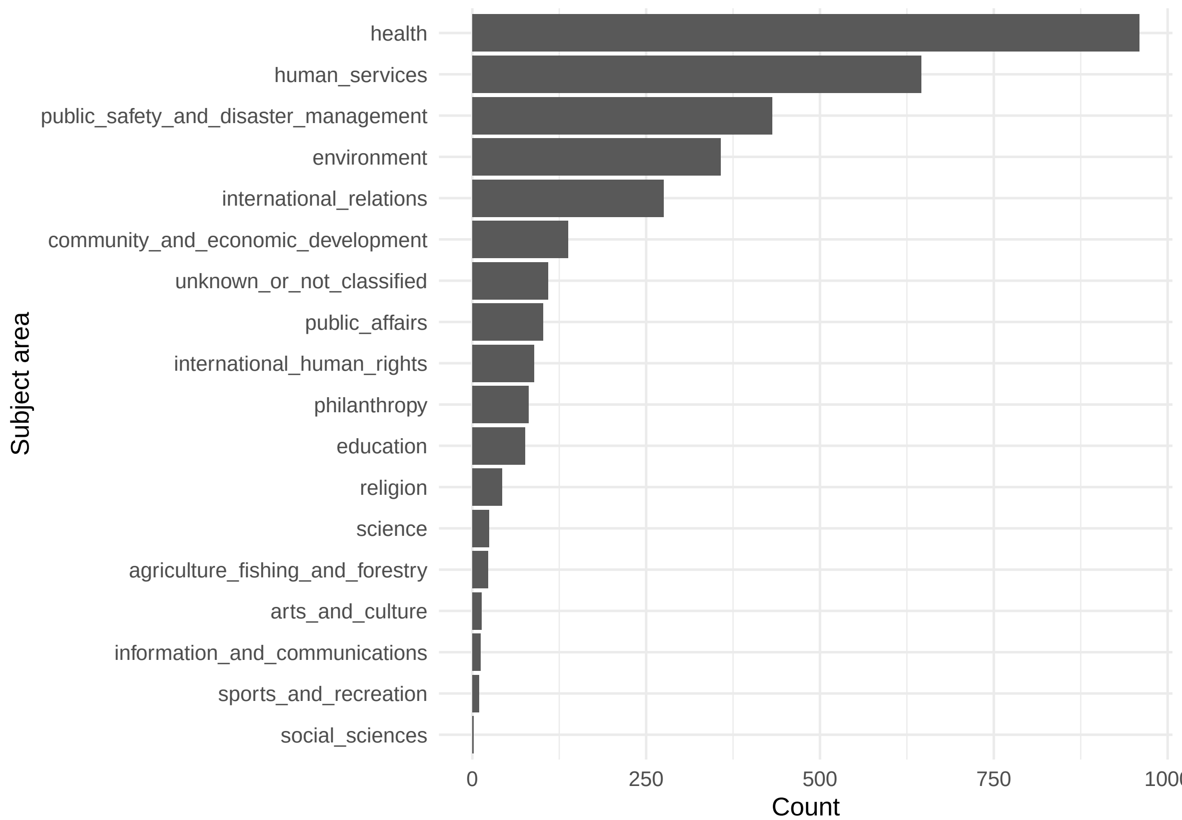
```
                           original                         closest distance
1                  American Indians                      Christians       10
2                     At-risk youth                 Out-of-home youth        9
3                          Dropouts                         Orphans        5
4                      Ex-offenders                         Mothers        8
5              Extremely poor people               Unemployed people       11
6                      LGBTQ people                   LGBTQIA+ people        3
7                 Multiracial people                  Retired people        8
8                         Offenders                      Caregivers        6
9          People of African descent              Black/African people       15
10           People of Asian descent             Central Asian people       14
11 People of Middle Eastern descent        People with disabilities       21
12              People with HIV/AIDS People living with HIV or AIDS       11
13                          Seniors                         Shintos        4
14                   Sexual identity                        Students        9
15                 Substance abusers                 Domestic workers       11
16          Unknown or not classified           Cross-border families       18
17       Victims and oppressed people  Refugees and displaced people       14
```

```
find_missing_with_match(pcs_subjects, subj_hierarchy_df)
```

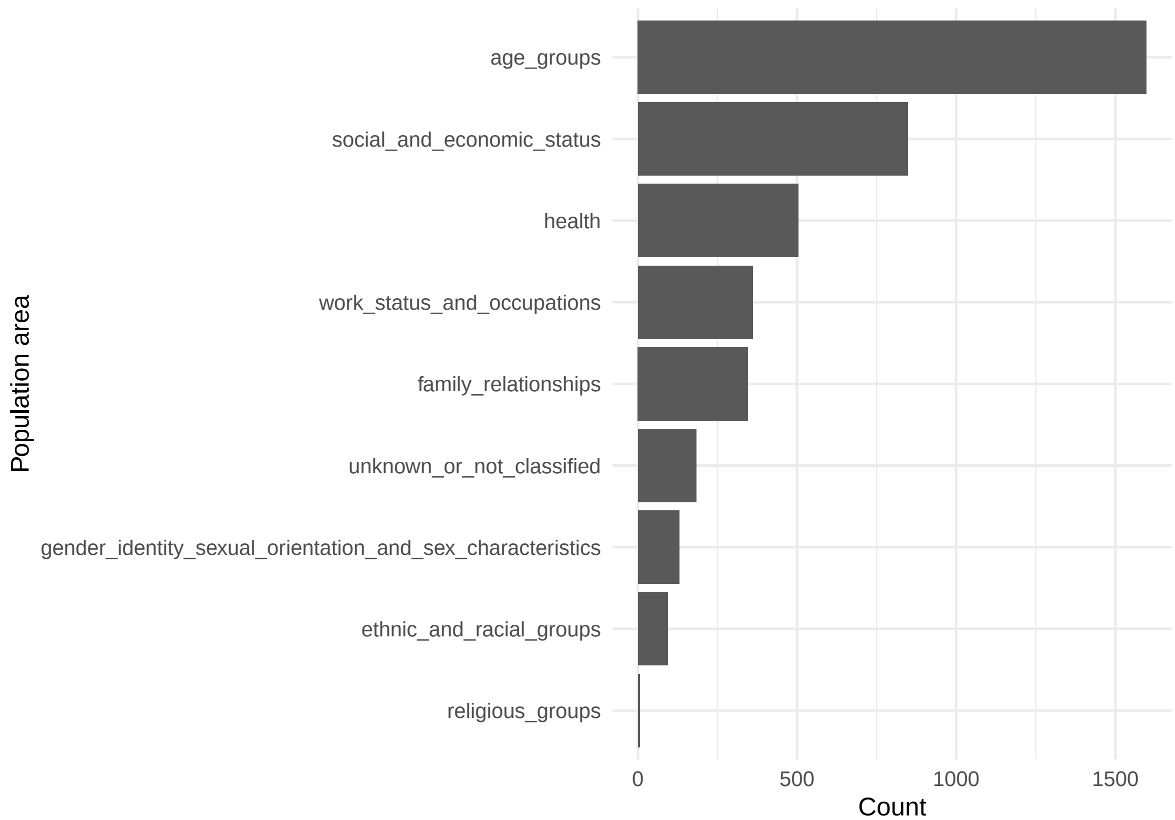
```
                          original                        closest distance
1                  Abuse prevention               Crime prevention        4
2  Ethnic and racial minority rights Ethnic and racial group rights        7
3                           HIV/AIDS                   HIV and AIDS        5
4            Housing for the homeless       Housing for older adults       10
5                       Human rights                     Humanities        5
6                 Immigrant services                 Human services        6
7               Individual liberties                    Visual arts       12
8                     Justice rights                Cultural rights        6
9                       LGBTQ rights                 LGBTQIA+ rights        3
10                 Nursing education              Nursing Education        1
11                     Public safety                    Public arts        4
12                     Right to life               Right to privacy        6
13             Senior assisted living               Impaired driving       13
14                   Senior services                Dining services        4
15                     Social rights                   Voter rights        5
16            Temporary accomodations       Temporary accommodations        1
```

```
## replace them manually after looking at hierarchy for closest match
pop_replacements <- c(
  "American Indians" = "American Indians/Native Americans",
  "At-risk youth" = "Out-of-home youth",
  "Dropouts" = "Out-of-school youth",
  "Ex-offenders" = "Formerly incarcerated people",
  "Extremely poor people" = "People living in extreme poverty",
  "LGBTQ people" = "LGBTQIA+ people",
  "Multiracial people" = "Multi-racial/Multi-ethnic people",
  "Offenders" = "Incarcerated people",
  "People of African descent" = "Black/African people",
  "People of Asian descent" = "Asian people",
  "People of Middle Eastern descent" = "Middle Eastern/North African people",
  "People with HIV/AIDS" = "People living with HIV or AIDS",
  "Seniors" = "Older adults",
  "Sexual identity" = "LGBTQIA+ people",
  "Substance abusers" = "People with substance use disorder",
  "Victims and oppressed people" = "Victims of violence or disasters"
)

subj_replacemnents <- c(
  "Abuse prevention"  = "Abuse prevention and services",
  "Ethnic and racial minority rights" = "Ethnic and racial group rights",
  "HIV/AIDS" = "HIV and AIDS",
  "Housing for the homeless" = "Housing for homeless people",
  "Human rights" = "International human rights",
  "Immigrant services" = "Immigrant and refugee services",
  "Individual liberties" = "International human rights",
  "Justice rights" = "Criminal justice system rights",
  "LGBTQ rights" = "LGBTQIA+ rights",
  "Nursing education" = "Nursing Education",
  "Public safety" = "Public safety and disaster management",
  "Right to life" = "Anti-abortion",
  "Senior assisted living" = "Assisted living for older adults",
  "Senior services" = "Services for older adults",
  "Social rights" = "International human rights",
  "Temporary accomodations" = "Temporary accommodations"
```

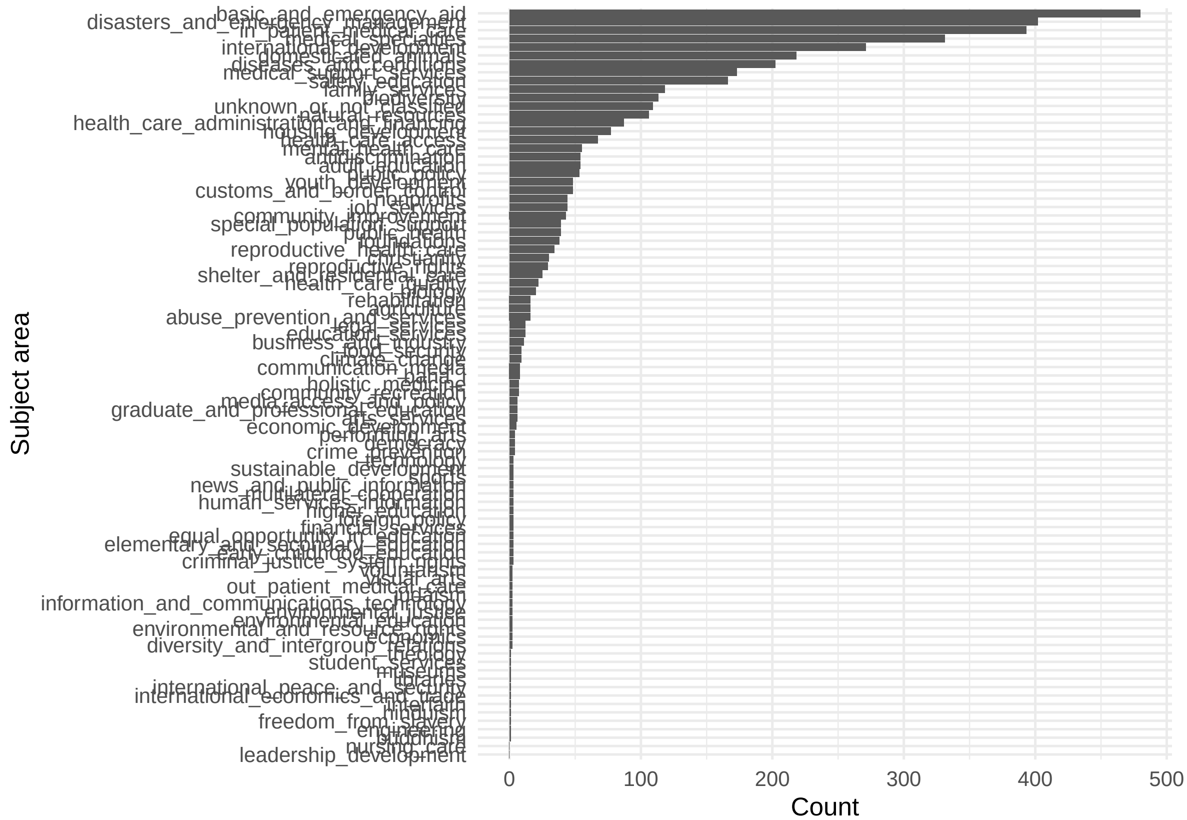
```r
)


# add higher levels of categores
d_candid <- d_candid |>
  mutate(
    population_served = replace_terms_named(population_served, pop_replacements),
    subject_area = replace_terms_named(subject_area, subj_replacemnents),
    pop_lvl1 = replace_with_level(population_served, pop_hierarchy_df, k = 1),
    pop_lvl2 = replace_with_level(population_served, pop_hierarchy_df, k = 2),
    subj_lvl1 = replace_with_level(subject_area, subj_hierarchy_df, k = 1),
    subj_lvl2 = replace_with_level(subject_area, subj_hierarchy_df, k = 2)
  )


pcs_subj1_mat <- make_pcs_matrix(d_candid$subj_lvl1, "subj") |> mutate(ein = d_candid$ein)
pcs_subj2_mat <- make_pcs_matrix(d_candid$subj_lvl2, "subj") |> mutate(ein = d_candid$ein)
pcs_pop1_mat <- make_pcs_matrix(d_candid$pop_lvl1, "pop") |> mutate(ein = d_candid$ein)
pcs_pop2_mat <- make_pcs_matrix(d_candid$pop_lvl2, "pop") |> mutate(ein = d_candid$ein)

# subject 1 counts
d_subj1 <- d_all |>
  select(ResponseId, condition, starts_with("cents_to_amf"), ein) |>
  filter(ResponseId %in% ps_final) |>
  mutate(ein = format_ein(ein)) |>
  left_join(pcs_subj1_mat, by = "ein") |>
  set_unknown_on_na("subj", "subj_unknown_or_not_classified")

subj1_counts <- d_subj1 |>
  summarise(across(starts_with("subj"), ~ sum(.x))) |>
  pivot_longer(cols = everything(), names_to = "subject_area", values_to = "count") |>
  mutate(subject_area = str_remove(subject_area, "^subj_")) |>
  arrange(desc(count))

#plot
subj1_counts |>
  ggplot(aes(x = reorder(subject_area, count), y = count)) +
  geom_col() +
  coord_flip() +
  labs(x = "Subject area", y = "Count") +
  theme_minimal()
```



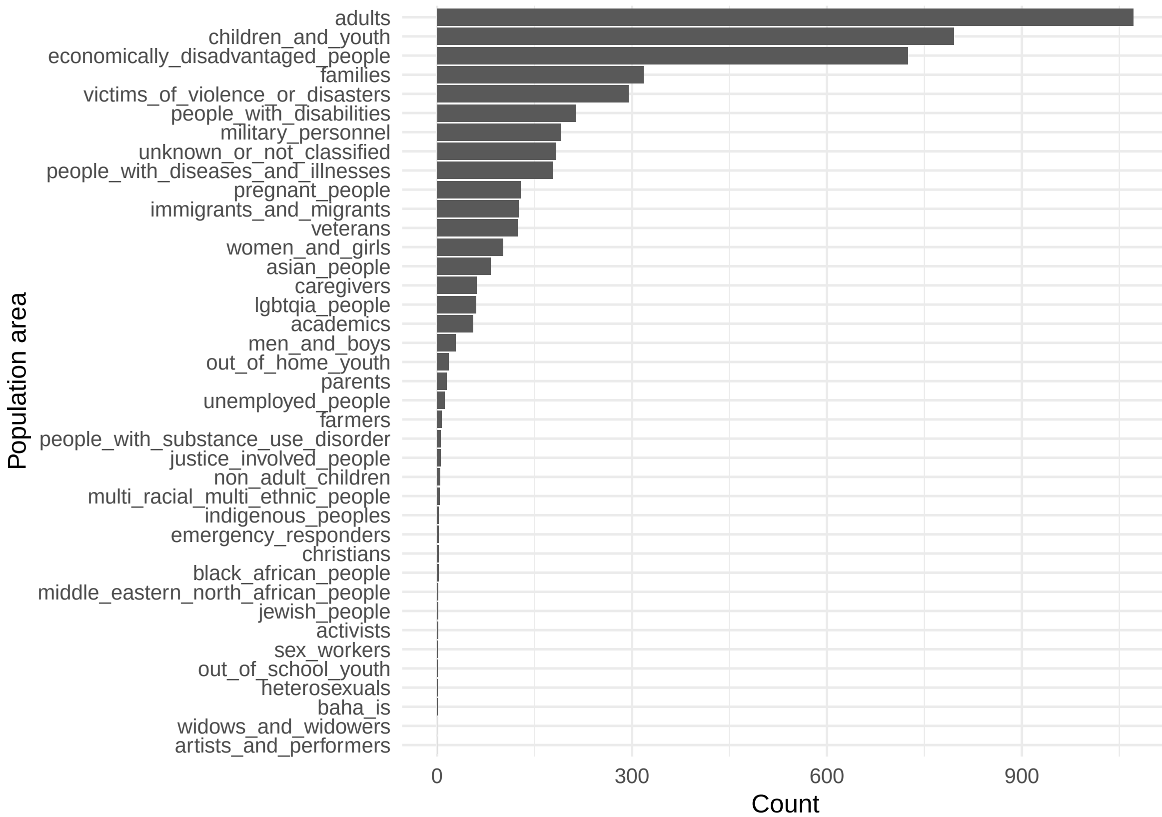

```r
# population 1 counts
d_pop1 <- d_all |>
  select(ResponseId, condition, starts_with("cents_to_amf"), ein) |>
  filter(ResponseId %in% ps_final) |>
  mutate(ein = format_ein(ein)) |>
  left_join(pcs_pop1_mat, by = "ein") |>
  set_unknown_on_na("pop", "pop_unknown_or_not_classified")

pop1_counts <- d_pop1 |>
  summarise(across(starts_with("pop"), ~ sum(.x))) |>
  pivot_longer(cols = everything(), names_to = "population_area", values_to = "count") |>
  mutate(population_area = str_remove(population_area, "^pop_")) |>
  arrange(desc(count))

#plot
pop1_counts |>
  ggplot(aes(x = reorder(population_area, count), y = count)) +
  geom_col() +
  coord_flip() +
  labs(x = "Population area", y = "Count") +
  theme_minimal()
```




```
# subject 2 counts
d_subj2 <- d_all |>
  select(ResponseId, condition, starts_with("cents_to_amf"), ein) |>
  filter(ResponseId %in% ps_final) |>
  mutate(ein = format_ein(ein)) |>
  left_join(pcs_subj2_mat, by = "ein") |>
  set_unknown_on_na("subj", "subj_unknown_or_not_classified")


subj2_counts <- d_subj2 |>
  summarise(across(starts_with("subj"), ~ sum(.x))) |>
  pivot_longer(cols = everything(), names_to = "subject_area", values_to = "count") |>
  mutate(subject_area = str_remove(subject_area, "^subj_")) |>
  arrange(desc(count))

#plot
subj2_counts |>
  ggplot(aes(x = reorder(subject_area, count), y = count)) +
  geom_col() +
  coord_flip() +
  labs(x = "Subject area", y = "Count") +
  theme_minimal()
```




```
# population 2 counts
d_pop2 <- d_all |>
  select(ResponseId, condition, starts_with("cents_to_amf"), ein) |>
  filter(ResponseId %in% ps_final) |>
  mutate(ein = format_ein(ein)) |>
  left_join(pcs_pop2_mat, by = "ein") |>
  set_unknown_on_na("pop", "pop_unknown_or_not_classified")

pop2_counts <- d_pop2 |>
  summarise(across(starts_with("pop"), ~ sum(.x))) |>
  pivot_longer(cols = everything(), names_to = "population_area", values_to = "count") |>
  mutate(population_area = str_remove(population_area, "^pop_")) |>
  arrange(desc(count))

#plot
pop2_counts |>
  ggplot(aes(x = reorder(population_area, count), y = count)) +
  geom_col() +
  coord_flip() +
  labs(x = "Population area", y = "Count") +
  theme_minimal()
```




```
## NOW lets look at the location data
d_where_orig <- read_csv("data/location_categories.csv") |>
  janitor::clean_names() |>
  mutate(
    location_cat = str_to_lower(category)
  )

## summarizi
d_where_mod_agreement <- d_where_orig %>%
  group_by(ein) %>%
  summarise(
    # total non-NA location_cat responses
    n_responses = sum(!is.na(location_cat)),
    n_unique = length(unique(location_cat)),
    # largest count of any single location_cat value
    max_same    = max(table(location_cat)),
    all_valid = n_responses == 3,
    perf_agreement = max_same == 3,
    all_agreement = n_responses == max_same,
    majority_cat = names(which.max(table(location_cat))),
    minority_cat = names(which.min(table(location_cat))),
    .groups = "drop"
  )
```

```r
## now lets get proportions of all of these, first for the whole dataset
d_where_mod_agreement |>
  summarise(
    n_total = n(),
    n_valid = sum(all_valid),
    n_perf_agreement = sum(perf_agreement),
    n_all_agreement = sum(all_agreement),
    n_complete_disagreement = sum(n_unique == 3),
    prop_valid = n_valid / n_total,
    prop_perf_agreement = n_perf_agreement / n_total,
    prop_all_agreement = n_all_agreement / n_total
  )
```

```
# A tibble: 1 x 8
  n_total n_valid n_perf_agreement n_all_agreement n_complete_disagreement
    <int>   <int>            <int>           <int>                   <int>
1     327     327              298             298                       0
# i 3 more variables: prop_valid <dbl>, prop_perf_agreement <dbl>,
#   prop_all_agreement <dbl>
```

```r
# now by majority answer
d_where_mod_agreement |>
  group_by(majority_cat) %>%
  summarise(
    n_total = n(),
    n_valid = sum(all_valid),
    n_perf_agreement = sum(perf_agreement),
    n_all_agreement = sum(all_agreement),
    n_complete_disagreement = sum(n_unique == 3),
    prop_valid = n_valid / n_total,
    prop_perf_agreement = n_perf_agreement / n_total,
    prop_all_agreement = n_all_agreement / n_total
  )
```

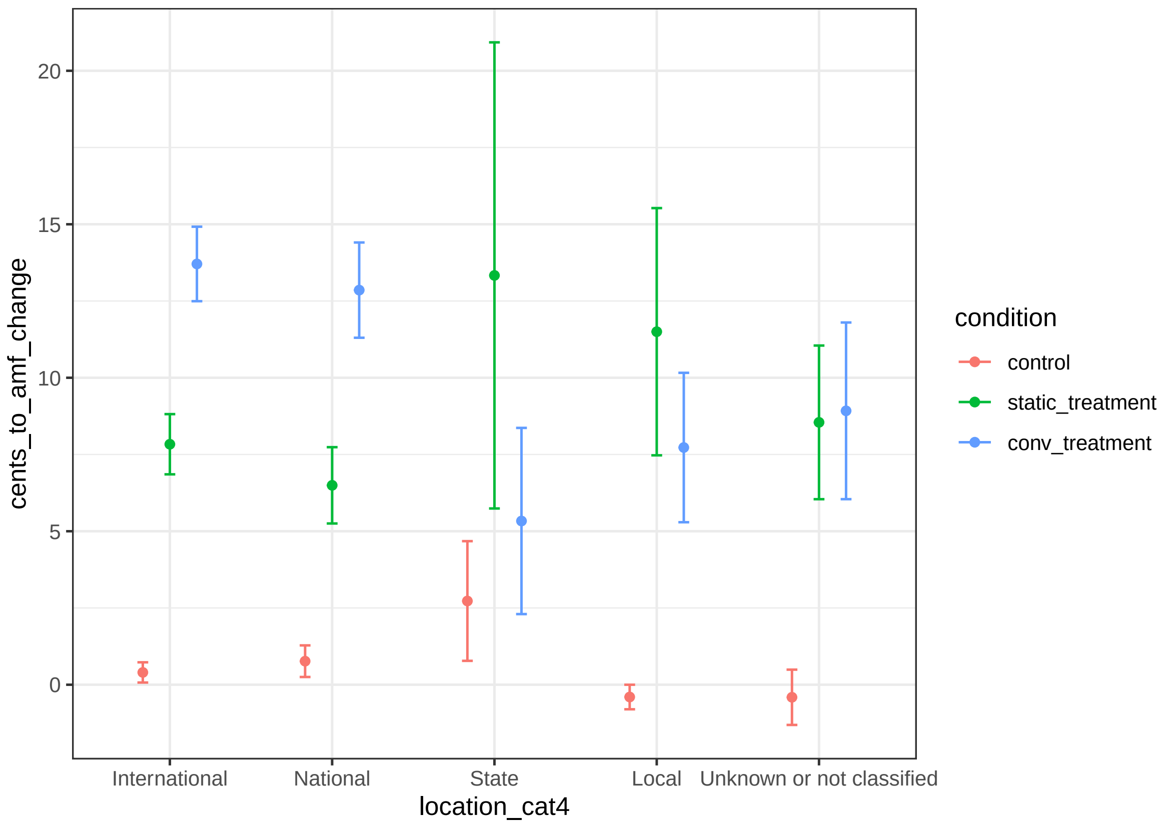
```
# A tibble: 4 x 9
  majority_cat  n_total n_valid n_perf_agreement n_all_agreement
  <chr>           <int>   <int>            <int>           <int>
1 international     118     118              114             114
2 local              75      75               67              67
3 national           95      95               91              91
4 state              39      39               26              26
# i 4 more variables: n_complete_disagreement <int>, prop_valid <dbl>,
#   prop_perf_agreement <dbl>, prop_all_agreement <dbl>
```

```r
# now lets look at when there is disagreement, what is the majority and minority answers, what proportion of the total
↪  category
d_where_mod_agreement |>
  count(majority_cat, minority_cat)
```

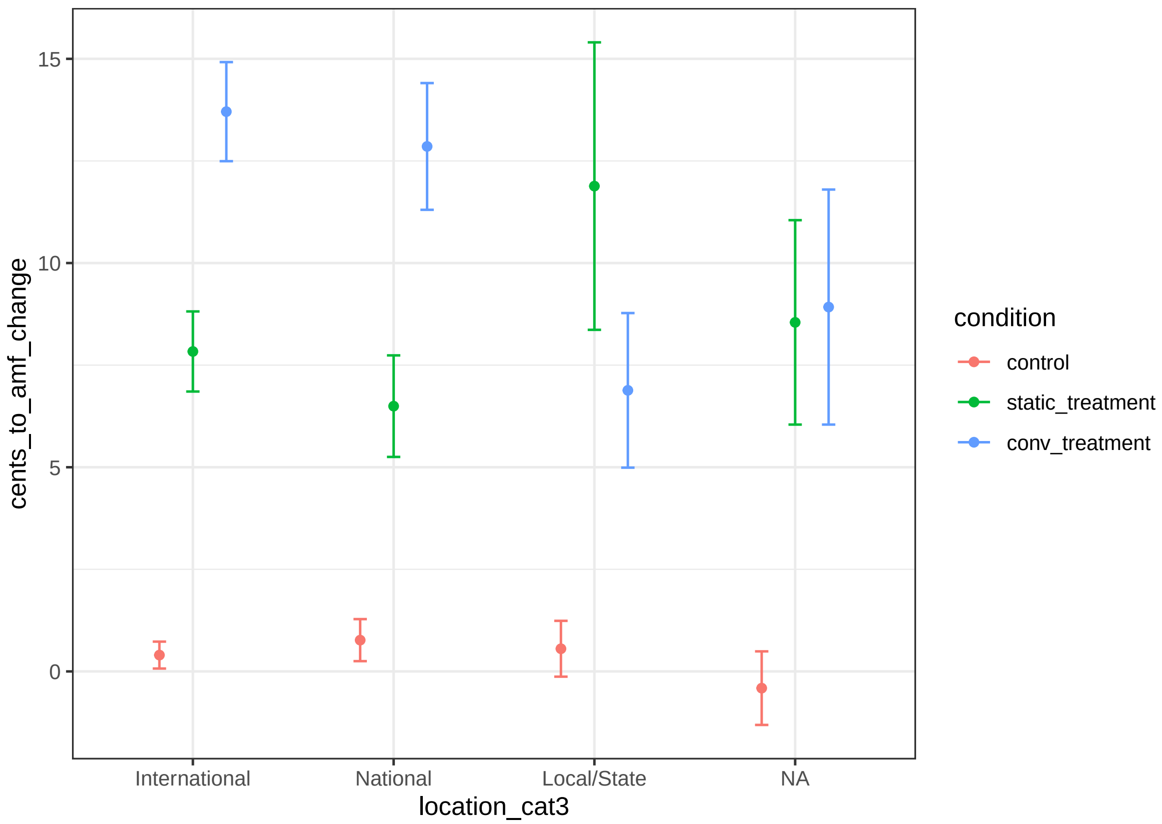
```
# A tibble: 9 x 3
  majority_cat  minority_cat      n
  <chr>         <chr>         <int>
1 international international   114
```

```
2 international national          4
3 local         local            67
4 local         state             8
5 national      international     4
6 national      national         91
7 state         local             7
8 state         national          6
9 state         state            26
```

```r
## lets look at results with cat4, and cat3 (collapsing local and state)
d_where_agg <- d_where_orig |>
  group_by(ein) |>
  summarise(
    location_cat4 = names(which.max(table(location_cat))),
    location_cat3 = case_when(
      location_cat4 %in% c("local", "state") ~ "local/state",
      TRUE ~ location_cat4
    ),
  )

d_where <- d_all |>
  select(ResponseId, condition, starts_with("cents_to_amf"), ein) |>
  filter(ResponseId %in% ps_final) |>
  mutate(ein = format_ein(ein)) |>
  left_join(d_where_agg, by = "ein") |>
  mutate(
    location_cat4 = replace_na(location_cat4, "Unknown or not classified"),
    location_cat3 = replace_na(location_cat3, "Unknown or not classified"),
    location_cat4 = factor(
      location_cat4,
      levels = c("international", "national", "state", "local", "Unknown or not classified"),
      labels = c("International", "National", "State", "Local", "Unknown or not classified")
    ),
    location_cat3 = factor(
      location_cat3,
      levels = c("international", "national", "local/state", "Unknown or not classified"),
      labels = c("International", "National", "Local/State", "NA")
    ),
    is_international = if_else(location_cat3 == "International", 1L, 0L),
  )

# plot cents_to_amf_change by location cats
d_where |>
  ggplot(aes(x = location_cat4, y = cents_to_amf_change, col = condition)) +
  #geom_jitter(position = position_dodge(width = 0.5), alpha = 0.5) +
  stat_summary(fun = mean, geom = "point", position = position_dodge(width = 0.5)) +
  stat_summary(fun.data = mean_se, geom = "errorbar", width = 0.2, position = position_dodge(width = 0.5))
```




```r
d_where |>
  ggplot(aes(x = location_cat3, y = cents_to_amf_change, col = condition)) +
  #geom_jitter(position = position_dodge(width = 0.5), alpha = 0.5) +
  stat_summary(fun = mean, geom = "point", position = position_dodge(width = 0.5)) +
  stat_summary(fun.data = mean_se, geom = "errorbar", width = 0.2, position = position_dodge(width = 0.5))
```



5 Motivation Analysis

```
m_dat1 <- read_csv("data/motivation_ratings_GPT4oSonnet3Deepseek.csv") # original 3, accidentally with earlier version of
↪ sonnet
m_dat_3.7 <- read_csv("data/motivation_ratings_Sonnet3.7.csv") # sonnet 3.7

m_dat_all <- m_dat1 |>
  bind_rows(m_dat_3.7) |>
  filter(model != "anthropic/claude-3-sonnet") |>
  arrange(ResponseId)

m_dat_all_long <- m_dat_all |>
  pivot_longer(AwarenessOfNeed:DoesntGive, names_to = "variable", values_to = "value")

#1. ICCs for agreement 2k (agreement)
d_ratings_wide <- m_dat_all_long |>
  filter(ResponseId %in% ps_final) |>
  filter(variable != "DoesntGive") |>
  pivot_wider(names_from = model, values_from = value) |>
  select(-charity_reasons, -why_charity_general, -ResponseId) |>
  rename_with(~ str_remove(.x, "^.*/"))
```

```r
agreement_analysis_by_group(d_ratings_wide, group_var ="variable")
```

```
Grand ICC:
Call: psych::ICC(x = select(d, -!!group_sym))

Intraclass correlation coefficients
                         type  ICC  F   df1   df2 p lower bound upper bound
Single_raters_absolute   ICC1 0.85 17 15591 31184 0        0.84        0.85
Single_random_raters     ICC2 0.85 19 15591 31182 0        0.82        0.87
Single_fixed_raters      ICC3 0.86 19 15591 31182 0        0.85        0.86
Average_raters_absolute ICC1k 0.94 17 15591 31184 0        0.94        0.94
Average_random_raters   ICC2k 0.94 19 15591 31182 0        0.93        0.95
Average_fixed_raters    ICC3k 0.95 19 15591 31182 0        0.95        0.95

 Number of subjects = 15592     Number of Judges =  3
See the help file for a discussion of the other 4 McGraw and Wong estimates,
Individual ICCs (ICC2k):
# A tibble: 8 x 10
# Groups:   variable [8]
  variable        icc_name type    ICC     F   df1   df2         p `lower bound`
  <chr>           <chr>    <chr> <dbl> <dbl> <dbl> <dbl>     <dbl>         <dbl>
1 AwarenessOfNeed Average~ ICC2k 0.902 11.1   1948  3896 0                 0.882
2 Solicitation    Average~ ICC2k 0.908 10.9   1948  3896 0                 0.901
3 CostsAndBenefi~ Average~ ICC2k 0.920 13.0   1948  3896 0                 0.911
4 Altruism        Average~ ICC2k 0.855  9.49  1948  3896 0                 0.738
5 Reputation      Average~ ICC2k 0.749  4.05  1948  3896 8.45e-301         0.728
6 PsychologicalB~ Average~ ICC2k 0.765  5.82  1948  3896 0                 0.590
7 Values          Average~ ICC2k 0.877  8.20  1948  3896 0                 0.867
8 Efficacy        Average~ ICC2k 0.822  6.70  1948  3896 0                 0.750
# i 1 more variable: `upper bound` <dbl>

mean ICCs (ICC):
# A tibble: 1 x 3
  mean_icc2k min_icc2k max_icc2k
       <dbl>     <dbl>     <dbl>
1      0.850     0.749     0.920

Cronbach's Alpha:
# A tibble: 8 x 10
# Groups:   variable [8]
  variable     raw_alpha std.alpha `G6(smc)` average_r `S/N`     ase  mean    sd
  <chr>            <dbl>     <dbl>     <dbl>     <dbl> <dbl>   <dbl> <dbl> <dbl>
1 AwarenessOf~     0.910     0.912     0.874     0.775 10.3  0.00348  3.77 1.07
2 Solicitation     0.909     0.910     0.879     0.771 10.1  0.00348  1.11 0.495
3 CostsAndBen~     0.923     0.937     0.910     0.833 14.9  0.00254  1.56 0.980
4 Altruism         0.895     0.896     0.853     0.741  8.57 0.00410  3.73 0.922
5 Reputation       0.753     0.790     0.718     0.556  3.75 0.00880  1.06 0.262
6 Psychologic~     0.828     0.836     0.773     0.629  5.08 0.00657  2.72 0.925
7 Values           0.878     0.884     0.836     0.717  7.61 0.00462  3.49 0.994
8 Efficacy         0.851     0.857     0.802     0.666  5.99 0.00563  2.79 0.948
# i 1 more variable: median_r <dbl>
```

```r
## final data for use in analysis
m_dat <- d |>
  select(AwarenessOfNeed:Efficacy, DoesntGive)
```

6 Average Treatment Effects (ATEs)

```r
## T-tests

## For the conversation group
t.test(
  d$cents_to_amf_post[d$condition == "conv_treatment"],
  d$cents_to_amf_pre[d$condition == "conv_treatment"], paired = TRUE
)
```

```
    Paired t-test

data:  d$cents_to_amf_post[d$condition == "conv_treatment"] and d$cents_to_amf_pre[d$condition == "conv_treatment"]
t = 14.457, df = 658, p-value < 2.2e-16
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
 10.69006 14.05045
sample estimates:
mean difference
       12.37026
```

```r
## for the static treatment group
t.test(
  d$cents_to_amf_post[d$condition == "static_treatment"],
  d$cents_to_amf_pre[d$condition == "static_treatment"], paired = TRUE
)
```

```
    Paired t-test

data:  d$cents_to_amf_post[d$condition == "static_treatment"] and d$cents_to_amf_pre[d$condition == "static_treatment"]
t = 10.627, df = 648, p-value < 2.2e-16
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
 6.299472 9.155073
sample estimates:
mean difference
       7.727273
```

```r
## for the control treatment group
t.test(
  d$cents_to_amf_post[d$condition == "control"],
  d$cents_to_amf_pre[d$condition == "control"], paired = TRUE
)
```

```
	Paired t-test

data:  d$cents_to_amf_post[d$condition == "control"] and d$cents_to_amf_pre[d$condition == "control"]
t = 1.7076, df = 640, p-value = 0.0882
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
 -0.06574601  0.94250108
sample estimates:
mean difference
      0.4383775
```

```r
## get means and SDs
d |>
  group_by(condition) |>
  summarise(
    mean_pre = mean(cents_to_amf_pre),
    sd_pre = sd(cents_to_amf_pre),
    mean_post = mean(cents_to_amf_post),
    sd_post = sd(cents_to_amf_post),
    mean_change = mean(cents_to_amf_change),
    sd_change = sd(cents_to_amf_change)
  )
```

```
# A tibble: 3 x 7
  condition        mean_pre sd_pre mean_post sd_post mean_change sd_change
  <fct>               <dbl>  <dbl>     <dbl>   <dbl>       <dbl>     <dbl>
1 control              27.4   26.3      27.8    26.6       0.438      6.50
2 static_treatment     26.9   26.2      34.6    29.1       7.73      18.5
3 conv_treatment       26.5   27.5      38.9    32.4      12.4       22.0
```

```r
# standardizers
pooled_pre_mean <- mean(d$cents_to_amf_pre) # for percent change
pooled_pre_sd <- sd(d$cents_to_amf_pre) # for cohens d

## get percentage increase for each from pre-treatment
mean(d$cents_to_amf_change[d$condition == "conv_treatment"])/pooled_pre_mean
```

```
[1] 0.4595024
```

```r
mean(d$cents_to_amf_change[d$condition == "static_treatment"])/pooled_pre_mean
```

```
[1] 0.2870353
```

```r
mean(d$cents_to_amf_change[d$condition == "control"])/pooled_pre_mean
```

```
[1] 0.01628386
```

```r
## get cohens d (mean change in donation amount / SD pre donation amount (pooled))
mean(d$cents_to_amf_change[d$condition == "conv_treatment"])/pooled_pre_sd
```

```
[1] 0.4635142
```

```r
mean(d$cents_to_amf_change[d$condition == "static_treatment"])/pooled_pre_sd
```

```
[1] 0.2895413
```

```r
mean(d$cents_to_amf_change[d$condition == "control"])/pooled_pre_sd
```

```
[1] 0.01642603
```

```r
### ATES
d_cov_scaled <- d |>
select(cents_to_amf_change, charity_wrong_change, trust_ai_change,
       cents_to_amf_pre, charity_wrong_pre, trust_ai_pre, condition) |>
  mutate(
    cents_to_amf_pre_c = cents_to_amf_pre - mean(cents_to_amf_pre),
    charity_wrong_pre_c = charity_wrong_pre - mean(charity_wrong_pre),
    trust_ai_pre_c = trust_ai_pre - mean(trust_ai_pre)
  )

## All relevant comparisons treatments
## same as preregistered
## estimatr::lm_lin(cents_to_amf_change ~ condition, covariates = ~ cents_to_amf_pre, data = d)
lh_mod <- estimatr::lh_robust(
  cents_to_amf_change ~ condition*cents_to_amf_pre_c, data = d_cov_scaled,
  linear_hypothesis = "conditionconv_treatment = conditionstatic_treatment"
)
lh_mod
```

```
$lm_robust
                                              Estimate  Std. Error   t value
(Intercept)                                 0.44787003 0.255466443  1.753146
conditionstatic_treatment                   7.27192285 0.758443190  9.587960
conditionconv_treatment                    11.87239317 0.877621966 13.527913
cents_to_amf_pre_c                         -0.02051145 0.007594457 -2.700845
conditionstatic_treatment:cents_to_amf_pre_c -0.11169191 0.028064319 -3.979855
conditionconv_treatment:cents_to_amf_pre_c   -0.10624057 0.029053268 -3.656751
                                               Pr(>|t|)    CI Lower
(Intercept)                                 7.973459e-02 -0.05314709
conditionstatic_treatment                   2.638291e-21  5.78447494
conditionconv_treatment                     6.465496e-40 10.15121355
cents_to_amf_pre_c                          6.976419e-03 -0.03540559
conditionstatic_treatment:cents_to_amf_pre_c 7.149085e-05 -0.16673125
conditionconv_treatment:cents_to_amf_pre_c   2.622265e-04 -0.16321942
                                               CI Upper   DF
(Intercept)                                 0.948887160 1943
conditionstatic_treatment                   8.759370758 1943
conditionconv_treatment                    13.593572787 1943
cents_to_amf_pre_c                         -0.005617309 1943
conditionstatic_treatment:cents_to_amf_pre_c -0.056652573 1943
conditionconv_treatment:cents_to_amf_pre_c   -0.049261716 1943

$lh
                                                    Estimate Std. Error t value
conditionconv_treatment = conditionstatic_treatment      4.6      1.102   4.174
                                                     Pr(>|t|) CI Lower CI Upper
```

```
conditionconv_treatment = conditionstatic_treatment 3.128e-05    2.439    6.762
                                                        DF
conditionconv_treatment = conditionstatic_treatment 1943
```

```
# Cohens d
lh_mod$lm_robust$coefficients["conditionconv_treatment"]/pooled_pre_sd #conv v control
```

```
conditionconv_treatment
              0.4448592
```

```
lh_mod$lm_robust$coefficients["conditionstatic_treatment"]/pooled_pre_sd #static v control
```

```
conditionstatic_treatment
                0.2724793
```

```
coef(lh_mod$lh)/pooled_pre_sd # conv v static
```

```
[1] 0.1723799
```

```
# percent change
lh_mod$lm_robust$coefficients["conditionconv_treatment"]/pooled_pre_mean #conv v control
```

```
conditionconv_treatment
              0.4410089
```

```
lh_mod$lm_robust$coefficients["conditionstatic_treatment"]/pooled_pre_mean #static v control
```

```
conditionstatic_treatment
                 0.270121
```

```
coef(lh_mod$lh)/pooled_pre_mean # conv v static
```

```
[1] 0.1708879
```

```
## click-through

#preregistered analysis
d %>%
  group_by(condition) %>%
  summarise(
    mean_clicked = mean(link_clicked)
  )
```

```
# A tibble: 3 x 2
  condition        mean_clicked
  <fct>                   <dbl>
1 control                0.0686
2 static_treatment       0.0940
3 conv_treatment         0.0910
```

```r
logreg <- glm(link_clicked ~ condition, data = d, family = binomial)

logreg |> summary()
```

```

Call:
glm(formula = link_clicked ~ condition, family = binomial, data = d)

Coefficients:
                          Estimate Std. Error z value Pr(>|z|)
(Intercept)                -2.6077     0.1562 -16.694   <2e-16 ***
conditionstatic_treatment   0.3419     0.2061   1.658   0.0972 .
conditionconv_treatment     0.3068     0.2067   1.484   0.1378
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 1130.4  on 1948  degrees of freedom
Residual deviance: 1127.1  on 1946  degrees of freedom
AIC: 1133.1

Number of Fisher Scoring iterations: 5
```

```r
exp(logreg$coefficients)
```

```
              (Intercept) conditionstatic_treatment   conditionconv_treatment
               0.07370184                1.40758349                1.35908332
```

```r
## Moral Belief change

#Now lets do a comparison of the conditions
d_cov_scaled <- d |>
  select(cents_to_amf_change, charity_wrong_change, trust_ai_change,
         cents_to_amf_pre, charity_wrong_pre, trust_ai_pre, condition) |>
  mutate(
    cents_to_amf_pre_c = cents_to_amf_pre - mean(cents_to_amf_pre),
    charity_wrong_pre_c = charity_wrong_pre - mean(charity_wrong_pre),
    trust_ai_pre_c = trust_ai_pre - mean(trust_ai_pre)
  )

## All relevant comparisons treatments
lh_mod <- estimatr::lh_robust(
  charity_wrong_change ~ condition*charity_wrong_pre_c, data = d_cov_scaled,
  linear_hypothesis = "conditionconv_treatment = conditionstatic_treatment"
)
lh_mod
```

```
$lm_robust
                                                  Estimate Std. Error
(Intercept)                                   -0.463390206 0.39607144
conditionstatic_treatment                      0.168173854 0.63248675
conditionconv_treatment                        1.277104066 0.61148999
charity_wrong_pre_c                           -0.072136652 0.01657080
```

```
conditionstatic_treatment:charity_wrong_pre_c -0.014642163 0.02684760
conditionconv_treatment:charity_wrong_pre_c    0.004258065 0.02373923
                                                t value     Pr(>|t|)
(Intercept)                                   -1.1699662 2.421580e-01
conditionstatic_treatment                      0.2658931 7.903498e-01
conditionconv_treatment                        2.0885118 3.688157e-02
charity_wrong_pre_c                           -4.3532390 1.411133e-05
conditionstatic_treatment:charity_wrong_pre_c -0.5453808 5.855542e-01
conditionconv_treatment:charity_wrong_pre_c    0.1793683 8.576672e-01
                                                CI Lower    CI Upper   DF
(Intercept)                                   -1.24015983  0.31337942 1943
conditionstatic_treatment                     -1.07225010  1.40859781 1943
conditionconv_treatment                        0.07785867  2.47634946 1943
charity_wrong_pre_c                           -0.10463507 -0.03963824 1943
conditionstatic_treatment:charity_wrong_pre_c -0.06729528  0.03801096 1943
conditionconv_treatment:charity_wrong_pre_c   -0.04229897  0.05081510 1943

$lh
                                                   Estimate Std. Error t value
conditionconv_treatment = conditionstatic_treatment    1.109     0.6784   1.635
                                                   Pr(>|t|) CI Lower CI Upper
conditionconv_treatment = conditionstatic_treatment   0.1023  -0.2215    2.439
                                                     DF
conditionconv_treatment = conditionstatic_treatment 1943
```

```
# Cohens d
lh_mod$lm_robust$coefficients["conditionconv_treatment"]/pooled_pre_sd #conv v control
```

```
conditionconv_treatment
             0.04785315
```

```
lh_mod$lm_robust$coefficients["conditionstatic_treatment"]/pooled_pre_sd #static v control
```

```
conditionstatic_treatment
              0.006301483
```

```
coef(lh_mod$lh)/pooled_pre_sd # conv v static
```

```
[1] 0.04155167
```

7 Categorical Heterogeneity Analysis

```
d <- d %>%
  mutate(
    charity_fct = charity_name_final %>%
      fct_na_value_to_level("Other") %>%
      fct_lump_min(min = 40, other_level = "Other") %>%
      fct_infreq()
  )
```

```r
# CHARITY
char_het <- het_by_cat("charity_fct", d, control_var = "cents_to_amf_pre_cat")
char_het
```

```
$lm_mod
                                                                                                                                   Estimate
(Intercept)                                                                                                                      0.76093183
conditionstatic_treatment                                                                                                       10.37586104
conditionconv_treatment                                                                                                         11.53936473
charity_fctALSAC - St. Jude Children's Research Hospital
-0.83400005
charity_fctAmerican Red Cross                                                                                                   -0.52137413
charity_fctFeeding America                                                                                                      -0.78899147
charity_fctDoctors Without Borders, USA                                                                                          0.17907413
charity_fctAmerican Society for the Prevention of Cruelty to Animals
-1.06984773
charity_fctMake-A-Wish America                                                                                                   1.73665999
charity_fctHabitat for Humanity International
-0.73783655
charity_fctSalvation Army World Service Office Sawso
-0.72396864
charity_fctGoodwill Industries International Inc.
-2.77807281
charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
0.70887050
cents_to_amf_pre_cat10-Jan                                                                                                       2.60700407
cents_to_amf_pre_cat20-Nov                                                                                                       1.92243542
cents_to_amf_pre_cat21-30                                                                                                        2.08673635
cents_to_amf_pre_cat31-40                                                                                                        1.09887188
cents_to_amf_pre_cat41-50                                                                                                       -0.79422706
cents_to_amf_pre_cat51-100                                                                                                      -2.76481085
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
0.68473817
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
6.38725181
conditionstatic_treatment:charity_fctAmerican Red Cross
1.84934750
conditionconv_treatment:charity_fctAmerican Red Cross
-2.03837479
conditionstatic_treatment:charity_fctFeeding America
1.91639635
conditionconv_treatment:charity_fctFeeding America
2.98102153
conditionstatic_treatment:charity_fctDoctors Without Borders, USA
4.98463168
conditionconv_treatment:charity_fctDoctors Without Borders, USA
12.88840160
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
-0.73846905
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
3.79747875
conditionstatic_treatment:charity_fctMake-A-Wish America
3.09780794
```

```
conditionconv_treatment:charity_fctMake-A-Wish America
0.57303661
conditionstatic_treatment:charity_fctHabitat for Humanity International
-3.81083500
conditionconv_treatment:charity_fctHabitat for Humanity International
-0.88608691
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso
-0.25080335
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso
4.74763425
conditionstatic_treatment:charity_fctGoodwill Industries International Inc.
0.22384660
conditionconv_treatment:charity_fctGoodwill Industries International Inc.
9.13676961
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
-9.16454122
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
3.28822015
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan
-3.41503962
conditionconv_treatment:cents_to_amf_pre_cat10-Jan
15.39017932
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov
-0.09251329
conditionconv_treatment:cents_to_amf_pre_cat20-Nov
7.14365234
conditionstatic_treatment:cents_to_amf_pre_cat21-30
-7.42417308
conditionconv_treatment:cents_to_amf_pre_cat21-30
-4.55486053
conditionstatic_treatment:cents_to_amf_pre_cat31-40
-8.25098647
conditionconv_treatment:cents_to_amf_pre_cat31-40
-1.25451109
conditionstatic_treatment:cents_to_amf_pre_cat41-50
-5.25410091
conditionconv_treatment:cents_to_amf_pre_cat41-50
-3.76263759
conditionstatic_treatment:cents_to_amf_pre_cat51-100
-9.50413670
conditionconv_treatment:cents_to_amf_pre_cat51-100
-11.88997615
                                                                                                                    Std. Error
(Intercept)                                                                                                          0.3882843
conditionstatic_treatment                                                                                            1.6842528
conditionconv_treatment                                                                                              1.8710822
charity_fctALSAC - St. Jude Children's Research Hospital                                                             0.6965570
charity_fctAmerican Red Cross                                                                                        0.9875902
charity_fctFeeding America                                                                                           1.0181702
charity_fctDoctors Without Borders, USA                                                                              0.8001465
charity_fctAmerican Society for the Prevention of Cruelty to Animals
0.6222916
charity_fctMake-A-Wish America                                                                                       2.2750533
charity_fctHabitat for Humanity International                                                                        0.5542797
```

charity_fctSalvation Army World Service Office Sawso	0.5538398
charity_fctGoodwill Industries International Inc.	2.0160888
charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)	1.0304684
cents_to_amf_pre_cat10-Jan	2.3739880
cents_to_amf_pre_cat20-Nov	1.7746405
cents_to_amf_pre_cat21-30	1.5003331
cents_to_amf_pre_cat31-40	1.4756224
cents_to_amf_pre_cat41-50	0.4504887
cents_to_amf_pre_cat51-100	1.6371878
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital	2.2198698
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital	2.5200890
conditionstatic_treatment:charity_fctAmerican Red Cross	2.7414511
conditionconv_treatment:charity_fctAmerican Red Cross	2.6635370
conditionstatic_treatment:charity_fctFeeding America	3.0157198
conditionconv_treatment:charity_fctFeeding America	3.5539742
conditionstatic_treatment:charity_fctDoctors Without Borders, USA	4.4201166
conditionconv_treatment:charity_fctDoctors Without Borders, USA	4.5257846
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals	3.5929801
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals	4.3322236
conditionstatic_treatment:charity_fctMake-A-Wish America	5.1433961
conditionconv_treatment:charity_fctMake-A-Wish America	4.3728241
conditionstatic_treatment:charity_fctHabitat for Humanity International	1.9992260
conditionconv_treatment:charity_fctHabitat for Humanity International	3.6390021
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso	3.4881687
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso	4.5777873
conditionstatic_treatment:charity_fctGoodwill Industries International Inc.	3.0044665
conditionconv_treatment:charity_fctGoodwill Industries International Inc.	4.9797730
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)	4.7696789
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)	8.4931685
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan	4.7431254
conditionconv_treatment:cents_to_amf_pre_cat10-Jan	7.1087433
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov	4.3776218
conditionconv_treatment:cents_to_amf_pre_cat20-Nov	4.7274614
conditionstatic_treatment:cents_to_amf_pre_cat21-30	2.5836268
conditionconv_treatment:cents_to_amf_pre_cat21-30	3.1877262
conditionstatic_treatment:cents_to_amf_pre_cat31-40	2.8388055
conditionconv_treatment:cents_to_amf_pre_cat31-40	4.4448459
conditionstatic_treatment:cents_to_amf_pre_cat41-50	1.8313148
conditionconv_treatment:cents_to_amf_pre_cat41-50	1.9136479

```
conditionstatic_treatment:cents_to_amf_pre_cat51-100                                    3.0924704
conditionconv_treatment:cents_to_amf_pre_cat51-100                                      2.8633876
                                                                                          t value
(Intercept)                                                                            1.95972864
conditionstatic_treatment                                                              6.16051269
conditionconv_treatment                                                                6.16721425
charity_fctALSAC - St. Jude Children's Research Hospital
-1.19731780
charity_fctAmerican Red Cross                                                         -0.52792560
charity_fctFeeding America                                                            -0.77491121
charity_fctDoctors Without Borders, USA                                                0.22380168
charity_fctAmerican Society for the Prevention of Cruelty to Animals
-1.71920651
charity_fctMake-A-Wish America                                                         0.76334914
charity_fctHabitat for Humanity International                                         -1.33116281
charity_fctSalvation Army World Service Office Sawso                                  -1.30718064
charity_fctGoodwill Industries International Inc.                                     -1.37795162
charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
0.68791092
cents_to_amf_pre_cat10-Jan                                                             1.09815386
cents_to_amf_pre_cat20-Nov                                                             1.08328164
cents_to_amf_pre_cat21-30                                                              1.39084867
cents_to_amf_pre_cat31-40                                                              0.74468365
cents_to_amf_pre_cat41-50                                                             -1.76303449
cents_to_amf_pre_cat51-100                                                            -1.68875611
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
0.30845871
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
2.53453420
conditionstatic_treatment:charity_fctAmerican Red Cross
0.67458707
conditionconv_treatment:charity_fctAmerican Red Cross
-0.76528872
conditionstatic_treatment:charity_fctFeeding America
0.63546896
conditionconv_treatment:charity_fctFeeding America                                     0.83878536
conditionstatic_treatment:charity_fctDoctors Without Borders, USA
1.12771496
conditionconv_treatment:charity_fctDoctors Without Borders, USA
2.84777175
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
-0.20553107
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
0.87656573
conditionstatic_treatment:charity_fctMake-A-Wish America
0.60228842
conditionconv_treatment:charity_fctMake-A-Wish America
0.13104497
conditionstatic_treatment:charity_fctHabitat for Humanity International
-1.90615515
conditionconv_treatment:charity_fctHabitat for Humanity International
-0.24349722
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso
-0.07190115
```

```
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso
1.03710241
conditionstatic_treatment:charity_fctGoodwill Industries International Inc.
0.07450461
conditionconv_treatment:charity_fctGoodwill Industries International Inc.
1.83477632
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
-1.92141682
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
0.38716059
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan
-0.71999775
conditionconv_treatment:cents_to_amf_pre_cat10-Jan
2.16496484
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov
-0.02113323
conditionconv_treatment:cents_to_amf_pre_cat20-Nov
1.51109693
conditionstatic_treatment:cents_to_amf_pre_cat21-30
-2.87354703
conditionconv_treatment:cents_to_amf_pre_cat21-30
-1.42887446
conditionstatic_treatment:cents_to_amf_pre_cat31-40
-2.90649941
conditionconv_treatment:cents_to_amf_pre_cat31-40
-0.28223950
conditionstatic_treatment:cents_to_amf_pre_cat41-50
-2.86903206
conditionconv_treatment:cents_to_amf_pre_cat41-50
-1.96621207
conditionstatic_treatment:cents_to_amf_pre_cat51-100
-3.07331533
conditionconv_treatment:cents_to_amf_pre_cat51-100
-4.15241586
                                                                                                                    Pr(>|t|)
(Intercept)                                                                                                     5.017367e-02
conditionstatic_treatment                                                                                       8.829997e-10
conditionconv_treatment                                                                                         8.470951e-10
charity_fctALSAC - St. Jude Children's Research Hospital
2.313322e-01
charity_fctAmerican Red Cross                                                                                   5.976127e-01
charity_fctFeeding America                                                                                      4.384887e-01
charity_fctDoctors Without Borders, USA                                                                         8.229357e-01
charity_fctAmerican Society for the Prevention of Cruelty to Animals
8.573982e-02
charity_fctMake-A-Wish America                                                                                  4.453501e-01
charity_fctHabitat for Humanity International
1.832953e-01
charity_fctSalvation Army World Service Office Sawso
1.913097e-01
charity_fctGoodwill Industries International Inc.
1.683807e-01
charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
4.915929e-01
```

```
cents_to_amf_pre_cat10-Jan                                                                                          2.722766e-01
cents_to_amf_pre_cat20-Nov                                                                                          2.788210e-01
cents_to_amf_pre_cat21-30                                                                                           1.644344e-01
cents_to_amf_pre_cat31-40                                                                                           4.565552e-01
cents_to_amf_pre_cat41-50                                                                                           7.805557e-02
cents_to_amf_pre_cat51-100                                                                                          9.143044e-02
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
7.577672e-01
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
1.133945e-02
conditionstatic_treatment:charity_fctAmerican Red Cross
5.000203e-01
conditionconv_treatment:charity_fctAmerican Red Cross
4.441948e-01
conditionstatic_treatment:charity_fctFeeding America
5.251992e-01
conditionconv_treatment:charity_fctFeeding America
4.016954e-01
conditionstatic_treatment:charity_fctDoctors Without Borders, USA
2.595829e-01
conditionconv_treatment:charity_fctDoctors Without Borders, USA
4.450043e-03
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
8.371793e-01
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
3.808335e-01
conditionstatic_treatment:charity_fctMake-A-Wish America
5.470541e-01
conditionconv_treatment:charity_fctMake-A-Wish America
8.957536e-01
conditionstatic_treatment:charity_fctHabitat for Humanity International
5.678099e-02
conditionconv_treatment:charity_fctHabitat for Humanity International
8.076465e-01
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso
9.426881e-01
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso
2.998202e-01
conditionstatic_treatment:charity_fctGoodwill Industries International Inc.
9.406167e-01
conditionconv_treatment:charity_fctGoodwill Industries International Inc.
6.669527e-02
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
5.482878e-02
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
6.986807e-01
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan
4.716150e-01
conditionconv_treatment:cents_to_amf_pre_cat10-Jan
3.051464e-02
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov
9.831416e-01
conditionconv_treatment:cents_to_amf_pre_cat20-Nov
1.309302e-01
```

```
conditionstatic_treatment:cents_to_amf_pre_cat21-30
4.104055e-03
conditionconv_treatment:cents_to_amf_pre_cat21-30
1.532049e-01
conditionstatic_treatment:cents_to_amf_pre_cat31-40
3.697355e-03
conditionconv_treatment:cents_to_amf_pre_cat31-40
7.777906e-01
conditionstatic_treatment:cents_to_amf_pre_cat41-50
4.162837e-03
conditionconv_treatment:cents_to_amf_pre_cat41-50
4.941966e-02
conditionstatic_treatment:cents_to_amf_pre_cat51-100
2.147062e-03
conditionconv_treatment:cents_to_amf_pre_cat51-100
3.435614e-05
                                                                                                                                CI Lower
(Intercept)                                                                                                                -5.769927e-04
conditionstatic_treatment                                                                                                   7.072680e+00
conditionconv_treatment                                                                                                     7.869771e+00
charity_fctALSAC - St. Jude Children's Research Hospital
-2.200098e+00
charity_fctAmerican Red Cross                                                                                              -2.458250e+00
charity_fctFeeding America                                                                                                 -2.785842e+00
charity_fctDoctors Without Borders, USA
-1.390185e+00
charity_fctAmerican Society for the Prevention of Cruelty to Animals
-2.290295e+00
charity_fctMake-A-Wish America                                                                                             -2.725208e+00
charity_fctHabitat for Humanity International
-1.824898e+00
charity_fctSalvation Army World Service Office Sawso
-1.810167e+00
charity_fctGoodwill Industries International Inc.
-6.732056e+00
charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
-1.312099e+00
cents_to_amf_pre_cat10-Jan                                                                                                 -2.048896e+00
cents_to_amf_pre_cat20-Nov                                                                                                 -1.558015e+00
cents_to_amf_pre_cat21-30                                                                                                  -8.557390e-01
cents_to_amf_pre_cat31-40                                                                                                  -1.795140e+00
cents_to_amf_pre_cat41-50                                                                                                  -1.677732e+00
cents_to_amf_pre_cat51-100                                                                                                 -5.975687e+00
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
-3.668903e+00
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
1.444816e+00
conditionstatic_treatment:charity_fctAmerican Red Cross
-3.527227e+00
conditionconv_treatment:charity_fctAmerican Red Cross
-7.262143e+00
conditionstatic_treatment:charity_fctFeeding America
-3.998078e+00
```

```
conditionconv_treatment:charity_fctFeeding America
-3.989085e+00
conditionstatic_treatment:charity_fctDoctors Without Borders, USA
-3.684166e+00
conditionconv_treatment:charity_fctDoctors Without Borders, USA
4.012367e+00
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
-7.785074e+00
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
-4.698942e+00
conditionstatic_treatment:charity_fctMake-A-Wish America
-6.989496e+00
conditionconv_treatment:charity_fctMake-A-Wish America
-8.003010e+00
conditionstatic_treatment:charity_fctHabitat for Humanity International
-7.731746e+00
conditionconv_treatment:charity_fctHabitat for Humanity International
-8.022951e+00
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso
-7.091851e+00
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso
-4.230389e+00
conditionstatic_treatment:charity_fctGoodwill Industries International Inc.
-5.668557e+00
conditionconv_treatment:charity_fctGoodwill Industries International Inc.
-6.296342e-01
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
-1.851891e+01
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
-1.336871e+01
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan
-1.271733e+01
conditionconv_treatment:cents_to_amf_pre_cat10-Jan
1.448408e+00
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov
-8.677969e+00
conditionconv_treatment:cents_to_amf_pre_cat20-Nov
-2.127914e+00
conditionstatic_treatment:cents_to_amf_pre_cat21-30
-1.249122e+01
conditionconv_treatment:cents_to_amf_pre_cat21-30
-1.080668e+01
conditionstatic_treatment:cents_to_amf_pre_cat31-40
-1.381849e+01
conditionconv_treatment:cents_to_amf_pre_cat31-40
-9.971808e+00
conditionstatic_treatment:cents_to_amf_pre_cat41-50
-8.845702e+00
conditionconv_treatment:cents_to_amf_pre_cat41-50
-7.515712e+00
conditionstatic_treatment:cents_to_amf_pre_cat51-100
-1.556913e+01
conditionconv_treatment:cents_to_amf_pre_cat51-100
-1.750569e+01
```

```
                                                                                                      CI Upper
(Intercept)                                                                                        1.522440660
conditionstatic_treatment                                                                         13.679042388
conditionconv_treatment                                                                           15.208958518
charity_fctALSAC - St. Jude Children's Research Hospital
0.532097665
charity_fctAmerican Red Cross                                                                      1.415502162
charity_fctFeeding America                                                                         1.207858759
charity_fctDoctors Without Borders, USA                                                            1.748333190
charity_fctAmerican Society for the Prevention of Cruelty to Animals
0.150599625
charity_fctMake-A-Wish America                                                                     6.198527861
charity_fctHabitat for Humanity International
0.349224956
charity_fctSalvation Army World Service Office Sawso
0.362230052
charity_fctGoodwill Industries International Inc.
1.175910058
charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
2.729840315
cents_to_amf_pre_cat10-Jan                                                                         7.262904114
cents_to_amf_pre_cat20-Nov                                                                         5.402886272
cents_to_amf_pre_cat21-30                                                                          5.029211665
cents_to_amf_pre_cat31-40                                                                          3.992884165
cents_to_amf_pre_cat41-50                                                                          0.089277917
cents_to_amf_pre_cat51-100                                                                         0.446065788
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
5.038379338
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
11.329687310
conditionstatic_treatment:charity_fctAmerican Red Cross
7.225921641
conditionconv_treatment:charity_fctAmerican Red Cross
3.185392941
conditionstatic_treatment:charity_fctFeeding America
7.830870296
conditionconv_treatment:charity_fctFeeding America
9.951127846
conditionstatic_treatment:charity_fctDoctors Without Borders, USA
13.653429189
conditionconv_treatment:charity_fctDoctors Without Borders, USA
21.764436680
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
6.308136122
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals
12.293899188
conditionstatic_treatment:charity_fctMake-A-Wish America
13.185111775
conditionconv_treatment:charity_fctMake-A-Wish America
9.149083359
conditionstatic_treatment:charity_fctHabitat for Humanity International
0.110076386
conditionconv_treatment:charity_fctHabitat for Humanity International
6.250777346
```

```
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso
6.590244184
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso
13.725657729
conditionstatic_treatment:charity_fctGoodwill Industries International Inc.
6.116250227
conditionconv_treatment:charity_fctGoodwill Industries International Inc.
18.903173392
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
0.189822873
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
19.945146569
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan
5.887247363
conditionconv_treatment:cents_to_amf_pre_cat10-Jan
29.331950852
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov
8.492942764
conditionconv_treatment:cents_to_amf_pre_cat20-Nov
16.415218819
conditionstatic_treatment:cents_to_amf_pre_cat21-30
-2.357126379
conditionconv_treatment:cents_to_amf_pre_cat21-30
1.696954775
conditionstatic_treatment:cents_to_amf_pre_cat31-40
-2.683479567
conditionconv_treatment:cents_to_amf_pre_cat31-40
7.462785878
conditionstatic_treatment:cents_to_amf_pre_cat41-50
-1.662499476
conditionconv_treatment:cents_to_amf_pre_cat41-50
-0.009563307
conditionstatic_treatment:cents_to_amf_pre_cat51-100
-3.439138448
conditionconv_treatment:cents_to_amf_pre_cat51-100
-6.274258410
                                                                                                     DF
(Intercept)                                                                                        1898
conditionstatic_treatment                                                                          1898
conditionconv_treatment                                                                            1898
charity_fctALSAC - St. Jude Children's Research Hospital                                           1898
charity_fctAmerican Red Cross                                                                      1898
charity_fctFeeding America                                                                         1898
charity_fctDoctors Without Borders, USA                                                            1898
charity_fctAmerican Society for the Prevention of Cruelty to Animals                               1898
charity_fctMake-A-Wish America                                                                     1898
charity_fctHabitat for Humanity International                                                      1898
charity_fctSalvation Army World Service Office Sawso                                               1898
charity_fctGoodwill Industries International Inc.                                                  1898
charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)    1898
cents_to_amf_pre_cat10-Jan                                                                         1898
cents_to_amf_pre_cat20-Nov                                                                         1898
cents_to_amf_pre_cat21-30                                                                          1898
cents_to_amf_pre_cat31-40                                                                          1898
```

```
cents_to_amf_pre_cat41-50                                                                                                  1898
cents_to_amf_pre_cat51-100                                                                                                 1898
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital                                        1898
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital                                          1898
conditionstatic_treatment:charity_fctAmerican Red Cross                                                                    1898
conditionconv_treatment:charity_fctAmerican Red Cross                                                                      1898
conditionstatic_treatment:charity_fctFeeding America                                                                       1898
conditionconv_treatment:charity_fctFeeding America                                                                         1898
conditionstatic_treatment:charity_fctDoctors Without Borders, USA                                                          1898
conditionconv_treatment:charity_fctDoctors Without Borders, USA                                                            1898
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals                            1898
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals                              1898
conditionstatic_treatment:charity_fctMake-A-Wish America                                                                   1898
conditionconv_treatment:charity_fctMake-A-Wish America                                                                     1898
conditionstatic_treatment:charity_fctHabitat for Humanity International                                                    1898
conditionconv_treatment:charity_fctHabitat for Humanity International                                                      1898
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso                                             1898
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso                                               1898
conditionstatic_treatment:charity_fctGoodwill Industries International Inc.                                               1898
conditionconv_treatment:charity_fctGoodwill Industries International Inc.                                                 1898
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
1898
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)   1898
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan                                                                       1898
conditionconv_treatment:cents_to_amf_pre_cat10-Jan                                                                         1898
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov                                                                       1898
conditionconv_treatment:cents_to_amf_pre_cat20-Nov                                                                         1898
conditionstatic_treatment:cents_to_amf_pre_cat21-30                                                                        1898
conditionconv_treatment:cents_to_amf_pre_cat21-30                                                                          1898
conditionstatic_treatment:cents_to_amf_pre_cat31-40                                                                        1898
conditionconv_treatment:cents_to_amf_pre_cat31-40                                                                          1898
conditionstatic_treatment:cents_to_amf_pre_cat41-50                                                                        1898
conditionconv_treatment:cents_to_amf_pre_cat41-50                                                                          1898
conditionstatic_treatment:cents_to_amf_pre_cat51-100                                                                       1898
conditionconv_treatment:cents_to_amf_pre_cat51-100                                                                         1898

$omnibus_tests
$omnibus_tests$all
Linear hypothesis test

Hypothesis:
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital = 0
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital = 0
conditionstatic_treatment:charity_fctAmerican Red Cross = 0
conditionconv_treatment:charity_fctAmerican Red Cross = 0
conditionstatic_treatment:charity_fctFeeding America = 0
conditionconv_treatment:charity_fctFeeding America = 0
conditionstatic_treatment:charity_fctDoctors Without Borders, USA = 0
conditionconv_treatment:charity_fctDoctors Without Borders, USA = 0
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals = 0
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals = 0
conditionstatic_treatment:charity_fctMake-A-Wish America = 0
conditionconv_treatment:charity_fctMake-A-Wish America = 0
conditionstatic_treatment:charity_fctHabitat for Humanity International = 0
conditionconv_treatment:charity_fctHabitat for Humanity International = 0
```

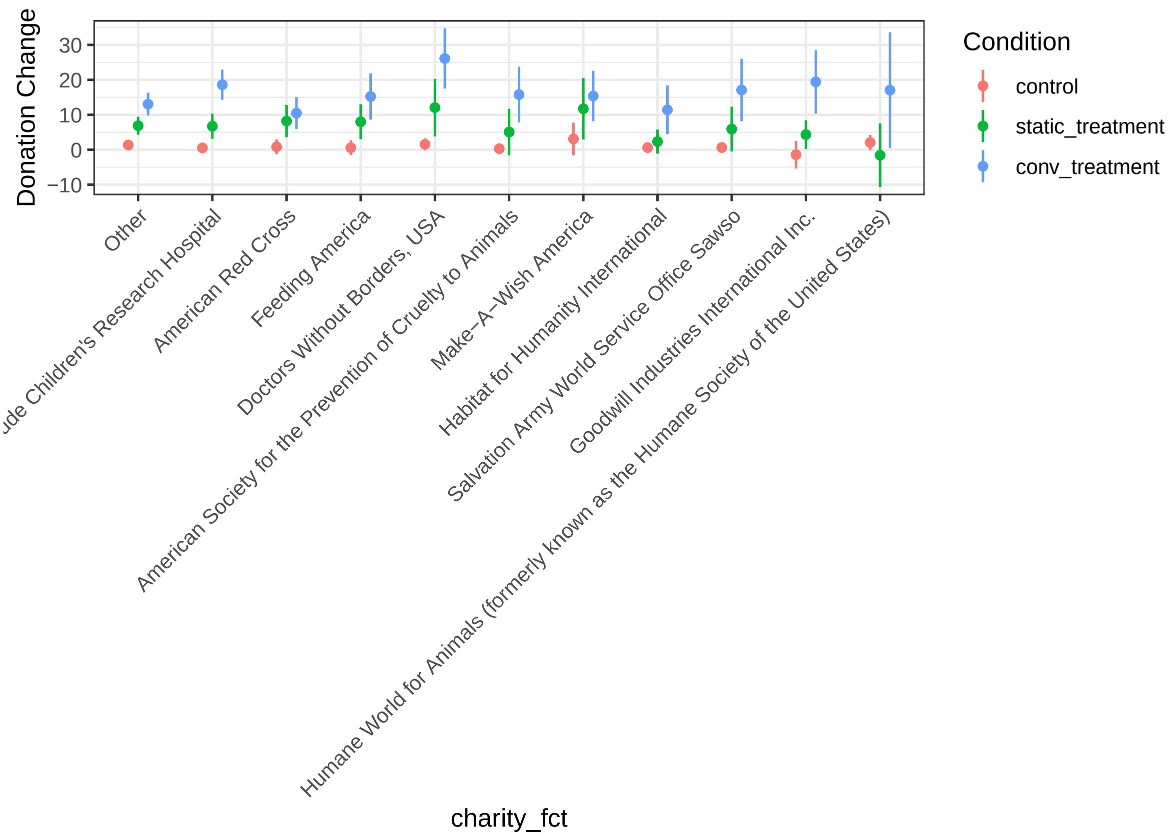
```
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso = 0
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso = 0
conditionstatic_treatment:charity_fctGoodwill Industries International Inc. = 0
conditionconv_treatment:charity_fctGoodwill Industries International Inc. = 0
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States) = 0
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States) = 0

Model 1: restricted model
Model 2: cents_to_amf_change ~ condition * charity_fct + condition * cents_to_amf_pre_cat

  Res.Df Df      F  Pr(>F)
1   1918
2   1898 20 1.6428 0.03612 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

$omnibus_tests$static_only
Linear hypothesis test

Hypothesis:
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital = 0
conditionstatic_treatment:charity_fctAmerican Red Cross = 0
conditionstatic_treatment:charity_fctFeeding America = 0
conditionstatic_treatment:charity_fctDoctors Without Borders, USA = 0
conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals = 0
conditionstatic_treatment:charity_fctMake-A-Wish America = 0
conditionstatic_treatment:charity_fctHabitat for Humanity International = 0
conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso = 0
conditionstatic_treatment:charity_fctGoodwill Industries International Inc. = 0
conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States) = 0

Model 1: restricted model
Model 2: cents_to_amf_change ~ condition * charity_fct + condition * cents_to_amf_pre_cat

  Res.Df Df      F Pr(>F)
1   1908
2   1898 10 1.2523 0.2525

$omnibus_tests$conv_only
Linear hypothesis test

Hypothesis:
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital = 0
conditionconv_treatment:charity_fctAmerican Red Cross = 0
conditionconv_treatment:charity_fctFeeding America = 0
conditionconv_treatment:charity_fctDoctors Without Borders, USA = 0
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals = 0
conditionconv_treatment:charity_fctMake-A-Wish America = 0
conditionconv_treatment:charity_fctHabitat for Humanity International = 0
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso = 0
conditionconv_treatment:charity_fctGoodwill Industries International Inc. = 0
conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States) = 0

Model 1: restricted model
Model 2: cents_to_amf_change ~ condition * charity_fct + condition * cents_to_amf_pre_cat
```

```
  Res.Df Df      F  Pr(>F)
1   1908
2   1898 10 1.9729 0.03255 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

$omnibus_tests$conv_vs_static
Linear hypothesis test

Hypothesis:
conditionconv_treatment:charity_fctALSAC - St. Jude Children's Research Hospital =
conditionstatic_treatment:charity_fctALSAC - St. Jude Children's Research Hospital
- conditionstatic_treatment:charity_fctAmerican Red Cross  + conditionconv_treatment:charity_fctAmerican Red Cross = 0
- conditionstatic_treatment:charity_fctFeeding America  + conditionconv_treatment:charity_fctFeeding America = 0
- conditionstatic_treatment:charity_fctDoctors Without Borders, USA  + conditionconv_treatment:charity_fctDoctors Without
Borders, USA = 0
- conditionstatic_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals  +
conditionconv_treatment:charity_fctAmerican Society for the Prevention of Cruelty to Animals = 0
conditionconv_treatment:charity_fctMake-A-Wish America = conditionstatic_treatment:charity_fctMake-A-Wish America
- conditionstatic_treatment:charity_fctHabitat for Humanity International  + conditionconv_treatment:charity_fctHabitat for
Humanity International = 0
- conditionstatic_treatment:charity_fctSalvation Army World Service Office Sawso  +
conditionconv_treatment:charity_fctSalvation Army World Service Office Sawso = 0
- conditionstatic_treatment:charity_fctGoodwill Industries International Inc.  + conditionconv_treatment:charity_fctGoodwill
Industries International Inc. = 0
- conditionstatic_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States)
+ conditionconv_treatment:charity_fctHumane World for Animals (formerly known as the Humane Society of the United States) = 0

Model 1: restricted model
Model 2: cents_to_amf_change ~ condition * charity_fct + condition * cents_to_amf_pre_cat

  Res.Df Df      F Pr(>F)
1   1908
2   1898 10 1.2245 0.2699


$comparisons

      Term                               Contrast
 condition mean(conv_treatment) - mean(control)
 condition mean(conv_treatment) - mean(control)
 condition mean(conv_treatment) - mean(control)
 condition mean(conv_treatment) - mean(control)
 condition mean(conv_treatment) - mean(control)
                                                                          charity_fct
 Other
 ALSAC - St. Jude Children's Research Hospital
 American Red Cross
 Feeding America
 Doctors Without Borders, USA
 Estimate Std. Error      z Pr(>|z|)    S    2.5 % 97.5 %
    11.69       1.80  6.498   <0.001 33.5   8.1659  15.22
    18.08       2.29  7.897   <0.001 48.3  13.5925  22.57
     9.65       2.56  3.776   <0.001 12.6   4.6429  14.67
```

```
    14.67       3.54  4.145   <0.001 14.8   7.7348  21.61
    24.58       4.48  5.488   <0.001 24.6  15.8025  33.36
--- 23 rows omitted. See ?print.marginaleffects ---
 condition mean(static_treatment) - mean(control)
 condition mean(static_treatment) - mean(control)
 condition mean(static_treatment) - mean(control)
 condition mean(static_treatment) - mean(control)
 condition mean(static_treatment) - mean(control)
                                                                          charity_fct
 Make-A-Wish America
 Habitat for Humanity International
 Salvation Army World Service Office Sawso
 Goodwill Industries International Inc.
 Humane World for Animals (formerly known as the Humane Society of the United States)
 Estimate Std. Error      z Pr(>|z|)   S    2.5 % 97.5 %
     8.62       5.07  1.700   0.0892 3.5  -1.3215  18.57
     1.72       1.83  0.939   0.3477 1.5  -1.8658   5.30
     5.28       3.32  1.589   0.1120 3.2  -1.2311  11.78
     5.75       2.92  1.972   0.0486 4.4   0.0365  11.47
    -3.64       4.77 -0.763   0.4455 1.2 -12.9817   5.71
Columns: term, contrast, charity_fct, estimate, std.error, statistic, p.value, s.value, conf.low, conf.high, predicted_lo,
predicted_hi, predicted
Type:  response


$preds

        condition
 control
 conv_treatment
 static_treatment
 control
 conv_treatment
                                                                          charity_fct
 Other
 Other
 Other
 ALSAC - St. Jude Children's Research Hospital
 ALSAC - St. Jude Children's Research Hospital
 Estimate Std. Error      z Pr(>|z|)    S    2.5 % 97.5 %
    1.355      0.684  1.981  0.04763  4.4   0.0142   2.70
   13.047      1.664  7.840  < 0.001 47.7   9.7852  16.31
    6.882      1.307  5.264  < 0.001 22.8   4.3197   9.44
    0.521      0.623  0.835  0.40346  1.3  -0.7008   1.74
   18.600      2.203  8.443  < 0.001 54.8  14.2826  22.92
--- 23 rows omitted. See ?print.marginaleffects ---
 conv_treatment
 static_treatment
 control
 conv_treatment
 static_treatment
                                                                          charity_fct
 Make-A-Wish America
 Make-A-Wish America
 Humane World for Animals (formerly known as the Humane Society of the United States)
```

```
 Humane World for Animals (formerly known as the Humane Society of the United States)
 Humane World for Animals (formerly known as the Humane Society of the United States)
 Estimate Std. Error      z Pr(>|z|)    S    2.5 % 97.5 %
   15.357      3.697  4.154  < 0.001 14.9   8.1107  22.60
   11.716      4.482  2.614  0.00895  6.8   2.9310  20.50
    2.064      1.118  1.846  0.06493  3.9  -0.1277   4.25
   17.044      8.459  2.015  0.04392  4.5   0.4644  33.62
   -1.574      4.635 -0.340  0.73417  0.4 -10.6576   7.51
Columns: charity_fct, condition, estimate, std.error, statistic, p.value, s.value, conf.low, conf.high
Type:  response
```

```
$marg_plot
```




```r
# look at comparisons between everyhing here
char_cate_comparisons <- marginaleffects::avg_comparisons(
  char_het$lm_mod,
  variables = list("condition" = "minmax"), # just conv v control
  newdata = "balanced",
  by = c("charity_fct"),
  hypothesis = "pairwise",
  p_adjust = "holm"
)
```

```r
char_cate_comparisons
```

```
                                                                                                  Term
 (Other) - (ALSAC - St. Jude Children's Research Hospital)
 (Other) - (American Red Cross)
 (Other) - (Feeding America)
 (Other) - (Doctors Without Borders, USA)
 (Other) - (American Society for the Prevention of Cruelty to Animals)
 Estimate Std. Error      z Pr(>|z|)    S
    -6.39       2.52 -2.535    0.586  0.8
     2.04       2.66  0.765    1.000 -0.0
    -2.98       3.55 -0.839    1.000 -0.0
   -12.89       4.53 -2.848    0.238  2.1
    -3.80       4.33 -0.877    1.000 -0.0
--- 45 rows omitted. See ?print.marginaleffects ---
 (Habitat for Humanity International) - (Goodwill Industries International Inc.)
 (Habitat for Humanity International) - (Humane World for Animals (formerly known as the Humane Society of the United States))
 (Salvation Army World Service Office Sawso) - (Goodwill Industries International Inc.)
 (Salvation Army World Service Office Sawso) - (Humane World for Animals (formerly known as the Humane Society of the United
 States))
 (Goodwill Industries International Inc.) - (Humane World for Animals (formerly known as the Humane Society of the United
 States))
 Estimate Std. Error      z Pr(>|z|)    S
   -10.02       5.88 -1.705    1.000 -0.0
    -4.17       9.11 -0.458    1.000 -0.0
    -4.39       6.43 -0.683    1.000 -0.0
     1.46       9.43  0.155    1.000 -0.0
     5.85       9.66  0.605    1.000 -0.0
Columns: term, estimate, std.error, statistic, p.value, s.value
Type:  response
```

```r
# none less thatn .05 after holm
char_cate_comparisons |>
  arrange(desc(abs(estimate))) |>
  as_tibble() |>
  filter(p.value < .05) |>
  print(n = Inf)
```

```
# A tibble: 0 x 6
# i 6 variables: term <chr>, estimate <dbl>, std.error <dbl>, statistic <dbl>,
#   p.value <dbl>, s.value <dbl>
```

```r
# Location
loc_het <- het_by_cat("location_cat3", d_where, control_var = "cents_to_amf_pre_cat")
loc_het
```

```
$lm_mod
                                                 Estimate Std. Error
(Intercept)                                    0.51014110  0.3222713
conditionstatic_treatment                     10.68038942  1.6393500
conditionconv_treatment                       15.22551381  1.9911330
location_cat3National                          0.35576073  0.5772829
```

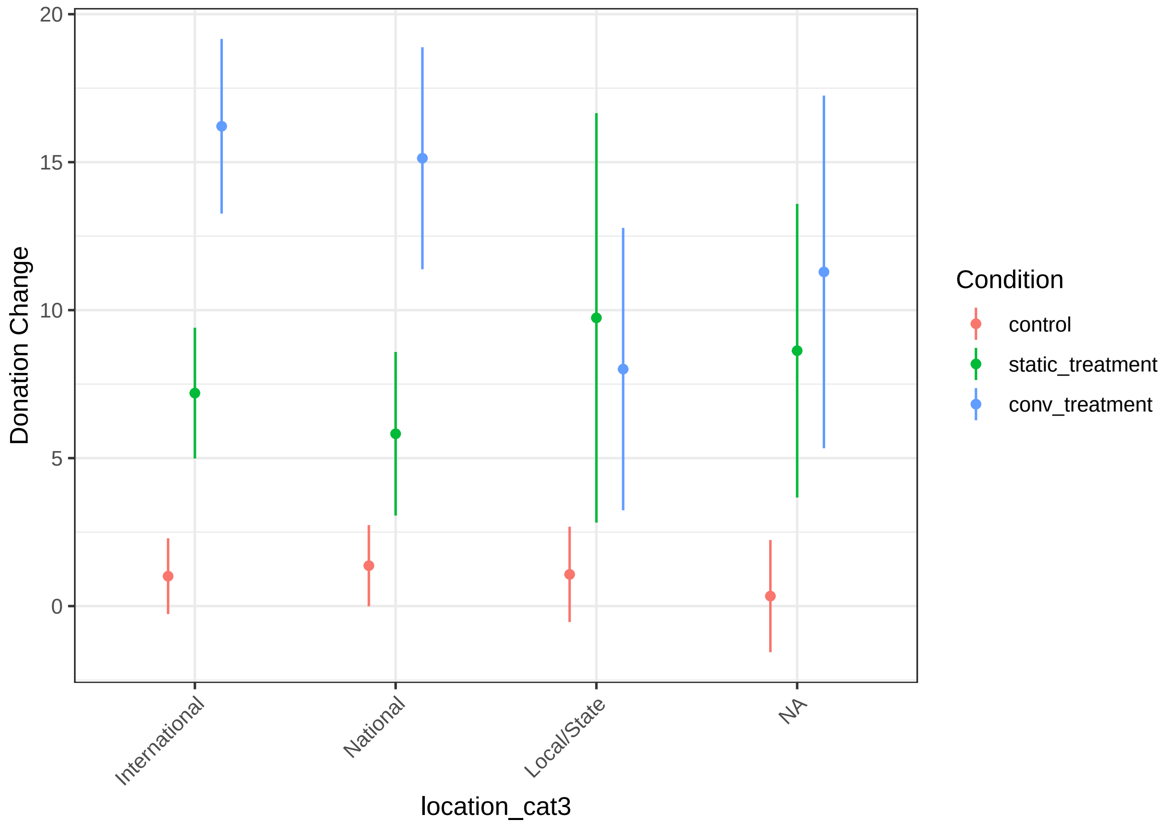
```
location_cat3Local/State                                 0.06129221  0.8137751
location_cat3NA                                         -0.67291051  1.0034828
cents_to_amf_pre_cat10-Jan                               2.43566936  2.3418576
cents_to_amf_pre_cat20-Nov                               1.68676647  1.7362111
cents_to_amf_pre_cat21-30                                1.91799040  1.5784050
cents_to_amf_pre_cat31-40                                1.18806585  1.4056573
cents_to_amf_pre_cat41-50                               -0.81534523  0.4365163
cents_to_amf_pre_cat51-100                              -2.91580386  1.7295912
conditionstatic_treatment:location_cat3National         -1.72970151  1.6737089
conditionconv_treatment:location_cat3National           -1.43602645  2.0343851
conditionstatic_treatment:location_cat3Local/State       2.48128268  3.7630918
conditionconv_treatment:location_cat3Local/State        -8.26681595  2.6000816
conditionstatic_treatment:location_cat3NA                2.10572727  2.8893636
conditionconv_treatment:location_cat3NA                 -4.24862281  3.0830886
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan    -2.91748530  4.7764732
conditionconv_treatment:cents_to_amf_pre_cat10-Jan      14.18931172  7.1758359
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov     0.27710480  4.2817385
conditionconv_treatment:cents_to_amf_pre_cat20-Nov       7.58979816  5.0043078
conditionstatic_treatment:cents_to_amf_pre_cat21-30     -6.59206627  2.5819111
conditionconv_treatment:cents_to_amf_pre_cat21-30       -4.85482012  3.2657923
conditionstatic_treatment:cents_to_amf_pre_cat31-40     -8.20604791  2.7874358
conditionconv_treatment:cents_to_amf_pre_cat31-40       -1.43215591  4.7712631
conditionstatic_treatment:cents_to_amf_pre_cat41-50     -5.17095316  1.7894872
conditionconv_treatment:cents_to_amf_pre_cat41-50       -3.86631343  1.9682235
conditionstatic_treatment:cents_to_amf_pre_cat51-100    -8.84720425  3.0992842
conditionconv_treatment:cents_to_amf_pre_cat51-100     -11.78220842  2.8844315
                                                          t value     Pr(>|t|)
(Intercept)                                             1.58295560 1.135964e-01
conditionstatic_treatment                               6.51501455 9.259491e-11
conditionconv_treatment                                 7.64665828 3.239640e-14
location_cat3National                                   0.61626759 5.377910e-01
location_cat3Local/State                                0.07531836 9.399693e-01
location_cat3NA                                        -0.67057500 5.025720e-01
cents_to_amf_pre_cat10-Jan                              1.04005869 2.984437e-01
cents_to_amf_pre_cat20-Nov                              0.97152153 3.314111e-01
cents_to_amf_pre_cat21-30                               1.21514466 2.244604e-01
cents_to_amf_pre_cat31-40                               0.84520305 3.981028e-01
cents_to_amf_pre_cat41-50                              -1.86784586 6.193587e-02
cents_to_amf_pre_cat51-100                             -1.68583414 9.199032e-02
conditionstatic_treatment:location_cat3National        -1.03345419 3.015216e-01
conditionconv_treatment:location_cat3National          -0.70587739 4.803501e-01
conditionstatic_treatment:location_cat3Local/State      0.65937342 5.097351e-01
conditionconv_treatment:location_cat3Local/State       -3.17944480 1.499108e-03
conditionstatic_treatment:location_cat3NA               0.72878583 4.662216e-01
conditionconv_treatment:location_cat3NA                -1.37804111 1.683513e-01
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan -0.61080323 5.414022e-01
conditionconv_treatment:cents_to_amf_pre_cat10-Jan      1.97737407 4.814226e-02
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov  0.06471782 9.484054e-01
conditionconv_treatment:cents_to_amf_pre_cat20-Nov      1.51665293 1.295190e-01
conditionstatic_treatment:cents_to_amf_pre_cat21-30  -2.55317323 1.075140e-02
conditionconv_treatment:cents_to_amf_pre_cat21-30      -1.48656734 1.372934e-01
conditionstatic_treatment:cents_to_amf_pre_cat31-40  -2.94394149 3.279552e-03
conditionconv_treatment:cents_to_amf_pre_cat31-40      -0.30016284 7.640855e-01
conditionstatic_treatment:cents_to_amf_pre_cat41-50  -2.88962851 3.900275e-03
conditionconv_treatment:cents_to_amf_pre_cat41-50      -1.96436708 4.963166e-02
```

```
conditionstatic_treatment:cents_to_amf_pre_cat51-100 -2.85459603 4.355439e-03
conditionconv_treatment:cents_to_amf_pre_cat51-100   -4.08475929 4.593704e-05
                                                        CI Lower     CI Upper
(Intercept)                                           -0.1218976  1.142179800
conditionstatic_treatment                              7.4652945 13.895484299
conditionconv_treatment                               11.3205018 19.130525792
location_cat3National                                 -0.7764070  1.487928444
location_cat3Local/State                              -1.5346843  1.657268737
location_cat3NA                                       -2.6409420  1.295120993
cents_to_amf_pre_cat10-Jan                            -2.1571840  7.028522760
cents_to_amf_pre_cat20-Nov                            -1.7182924  5.091825326
cents_to_amf_pre_cat21-30                             -1.1775790  5.013559768
cents_to_amf_pre_cat31-40                             -1.5687106  3.944842328
cents_to_amf_pre_cat41-50                             -1.6714415  0.040751022
cents_to_amf_pre_cat51-100                            -6.3078797  0.476272004
conditionstatic_treatment:location_cat3National       -5.0121811  1.552778056
conditionconv_treatment:location_cat3National         -5.4258644  2.553811545
conditionstatic_treatment:location_cat3Local/State    -4.8988965  9.861461858
conditionconv_treatment:location_cat3Local/State     -13.3660985 -3.167533418
conditionstatic_treatment:location_cat3NA             -3.5608955  7.772349999
conditionconv_treatment:location_cat3NA              -10.2951791  1.797933474
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan -12.2851092  6.450138562
conditionconv_treatment:cents_to_amf_pre_cat10-Jan     0.1160556 28.262567839
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov  -8.1202448  8.674454424
conditionconv_treatment:cents_to_amf_pre_cat20-Nov    -2.2246551 17.404251450
conditionstatic_treatment:cents_to_amf_pre_cat21-30  -11.6557128 -1.528419776
conditionconv_treatment:cents_to_amf_pre_cat21-30    -11.2596950  1.550054783
conditionstatic_treatment:cents_to_amf_pre_cat31-40  -13.6727697 -2.739326156
conditionconv_treatment:cents_to_amf_pre_cat31-40    -10.7895617  7.925249842
conditionstatic_treatment:cents_to_amf_pre_cat41-50   -8.6804971 -1.661409205
conditionconv_treatment:cents_to_amf_pre_cat41-50     -7.7263952 -0.006231652
conditionstatic_treatment:cents_to_amf_pre_cat51-100 -14.9255233 -2.768885198
conditionconv_treatment:cents_to_amf_pre_cat51-100   -17.4391583 -6.125258580
                                                       DF
(Intercept)                                          1919
conditionstatic_treatment                            1919
conditionconv_treatment                              1919
location_cat3National                                1919
location_cat3Local/State                             1919
location_cat3NA                                      1919
cents_to_amf_pre_cat10-Jan                           1919
cents_to_amf_pre_cat20-Nov                           1919
cents_to_amf_pre_cat21-30                            1919
cents_to_amf_pre_cat31-40                            1919
cents_to_amf_pre_cat41-50                            1919
cents_to_amf_pre_cat51-100                           1919
conditionstatic_treatment:location_cat3National      1919
conditionconv_treatment:location_cat3National        1919
conditionstatic_treatment:location_cat3Local/State   1919
conditionconv_treatment:location_cat3Local/State     1919
conditionstatic_treatment:location_cat3NA            1919
conditionconv_treatment:location_cat3NA              1919
conditionstatic_treatment:cents_to_amf_pre_cat10-Jan 1919
conditionconv_treatment:cents_to_amf_pre_cat10-Jan   1919
conditionstatic_treatment:cents_to_amf_pre_cat20-Nov 1919
```

```
conditionconv_treatment:cents_to_amf_pre_cat20-Nov   1919
conditionstatic_treatment:cents_to_amf_pre_cat21-30  1919
conditionconv_treatment:cents_to_amf_pre_cat21-30    1919
conditionstatic_treatment:cents_to_amf_pre_cat31-40  1919
conditionconv_treatment:cents_to_amf_pre_cat31-40    1919
conditionstatic_treatment:cents_to_amf_pre_cat41-50  1919
conditionconv_treatment:cents_to_amf_pre_cat41-50    1919
conditionstatic_treatment:cents_to_amf_pre_cat51-100 1919
conditionconv_treatment:cents_to_amf_pre_cat51-100   1919

$omnibus_tests
$omnibus_tests$all
Linear hypothesis test

Hypothesis:
conditionstatic_treatment:location_cat3National = 0
conditionconv_treatment:location_cat3National = 0
conditionstatic_treatment:location_cat3Local/State = 0
conditionconv_treatment:location_cat3Local/State = 0
conditionstatic_treatment:location_cat3NA = 0
conditionconv_treatment:location_cat3NA = 0

Model 1: restricted model
Model 2: cents_to_amf_change ~ condition * location_cat3 + condition *
    cents_to_amf_pre_cat

  Res.Df Df     F  Pr(>F)
1   1925
2   1919  6 2.357 0.02849 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

$omnibus_tests$static_only
Linear hypothesis test

Hypothesis:
conditionstatic_treatment:location_cat3National = 0
conditionstatic_treatment:location_cat3Local/State = 0
conditionstatic_treatment:location_cat3NA = 0

Model 1: restricted model
Model 2: cents_to_amf_change ~ condition * location_cat3 + condition *
    cents_to_amf_pre_cat

  Res.Df Df      F Pr(>F)
1   1922
2   1919  3 0.8974 0.4417

$omnibus_tests$conv_only
Linear hypothesis test

Hypothesis:
conditionconv_treatment:location_cat3National = 0
conditionconv_treatment:location_cat3Local/State = 0
conditionconv_treatment:location_cat3NA = 0
```

```
Model 1: restricted model
Model 2: cents_to_amf_change ~ condition * location_cat3 + condition *
    cents_to_amf_pre_cat

  Res.Df Df      F  Pr(>F)
1   1922
2   1919  3 3.5932 0.01314 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

$omnibus_tests$conv_vs_static
Linear hypothesis test

Hypothesis:
- conditionstatic_treatment:location_cat3National  + conditionconv_treatment:location_cat3National = 0
conditionconv_treatment:location_cat3Local/State = conditionstatic_treatment:location_cat3Local/State
- conditionstatic_treatment:location_cat3NA  + conditionconv_treatment:location_cat3NA = 0

Model 1: restricted model
Model 2: cents_to_amf_change ~ condition * location_cat3 + condition *
    cents_to_amf_pre_cat

  Res.Df Df      F  Pr(>F)
1   1922
2   1919  3 2.8388 0.03674 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


$comparisons

      Term                                    Contrast location_cat3 Estimate
 condition mean(conv_treatment) - mean(control)          International    15.20
 condition mean(conv_treatment) - mean(control)          National         13.77
 condition mean(conv_treatment) - mean(control)          Local/State       6.94
 condition mean(conv_treatment) - mean(control)          NA               10.95
 condition mean(conv_treatment) - mean(static_treatment) International     9.02
 condition mean(conv_treatment) - mean(static_treatment) National          9.31
 condition mean(conv_treatment) - mean(static_treatment) Local/State      -1.73
 condition mean(conv_treatment) - mean(static_treatment) NA                2.66
 condition mean(static_treatment) - mean(control)        International     6.19
 condition mean(static_treatment) - mean(control)        National          4.46
 condition mean(static_treatment) - mean(control)        Local/State       8.67
 condition mean(static_treatment) - mean(control)        NA                8.29
 Std. Error      z Pr(>|z|)    S  2.5 % 97.5 %
       1.64  9.261  < 0.001 65.4  11.99  18.42
       2.04  6.757  < 0.001 36.0   9.77  17.76
       2.57  2.700  0.00694  7.2   1.90  11.97
       3.19  3.434  < 0.001 10.7   4.70  17.21
       1.88  4.794  < 0.001 19.2   5.33  12.70
       2.38  3.917  < 0.001 13.4   4.65  13.97
       4.29 -0.404  0.68633  0.5 -10.14   6.67
       3.96  0.673  0.50096  1.0  -5.09  10.42
       1.30  4.749  < 0.001 18.9   3.63   8.74
```

```
    1.57  2.831  0.00464  7.8   1.37   7.54
    3.62  2.392  0.01677  5.9   1.56  15.77
    2.71  3.060  0.00222  8.8   2.98  13.60

Columns: term, contrast, location_cat3, estimate, std.error, statistic, p.value, s.value, conf.low, conf.high, predicted_lo,
predicted_hi, predicted
Type:  response


$preds

        condition location_cat3 Estimate Std. Error      z Pr(>|z|)    S
 control          National         1.366      0.700  1.951  0.05109  4.3
 conv_treatment   National        15.133      1.914  7.908  < 0.001 48.4
 static_treatment National         5.822      1.410  4.129  < 0.001 14.7
 control          NA               0.337      0.968  0.348  0.72788  0.5
 conv_treatment   NA              11.291      3.040  3.714  < 0.001 12.3
 static_treatment NA               8.629      2.531  3.409  < 0.001 10.6
 control          International    1.010      0.654  1.545  0.12241  3.0
 conv_treatment   International   16.213      1.506 10.767  < 0.001 87.4
 static_treatment International    7.196      1.127  6.386  < 0.001 32.4
 control          Local/State      1.071      0.822  1.303  0.19245  2.4
 conv_treatment   Local/State      8.007      2.434  3.289  0.00100 10.0
 static_treatment Local/State      9.739      3.530  2.759  0.00579  7.4
    2.5 % 97.5 %
 -0.00644   2.74
 11.38207  18.88
  3.05843   8.59
 -1.56060   2.23
  5.33329  17.25
  3.66755  13.59
 -0.27143   2.29
 13.26152  19.16
  4.98752   9.41
 -0.53957   2.68
  3.23639  12.78
  2.82100  16.66

Columns: location_cat3, condition, estimate, std.error, statistic, p.value, s.value, conf.low, conf.high
Type:  response


$marg_plot
```




```
loc_cate_comparisons <- marginaleffects::avg_comparisons(
  loc_het$lm_mod,
  variables = "condition",#list("condition" = "minmax"), # just conv v control
  newdata = "balanced",
  by = c("location_cat3"),
  hypothesis = "pairwise",
  p_adjust = "holm"
)


## NOW for binned variables, cause area (subj) and population served (pop)
subj1_cond <- het_by_bins_cond("subj", d_subj1) #Level 1 of PCS
pop2_cond <- het_by_bins_cond("pop", d_pop2) #Lvl 2 fo PCS
```

8 Causal Forest Analysis

```
## Causal forests final

# input ------------------------------------------------------------------
```

```r
covars_vec <- c(
  "age", "education",
  "Social_Conserv", "Economic_Conserv", #"pol_party",
  "EA_familiarity",
  "ous_instrumental_harm", "ous_impartial_beneficence",
  "crt_prop_cor", "mean_aot",
  "ai_use_1", "trust_ai_pre",
  "income_for_denominator",
  "charity_times_per_year",
  "charity_amount_per_year_log10",
  "charity_proportion_log10",
  "charity_wrong_pre",
  "dogs_v_cats_pre_1",
  "cents_to_amf_pre",
  "AwarenessOfNeed", "Solicitation", "Altruism", "Reputation", "PsychologicalBenefits",
  "Values", "Efficacy", "DoesntGive",
  "encompass_score",
  "revenue_log10"
)

covars_labels <- c(
  "Age", "Education",
  "Social Conservatism", "Economic Conservatism", #"Political Party",
  "EA Familiarity",
  "OUS: Instrumental Harm", "OUS: Impartial Beneficence",
  "CRT % Correct", "Mean AOT-E",
  "AI Use", "Trust in AI",
  "Income",
  "# Donations/yr",
  "$ Donations/yr (log10)",
  "Rel. $/yr (log10)",
  "Not Giving Wrong",
  "Dogs vs Cats",
  "Pre-trt Cents to AMF ",
  "Motivation: Awareness of Need", "Motivation: Solicitation", "Motivation: Altruism",
  "Motivation: Reputation", "Motivation: Psychological Benefits",
  "Motivation: Values", "Motivation: Efficacy", "Motivation: Doesn't Give",
  "Charity Navigator Encompass Score",
  "Revenue (log10)"
)

labels_map <- covars_labels
names(labels_map) <- covars_vec


# Run multi-arm causal forest
ma_cf <- grf::multi_arm_causal_forest(
  X = as.matrix(d[, covars_vec]),
  Y = d$cents_to_amf_change,
  W = d$condition,
  W.hat = rep(1/3, 3)
)

## ATE
```

```r
ate <- grf::average_treatment_effect(ma_cf) #ATE
ites <- predict(ma_cf)$predictions

static_ites <- ites[, 1, ]
conv_ites <- ites[, 2, ]

sd(conv_ites)
```

```
[1] 1.71286
```

```r
sd(static_ites)
```

```
[1] 1.072896
```

```r
## plot variable importance
importance_tbl <- tibble(
  variable = covars_labels,
  variable_dirty = covars_vec,
  importance = grf::variable_importance(ma_cf)[, 1]
) |>
  arrange(desc(importance))

importance_plot <- importance_tbl %>%
  ggplot(aes(x = importance, y = reorder(variable, importance))) +
  geom_bar(
    stat = "identity",
    fill = amf_blue
  ) +
  labs(
    x = "Variable importance",
    y = NULL
  ) +
  theme(
    panel.grid = element_blank()
    #panel.grid.minor = element_blank(),
    #panel.grid.major.y = element_blank(),
    #panel.grid.minor.x = element_blank()
  )
```

9 Generalized Additive Models (GAMs)

```r
# run gams on these variables
important_covars <- c(
  "revenue_log10", "cents_to_amf_pre", "mean_aot", "ous_impartial_beneficence"
)

important_covar_names <- c(
  "revenue_log10" = "Charity 2024 Revenue (log10)",
  "cents_to_amf_pre" = "Pre-trt Cents to AMF",
  "mean_aot" = "Open-Minded Thinking (AOT-E)",
```

```r
  "ous_impartial_beneficence" = "Utilitarianism: Impartial Beneficence (OUS)"
)

# run gams for each
gams <- lapply(
  important_covars,
  \(cov) run_gam_simple(d, cov, include_data = FALSE, add_hist = TRUE, x_label = important_covar_names[cov], include_legend =
↪  FALSE)
)
```

10 Persuasive Strategies Analysis

```r
d_strategy1 <- read_csv("data/strategy_ratings_GPT4Sonnet3Deepseek.csv")
d_strategy3.7 <- read_csv("data/strategy_ratings_GPT4oSonnet3.7.csv") # sonnet 3.7

#combine all
d_strategy <- d_strategy1 |>
  bind_rows(d_strategy3.7)

d_strategy_long <- d_strategy |>
  pivot_longer(
    cols = EffectivenessFraming:GuiltAppeals,
    names_to = "strategy",
    values_to = "rating"
  ) |>
  mutate(
    rating = dplyr::recode(
      rating,
      "None" = 0,
      "Low" = 1,
      "Moderate" = 2,
      "High" = 3
    ),
  )

## MODEL agreement
d_strat_agree_wide <- d_strategy_long |>
  filter(ResponseId %in% ps_final) |> # yes want this just for real sample
  pivot_wider(names_from = model, values_from = rating) |>
  select(strategy, `deepseek/deepseek-chat-v3-0324`:`anthropic/claude-3.7-sonnet`) |>
  rename_with(~ str_remove(.x, "^.*/"))

strat_agreement <- agreement_analysis_by_group(d_strat_agree_wide, group_var = "strategy")
```

```
Grand ICC:
Call: psych::ICC(x = select(d, -!!group_sym))

Intraclass correlation coefficients
                         type  ICC  F   df1   df2 p lower bound upper bound
Single_raters_absolute   ICC1 0.81 18 16399 49200 0        0.80        0.81
Single_random_raters     ICC2 0.81 19 16399 49197 0        0.79        0.82
```

```
Single_fixed_raters      ICC3 0.82 19 16399 49197 0        0.81        0.82
Average_raters_absolute ICC1k 0.94 18 16399 49200 0        0.94        0.95
Average_random_raters   ICC2k 0.94 19 16399 49197 0        0.94        0.95
Average_fixed_raters    ICC3k 0.95 19 16399 49197 0        0.95        0.95

 Number of subjects = 16400     Number of Judges =  4
See the help file for a discussion of the other 4 McGraw and Wong estimates,
Individual ICCs (ICC2k):
# A tibble: 25 x 10
# Groups:   strategy [25]
   strategy       icc_name type    ICC     F   df1   df2         p `lower bound`
   <chr>          <chr>    <chr> <dbl> <dbl> <dbl> <dbl>     <dbl>         <dbl>
 1 Effectiveness~ Average~ ICC2k 0.681  3.70   655  1965 6.05e-110        0.585
 2 CostEffective~ Average~ ICC2k 0.532  3.07   655  1965 2.93e- 80        0.288
 3 GoalMatching   Average~ ICC2k 0.840  6.34   655  1965 1.91e-222        0.819
 4 MoralReasoning Average~ ICC2k 0.380  2.21   655  1965 9.41e- 40        0.149
 5 Personalizati~ Average~ ICC2k 0.637  3.67   655  1965 2.11e-108        0.464
 6 SplitDonation  Average~ ICC2k 0.958 30.4    655  1965 0                0.936
 7 ExpandingMora~ Average~ ICC2k 0.538  3.13   655  1965 6.41e- 83        0.294
 8 AvoidingRegret Average~ ICC2k 0.359  2.20   655  1965 3.33e- 39        0.117
 9 SocialNorms    Average~ ICC2k 0.884  8.63   655  1965 2.12e-303        0.869
10 AgencyFraming  Average~ ICC2k 0.497  2.53   655  1965 8.40e- 55        0.313
11 MoralConsiste~ Average~ ICC2k 0.706  4.23   655  1965 4.31e-134        0.590
12 EfficiencyAnd~ Average~ ICC2k 0.596  2.98   655  1965 5.40e- 76        0.465
13 Transparency   Average~ ICC2k 0.949 22.0    655  1965 0                0.936
14 IndependentEn~ Average~ ICC2k 0.878  9.80   655  1965 0                0.836
15 LegitimizingS~ Average~ ICC2k 0.900 11.2    655  1965 0                0.876
16 Observability  Average~ ICC2k 0.575  2.44   655  1965 1.77e- 50        0.514
17 IdentifiableV~ Average~ ICC2k 0.345  2.26   655  1965 3.84e- 42        0.0880
18 PromotingDeli~ Average~ ICC2k 0.499  3.03   655  1965 3.57e- 78        0.225
19 PiquePricing   Average~ ICC2k 0.780  4.54   655  1965 3.45e-148        0.751
20 GainFramedMes~ Average~ ICC2k 0.512  3.05   655  1965 4.38e- 79        0.249
21 PerceivedNeed  Average~ ICC2k 0.596  2.88   655  1965 3.69e- 71        0.487
22 WarmGlow       Average~ ICC2k 0.638  3.51   655  1965 3.03e-101        0.489
23 SocialIdentity Average~ ICC2k 0.670  3.59   655  1965 9.16e-105        0.567
24 VirtueLabeling Average~ ICC2k 0.761  5.26   655  1965 3.83e-179        0.661
25 GuiltAppeals   Average~ ICC2k 0.532  2.51   655  1965 1.14e- 53        0.402
# i 1 more variable: `upper bound` <dbl>

mean ICCs (ICC):
# A tibble: 1 x 3
  mean_icc2k min_icc2k max_icc2k
       <dbl>     <dbl>     <dbl>
1      0.650     0.345     0.958

Cronbach's Alpha:
# A tibble: 25 x 10
# Groups:   strategy [25]
   strategy raw_alpha std.alpha `G6(smc)` average_r `S/N`     ase    mean     sd
   <chr>        <dbl>     <dbl>     <dbl>     <dbl> <dbl>   <dbl>   <dbl>  <dbl>
 1 Effecti~     0.730     0.751     0.700     0.430  3.01 0.0153  2.74    0.332
 2 CostEff~     0.674     0.676     0.612     0.342  2.08 0.0208  2.32    0.313
 3 GoalMat~     0.842     0.847     0.808     0.581  5.54 0.00996 2.02    0.581
 4 MoralRe~     0.547     0.556     0.487     0.238  1.25 0.0273  1.40    0.277
 5 Persona~     0.727     0.736     0.678     0.410  2.78 0.0169  2.33    0.387
```

```
 6 SplitDo~     0.967     0.970     0.961     0.889 31.9  0.00193 1.86    1.01
 7 Expandi~     0.680     0.693     0.636     0.360  2.25 0.0185  1.73    0.343
 8 Avoidin~     0.545     0.568     0.499     0.247  1.32 0.0269  0.646   0.305
 9 SocialN~     0.884     0.889     0.860     0.668  8.04 0.00722 0.0400  0.183
10 AgencyF~     0.605     0.630     0.567     0.298  1.70 0.0230  1.88    0.312
11 MoralCo~     0.763     0.774     0.722     0.462  3.43 0.0147  2.02    0.395
12 Efficie~     0.665     0.691     0.628     0.359  2.24 0.0195  1.71    0.396
13 Transpa~     0.955     0.957     0.947     0.849 22.5  0.00282 0.362   0.661
14 Indepen~     0.898     0.902     0.876     0.696  9.17 0.00637 0.516   0.590
15 Legitim~     0.911     0.913     0.892     0.723 10.5  0.00570 0.624   0.703
16 Observa~     0.590     0.687     0.666     0.355  2.20 0.0224  0.0366  0.124
17 Identif~     0.558     0.557     0.488     0.239  1.26 0.0279  0.710   0.312
18 Promoti~     0.670     0.682     0.623     0.349  2.14 0.0195  1.96    0.339
19 PiquePr~     0.780     0.775     0.765     0.462  3.44 0.0124  0.00953 0.0841
20 GainFra~     0.672     0.675     0.616     0.341  2.07 0.0193  2.44    0.309
21 Perceiv~     0.653     0.676     0.614     0.343  2.09 0.0215  1.98    0.293
22 WarmGlow     0.715     0.727     0.670     0.400  2.67 0.0174  1.11    0.362
23 SocialI~     0.721     0.724     0.675     0.396  2.63 0.0170  0.454   0.365
24 VirtueL~     0.810     0.821     0.783     0.534  4.58 0.0112  1.74    0.458
25 GuiltAp~     0.602     0.615     0.549     0.285  1.59 0.0245  0.295   0.300
# i 1 more variable: median_r <dbl>
```

```
d_strat_agree_wide
```

```
# A tibble: 16,400 x 5
   strategy              `deepseek-chat-v3-0324` `claude-3-sonnet` `gpt-4o`
   <chr>                                   <dbl>             <dbl>    <dbl>
 1 EffectivenessFraming                        3                 3        2
 2 CostEffectivenessGap                        2                 3        2
 3 GoalMatching                                2                 1        2
 4 MoralReasoning                              2                 2        2
 5 Personalization                             2                 3        2
 6 SplitDonation                               0                 0        0
 7 ExpandingMoralConcern                       2                 3        2
 8 AvoidingRegret                              1                 1        1
 9 SocialNorms                                 0                 0        0
10 AgencyFraming                               2                 2        2
# i 16,390 more rows
# i 1 more variable: `claude-3.7-sonnet` <dbl>
```

```r
d_strategy_agg_long  <- d_strategy_long |>
  group_by(ResponseId, strategy) |>
  summarise(
    rating = mean(rating, na.rm = TRUE)
  )

d_strategy_agg_wide <- d_strategy_agg_long |>
  pivot_wider(
    names_from = strategy,
    values_from = rating
  ) |>
  ungroup()

# Link wide data with whole dataset
```

```r
d_strat_all_wide <- d |>
  filter(treatment == "conv_treatment") |>
  select(ResponseId,
         cents_to_amf_change, cents_to_amf_pre, cents_to_amf_post, cents_to_amf_pre_cat, ## donation change
         charity_wrong_pre, charity_wrong_post, charity_wrong_change, link_clicked, ## other dvs


         # control for these other factors that might differ
         AwarenessOfNeed, Solicitation, CostsAndBenefits,
         Altruism, Reputation, PsychologicalBenefits, Values, Efficacy,
         DoesntGive) |>

  ## add new data
  left_join(d_where[, c("ResponseId", "is_international", "location_cat3")], by = "ResponseId") |>
  left_join(
    reduce_pcs_matrix(d_subj1 |> filter(condition == "conv_treatment"), "subj", min_n = 30) |>
      select(ResponseId, starts_with("subj")),
    by = "ResponseId"
  ) |>
  left_join(
    reduce_pcs_matrix(d_pop2 |> filter(condition == "conv_treatment"), "pop", min_n = 30) |>
      select(ResponseId, starts_with("pop")),
    by = "ResponseId"
  ) |>
  left_join(d_strategy_agg_wide, by = "ResponseId")


# Models  ----------------------------------------------------------------

## for Donation change
# with the categorical control for pre score -- the exact same vars are significant.
mod_lm_donation <- d_strat_all_wide |>
  select(
    -ResponseId,
    -location_cat3,
    -cents_to_amf_post,-cents_to_amf_pre,
    -charity_wrong_pre, -charity_wrong_post, -charity_wrong_change, -link_clicked
  ) |>
  estimatr::lm_robust(
    cents_to_amf_change ~ . ,
    data = _
  )

# hacky update p values with q values
mod_lm_donation$p.value <- get_qvals(mod_lm_donation, strat_names)
summary(mod_lm_donation)
```

```

Call:
estimatr::lm_robust(formula = cents_to_amf_change ~ ., data = select(d_strat_all_wide,
    -ResponseId, -location_cat3, -cents_to_amf_post, -cents_to_amf_pre,
    -charity_wrong_pre, -charity_wrong_post, -charity_wrong_change,
    -link_clicked))
```

```
Standard error type:  HC2

Coefficients:
                                          Estimate Std. Error  t value
(Intercept)                               -41.8199    19.8380 -2.10807
cents_to_amf_pre_cat10-Jan                 12.5093     5.8365  2.14328
cents_to_amf_pre_cat20-Nov                  3.4793     3.9854  0.87300
cents_to_amf_pre_cat21-30                  -8.3573     3.3690 -2.48066
cents_to_amf_pre_cat31-40                  -6.3085     5.3272 -1.18421
cents_to_amf_pre_cat41-50                 -10.0836     2.5893 -3.89437
cents_to_amf_pre_cat51-100                -23.0533     3.8215 -6.03253
AwarenessOfNeed                             1.3723     1.2331  1.11289
Solicitation                                2.7581     1.9732  1.39772
CostsAndBenefits                           -0.1027     0.9461 -0.10855
Altruism                                    0.3859     1.9086  0.20221
Reputation                                 -1.0834     2.7216 -0.39808
PsychologicalBenefits                       0.7249     1.0383  0.69814
Values                                     -0.8121     1.2262 -0.66230
Efficacy                                   -0.2607     0.8934 -0.29183
DoesntGiveTRUE                              2.1374     3.6922  0.57888
is_international                            4.1754     3.0973  1.34805
subj_environment                            2.4848     3.2749  0.75874
subj_health                                -3.1466     3.0136 -1.04415
subj_human_services                         2.4486     2.7568  0.88821
subj_public_safety_and_disaster_management  9.4284     5.1591  1.82752
subj_community_and_economic_development    -3.8915     3.9738 -0.97928
subj_international_relations              -14.6658     5.7708 -2.54136
subj_philanthropy                           0.9475     4.1293  0.22946
subj_international_human_rights            12.1351     5.7115  2.12469
subj_unknown_or_not_classified              2.2061     4.7744  0.46208
subj_other_categorization                   1.5554     2.2307  0.69726
pop_adults                                 -1.3997     2.7720 -0.50497
pop_children_and_youth                     -1.0577     2.7317 -0.38720
pop_economically_disadvantaged_people       0.5148     3.0136  0.17083
pop_veterans                               -8.9266     4.4874 -1.98924
pop_people_with_disabilities                2.6667     3.3526  0.79541
pop_people_with_diseases_and_illnesses      1.6493     4.2135  0.39145
pop_families                               -1.9820     3.4711 -0.57100
pop_victims_of_violence_or_disasters        3.5648     6.9488  0.51301
pop_unknown_or_not_classified              -4.6744     4.7460 -0.98491
pop_pregnant_people                         5.7446     6.4875  0.88549
pop_immigrants_and_migrants               -17.1423     7.3785 -2.32326
pop_military_personnel                     -0.3745     6.4860 -0.05774
pop_women_and_girls                         0.3721     4.6327  0.08032
pop_asian_people                           11.4172     5.1286  2.22620
pop_other_categorization                   -4.6763     3.1971 -1.46267
AgencyFraming                               5.7709     3.7682  1.53146
AvoidingRegret                             12.4395     4.5701  2.72190
CostEffectivenessGap                       -3.6324     3.6011 -1.00869
EffectivenessFraming                       10.9522     5.2844  2.07257
EfficiencyAndScale                         -1.5120     2.1500 -0.70326
ExpandingMoralConcern                      -4.6716     2.3223 -2.01166
GainFramedMessaging                        11.3439     5.5072  2.05984
GoalMatching                                2.0514     1.9974  1.02707
GuiltAppeals                              -12.8915     4.9100 -2.62558
```

```
IdentifiableVictim                          -2.3709     3.9059 -0.60701
IndependentEndorsements                      0.1127     1.9521  0.05771
LegitimizingSmallContributions              -2.4822     1.2523 -1.98213
MoralConsistency                             0.3688     2.9901  0.12334
MoralReasoning                               2.8931     3.0844  0.93799
Observability                                4.5495     8.4300  0.53968
PerceivedNeed                                1.9767     3.4805  0.56793
Personalization                             -6.9724     4.1535 -1.67868
PiquePricing                                -9.3981    10.3018 -0.91227
PromotingDeliberation                       -3.7470     3.2617 -1.14880
SocialIdentity                              -1.3637     3.3763 -0.40390
SocialNorms                                 -4.5485     5.1528 -0.88272
SplitDonation                               -1.0634     1.2785 -0.83172
Transparency                                 4.1972     1.9843  2.11521
VirtueLabeling                               5.4618     1.9672  2.77635
WarmGlow                                     3.2762     2.8971  1.13085
                                            Pr(>|t|) CI Lower  CI Upper  DF
(Intercept)                                3.545e-02 -80.7818  -2.85798 589
cents_to_amf_pre_cat10-Jan                 3.250e-02   1.0464  23.97231 589
cents_to_amf_pre_cat20-Nov                 3.830e-01  -4.3480  11.30656 589
cents_to_amf_pre_cat21-30                  1.339e-02 -14.9739  -1.74061 589
cents_to_amf_pre_cat31-40                  2.368e-01 -16.7711   4.15411 589
cents_to_amf_pre_cat41-50                  1.097e-04 -15.1690  -4.99828 589
cents_to_amf_pre_cat51-100                 2.853e-09 -30.5587 -15.54788 589
AwarenessOfNeed                            2.662e-01  -1.0495   3.79410 589
Solicitation                               1.627e-01  -1.1174   6.63351 589
CostsAndBenefits                           9.136e-01  -1.9608   1.75536 589
Altruism                                   8.398e-01  -3.3626   4.13453 589
Reputation                                 6.907e-01  -6.4286   4.26180 589
PsychologicalBenefits                      4.854e-01  -1.3144   2.76413 589
Values                                     5.080e-01  -3.2203   1.59609 589
Efficacy                                   7.705e-01  -2.0153   1.49391 589
DoesntGiveTRUE                             5.629e-01  -5.1141   9.38884 589
is_international                           1.782e-01  -1.9078  10.25857 589
subj_environment                           4.483e-01  -3.9471   8.91661 589
subj_health                                2.968e-01  -9.0653   2.77203 589
subj_human_services                        3.748e-01  -2.9657   7.86288 589
subj_public_safety_and_disaster_management 6.813e-02  -0.7041  19.56081 589
subj_community_and_economic_development    3.278e-01 -11.6961   3.91311 589
subj_international_relations               1.130e-02 -25.9997  -3.33184 589
subj_philanthropy                          8.186e-01  -7.1624   9.05741 589
subj_international_human_rights            3.403e-02   0.9178  23.35248 589
subj_unknown_or_not_classified             6.442e-01  -7.1707  11.58297 589
subj_other_categorization                  4.859e-01  -2.8257   5.93640 589
pop_adults                                 6.138e-01  -6.8439   4.04437 589
pop_children_and_youth                     6.987e-01  -6.4227   4.30729 589
pop_economically_disadvantaged_people      8.644e-01  -5.4039   6.43354 589
pop_veterans                               4.714e-02 -17.7399  -0.11329 589
pop_people_with_disabilities               4.267e-01  -3.9178   9.25108 589
pop_people_with_diseases_and_illnesses     6.956e-01  -6.6259   9.92458 589
pop_families                               5.682e-01  -8.7993   4.83525 589
pop_victims_of_violence_or_disasters       6.081e-01 -10.0826  17.21223 589
pop_unknown_or_not_classified              3.251e-01 -13.9954   4.64672 589
pop_pregnant_people                        3.763e-01  -6.9968  18.48609 589
pop_immigrants_and_migrants                2.050e-02 -31.6337  -2.65080 589
```

```
pop_military_personnel                    9.540e-01 -13.1130  12.36405 589
pop_women_and_girls                       9.360e-01  -8.7266   9.47083 589
pop_asian_people                          2.638e-02   1.3447  21.48976 589
pop_other_categorization                  1.441e-01 -10.9554   1.60278 589
AgencyFraming                             1.952e-01  -1.6299  13.17161 589
AvoidingRegret                            4.575e-02   3.4637  21.41521 589
CostEffectivenessGap                      3.436e-01 -10.7049   3.44015 589
EffectivenessFraming                      9.265e-02   0.5737  21.33074 589
EfficiencyAndScale                        3.925e-01  -5.7346   2.71056 589
ExpandingMoralConcern                     9.265e-02  -9.2325  -0.11067 589
GainFramedMessaging                       9.265e-02   0.5278  22.15993 589
GoalMatching                              3.436e-01  -1.8714   5.97430 589
GuiltAppeals                              4.575e-02 -22.5346  -3.24834 589
IdentifiableVictim                        4.145e-01 -10.0421   5.30027 589
IndependentEndorsements                   5.902e-01  -3.7214   3.94669 589
LegitimizingSmallContributions            9.265e-02  -4.9417  -0.02271 589
MoralConsistency                          5.812e-01  -5.5038   6.24139 589
MoralReasoning                            3.436e-01  -3.1646   8.95087 589
Observability                             4.145e-01 -12.0070  21.10609 589
PerceivedNeed                             4.145e-01  -4.8590   8.81235 589
Personalization                           1.611e-01 -15.1300   1.18508 589
PiquePricing                              3.436e-01 -29.6308  10.83471 589
PromotingDeliberation                     3.333e-01 -10.1530   2.65893 589
SocialIdentity                            4.616e-01  -7.9947   5.26732 589
SocialNorms                               3.436e-01 -14.6687   5.57163 589
SplitDonation                             3.487e-01  -3.5745   1.44767 589
Transparency                              9.265e-02   0.3000   8.09444 589
VirtueLabeling                            4.575e-02   1.5981   9.32544 589
WarmGlow                                  3.333e-01  -2.4137   8.96610 589

Multiple R-squared:  0.3281 ,   Adjusted R-squared:  0.2528
F-statistic: 3.706 on 66 and 589 DF,  p-value: < 2.2e-16
```

```r
## For moral belief change
mod_lm_char_wrong <- d_strat_all_wide |>
  select(
    -ResponseId,
    -location_cat3,
    -cents_to_amf_post,-cents_to_amf_pre, -cents_to_amf_change, -cents_to_amf_pre_cat,
    -charity_wrong_post, -link_clicked
  ) |>
  estimatr::lm_robust(
    charity_wrong_change ~ . ,
    data = _
  )

# hacky update p values with q values
mod_lm_char_wrong$p.value <- get_qvals(mod_lm_char_wrong, strat_names)
mod_lm_char_wrong |> summary()
```

```
Call:
estimatr::lm_robust(formula = charity_wrong_change ~ ., data = select(d_strat_all_wide,
    -ResponseId, -location_cat3, -cents_to_amf_post, -cents_to_amf_pre,
    -cents_to_amf_change, -cents_to_amf_pre_cat, -charity_wrong_post,
```

```
    -link_clicked))

Standard error type:  HC2

Coefficients:
                                           Estimate Std. Error  t value
(Intercept)                                -3.66435    6.47768 -0.56569
charity_wrong_pre                          -0.07560    0.02007 -3.76577
AwarenessOfNeed                             0.80694    0.72238  1.11705
Solicitation                                0.34334    0.80364  0.42723
CostsAndBenefits                           -0.05869    0.60934 -0.09632
Altruism                                    0.20071    1.48724  0.13495
Reputation                                  0.06663    1.29965  0.05127
PsychologicalBenefits                      -0.30133    0.68192 -0.44189
Values                                     -0.48426    1.08785 -0.44515
Efficacy                                   -0.71598    0.58286 -1.22839
DoesntGiveTRUE                             -0.16729    2.21998 -0.07536
is_international                            1.06391    2.06275  0.51577
subj_environment                           -0.92735    1.51094 -0.61376
subj_health                                -1.91810    1.80174 -1.06458
subj_human_services                        -1.30676    1.48677 -0.87893
subj_public_safety_and_disaster_management -1.14885    1.80099 -0.63790
subj_community_and_economic_development    -3.45496    2.50383 -1.37987
subj_international_relations                4.52282    2.70749  1.67049
subj_philanthropy                           1.34674    2.40754  0.55938
subj_international_human_rights             0.17647    2.16884  0.08137
subj_unknown_or_not_classified             -1.01834    2.44225 -0.41697
subj_other_categorization                  -0.77281    0.99660 -0.77545
pop_adults                                 -2.81427    1.53921 -1.82839
pop_children_and_youth                      0.82014    1.51855  0.54008
pop_economically_disadvantaged_people       1.73918    1.36186  1.27707
pop_veterans                               -0.76794    4.16639 -0.18432
pop_people_with_disabilities                1.79572    2.23995  0.80167
pop_people_with_diseases_and_illnesses      2.94944    3.07272  0.95988
pop_families                               -0.77284    1.57950 -0.48930
pop_victims_of_violence_or_disasters        0.42452    4.60668  0.09215
pop_unknown_or_not_classified              -0.79765    2.03353 -0.39225
pop_pregnant_people                        -0.71803    3.02811 -0.23712
pop_immigrants_and_migrants                -0.34469    4.88493 -0.07056
pop_military_personnel                     -4.40006    4.75688 -0.92499
pop_women_and_girls                        -1.37810    3.27923 -0.42025
pop_asian_people                           -0.48023    2.45351 -0.19573
pop_other_categorization                    1.53363    1.53698  0.99782
AgencyFraming                               0.54247    2.04785  0.26490
AvoidingRegret                             -4.78231    2.40554 -1.98804
CostEffectivenessGap                       -0.62032    2.09387 -0.29626
EffectivenessFraming                        0.09851    2.88026  0.03420
EfficiencyAndScale                         -1.69794    1.40719 -1.20662
ExpandingMoralConcern                      -1.73499    1.66691 -1.04084
GainFramedMessaging                         3.81116    3.05640  1.24695
GoalMatching                               -1.87913    1.53147 -1.22701
GuiltAppeals                                2.46177    2.60222  0.94603
IdentifiableVictim                          0.79013    1.89111  0.41782
IndependentEndorsements                     1.72982    1.42267  1.21590
LegitimizingSmallContributions             -0.84986    0.69739 -1.21864
```

```
MoralConsistency                          4.21431    1.91617  2.19934
MoralReasoning                            1.86120    2.02788  0.91781
Observability                            -0.27165    5.62575 -0.04829
PerceivedNeed                             1.54413    2.25339  0.68525
Personalization                          -4.13966    1.71154 -2.41867
PiquePricing                             21.79101   25.05740  0.86964
PromotingDeliberation                     1.67392    1.89746  0.88219
SocialIdentity                            0.51082    1.68794  0.30263
SocialNorms                              -2.56965    2.80265 -0.91686
SplitDonation                            -0.37112    0.60921 -0.60919
Transparency                             -0.52414    1.10263 -0.47536
VirtueLabeling                            0.79080    1.27571  0.61989
WarmGlow                                  2.64018    2.13744  1.23521
                                          Pr(>|t|) CI Lower CI Upper  DF
(Intercept)                              0.5718189 -16.3863  9.05759 594
charity_wrong_pre                        0.0001826  -0.1150 -0.03617 594
AwarenessOfNeed                          0.2644235  -0.6118  2.22568 594
Solicitation                             0.6693635  -1.2350  1.92165 594
CostsAndBenefits                         0.9233013  -1.2554  1.13803 594
Altruism                                 0.8926936  -2.7202  3.12159 594
Reputation                               0.9591300  -2.4858  2.61909 594
PsychologicalBenefits                    0.6587282  -1.6406  1.03793 594
Values                                   0.6563744  -2.6208  1.65225 594
Efficacy                                 0.2197875  -1.8607  0.42874 594
DoesntGiveTRUE                           0.9399566  -4.5272  4.19267 594
is_international                         0.6062037  -2.9873  5.11508 594
subj_environment                         0.5396088  -3.8948  2.04007 594
subj_health                              0.2874972  -5.4566  1.62045 594
subj_human_services                      0.3797957  -4.2267  1.61320 594
subj_public_safety_and_disaster_management 0.5237856  -4.6859  2.38824 594
subj_community_and_economic_development  0.1681448  -8.3724  1.46247 594
subj_international_relations             0.0953502  -0.7946  9.84024 594
subj_philanthropy                        0.5761116  -3.3816  6.07506 594
subj_international_human_rights          0.9351778  -4.0830  4.43599 594
subj_unknown_or_not_classified           0.6768524  -5.8148  3.77815 594
subj_other_categorization                0.4383810  -2.7301  1.18447 594
pop_adults                               0.0679925  -5.8372  0.20868 594
pop_children_and_youth                   0.5893427  -2.1622  3.80252 594
pop_economically_disadvantaged_people    0.2020771  -0.9355  4.41382 594
pop_veterans                             0.8538266  -8.9506  7.41471 594
pop_people_with_disabilities             0.4230616  -2.6035  6.19491 594
pop_people_with_diseases_and_illnesses   0.3375056  -3.0853  8.98416 594
pop_families                             0.6248118  -3.8749  2.32924 594
pop_victims_of_violence_or_disasters     0.9266077  -8.6228  9.47188 594
pop_unknown_or_not_classified            0.6950163  -4.7914  3.19614 594
pop_pregnant_people                      0.8126447  -6.6651  5.22907 594
pop_immigrants_and_migrants              0.9437698  -9.9385  9.24915 594
pop_military_personnel                   0.3553479 -13.7424  4.94229 594
pop_women_and_girls                      0.6744549  -7.8184  5.06220 594
pop_asian_people                         0.8448867  -5.2988  4.33838 594
pop_other_categorization                 0.3187708  -1.4849  4.55221 594
AgencyFraming                            0.8127897  -3.4794  4.56437 594
AvoidingRegret                           0.3722710  -9.5067 -0.05791 594
CostEffectivenessGap                     0.8127897  -4.7326  3.49196 594
EffectivenessFraming                     0.9193525  -5.5582  5.75524 594
```

```
EfficiencyAndScale                          0.5987394  -4.4616  1.06574 594
ExpandingMoralConcern                       0.6062148  -5.0087  1.53876 594
GainFramedMessaging                         0.5987394  -2.1915  9.81383 594
GoalMatching                                0.5987394  -4.8869  1.12862 594
GuiltAppeals                                0.6062148  -2.6489  7.57244 594
IdentifiableVictim                          0.7989081  -2.9239  4.50420 594
IndependentEndorsements                     0.5987394  -1.0643  4.52388 594
LegitimizingSmallContributions              0.5987394  -2.2195  0.51978 594
MoralConsistency                            0.3336130   0.4510  7.97761 594
MoralReasoning                              0.6062148  -2.1215  5.84388 594
Observability                               0.9193525 -11.3204 10.77713 594
PerceivedNeed                               0.7123024  -2.8814  5.96971 594
Personalization                             0.3336130  -7.5011 -0.77825 594
PiquePricing                                0.6062148 -27.4209 71.00288 594
PromotingDeliberation                       0.6062148  -2.0526  5.40046 594
SocialIdentity                              0.8127897  -2.8042  3.82587 594
SocialNorms                                 0.6062148  -8.0740  2.93466 594
SplitDonation                               0.7123024  -1.5676  0.82534 594
Transparency                                0.7893144  -2.6897  1.64138 594
VirtueLabeling                              0.7123024  -1.7147  3.29625 594
WarmGlow                                    0.5987394  -1.5577  6.83805 594

Multiple R-squared:  0.125 ,    Adjusted R-squared:  0.03511
F-statistic: 0.782 on 61 and 594 DF,  p-value: 0.8845
```

```r
## For link clicked
mod_lm_clicked <- d_strat_all_wide |>
  select(
    -ResponseId,
    -location_cat3,
    -cents_to_amf_post,-cents_to_amf_pre, -cents_to_amf_change,
    -charity_wrong_pre, -charity_wrong_post, -charity_wrong_change,
  ) |>
  estimatr::lm_robust(
    link_clicked ~ . ,
    data = _
  )

mod_lm_clicked$p.value <- get_qvals(mod_lm_clicked, strat_names)
mod_lm_clicked |>
  summary()
```

```
Call:
estimatr::lm_robust(formula = link_clicked ~ ., data = select(d_strat_all_wide,
    -ResponseId, -location_cat3, -cents_to_amf_post, -cents_to_amf_pre,
    -cents_to_amf_change, -charity_wrong_pre, -charity_wrong_post,
    -charity_wrong_change, ))

Standard error type:  HC2

Coefficients:
                                              Estimate Std. Error   t value
(Intercept)                                 -0.1442196    0.15804 -0.912541
cents_to_amf_pre_cat10-Jan                   0.0989843    0.08255  1.199137
```

cents_to_amf_pre_cat20-Nov	-0.0468291	0.03379	-1.386066
cents_to_amf_pre_cat21-30	0.0660051	0.05381	1.226657
cents_to_amf_pre_cat31-40	0.1465738	0.08832	1.659525
cents_to_amf_pre_cat41-50	0.0854559	0.03923	2.178364
cents_to_amf_pre_cat51-100	0.0829792	0.06291	1.318939
AwarenessOfNeed	-0.0197934	0.01542	-1.283924
Solicitation	-0.0195889	0.01462	-1.339519
CostsAndBenefits	0.0214017	0.01578	1.356200
Altruism	-0.0024820	0.02870	-0.086477
Reputation	-0.0631622	0.02635	-2.396812
PsychologicalBenefits	0.0229992	0.01436	1.601283
Values	0.0265298	0.02200	1.205761
Efficacy	-0.0007643	0.01403	-0.054484
DoesntGiveTRUE	0.0125623	0.05684	0.221008
is_international	-0.0125199	0.03954	-0.316607
subj_environment	0.0037307	0.04614	0.080856
subj_health	-0.0550338	0.03756	-1.465160
subj_human_services	-0.0114188	0.03523	-0.324109
subj_public_safety_and_disaster_management	0.0282918	0.06043	0.468146
subj_community_and_economic_development	-0.0291522	0.04745	-0.614348
subj_international_relations	0.0036580	0.05629	0.064980
subj_philanthropy	-0.0928244	0.05120	-1.812821
subj_international_human_rights	-0.0111595	0.06004	-0.185872
subj_unknown_or_not_classified	0.0499592	0.07656	0.652543
subj_other_categorization	0.0071462	0.02765	0.258483
pop_adults	-0.0209989	0.03583	-0.586144
pop_children_and_youth	-0.0037499	0.04301	-0.087178
pop_economically_disadvantaged_people	0.0424832	0.03620	1.173524
pop_veterans	-0.0906360	0.07776	-1.165590
pop_people_with_disabilities	0.0369945	0.05885	0.628619
pop_people_with_diseases_and_illnesses	0.1388637	0.06300	2.204065
pop_families	-0.0314943	0.04729	-0.666042
pop_victims_of_violence_or_disasters	-0.0066427	0.09732	-0.068256
pop_unknown_or_not_classified	-0.0243907	0.06527	-0.373682
pop_pregnant_people	0.0813802	0.07899	1.030253
pop_immigrants_and_migrants	-0.0079113	0.09733	-0.081285
pop_military_personnel	-0.0005386	0.09340	-0.005767
pop_women_and_girls	-0.0945334	0.05474	-1.727052
pop_asian_people	-0.0983600	0.05211	-1.887538
pop_other_categorization	-0.0013590	0.03250	-0.041812
AgencyFraming	-0.0004600	0.04348	-0.010579
AvoidingRegret	0.0414186	0.07080	0.585019
CostEffectivenessGap	0.0185552	0.05514	0.336483
EffectivenessFraming	-0.0484890	0.06625	-0.731951
EfficiencyAndScale	-0.0229015	0.02922	-0.783842
ExpandingMoralConcern	0.0654269	0.03668	1.783897
GainFramedMessaging	0.0879522	0.07520	1.169610
GoalMatching	0.0446633	0.03254	1.372624
GuiltAppeals	-0.0943094	0.05703	-1.653810
IdentifiableVictim	-0.0299515	0.05253	-0.570136
IndependentEndorsements	0.0295093	0.03105	0.950445
LegitimizingSmallContributions	-0.0004766	0.01815	-0.026264
MoralConsistency	-0.0910066	0.04363	-2.085892
MoralReasoning	-0.0185010	0.04810	-0.384671
Observability	0.1205360	0.18767	0.642292

```
PerceivedNeed                              -0.0364387    0.05117 -0.712135
Personalization                            -0.0001967    0.04720 -0.004166
PiquePricing                               -0.1899344    0.09918 -1.915006
PromotingDeliberation                       0.1182559    0.04672  2.531318
SocialIdentity                              0.0005043    0.05311  0.009496
SocialNorms                                 0.1635297    0.11519  1.419620
SplitDonation                               0.0020485    0.01651  0.124077
Transparency                               -0.0168537    0.02833 -0.594987
VirtueLabeling                              0.0035839    0.02803  0.127849
WarmGlow                                   -0.0609796    0.04205 -1.450084
                                           Pr(>|t|)  CI Lower  CI Upper  DF
(Intercept)                                 0.36186 -0.454613  0.166174 589
cents_to_amf_pre_cat10-Jan                  0.23096 -0.063137  0.261105 589
cents_to_amf_pre_cat20-Nov                  0.16625 -0.113184  0.019526 589
cents_to_amf_pre_cat21-30                   0.22044 -0.039676  0.171686 589
cents_to_amf_pre_cat31-40                   0.09754 -0.026892  0.320040 589
cents_to_amf_pre_cat41-50                   0.02977  0.008409  0.162502 589
cents_to_amf_pre_cat51-100                  0.18770 -0.040583  0.206542 589
AwarenessOfNeed                             0.19967 -0.050071  0.010484 589
Solicitation                                0.18092 -0.048310  0.009132 589
CostsAndBenefits                            0.17556 -0.009591  0.052395 589
Altruism                                    0.93112 -0.058852  0.053888 589
Reputation                                  0.01685 -0.114919 -0.011406 589
PsychologicalBenefits                       0.10985 -0.005210  0.051208 589
Values                                      0.22839 -0.016683  0.069743 589
Efficacy                                    0.95657 -0.028316  0.026787 589
DoesntGiveTRUE                              0.82516 -0.099073  0.124198 589
is_international                            0.75165 -0.090184  0.065144 589
subj_environment                            0.93558 -0.086888  0.094350 589
subj_health                                 0.14341 -0.128805  0.018737 589
subj_human_services                         0.74597 -0.080613  0.057776 589
subj_public_safety_and_disaster_management  0.63985 -0.090400  0.146983 589
subj_community_and_economic_development     0.53922 -0.122348  0.064044 589
subj_international_relations                0.94821 -0.106902  0.114218 589
subj_philanthropy                           0.07037 -0.193390  0.007741 589
subj_international_human_rights             0.85261 -0.129075  0.106756 589
subj_unknown_or_not_classified              0.51431 -0.100406  0.200324 589
subj_other_categorization                   0.79612 -0.047152  0.061444 589
pop_adults                                  0.55800 -0.091360  0.049362 589
pop_children_and_youth                      0.93056 -0.088229  0.080730 589
pop_economically_disadvantaged_people       0.24106 -0.028616  0.113583 589
pop_veterans                                0.24425 -0.243356  0.062084 589
pop_people_with_disabilities                0.52984 -0.078588  0.152577 589
pop_people_with_diseases_and_illnesses      0.02791  0.015125  0.262603 589
pop_families                                0.50564 -0.124363  0.061375 589
pop_victims_of_violence_or_disasters        0.94561 -0.197780  0.184494 589
pop_unknown_or_not_classified               0.70878 -0.152583  0.103802 589
pop_pregnant_people                         0.30331 -0.073757  0.236518 589
pop_immigrants_and_migrants                 0.93524 -0.199063  0.183241 589
pop_military_personnel                      0.99540 -0.183978  0.182901 589
pop_women_and_girls                         0.08468 -0.202037  0.012970 589
pop_asian_people                            0.05958 -0.200704  0.003984 589
pop_other_categorization                    0.96666 -0.065194  0.062476 589
AgencyFraming                               0.99668 -0.085854  0.084935 589
AvoidingRegret                              0.83647 -0.097630  0.180467 589
```

```
CostEffectivenessGap                        0.96925 -0.089749  0.126859 589
EffectivenessFraming                        0.83647 -0.178596  0.081618 589
EfficiencyAndScale                          0.83647 -0.080284  0.034481 589
ExpandingMoralConcern                       0.46847 -0.006606  0.137459 589
GainFramedMessaging                         0.67397 -0.059736  0.235641 589
GoalMatching                                0.53247 -0.019243  0.108569 589
GuiltAppeals                                0.49349 -0.206308  0.017689 589
IdentifiableVictim                          0.83647 -0.133128  0.073225 589
IndependentEndorsements                     0.83647 -0.031469  0.090487 589
LegitimizingSmallContributions              0.99668 -0.036114  0.035161 589
MoralConsistency                            0.46647 -0.176695 -0.005318 589
MoralReasoning                              0.96925 -0.112961  0.075959 589
Observability                               0.83647 -0.248039  0.489111 589
PerceivedNeed                               0.83647 -0.136933  0.064056 589
Personalization                             0.99668 -0.092895  0.092502 589
PiquePricing                                0.46647 -0.384728  0.004859 589
PromotingDeliberation                       0.29056  0.026503  0.210008 589
SocialIdentity                              0.99668 -0.103798  0.104806 589
SocialNorms                                 0.53247 -0.062709  0.389768 589
SplitDonation                               0.99668 -0.030377  0.034474 589
Transparency                                0.83647 -0.072486  0.038779 589
VirtueLabeling                              0.99668 -0.051472  0.058639 589
WarmGlow                                    0.53247 -0.143571  0.021611 589

Multiple R-squared:   0.12 ,    Adjusted R-squared:  0.02136
F-statistic: 0.9291 on 66 and 589 DF,  p-value: 0.6359
```

11 AI Accuracy Assessment

```r
## correlation between accuracy and donation change

d_fact <- read_csv("data/fact_check_results.csv") |>
  mutate(
    round = ordered(
      round,
      levels = c("round1", "round2", "round3", "round4"),
      labels = c("Round 1", "Round 2", "Round 3", "Round 4")
    ),
    round_num = as.numeric(gsub("Round", "", round)),
  )

## agreement analysis
d_fact_wide <- d_fact  %>%
  filter(ResponseId %in% ps_final) |> # yes want this just for real sample
  select( -explanation) |>
  pivot_wider(names_from = model, values_from = rating) |>
  select(-round, -round_num, -text, -ResponseId) |>
  rename_with(~ str_remove(.x, "^.*/"))

d_fact_wide_by_round <- d_fact  %>%
  filter(ResponseId %in% ps_final) |> # yes want this just for real sample
  select( -explanation) |>
```

```r
  pivot_wider(names_from = model, values_from = rating) |>
  select(-round_num, -text, -ResponseId) |>
  rename_with(~ str_remove(.x, "^.*/"))

agreement_analysis(d_fact_wide)
```

```
=== Intraclass Correlation (ICC) ===
Call: psych::ICC(x = d)

Intraclass correlation coefficients
                         type  ICC   F  df1  df2       p lower bound
Single_raters_absolute   ICC1 0.23 1.9 1811 3624 1.2e-60        0.20
Single_random_raters     ICC2 0.24 2.0 1811 3622 5.6e-68        0.21
Single_fixed_raters      ICC3 0.25 2.0 1811 3622 5.6e-68        0.22
Average_raters_absolute ICC1k 0.48 1.9 1811 3624 1.2e-60        0.43
Average_random_raters   ICC2k 0.49 2.0 1811 3622 5.6e-68        0.44
Average_fixed_raters    ICC3k 0.50 2.0 1811 3622 5.6e-68        0.46
                        upper bound
Single_raters_absolute         0.26
Single_random_raters           0.27
Single_fixed_raters            0.28
Average_raters_absolute        0.52
Average_random_raters          0.53
Average_fixed_raters           0.54

 Number of subjects = 1812     Number of Judges =  3
See the help file for a discussion of the other 4 McGraw and Wong estimates,
=== Cronbach's Alpha ===
 raw_alpha std.alpha   G6(smc) average_r     S/N        ase     mean       sd
 0.4968543 0.5089252 0.4170259 0.2567542 1.03635 0.02046639 93.19224 5.366181
 median_r
 0.238058
```

```r
agreement_analysis_by_group(d_fact_wide_by_round, group_var = "round")
```

```
Grand ICC:
Call: psych::ICC(x = select(d, -!!group_sym))

Intraclass correlation coefficients
                         type  ICC   F  df1  df2       p lower bound
Single_raters_absolute   ICC1 0.23 1.9 1811 3624 1.2e-60        0.20
Single_random_raters     ICC2 0.24 2.0 1811 3622 5.6e-68        0.21
Single_fixed_raters      ICC3 0.25 2.0 1811 3622 5.6e-68        0.22
Average_raters_absolute ICC1k 0.48 1.9 1811 3624 1.2e-60        0.43
Average_random_raters   ICC2k 0.49 2.0 1811 3622 5.6e-68        0.44
Average_fixed_raters    ICC3k 0.50 2.0 1811 3622 5.6e-68        0.46
                        upper bound
Single_raters_absolute         0.26
Single_random_raters           0.27
Single_fixed_raters            0.28
Average_raters_absolute        0.52
Average_random_raters          0.53
Average_fixed_raters           0.54
```

```
 Number of subjects = 1812     Number of Judges =  3
See the help file for a discussion of the other 4 McGraw and Wong estimates,
Individual ICCs (ICC2k):
# A tibble: 4 x 10
# Groups:   round [4]
  round   icc_name          type    ICC     F   df1   df2        p `lower bound`
  <ord>   <chr>             <chr> <dbl> <dbl> <dbl> <dbl>    <dbl>         <dbl>
1 Round 1 Average_random_r~ ICC2k 0.359  1.66   652  1304 7.63e-15         0.246
2 Round 2 Average_random_r~ ICC2k 0.401  1.69   578  1156 4.73e-14         0.311
3 Round 3 Average_random_r~ ICC2k 0.542  2.20   364   728 1.47e-19         0.455
4 Round 4 Average_random_r~ ICC2k 0.421  1.74   214   428 6.82e- 7         0.275
# i 1 more variable: `upper bound` <dbl>

mean ICCs (ICC):
# A tibble: 1 x 3
  mean_icc2k min_icc2k max_icc2k
       <dbl>     <dbl>     <dbl>
1      0.431     0.359     0.542

Cronbach's Alpha:
# A tibble: 4 x 10
# Groups:   round [4]
  round   raw_alpha std.alpha `G6(smc)` average_r `S/N`    ase  mean    sd
  <ord>       <dbl>     <dbl>     <dbl>     <dbl> <dbl>  <dbl> <dbl> <dbl>
1 Round 1     0.399     0.447     0.360     0.213 0.810 0.0383  90.9  3.89
2 Round 2     0.408     0.429     0.334     0.200 0.750 0.0414  93.6  5.86
3 Round 3     0.545     0.548     0.459     0.288 1.21  0.0380  95.2  5.34
4 Round 4     0.427     0.456     0.361     0.218 0.838 0.0657  95.8  5.12
# i 1 more variable: median_r <dbl>
```

```r
# average across models
d_fact_ave <- d_fact %>%
  group_by(ResponseId, round, round_num, text) %>%
  summarise(accuracy = mean(rating)) %>%
  ungroup()

# likilihood of being factual claim reduces throughout rounds
trt_n <- d |> filter(condition == "conv_treatment") |> nrow()
d_fact_ave |>
  count(round) |>
  mutate(pct = n / trt_n * 100)
```

```
# A tibble: 4 x 3
  round       n   pct
  <ord>   <int> <dbl>
1 Round 1   653  99.1
2 Round 2   579  87.9
3 Round 3   365  55.4
4 Round 4   215  32.6
```

```r
## get factual accuracy over rounds
d_fact_ave |>
  group_by(round) %>%
  summarise(mean = mean(accuracy),
```

```r
            sd = sd(accuracy),
            n = n(),
            se = sd/sqrt(n),
            min = min(accuracy),
            max = max(accuracy),
  ) |>
  ungroup()
```

```
# A tibble: 4 x 7
  round    mean    sd     n    se   min   max
  <ord>   <dbl> <dbl> <int> <dbl> <dbl> <dbl>
1 Round 1  90.9  3.89   653 0.152  68.3  98.3
2 Round 2  93.6  5.86   579 0.244  60   100
3 Round 3  95.2  5.34   365 0.279  60   100
4 Round 4  95.8  5.12   215 0.350  66.7 100
```

```r
# model this increase over time
# linearly, reported in paper (but same general result regardless of specification)
d_fact_ave |> lm(accuracy ~ round_num, data = _) |> summary()
```

```

Call:
lm(formula = accuracy ~ round_num, data = d_fact_ave)

Residuals:
    Min      1Q  Median      3Q     Max 
-34.838  -1.624   0.400   3.495   7.067 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept)  89.4801     0.2704  330.87   <2e-16 ***
round_num     1.7861     0.1169   15.28   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 5.052 on 1810 degrees of freedom
Multiple R-squared:  0.1142,	Adjusted R-squared:  0.1137 
F-statistic: 233.3 on 1 and 1810 DF,  p-value: < 2.2e-16
```

```r
## as successive differences (adjacent category comparison)
d_fact_ave |>
  within(contrasts(round) <- MASS::contr.sdif(nlevels(round))) |>
  lm(accuracy ~ round, data = _) |>
  summary()
```

```

Call:
lm(formula = accuracy ~ round, data = within(d_fact_ave, contrasts(round) <- MASS::contr.sdif(nlevels(round))))

Residuals:
    Min      1Q  Median      3Q     Max 
-35.181  -1.917   0.778   3.153   7.445 
```

```
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  93.8531     0.1298 723.316  < 2e-16 ***
round2-1      2.6956     0.2871   9.389  < 2e-16 ***
round3-2      1.5971     0.3361   4.751 2.18e-06 ***
round4-3      0.5789     0.4324   1.339    0.181
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 5.029 on 1808 degrees of freedom
Multiple R-squared:  0.123,	Adjusted R-squared:  0.1216
F-statistic: 84.55 on 3 and 1808 DF,  p-value: < 2.2e-16
```

```
# now with quadratic term
d_fact_ave |> lm(accuracy ~ round_num + I(round_num^2), data = _) |> summary()
```

```
Call:
lm(formula = accuracy ~ round_num + I(round_num^2), data = d_fact_ave)

Residuals:
    Min      1Q  Median      3Q     Max
-35.195  -1.908   0.776   3.138   7.442

Coefficients:
               Estimate Std. Error t value Pr(>|t|)
(Intercept)     87.1433     0.6102 142.803  < 2e-16 ***
round_num        4.2794     0.5958   7.182 9.96e-13 ***
I(round_num^2)  -0.5318     0.1246  -4.267 2.08e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 5.028 on 1809 degrees of freedom
Multiple R-squared:  0.123,	Adjusted R-squared:  0.1221
F-statistic: 126.9 on 2 and 1809 DF,  p-value: < 2.2e-16
```

```
## get overall totals
d_fact_ave |>
  summarise(
    mean = mean(accuracy),
    sd = sd(accuracy),
    n = n(),
    min = min(accuracy),
    max = max(accuracy)
  )
```

```
# A tibble: 1 x 5
   mean    sd     n   min   max
  <dbl> <dbl> <int> <dbl> <dbl>
1  93.2  5.37  1812    60   100
```

```r
## NOW lets get one accuracy per conversation, to get overall correlation with donation change
d_fact_subj_ave <- d_fact_ave %>%
  group_by(ResponseId) %>%
  summarise(accuracy = mean(accuracy)) %>%
  ungroup()

d_acc <- d |>
  select(ResponseId, cents_to_amf_change, cents_to_amf_pre, cents_to_amf_pre_cat, cents_to_amf_post) |>
  inner_join(d_fact_subj_ave, by = "ResponseId")

## regressions
estimatr::lm_robust(cents_to_amf_change ~ accuracy, data = d_acc) ## sig just by itself -- reported in paper
```

```
               Estimate Std. Error   t value   Pr(>|t|)     CI Lower  CI Upper
(Intercept) -37.7967950  21.242732 -1.779281 0.07566014 -79.50933534 3.9157453
accuracy      0.5404142   0.230214  2.347443 0.01920132   0.08836265 0.9924658
             DF
(Intercept) 651
accuracy    651
```

```r
estimatr::lm_robust(cents_to_amf_change ~ accuracy + cents_to_amf_pre_cat, data = d_acc) ## also sig when controlling for pre
↪  score.
```

```
                              Estimate Std. Error    t value     Pr(>|t|)
(Intercept)                -33.2061118 21.1321526 -1.5713549 1.165906e-01
accuracy                     0.5023934  0.2274136  2.2091612 2.751412e-02
cents_to_amf_pre_cat10-Jan  16.8706903  6.9340636  2.4330164 1.524434e-02
cents_to_amf_pre_cat20-Nov   9.3932582  4.5401019  2.0689532 3.894829e-02
cents_to_amf_pre_cat21-30   -1.6307244  2.7974219 -0.5829383 5.601386e-01
cents_to_amf_pre_cat31-40    2.1500650  4.4728549  0.4806919 6.308985e-01
cents_to_amf_pre_cat41-50   -3.1449275  1.8917566 -1.6624377 9.691090e-02
cents_to_amf_pre_cat51-100 -14.5469792  2.4516401 -5.9335703 4.838010e-09
                               CI Lower   CI Upper  DF
(Intercept)                -74.70223610  8.2900126 645
accuracy                     0.05583288  0.9489538 645
cents_to_amf_pre_cat10-Jan   3.25462513 30.4867554 645
cents_to_amf_pre_cat20-Nov   0.47809287 18.3084235 645
cents_to_amf_pre_cat21-30   -7.12387844  3.8624296 645
cents_to_amf_pre_cat31-40   -6.63305082 10.9331808 645
cents_to_amf_pre_cat41-50   -6.85967291  0.5698180 645
cents_to_amf_pre_cat51-100 -19.36113921 -9.7328192 645
```

12 Figures

12.1 Charity Descriptive Plot

```r
# charity descriptives plot

## charites plot?
top10 <- d |>
```

```r
  drop_na(charity_name_final) |>
  count(charity_name_final) |>
  arrange(desc(n)) |>
  head(n = 10) |>
  pull(charity_name_final)

# 1) Compute overall counts and total mentions
overall_counts <- d %>%
  drop_na(charity_name_final) %>%
  count(charity_name_final, sort = TRUE)

total_mentions <- sum(overall_counts$n)

# 2) Keep top 10
top_df <- overall_counts %>%
  slice_head(n = 10) %>%                      # top 10 by n
  mutate(
    prop  = n / total_mentions,               # proportion of all mentions
    short = dplyr::recode(charity_name_final, !!!short_names)
  )

charity_tab <-
  top_df %>%
  mutate(
    charity = short,
    prop = scales::percent(prop, accuracy = 0.1),
  ) |>
  select(charity, prop)

charity_tab_gt <-
  charity_tab |>
  gt() |>
  tab_header(
    title = "Top 10 Favorite Charities"
  ) |>
  cols_label(
    charity = "Charity",
    prop = "Proportion of Sample"
  ) |>
  fmt_percent(
    columns = vars(prop),
    decimals = 1
  ) |>
  tab_options(
    table.font.size = px(10),
    data_row.padding = px(2.5)
  )

# 3) Plot percentages
charity_plot <- ggplot(top_df, aes(x = fct_reorder(short, prop), y = prop)) +
  geom_col(fill = "steelblue") +
  scale_y_continuous(
    labels    = scales::percent_format(accuracy = 0.1),
    expand    = expansion(mult = c(0, 0.05))
```

```
  ) +
  labs(
    x     = "Charity",
    y     = "Proportion"
  ) +
  theme_bw()

## population plot
pop_plot <- pop2_counts |>
  filter(count >= 20) |>
  filter(population_area != "adults") |>
  ggplot(
    aes(x = reorder(population_area, count), y = count, fill = amf_blue)
  ) +
  geom_col() +
  coord_flip() +
  labs(
    x = "Population served",
    y = "Count",
    title = "Population served by chosen favorite charities"
    ) +
  scale_x_discrete(labels = clean_names) +
  theme_bw()  +
  theme(
    panel.grid.major.y = element_blank(),
    panel.grid.minor.y = element_blank(),
    axis.title.y = element_blank()
  ) +
  scale_fill_identity()


## subject plot
subject_plot <- subj1_counts |>
  ggplot(
    aes(x = reorder(subject_area, count), y = count,
        fill = amf_blue
        # fill = ifelse(
        #   subject_area == "health",
        #   amf_red,
        #   amf_blue
        #)
      )
    ) +
  geom_col() +
  scale_x_discrete(labels = clean_names) +
  coord_flip() +
  labs(
    x = "Subject area",
    y = "Count",
    title = "Cause area of chosen favorite charities") +
  theme_bw() +
  theme(
    panel.grid.major.y = element_blank(),
    panel.grid.minor.y = element_blank(),
```

```
    axis.title.y = element_blank()
  ) +
  scale_fill_identity()


## where plot (could probably inset this on3
where_plot <- d_where |>
  ggplot(
    aes(x = location_cat3,
        fill = amf_blue
        # fill = ifelse(
        #    location_cat3 == "International" & !is.na(location_cat3),
        #    amf_red,
        #    amf_blue
        #  )
        )
    ) +
  geom_bar(aes(y = after_stat(count/sum(count)))) +
  #geom_bar() + #for count
  scale_y_continuous(
    labels = scales::percent_format(accuracy = 1),
    expand = expansion(mult = c(0, 0.05))
  ) +
  labs(title = "Where do the charities operate?",
       x = NULL,
       y = NULL) +
  theme_bw() +
  theme(
    title = element_text(size = 10),
    panel.grid = element_blank(),
    axis.title.x = element_blank()
    ) +
  scale_fill_identity()



## size plot?
d_size <- d |>
  select(ResponseId, condition, starts_with("cents_to_amf"), ein, revenue)

size_plot <- ggplot(d_size, aes(x = revenue)) +
  stat_bin(
    bins = 15,
    aes(
     #fill = ifelse(after_stat(x) > 5e7 & after_stat(x) < 6.5e7, amf_red, amf_blue)
     fill = amf_blue
    ),
    geom = "bar",
    show.legend = FALSE
  ) +
  scale_fill_identity() +
  scale_x_log10(
    breaks = scales::breaks_log(n = 7),
    labels = scales::label_number(
```

```
      scale_cut = scales::cut_short_scale(),
      prefix = "$",
      accuracy = 1
    )
  ) +
  labs(
    title = "Charity size",
    x = "Charity 2024 Revenue (log10)",
    y = "Count"
  )

### NOW LETS PUT IT ALL TOGETHER

p1 <- subject_plot +
  #inset_element(charity_plot, .1, .1, 1, .9)
  inset_element(charity_tab_gt, .35, .20, .975, .75)

p2 <- pop_plot +
  inset_element(where_plot, .23, 0.025, .975, .55)



# —— 1) Shared theme ————————————————————————————————————————————————————————————
shared_theme <- theme(
  plot.title = element_text(size = 10),
  axis.title = element_text(size = 8.5),
  axis.text  = element_text(size = 7),
  plot.tag.position = c(0.0, 0.95),  # top-left corner
  plot.tag = element_text(size = 10, hjust = 0, vjust = 0, face = "bold"),
  panel.grid = element_blank()
)

# —— 2) Read & style the JPEG logo ———————————————————————————————————————————————
img <- jpeg::readJPEG("logo_amf.jpg")
img_grob <- rasterGrob(
  img,
  x      = unit(0.20, "npc"),    # 2% in from left
  y      = unit(0.90, "npc"),
  just = c("left", "top")  # align top-left
  #width  = unit(1, "npc"),        # fill its cell
  #height = unit(1, "npc"),
  #just   = c("left", "top")       # align top-left
)

# colours from logo
amf_blue <- "#0193CF"
amf_red <- "#CB1031"


# —— 3) Build your rich HTML text ———————————————————————————————————————————————
info_html <- paste0(
  "<b>Against Malaria Foundation (AMF)</b><br/>",
  "<i>“We fund and provide long-lasting insecticidal<br/>",
  "nets to protect those at risk from malaria.”</i><br/>",
```

```
  "<b>Cause area</b>: Health<br/>",
  "<b>Population</b>: People with diseases and illnesses<br/>",
  "<b>Operation</b>: Internationally<br/>",
  "<b>Size (2024 Revenue)</b>: $62.3M"
)

info_txt <- paste0(
  "**Against Malaria Foundation (AMF)**\n\n",
  "_“We fund and provide long-lasting insecticidal nets  \n",
  "to protect those at risk from malaria.”_\n\n",
  "**Cause area**: Health  \n",
  "**Population**: People with diseases and illnesses  \n",
  "**Operation**: Internationally  \n",
  "**Size (2024 Revenue)**: $62.3M"
)

text_grob <- richtext_grob(
  info_html,
  x      = unit(0.05, "npc"),
  y      = unit(0.5, "npc"),
  hjust  = 0,
  vjust  = 0.5,
  halign = 0,  # left-align text
  align_widths = TRUE,  # align text width
  gp     = gpar(fontsize = 8, lineheight = 1.1)  # smaller text
)

# —— 4) Arrange image + text in 1:4 ratio with null units ———————————————————————
info_inner <- arrangeGrob(
  img_grob,
  nullGrob(), # spacer column
  text_grob,
  ncol   = 3,
  widths = unit(c(1, 0.05, 4), "null"),  # 0.05 = small space
  heights = unit(1, "null")
)

# —— 5) Draw a white background + border around that two-column block ——————————
#info_bordered <- grobTree(
#  rectGrob(gp = gpar(fill = "white", col = "black", lwd = 0.8)),
#  info_inner
#)

# —— 6) Turn into one patchwork element ————————————————————————————————————————
info_elem <- wrap_elements(full = info_inner)


# plot altgether
plots <- list(
  A = p1,
  B = p2,
  C = free(size_plot),
  D = free(info_elem)
)
```

```r
final_plot <- wrap_plots(
  plots,
  design  = "
    AA
    BB
    CD
  ",
  heights = c(2.5, 2.5, 1),
  widths  = c(1, 4) # this only works on the aligned part of the plots, not the whole space!
) +
  plot_annotation(tag_levels = "A") &
  shared_theme

final_plot
```

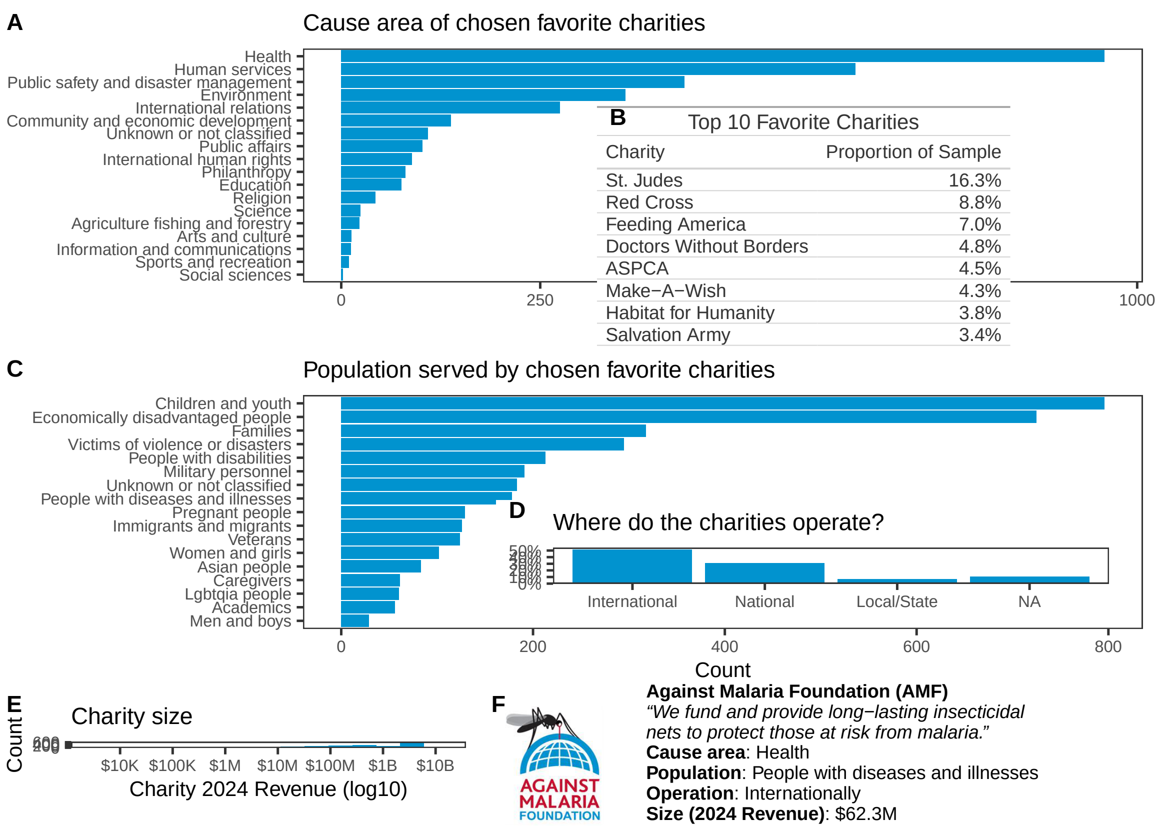


Figure 1: Figure 2: Charity descriptive statistics

```r
# —— 9) Save ————————————————————————————————————————————————————————————————————
ggsave("output/figures/charity_descriptive_plot_no_adults.png",
       final_plot,
       width  = 6.25, # max width according to NHB is 7.1
       height = 7.1,
       dpi    = FIGURE_DPI,
       create.dir = TRUE
)
```

12.2 Motivation Plots

```r
# Add long label to your dataframe
m_dat_long <- m_dat %>%
  pivot_longer(AwarenessOfNeed:Efficacy, names_to = "variable", values_to = "value") |>
  filter(variable != "DoesntGive") %>%
  mutate(
    label = fct_rev(factor(variable)),
    label_formatted = fct_rev(factor(glue(
      "**{variable}**\n<span style='font-weight:normal; font-size:9pt'>{MOTIVATION_DESCRIPTIONS[variable]}</span>"
    ), levels = unique(variable)))
  )

# 1.  Build HTML labels with <b> and <br>
label_map <- imap_chr(MOTIVATION_DESCRIPTIONS, ~ {
  clean_name <- str_to_sentence(str_replace_all(.y, "(?<=[a-z])(?=[A-Z])", " "))
  paste0(
    "<b>", clean_name, "</b><br>",
    "<span style='font-size:8pt;'>", .x, "</span>"
  )
})
# Ensure names(label_map) match your factor levels

# 3. Plot
m_dat_long %>%
  filter(variable != "DoesntGive") %>%
  mutate(variable = factor(variable, levels = names(label_map))) %>%
  ggplot(aes(x = value, y = variable)) +
  stat_histinterval(
    point_interval = "mean_qi",
    breaks         = seq(0.75, 5.25, by = 0.5),
    slab_color     = NA,
    fill           = amf_blue,
    alpha          = 0.9,
    linewidth      = 2,
    size           = 3,
    .width         = 0.5,
    interval_color = NA # REMOVE interavl
  ) +
  scale_y_discrete(
    labels = label_map,
    expand = expansion(add = c(0.5, 0))
```

```r
) +
scale_x_continuous(
  breaks = seq(1, 5, 1),
  expand = expansion(add = c(0.25, 0.25))
) +
labs(
  x     = "Rating",
  y     = NULL#,
  #title = "Distribution of Motivation Ratings (Histogram Slabs)"
) +
theme_bw(base_size = 11) +
theme(
  axis.text.y      = element_markdown(lineheight = 0.9),
  plot.title       = element_text(face = "bold", size = 13, margin = margin(b = 4)),
  panel.grid.major = element_blank(),
  panel.grid.minor = element_blank()
)
```

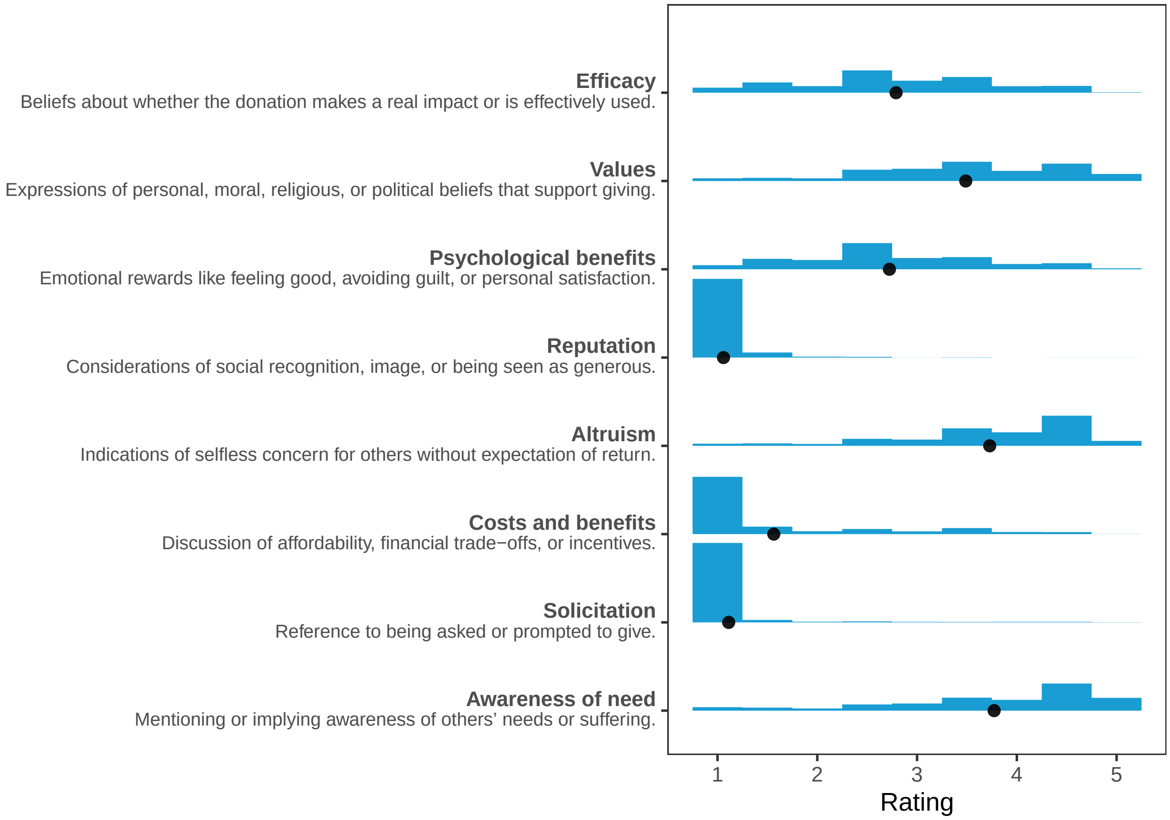


Figure 2: Figure S1: Motivation analysis plots

```
ggsave(
  filename = "output/figures/motivation-descriptives.png",
  width    = 7,
  height   = 3.5,
  dpi      = FIGURE_DPI
)
```

12.3 Main Treatment Effects Plot

```
# main plot

# Define condition labels
cond_names <- c(
  control = "Control conversation",
  static_treatment = "Static message",
  conv_treatment = "Persuasive LLM conversation"
)

cond_names_short <- c(
  control = "Control",
  static_treatment = "Static Msg",
  conv_treatment = "LLM Conv."
)

# --- Create Individual Plots ---
# --- Plot A, change by condition ---
a <- plot_predictions(
  lm_robust(cents_to_amf_change ~ condition * cents_to_amf_pre, data = d),
  by = c("condition"),
  newdata = "balanced",
) +
  aes(color = condition, fill = condition) +
  labs(
    x = NULL,
    color = "Condition",
    fill = "Condition",
    y = "Donation change"
  ) +
  scale_x_discrete(labels = cond_names_short) +
  scale_y_continuous(
    labels = scales::label_number(suffix = "c")
  ) +
  geom_hline(yintercept = 0, linetype = "dashed") +
  coord_flip() +
  guides(color = guide_legend(reverse = TRUE), fill = guide_legend(reverse = TRUE)) +
  theme(
    #panel.grid.major.y = element_blank(),
    legend.position = "bottom"
    )

## Plot B, change by pre (binned)
```

```r
nl_preds <- plot_predictions(
  lm_robust(cents_to_amf_change ~ condition * cents_to_amf_pre_cat, data = d),
  by = c("cents_to_amf_pre_cat", "condition"),
  newdata = "balanced",
  draw = FALSE
) |>
  ggplot(
    aes(x = cents_to_amf_pre_cat,
        y = estimate, ymin = conf.low, ymax = conf.high,
        colour = condition, fill = condition)
  ) +
  geom_pointrange(size = 0.25, position = position_dodge(width = 0.25), show.legend = FALSE) +
  geom_hline(yintercept = 0, linetype = "dashed") +
  labs(
    x = "Pre-treatment donation to AMF",
    y = "Donation change"
  ) +
  scale_y_continuous(
    labels = scales::label_number(suffix = "c")
  ) +
  scale_x_discrete(labels = function(x) paste0(x, "c")) +
  ggsci::scale_color_locuszoom(labels = cond_names) +
  ggsci::scale_fill_locuszoom(labels = cond_names) +
  theme(
    panel.grid.major.x = element_blank(),
    plot.margin = margin(0, 0, 0, 0)
    )

# get n counts and have histogram
n_counts <- d %>%
  count(cents_to_amf_pre_cat) %>%
  mutate(label = paste0("n = ", n))

histogram_plot <- ggplot(n_counts, aes(x = as.factor(cents_to_amf_pre_cat), y = n)) +
  geom_bar(stat = "identity", fill = "darkgray", alpha = 0.4) +
  theme_void() +
  theme(axis.text.x = element_blank(), axis.ticks.x = element_blank())  +
  geom_text(
    data = n_counts,
    aes(label = label),
    y = 100,
    size = 2.5
  ) +
  theme(plot.margin = margin(0, 0, 0, 0))

b <- (histogram_plot /
        (nl_preds + plot_layout(tag_level = "new"))
) +
  plot_layout(heights = c(0.3, 1))




# --- Apply Consistent Scales After Creating Plots ---
```

```r
color_scale <- ggsci::scale_color_locuszoom(labels = cond_names)
fill_scale <- ggsci::scale_fill_locuszoom(labels = cond_names)

a <- a + color_scale + fill_scale
b <- b + color_scale + fill_scale
l <- guide_area() # specify legend space

# --- Arrange Plots in Patchwork ---

# Define layout
design <- "
ABB
LLL
"


# Combine plots with shared legend
final_plot <- wrap_plots(a, b, l, design = design) +
  plot_annotation(tag_levels = "A") +
  plot_layout(guides = "collect", heights = c(1, 0.1)) &
  theme(
    panel.grid = element_blank(),
    plot.tag.position = c(0.0, 0.95),  # top-left corner
    plot.tag = element_text(size = 10, hjust = 0, vjust = 0, face = "bold")
  )

final_plot
```

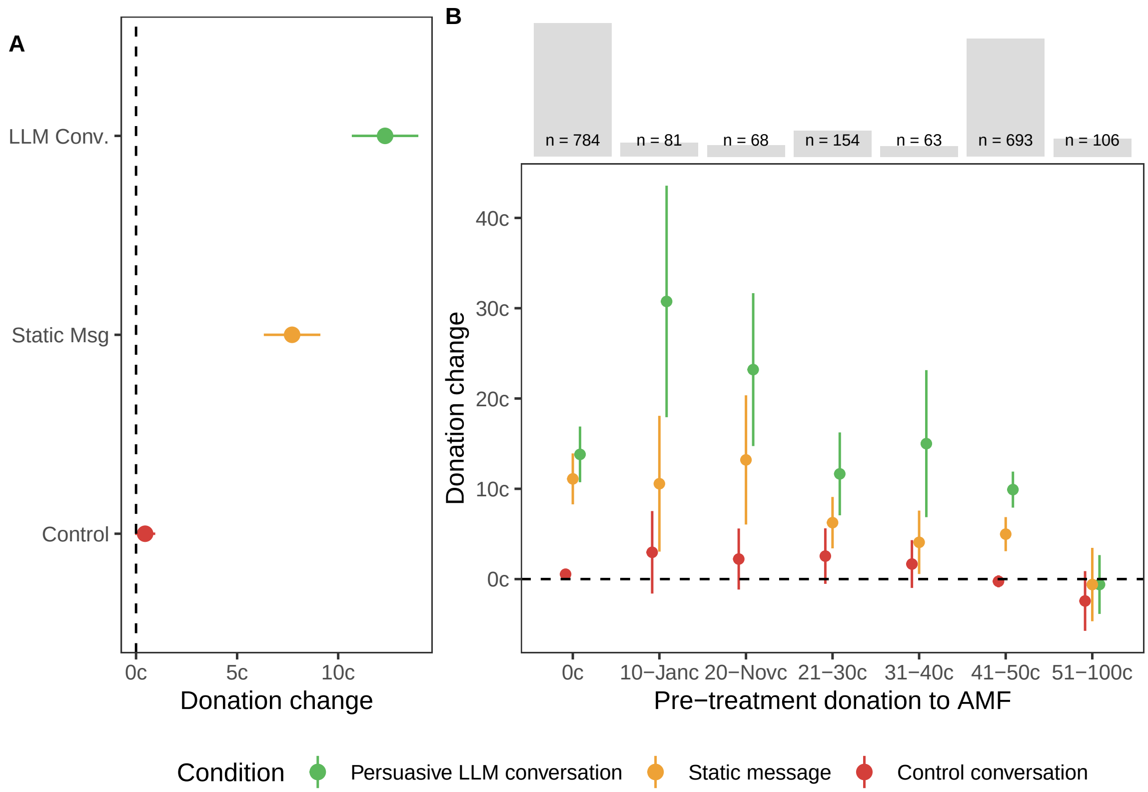


Figure 3: Figure 3: Main treatment effects

```
shared_theme <- theme(
  plot.title = element_text(size = 10),
  axis.title = element_text(size = 8.5),
  axis.text  = element_text(size = 7),
  plot.tag.position = c(0.0, 0.95),  # top-left corner
  plot.tag = element_text(size = 10, hjust = 0, vjust = 0, face = "bold"),
  panel.grid = element_blank()
)

# Save and Display
ggsave(
  "output/figures/main_plot.png",
   final_plot, width = FIGURE_WIDTH, height = 3, units = "in", dpi = FIGURE_DPI
)
```

12.4 Categorical Heterogeneity Plot

```
#categorical heterogeneity plot


# ─────────────────────────────────────────────────────────────────────────────
# POSITION PARAMETERS FOR SIG DIFFERENCES (fractions of panel CI-range)
initial_offset_frac  <- 0.05  # how far beyond the max CI the first bracket stem sits
bracket_spacing_frac <- 0.04  # spacing between successive bracket stems
leg_length_frac      <- 0.02  # horizontal “leg” tick length
symbol_offset_frac   <- 0.5  # distance from the bracket stem to the star
symbol_size <- 1.5
# ─────────────────────────────────────────────────────────────────────────────



## FOR CHARITY HETEROGENEITY
df_plot <- char_het$comparisons |>
  filter(contrast == "mean(conv_treatment) - mean(control)") |>
  mutate(
    charity_fct = fct_reorder(charity_fct, estimate, \(x) median(abs(x))),
    #charity_fct = fct_rev(charity_fct),
    contrast = factor(contrast, levels = unique(contrast))
  )

manual_p <- char_cate_comparisons %>%
  tidyr::extract(
    term,
    into = c("group1","group2"),
    regex = "^\\((.+)\\)\\s*-\\s*\\((.+)\\)$"
  ) %>%
  mutate(
    contrast = "mean(conv_treatment) - mean(control)",
    code1 = as.integer(factor(group1, levels = levels(df_plot$charity_fct))),
    code2 = as.integer(factor(group2, levels = levels(df_plot$charity_fct))),
    group1 = factor(levels(df_plot$charity_fct)[pmax(code1, code2)],
                    levels = levels(df_plot$charity_fct)),
    group2 = factor(levels(df_plot$charity_fct)[pmin(code1, code2)],
                    levels = levels(df_plot$charity_fct))
  ) |>
  select(-code1, -code2) |>
  mutate(
    p_str  = as.character(p.value),
    p_num  = readr::parse_number(p_str),
    signif = case_when(
      str_detect(p_str, "^<") & p_num <= 0.001 ~ "***",
      p_num < 0.001                           ~ "***",
      p_num < 0.01                            ~ "**",
      p_num < 0.05                            ~ "*",
      p_num < 0.1                             ~ "+",
      TRUE                                    ~ NA_character_
    ),
    shape = case_when(
      p_num < 0.001        ~ "triangle",
```

```
      p_num < 0.01         ~ "square",
      p_num < 0.05         ~ "circle",
      p_num < 0.10         ~ "diamond",
      TRUE             ~ NA_character_
    )
  ) %>%
  filter(!is.na(signif)) %>%
  mutate(
    contrast = factor(contrast, levels = levels(df_plot$contrast)),
    y1       = as.numeric(factor(group1, levels = levels(df_plot$charity_fct))),
    y2       = as.numeric(factor(group2, levels = levels(df_plot$charity_fct))),
    y        = (y1 + y2) / 2
  ) %>%
  group_by(contrast) |>
  arrange(desc(group1), desc(group2)) %>%
  mutate(idx = row_number()) %>%
  ungroup()

# 4. Compute per-panel CI stats & scaled offsets
panel_info <- df_plot %>%
  group_by(contrast) %>%
  summarise(
    max_hi = max(conf.high),
    min_lo = min(conf.low)
  ) %>%
  mutate(
    range           = max_hi - min_lo,
    offset          = initial_offset_frac  * range,
    spacing         = bracket_spacing_frac * range,
    leg_length      = leg_length_frac      * range,
    symbol_offset   = symbol_offset_frac   * range
  )

# 5. Join & turn those fractions into absolute positions
manual_p <- manual_p %>%
  left_join(panel_info, by = "contrast") %>%
  mutate(
    x_start   = max_hi + offset,
    x         = x_start + (idx - 1) * spacing,
    x_leg_end = x - leg_length,
    labelx    = x + symbol_offset
  )

# 6. Plot everything
p1 <- ggplot(df_plot, aes(x = estimate, y = charity_fct, color = contrast)) +
  # forest plot
  geom_point(position = position_dodge(0.4)) +
  geom_linerange(aes(xmin = conf.low, xmax = conf.high),
                position = position_dodge(0.4)) +
  geom_vline(xintercept = 0, linetype = "dashed") +
  facet_wrap(~contrast, ncol = 1,
             labeller = labeller(contrast = comparison_names_cate)) +
  scale_color_manual(
    values = contrast_colors,
```

```
    labels = comparison_names_short
  ) +
  scale_y_discrete(labels = short_names) +
  labs(x = "Conditional Average Treatment Effect (95% CI)", y = NULL) +
  theme(legend.position = "bottom") +
  # bracket stems
  geom_segment(data = manual_p,
               aes(x = x, xend = x, y = y1, yend = y2),
               inherit.aes = FALSE) +
  # inward legs
  geom_segment(data = manual_p,
               aes(x = x, xend = x_leg_end, y = y1, yend = y1),
               inherit.aes = FALSE) +
  geom_segment(data = manual_p,
               aes(x = x, xend = x_leg_end, y = y2, yend = y2),
               inherit.aes = FALSE) +
  # stars
  geom_text(data = manual_p,
            aes(x = x, y = y, label = signif),
            inherit.aes = FALSE,
            hjust = 0.5, vjust = 0.25, size = 4)
  #shapes
  # geom_point(
  #   data      = manual_p,
  #   aes(x = x, y = y, shape = shape),
  #   inherit.aes = FALSE,
  #   size      = symbol_size
  # ) +
  # scale_shape_manual(
  #   values = c(
  #     circle   = 16,  # filled circle
  #     square   = 15,  # filled square
  #     triangle = 17,   # filled triangle-up
  #     diamond  = 18    # filled diamond
  #   ),
  #   na.translate = FALSE
  # )


## LOCATION HETEROGENEITY

# 2. Prepare forest-plot data
df_plot <- loc_het$comparisons %>%
  filter(contrast == "mean(conv_treatment) - mean(control)") %>%
  mutate(
    location = fct_rev(location_cat3),
    contrast = factor(contrast, levels = unique(contrast))
  )

# 3. Parse & filter only within-contrast significant tests
manual_p <- loc_cate_comparisons %>%
  tidyr::extract(
    term,
    into = c("contrast1","group1","contrast2","group2"),
```

```r
    regex = "^\\(([^,]+), ([^)]+)\\) - \\(([^,]+), ([^)]+)\\)$"
  ) %>%
  filter(contrast1 == contrast2) %>%
  rename(contrast = contrast1) %>%
  mutate(
    p_str  = as.character(p.value),
    p_num  = readr::parse_number(p_str),
    signif = case_when(
      str_detect(p_str, "^<") & p_num <= 0.001 ~ "***",
      p_num < 0.001                           ~ "***",
      p_num < 0.01                            ~ "**",
      p_num < 0.05                            ~ "*",
      p_num < 0.1                             ~ "+",
      TRUE                                    ~ NA_character_
    ),
    shape = case_when(
      p_num < 0.001        ~ "triangle",
      p_num < 0.01         ~ "square",
      p_num < 0.05         ~ "circle",
      p_num < 0.10         ~ "diamond",
      TRUE             ~ NA_character_
    )
  ) %>%
  filter(!is.na(signif)) %>%
  mutate(
    contrast = factor(contrast, levels = levels(df_plot$contrast)),
    y1       = as.numeric(factor(group1, levels = levels(df_plot$location))),
    y2       = as.numeric(factor(group2, levels = levels(df_plot$location))),
    y        = (y1 + y2) / 2
  ) %>%
  group_by(contrast) %>%
  mutate(idx = row_number()) %>%
  ungroup()

# 4. Compute per-panel CI stats & scaled offsets
panel_info <- df_plot %>%
  group_by(contrast) %>%
  summarise(
    max_hi = max(conf.high),
    min_lo = min(conf.low)
  ) %>%
  mutate(
    range           = max_hi - min_lo,
    offset          = initial_offset_frac  * range,
    spacing         = bracket_spacing_frac * range,
    leg_length      = leg_length_frac      * range,
    symbol_offset   = symbol_offset_frac   * range
  )

# 5. Join & turn those fractions into absolute positions
manual_p <- manual_p %>%
  left_join(panel_info, by = "contrast") %>%
  mutate(
    x_start   = max_hi + offset,
```

```
    x         = x_start + (idx - 1) * spacing,
    x_leg_end = x - leg_length,
    labelx    = x + symbol_offset
  )

# 6. Plot everything
p2 <- ggplot(df_plot, aes(x = estimate, y = location, color = contrast)) +
  # forest plot
  geom_point(position = position_dodge(0.4)) +
  geom_linerange(aes(xmin = conf.low, xmax = conf.high),
                 position = position_dodge(0.4)) +
  geom_vline(xintercept = 0, linetype = "dashed") +
  facet_wrap(~contrast, ncol = 1,
             labeller = labeller(contrast = comparison_names_cate)) +
  scale_color_manual(
    values = contrast_colors,
    labels = comparison_names_short
  ) +
  labs(x = "Conditional Average Treatment Effect (95% CI)", y = NULL) +
  theme(legend.position = "bottom") +
  # bracket stems
  geom_segment(data = manual_p,
               aes(x = x, xend = x, y = y1, yend = y2),
               inherit.aes = FALSE) +
  # inward legs
  geom_segment(data = manual_p,
               aes(x = x, xend = x_leg_end, y = y1, yend = y1),
               inherit.aes = FALSE) +
  geom_segment(data = manual_p,
               aes(x = x, xend = x_leg_end, y = y2, yend = y2),
               inherit.aes = FALSE) +
  # stars
  geom_text(data = manual_p,
            aes(x = x, y = y, label = signif),
            inherit.aes = FALSE,
            hjust = -.35, vjust = 0.5, size = 4)

  #shapes
  # geom_point(
  #   data      = manual_p,
  #   aes(x = x, y = y, shape = shape),
  #   inherit.aes = FALSE,
  #   size      = symbol_size
  # ) +
  # scale_shape_manual(
  #   values = c(
  #     circle   = 16,  # filled circle
  #     square   = 15,  # filled square
  #     triangle = 17   # filled triangle-up
  #   ),
  #   na.translate = FALSE
  # )

# PUT TOGETHER
```

```r
(p1 + p2) +
  plot_annotation(tag_levels = "A") +
  plot_layout(guides = "collect", axes = "collect", widths = c(3/3, 1)) &
  geom_hline(yintercept = 0, linetype = "dashed", color = "black") &
  scale_x_continuous(label = scales::label_number(suffix = "c")) &
  theme(
    legend.position = "none",
    #axis.title.x = element_blank(),
    panel.grid = element_blank(),
    #plot.tag.position = c(0.0, 1),  # top-left corner
    plot.tag = element_text(size = 10, vjust = 2, face = "bold")
  )
```

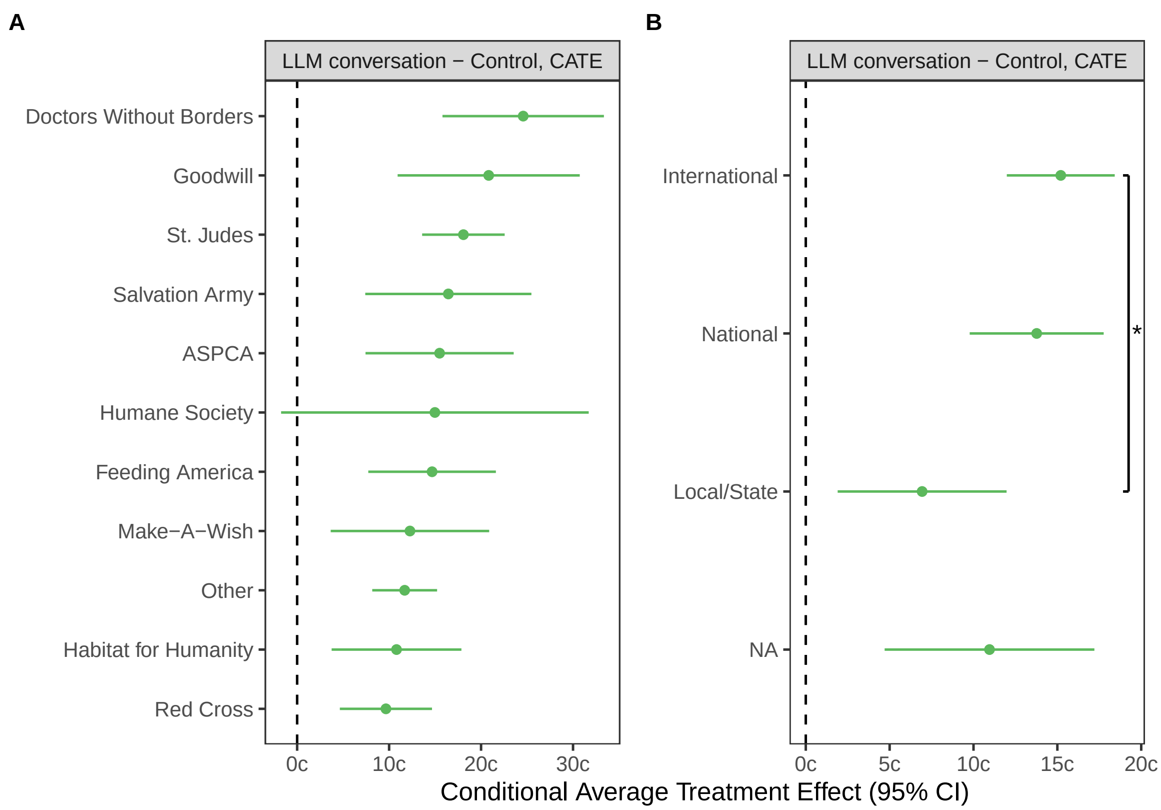


Figure 4: Figure 4: Categorical heterogeneity in treatment effects

```r
ggsave(
  "output/figures/cat_het_cates.png",
  width = FIGURE_WIDTH,
```

```
  height = 3.5
)
```

12.5 Binned Heterogeneity Plot

```
## binned categorical variable plots


subj1_cond$mod |>
  broom::tidy() |>
  dplyr::filter(grepl("^conditionconv_treatment:subj", term)) |>
  mutate(
    cause_area = gsub("conditionconv_treatment:subj_", "", term),
    cause_area = clean_names(cause_area)
  ) |>
  ggplot(aes(x = estimate, y = cause_area)) +
  geom_point() +
  geom_errorbar(aes(xmin = conf.low, xmax = conf.high)) +
  labs(x = "Estimated CATE", y = "Cause Area") +
  theme_minimal()
```

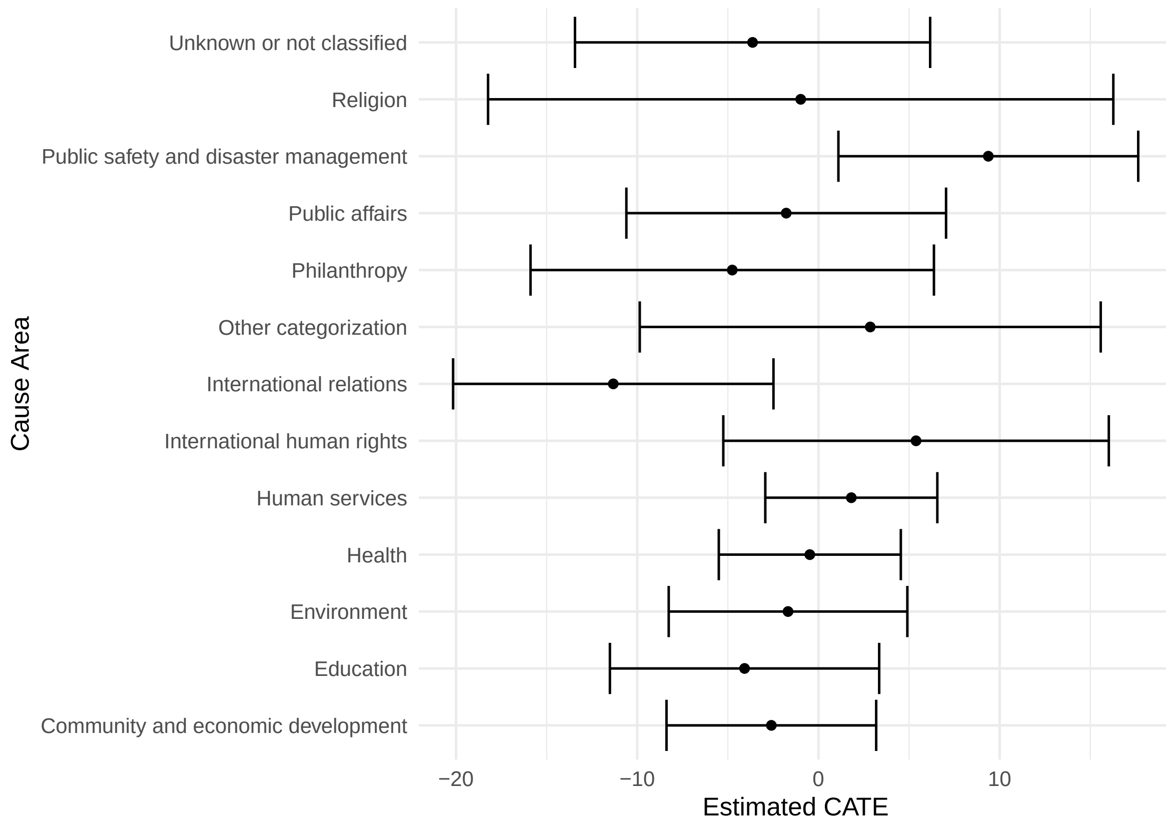


Figure 5: Figure S2: Binned heterogeneity analysis

```
## Profile TEs
# no sig differences between any groups
#subj1_cond$profile_tes_diff
#pop2_cond$profile_tes_diff

p1 <- subj1_cond$profile_tes |>
  filter(contrast == "mean(conv_treatment) - mean(control)") |>
  mutate(
    cause_area = clean_names(gsub("subj_", "",  profile_var)),
    cause_area = fct_reorder(cause_area, estimate)
  ) |>
  ggplot(aes(x = estimate, y = cause_area, color = contrast)) +
  # forest plot
  geom_point() +
  geom_linerange(aes(xmin = conf.low, xmax = conf.high)) +
  geom_vline(xintercept = 0, linetype = "dashed") +
  facet_wrap(~contrast, ncol = 1,
             labeller = labeller(contrast = comparison_names_cate)) +
  scale_color_manual(
    values = contrast_colors,
```

```
    labels = comparison_names_short
  ) +
  labs(
    title = "Treatment Effect Heterogeneity by Charity Cause Area",
    x = "Conditional Average Treatment Effect (95% CI)",
    y = NULL) +
  theme(legend.position = "bottom")
```

```
p2 <- pop2_cond$profile_tes |>
  filter(contrast == "mean(conv_treatment) - mean(control)") |>
  mutate(
    population_served = clean_names(gsub("pop_", "",  profile_var)),
    population_served = fct_reorder(population_served, estimate)
  ) |>
  ggplot(aes(x = estimate, y = population_served, color = contrast)) +
  # forest plot
  geom_point() +
  geom_linerange(aes(xmin = conf.low, xmax = conf.high)) +
  geom_vline(xintercept = 0, linetype = "dashed") +
  facet_wrap(~contrast, ncol = 1,
             labeller = labeller(contrast = comparison_names_cate)) +
  scale_color_manual(
    values = contrast_colors,
    labels = comparison_names_short
  ) +
  labs(
    title = "Treatment Effect Heterogeneity by Charity Population Served",
    x = "Conditional Average Treatment Effect (95% CI)",
    y = NULL) +
  theme(legend.position = "bottom")
```

```
(p1 / p2) +
  plot_annotation(tag_levels = "A") +
  plot_layout(guides = "collect", heights = c(1, 1.5)) & #axis_titles = "collect",
  scale_x_continuous(
    label = scales::label_number(suffix = "c"),
    limits = c(-18, 45),
    breaks = seq(-20, 40, by = 10)
  ) &
  theme(
    legend.position = "none",
    plot.title = element_text(size = 11),
    #axis.title.x = element_blank(),
    panel.grid = element_blank(),
    #plot.tag.position = c(0.0, 1),  # top-left corner
    plot.tag = element_text(size = 10, vjust = 2, face = "bold")
  )
```

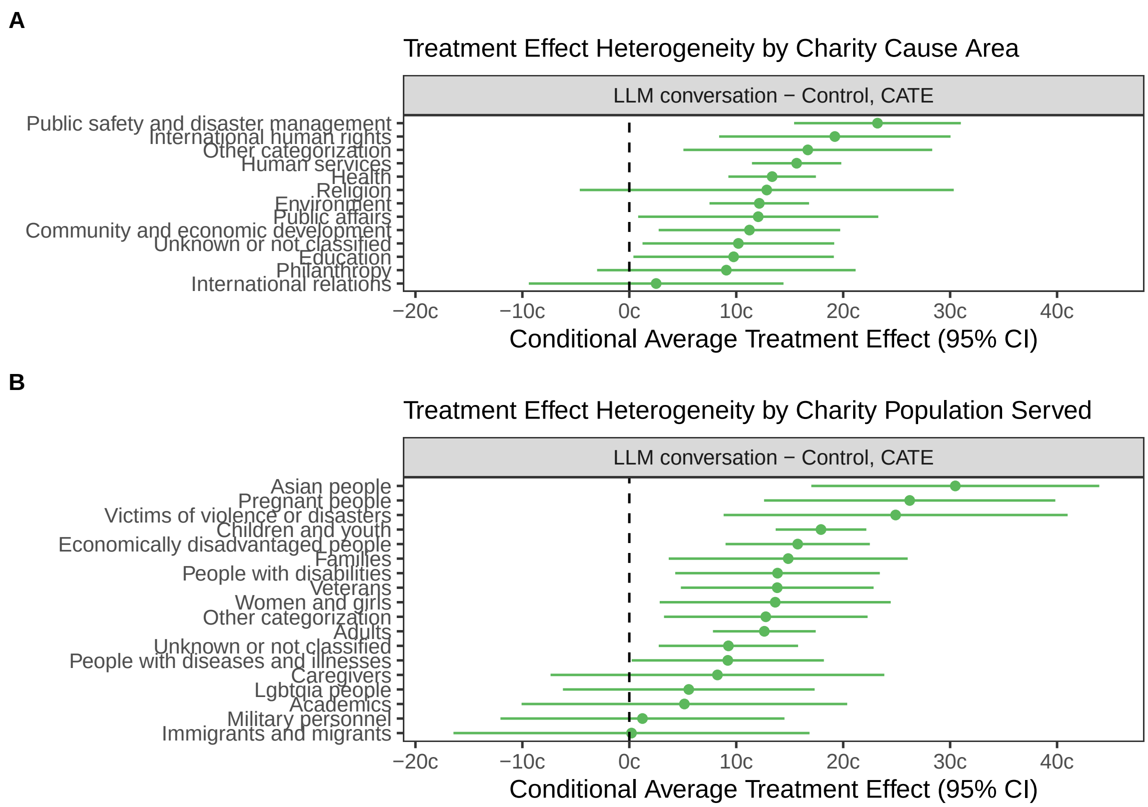


Figure 6: Figure S2: Binned heterogeneity analysis

```
ggsave(
  "output/figures/binned_het_cates.png",
  width = FIGURE_WIDTH,
  height = 6
)
```

12.6 VIP and GAM Plot

```
## causal forest and GAM plot.
##

# do one gam plot to extract legend
plot_w_legend <- run_gam_simple(d, "age", add_hist = FALSE, include_legend = TRUE)$pred_plot +
  theme(legend.position = "bottom")

legend <- cowplot::get_plot_component(plot_w_legend, "guide-box", return_all = TRUE)[[3]]
```

```r
gam_plots <- lapply(gams, function(g) g$pred_plot)
all_plots <- c(list(importance_plot), gam_plots[c(1, 3, 4)], list(legend))

layout <- "
ABB
ACC
ADD
EEE
"

wrap_plots(all_plots, design = layout, heights = c(1, 1, 1, 0.1)) +
  plot_annotation(tag_levels = list(c("A", "B", "C", "D", " "))) &
  theme(
    plot.tag.position = c(0.0, 0.975),  # top-left corner
    plot.tag = element_text(size = 10, hjust = .5, vjust = 0, face = "bold")
  )
```

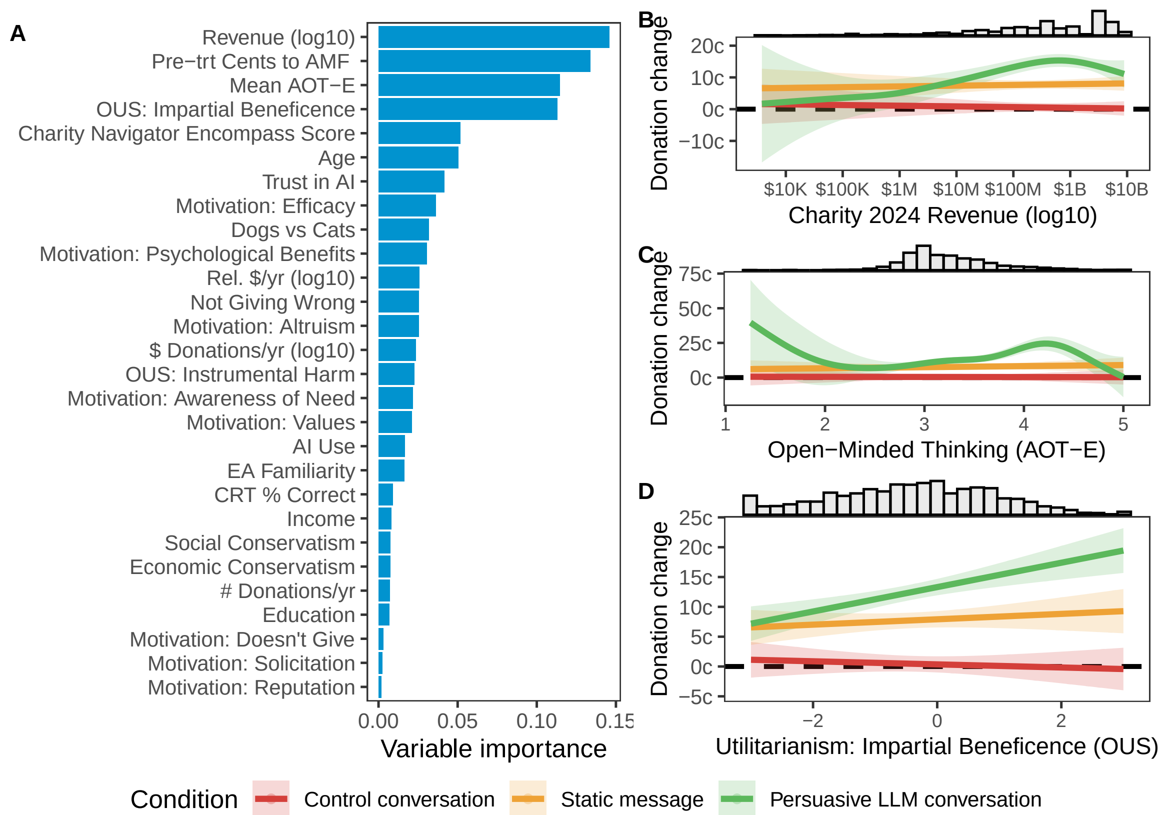


Figure 7: Figure 5: Variable importance and GAM analysis

```r
ggsave("output/figures/htes_cf.png",
       width = FIGURE_WIDTH, height = 6, dpi = FIGURE_DPI
)
```

12.7 Causal Forest Plots

```r
## Now do unadjusted heterogeneity plots and partial dependence plots for all variables
uhps <- plot_all_uhps(
  conv_ites, static_ites, d,
  importance_tbl$variable_dirty, importance_tbl$variable
)
ggsave(
  "output/figures/uhps.png",
  uhps,
  width = 8.25, height = 9.3, dpi = FIGURE_DPI
)

## now get PDPs
pdps <- plot_all_pdps(
  ma_cf, as.matrix(d[, covars_vec]),
  importance_tbl$variable_dirty, labels_map
)
ggsave(
  "output/figures/pdps.png",
  pdps,
  width = 8.25, height = 9.3, dpi = FIGURE_DPI
)
```

12.8 Strategy Plot

```r
# strategy plot


# Plot distributions -------------------------------------------------------

# 1. Pull out and rank your strategy coefficients
coef_df <- broom::tidy(mod_lm_donation) |>
  filter(term %in% names(STRATEGY_DESCRIPTIONS)) |>
  mutate(
    strategy = str_remove(term, "^strategy"),
    strategy = factor(strategy, levels = strategy[order(-estimate)]),
    sig = case_when(
      p.value < .10 & estimate >  0 ~ "pos",
      p.value < .10 & estimate <  0 ~ "neg",
      TRUE                          ~ "ns"
    )
  )

ranked_strats <- levels(coef_df$strategy)
```

```r
# 2. Build HTML labels using centralized strategy descriptions
label_map <- imap_chr(SHORT_STRAT_DESCRIPTIONS, ~ {
  clean_name <- str_to_sentence(str_replace_all(.y, "(?<=[a-z])(?=[A-Z])", " "))
  paste0(
    "<b>", clean_name, "</b><br>",
    "<span style='font-size:8pt;'>", .x, "</span>"
  )
})

# I could just do it as a boxplot with dots if these are causing too much trouble
# probably just need to separate out the point interval and the slab and it should all work:
↪  https://github.com/mjskay/ggdist/issues/93
# 4. Plot, ordering by your OLS rank
p1  <- d_strategy_agg_long %>%
  mutate(
    strategy = factor(strategy, levels = ranked_strats)
  ) %>%
  ggplot(aes(x = rating, y = strategy)) +
  stat_slab(
    density = "histogram",
    breaks = seq(-0.25, 3.25, by = 0.5),
    fill = amf_blue,
    height = 0.5,
    justification = 0.5
  ) +
  stat_pointinterval(
    point_interval = "mean_qi",
   .width  = 0.5, #IQR
   interval_size_domain = c(0, 20),
   position = position_nudge(y = -.2),
   interval_color = NA
  ) +
  scale_y_discrete(
    labels = label_map,
    #expand = expansion(add = c(0.5, 0))
  ) +
  scale_x_continuous(
    breaks = seq(0, 3, 1),
    #expand = expansion(add = c(0.25, 0.25)),
    labels = c("Not\nused", "Used\nminimally", "Used\nmoderately", "Used\nextensively"),
  ) +
  labs(
    x = "Strategy Rating",
    y = NULL
  ) +
  theme_bw(base_size = 11) +
  theme(
    axis.text.y      = element_markdown(lineheight = 0.9),
    panel.grid.major = element_blank(),
    panel.grid.minor = element_blank()
  )

# try p1 as a boxplot?
```

```r
# ────────────────────────────────────────────────────────────────────────────
# 3. Panel B: horizontal bar plot of coefficients ± SE
p2 <- ggplot(coef_df, aes(x = estimate, y = strategy, fill = sig)) +
  geom_col() +
  geom_errorbarh(aes(xmin = estimate - std.error, xmax = estimate + std.error),
                 height = 0) +
  scale_y_discrete(labels = NULL,
                   expand = expansion(add = c(.6, .6))
                   ) +
  geom_vline(xintercept = 0, linetype = "dashed", color = "black") +
  scale_fill_manual(
    values = c(
      pos = amf_blue,     # significant & positive
      neg = amf_red,      # significant & negative
      ns  = "grey80"      # non-significant
    ),
    guide = FALSE
  ) +
  labs(x = "OLS Coefficient", y = NULL) +
  theme_bw(base_size = 11) +
  theme(
    axis.text.y      = element_blank(),
    #axis.ticks.y     = element_blank(),
    panel.grid.major.y = element_blank(),
    panel.grid.minor   = element_blank()
  )

# Combine -----------------------------------------------------------------

shared_theme <- theme(
  plot.title = element_text(size = 10),
  axis.title = element_text(size = 8.5),
  axis.text  = element_text(size = 7),
  plot.tag.position = c(0.0, 1),  # top-left corner
  plot.tag = element_text(size = 10, hjust = 1, vjust = 0, face = "bold"),
  panel.grid = element_blank()
)

combined <- p1 + p2 +
  plot_layout(ncol = 2, widths = c(1.6, 1)) +
  plot_annotation(tag_levels = "A") &
  shared_theme

# Print it
combined
```

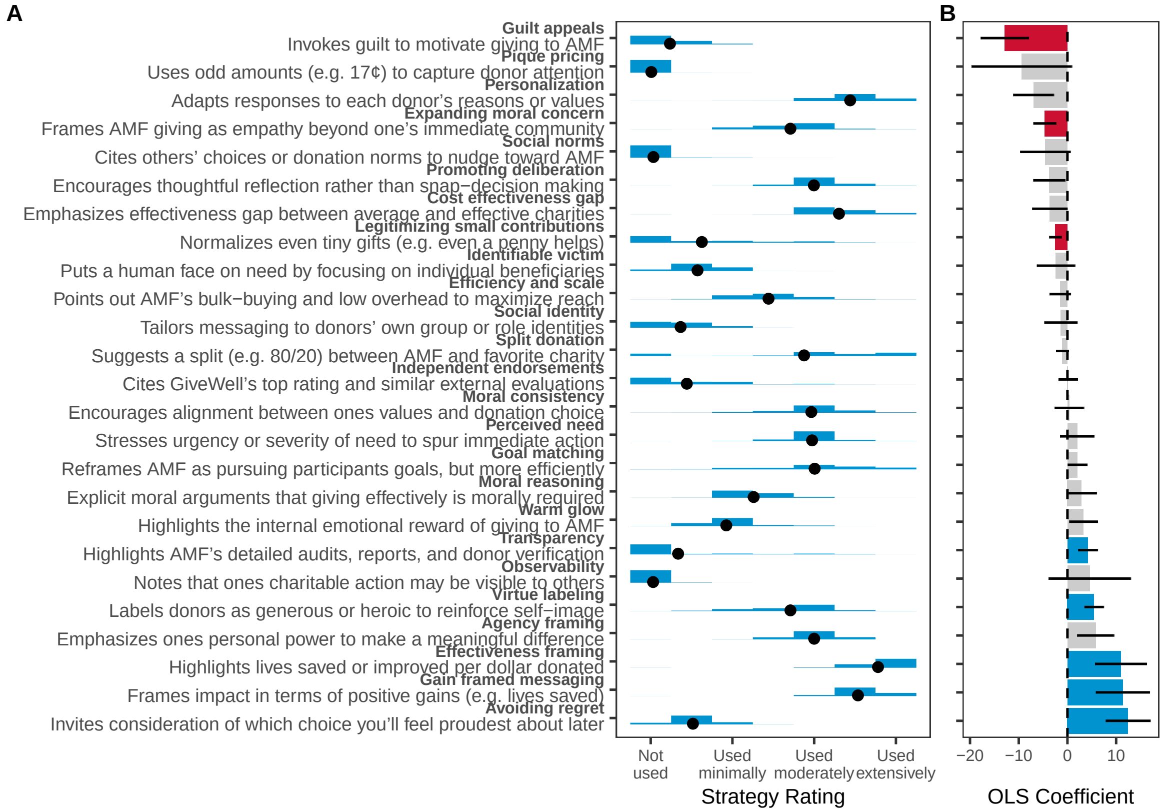


Figure 8: Figure 6: Persuasive strategies analysis

```r
ggsave(
  "output/figures/strategy_plot.png",
  combined,
  width = FIGURE_WIDTH,
  height = 7,
  dpi = FIGURE_DPI
)
```

12.9 Accuracy Figure

```r
# accuracy of factual claim increases over rounds
plot_a <- d_fact_ave |>
  ggplot(aes(x = round, y = accuracy)) +
  geom_violin() +
  geom_jitter(alpha = 0.1) +
  stat_summary(fun = mean, geom = "point", col = "red", size = 1) +
  stat_summary(fun.data = ~ mean_se(.x), geom = "errorbar", width = 0.2,  col = "red") +
```

```r
  #geom_smooth(method = "lm",  se = TRUE, col = "black", aes(x = round_num)) +
  #geom_smooth(method = "lm", formula = y ~ x + I(x^2), se = TRUE, col = "blue", aes(x = round_num)) +
  labs(x = "Round", y = "Factual Accuracy Rating")


# correlation between accuracy and donation change
plot_b <- d_acc %>%
  ggplot(aes(x = accuracy, y = cents_to_amf_change)) +
  geom_hline(yintercept = 0, linetype = "dashed") +
  geom_jitter(alpha = 0.25) +
  geom_smooth(method = "lm", se = FALSE) +
  geom_smooth(col = "red", se = FALSE) +
  scale_y_continuous(labels = scales::label_number(suffix = "c")) +
  labs(x = "Factual Accuracy Rating", y = "Donation Change")

## plot
(plot_a + plot_b) +
  plot_annotation(
    tag_levels = "A",
  )
```

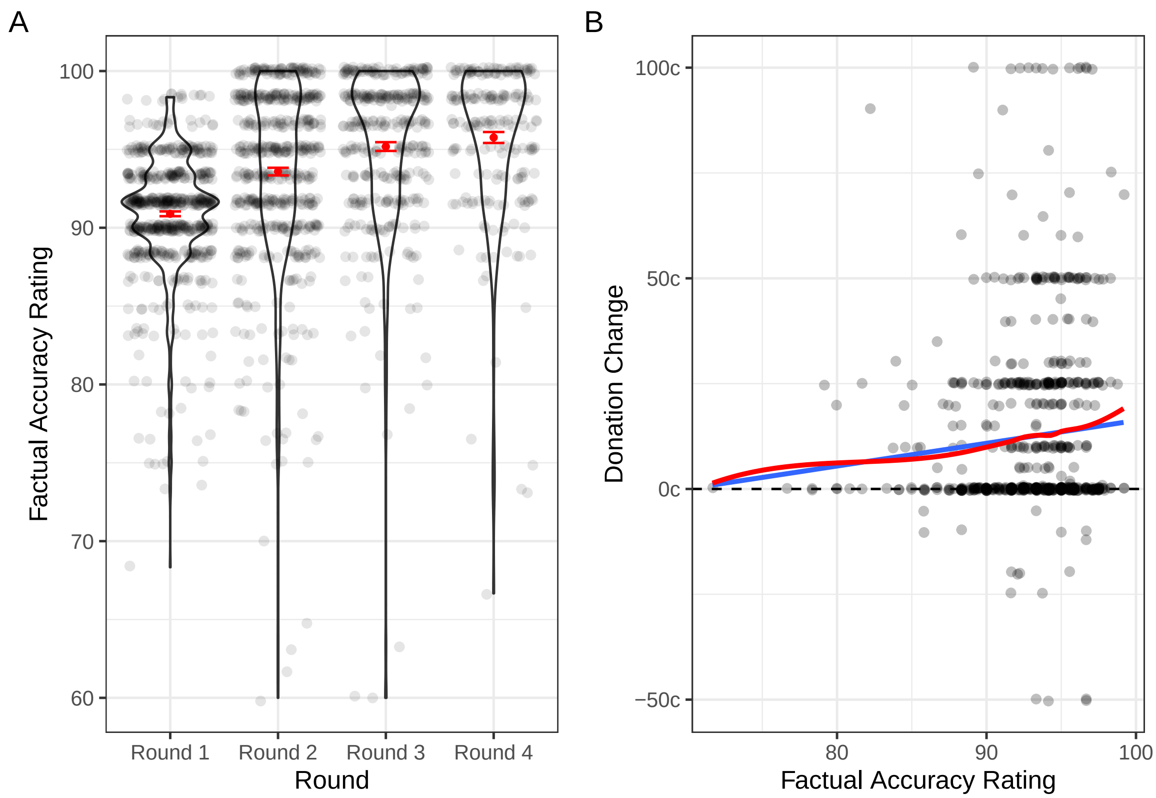


Figure 9: Figure S5: AI accuracy assessment

```
ggsave("output/figures/accuracy_plot.png",
       width = FIGURE_WIDTH, height = 4, dpi = FIGURE_DPI
)
```

13 Tables

13.1 GAM Tables

```
m1 <- gams[[1]]$mod
m2 <- gams[[3]]$mod
m3 <- gams[[4]]$mod

mods <- list(
  "Charity Revenue" = m1,
  "AOT-E" = m2,
  "Impartial Beneficence" = m3
```

Table 1: Fixed Parameters from General Additive Models

	Charity Revenue	AOT-E	Impartial Beneficence
Intercept	0.550 (0.692)	0.438 (0.668)	0.459 (0.673)
Static treatment	7.190*** (0.975)	7.281*** (0.941)	7.276*** (0.948)
LLM Conv. Treatment	12.228*** (0.972)	12.085*** (0.939)	12.037*** (0.945)
R2	0.088	0.093	0.082
Num.Obs.	1811	1949	1949

Each column shows separate GAM predicting donation change with a different covariate.
*** p<0.001, standard errors in parentheses.

```
)

coef_map  = c(
  `(Intercept)` = "Control",
  conditionstatic_treatment = "Static Treatment",
  conditionconv_treatment = "LLM Conv. Treatment"
)

## ---------- 1) Parametric-only model table ----------
param_tbl <- msummary(
  mods,
  output   = "kableExtra",
  format   = "latex",
  float    = TRUE,
  booktabs = TRUE,
  escape   = FALSE,
  estimate = "{estimate}{stars} ({std.error})",
  title    = "\\label{tab:gam-params}Fixed Parameters from General Additive Models",
  statistic = NULL,
  gof_map   = c("r.squared", "nobs"),
  coef_omit = "^s\\(",
  coef_rename = c(
    "(Intercept)"               = "Intercept",
    "conditionstatic_treatment" = "Static treatment",
    "conditionconv_treatment"   = "LLM Conv. Treatment"
  ),

  notes = c(
    "Each column shows separate GAM predicting donation change with a different covariate.",
    "*** p<0.001, standard errors in parentheses."
  )
)

param_tbl
```

```
## ---------- 2) Smooth terms table ----------

# optional: clean smooth labels (turn "s(revenue_log10):conditionconv_treatment"
# into "s(revenue_log10) × LLM Conv.Treatment")
pretty_condition <- function(x) {
```

```r
  x |>
    str_replace_all("conditioncontrol", "Control") |>
    str_replace_all("conditionstatic_treatment", "Static Treatment") |>
    str_replace_all("conditionconv_treatment",   "LLM Conv. Treatment") |>
    str_replace_all("s\\(revenue_log10\\)", "Revenue (Log10)")  |>
    str_replace_all("s\\(ous_impartial_beneficence\\)", "Impartial Beneficence") |>
    str_replace_all("s\\(mean_aot\\)", "AOT-E")
}

smooth_tbl <- purrr::imap_dfr(mods, ~{
  st <- summary(.x)$s.table
  # coerce to dataframe with named columns
  st_df <- as.data.frame(st)
  st_df$Term <- rownames(st)
  st_df |>
    transmute(
      Model  = .y,
      Smooth = Term |>
        pretty_condition() |>
        # replace ":" with " × " for readability
        str_replace(":", " × "),
      edf    = sprintf("%.2f", `edf`),
      Ref.df = sprintf("%.2f", `Ref.df`),
      F      = sprintf("%.2f", `F`),
      p  = ifelse(`p-value` < .001, "<0.001***", sprintf("%.3f", `p-value`))
    ) |>
    select(Smooth, edf, Ref.df, F, p) %>%
    remove_rownames()
})


smooth_tbl_kbl <- smooth_tbl %>%
  kbl(
    format   = "latex",
    booktabs = TRUE,
    escape   = TRUE,  # we already escaped text; keep stars and symbols
    align    = c("l","l","r","r","r","r"),
    caption  = "\\label{tab:gam-smooths}Approximate significance of smooth terms",
    col.names = c("Smooth","Edf","Ref.df","F","p-value")
  ) |>
  kable_styling(latex_options = "hold_position")

smooth_tbl_kbl
```

13.2 Strategy Regression Table

```r
options("modelsummary_format_numeric_latex" = "plain")

# need to get clean names.
strat_names <- names(SHORT_STRAT_DESCRIPTIONS)
strat_names_clean <- paste0(
```

Table 2: Approximate significance of smooth terms

Smooth	Edf	Ref.df	F	p-value
Revenue (Log10) × Control	1.00	1.01	0.12	0.733
Revenue (Log10) × Static Treatment	1.00	1.00	0.14	0.707
Revenue (Log10) × LLM Conv. Treatment	3.22	4.01	4.74	<0.001***
AOT-E × Control	1.00	1.01	0.00	0.976
AOT-E × Static Treatment	1.00	1.00	0.25	0.618
AOT-E × LLM Conv. Treatment	5.62	6.59	5.97	<0.001***
Impartial Beneficence × Control	1.01	1.01	0.26	0.615
Impartial Beneficence × Static Treatment	1.01	1.01	0.76	0.383
Impartial Beneficence × LLM Conv. Treatment	1.00	1.00	15.43	<0.001***

```
  "Strategy: ",
  str_to_sentence(str_replace_all(strat_names, "(?<=[a-z])(?=[A-Z])", " "))
)



motivations <- names(MOTIVATION_DESCRIPTIONS)
motivations_clean <- paste0(
  "Motivation: ",
  str_to_sentence(str_replace_all(motivations, "(?<=[a-z])(?=[A-Z])", " "))
)
pop_served <- mod_lm_donation |> coef() |> names() |> grep("^pop_", x = _, value = TRUE)
pop_served_clean <- pop_served |>
  str_remove("^pop_")                |>  # drop the pop_ prefix
  str_replace_all("_", " ")          |>  # turn underscores into spaces
  str_to_sentence()                  |>  # capitalize first letter
  (\(x) paste0("Population: ", x))()

subjects <- mod_lm_donation |> coef() |> names() |>  grep("^subj_", x = _, value = TRUE)
subjects_clean <- subjects |>
  str_remove("^subj_")               |>  # drop the subj_ prefix
  str_replace_all("_", " ")          |>  # turn underscores into spaces
  str_to_sentence()                  |>  # capitalize first letter
  (\(x) paste0("Subject Area: ", x))()  # prepend label



# rename some vars
coef_map  = c(
  `(Intercept)` = "Intercept",
  `cents_to_amf_pre_cat1-10` = "Pre-treatment Donation, 1-10c",
  `cents_to_amf_pre_cat11-20` = "Pre-treatment Donation, 11-20c",
  `cents_to_amf_pre_cat21-30` = "Pre-treatment Donation, 21-30c",
  `cents_to_amf_pre_cat31-40` = "Pre-treatment Donation, 31-40c",
  `cents_to_amf_pre_cat41-50` = "Pre-treatment Donation, 41-50c",
  `cents_to_amf_pre_cat51-100` = "Pre-treatment Donation, 51-100c",
  charity_wrong_pre = "Pre-treatment Moral Belief",
  setNames(strat_names_clean, strat_names),
  setNames(motivations_clean, motivations),
  `DoesntGiveTRUE` = "Motivation: Doesn't Give",
  is_international = "Scope: International",
```

```r
  setNames(pop_served_clean, pop_served),
  setNames(subjects_clean, subjects)
)


# 2) Move controls to top
coef_order = c(
  "Strategy",
  "Intercept",
  "cents_to_amf_pre_cat1-10",
  "cents_to_amf_pre_cat11-20",
  "cents_to_amf_pre_cat21-30",
  "cents_to_amf_pre_cat31-40",
  "cents_to_amf_pre_cat41-50",
  "cents_to_amf_pre_cat51-100",
  "charity_wrong_pre",
  ".*"
)

table_latex <- modelsummary(
  list(
    "Donation Change" = mod_lm_donation,
    "Moral Belief Change" = mod_lm_char_wrong,
    "Click-through" = mod_lm_clicked
  ),
  output     = "kableExtra", #you need to go via kable to get longtable
  format     = "latex",
  float = TRUE,
  booktabs   = TRUE,
  longtable  = TRUE,
  title      = "\\label{tab:strategy-regressions}Persuasive Strategy Regression Results",
  escape     = FALSE,
  gof_omit   = ".*",     # drop goodness-of-fit rows if you like
  estimate  = "{estimate} ({std.error}){stars}",
  statistic = NULL,
  notes     = c(
    "*** p<0.001, ** p<0.01; * p<0.05; + p<0.10. Standard errors (HC2) in parentheses.",
    "Strategy coef. p values replaced with q values to maintain pFDR < .05 (Storey)"
  ),
  coef_map = coef_map,
  coef_order = coef_order
)

table_latex <- kableExtra::column_spec(table_latex, 1, width = "6cm")
table_latex
```

Table 3: Persuasive Strategy Regression Results

	Donation Change	Moral Belief Change	Click-through
Intercept	-41.820 (19.838)*	-3.664 (6.478)	-0.144 (0.158)
Pre-treatment Donation, 21-30c	-8.357 (3.369)*		0.066 (0.054)
Pre-treatment Donation, 31-40c	-6.308 (5.327)		0.147 (0.088)+

Pre-treatment Donation, 41-50c	-10.084 (2.589)***		0.085 (0.039)*
Pre-treatment Donation, 51-100c	-23.053 (3.822)***		0.083 (0.063)
Pre-treatment Moral Belief		-0.076 (0.020)***	
Strategy: Effectiveness framing	10.952 (5.284)*	0.099 (2.880)	-0.048 (0.066)
Strategy: Cost effectiveness gap	-3.632 (3.601)	-0.620 (2.094)	0.019 (0.055)
Strategy: Goal matching	2.051 (1.997)	-1.879 (1.531)	0.045 (0.033)
Strategy: Moral reasoning	2.893 (3.084)	1.861 (2.028)	-0.019 (0.048)
Strategy: Personalization	-6.972 (4.154)+	-4.140 (1.712)*	0.000 (0.047)
Strategy: Split donation	-1.063 (1.279)	-0.371 (0.609)	0.002 (0.017)
Strategy: Expanding moral concern	-4.672 (2.322)*	-1.735 (1.667)	0.065 (0.037)+
Strategy: Avoiding regret	12.439 (4.570)**	-4.782 (2.406)*	0.041 (0.071)
Strategy: Social norms	-4.549 (5.153)	-2.570 (2.803)	0.164 (0.115)
Strategy: Agency framing	5.771 (3.768)	0.542 (2.048)	0.000 (0.043)
Strategy: Moral consistency	0.369 (2.990)	4.214 (1.916)*	-0.091 (0.044)*
Strategy: Efficiency and scale	-1.512 (2.150)	-1.698 (1.407)	-0.023 (0.029)
Strategy: Transparency	4.197 (1.984)*	-0.524 (1.103)	-0.017 (0.028)
Strategy: Independent endorsements	0.113 (1.952)	1.730 (1.423)	0.030 (0.031)
Strategy: Legitimizing small contributions	-2.482 (1.252)*	-0.850 (0.697)	0.000 (0.018)
Strategy: Observability	4.550 (8.430)	-0.272 (5.626)	0.121 (0.188)
Strategy: Identifiable victim	-2.371 (3.906)	0.790 (1.891)	-0.030 (0.053)
Strategy: Promoting deliberation	-3.747 (3.262)	1.674 (1.897)	0.118 (0.047)*
Strategy: Pique pricing	-9.398 (10.302)	21.791 (25.057)	-0.190 (0.099)+
Strategy: Gain framed messaging	11.344 (5.507)*	3.811 (3.056)	0.088 (0.075)
Strategy: Perceived need	1.977 (3.480)	1.544 (2.253)	-0.036 (0.051)
Strategy: Warm glow	3.276 (2.897)	2.640 (2.137)	-0.061 (0.042)
Strategy: Social identity	-1.364 (3.376)	0.511 (1.688)	0.001 (0.053)
Strategy: Virtue labeling	5.462 (1.967)**	0.791 (1.276)	0.004 (0.028)
Strategy: Guilt appeals	-12.891 (4.910)**	2.462 (2.602)	-0.094 (0.057)+
Motivation: Awareness of need	1.372 (1.233)	0.807 (0.722)	-0.020 (0.015)
Motivation: Solicitation	2.758 (1.973)	0.343 (0.804)	-0.020 (0.015)
Motivation: Costs and benefits	-0.103 (0.946)	-0.059 (0.609)	0.021 (0.016)
Motivation: Altruism	0.386 (1.909)	0.201 (1.487)	-0.002 (0.029)
Motivation: Reputation	-1.083 (2.722)	0.067 (1.300)	-0.063 (0.026)*
Motivation: Psychological benefits	0.725 (1.038)	-0.301 (0.682)	0.023 (0.014)
Motivation: Values	-0.812 (1.226)	-0.484 (1.088)	0.027 (0.022)
Motivation: Efficacy	-0.261 (0.893)	-0.716 (0.583)	-0.001 (0.014)
Motivation: Doesn't Give	2.137 (3.692)	-0.167 (2.220)	0.013 (0.057)
Scope: International	4.175 (3.097)	1.064 (2.063)	-0.013 (0.040)
Population: Adults	-1.400 (2.772)	-2.814 (1.539)+	-0.021 (0.036)
Population: Children and youth	-1.058 (2.732)	0.820 (1.519)	-0.004 (0.043)
Population: Economically disadvantaged people	0.515 (3.014)	1.739 (1.362)	0.042 (0.036)
Population: Veterans	-8.927 (4.487)*	-0.768 (4.166)	-0.091 (0.078)
Population: People with disabilities	2.667 (3.353)	1.796 (2.240)	0.037 (0.059)
Population: People with diseases and illnesses	1.649 (4.213)	2.949 (3.073)	0.139 (0.063)*
Population: Families	-1.982 (3.471)	-0.773 (1.579)	-0.031 (0.047)
Population: Victims of violence or disasters	3.565 (6.949)	0.425 (4.607)	-0.007 (0.097)
Population: Unknown or not classified	-4.674 (4.746)	-0.798 (2.034)	-0.024 (0.065)
Population: Pregnant people	5.745 (6.488)	-0.718 (3.028)	0.081 (0.079)
Population: Immigrants and migrants	-17.142 (7.379)*	-0.345 (4.885)	-0.008 (0.097)
Population: Military personnel	-0.374 (6.486)	-4.400 (4.757)	-0.001 (0.093)
Population: Women and girls	0.372 (4.633)	-1.378 (3.279)	-0.095 (0.055)+

Population: Asian people	11.417 (5.129)*	-0.480 (2.454)	-0.098 (0.052)+
Population: Other categorization	-4.676 (3.197)	1.534 (1.537)	-0.001 (0.033)
Subject Area: Environment	2.485 (3.275)	-0.927 (1.511)	0.004 (0.046)
Subject Area: Health	-3.147 (3.014)	-1.918 (1.802)	-0.055 (0.038)
Subject Area: Human services	2.449 (2.757)	-1.307 (1.487)	-0.011 (0.035)
Subject Area: Public safety and disaster management	9.428 (5.159)+	-1.149 (1.801)	0.028 (0.060)
Subject Area: Community and economic development	-3.891 (3.974)	-3.455 (2.504)	-0.029 (0.047)
Subject Area: International relations	-14.666 (5.771)*	4.523 (2.707)+	0.004 (0.056)
Subject Area: Philanthropy	0.948 (4.129)	1.347 (2.408)	-0.093 (0.051)+
Subject Area: International human rights	12.135 (5.711)*	0.176 (2.169)	-0.011 (0.060)
Subject Area: Unknown or not classified	2.206 (4.774)	-1.018 (2.442)	0.050 (0.077)
Subject Area: Other categorization	1.555 (2.231)	-0.773 (0.997)	0.007 (0.028)

*** $p<0.001$, ** $p<0.01$; * $p<0.05$; + $p<0.10$. Standard errors (HC2) in parentheses.

Strategy coef. p values replaced with q values to maintain pFDR < .05 (Storey)

14 Session Information

```r
sessionInfo()
```

```
R version 4.5.1 (2025-06-13 ucrt)
Platform: x86_64-w64-mingw32/x64
Running under: Windows 11 x64 (build 22631)

Matrix products: default
  LAPACK version 3.12.1

locale:
[1] LC_COLLATE=English_United States.utf8
[2] LC_CTYPE=English_United States.utf8
[3] LC_MONETARY=English_United States.utf8
[4] LC_NUMERIC=C
[5] LC_TIME=English_United States.utf8

time zone: America/New_York
tzcode source: internal

attached base packages:
[1] grid      stats     graphics  grDevices utils     datasets  methods
[8] base

other attached packages:
 [1] qvalue_2.15.0          BiocManager_1.30.24    tibble_3.2.1
 [4] forcats_1.0.0          car_3.1-2              carData_3.0-5
 [7] tidyr_1.3.1            readr_2.1.5            modelsummary_2.1.1
[10] kableExtra_1.4.0       gt_0.11.0              osfr_0.2.9
[13] fs_1.6.4               here_1.0.1             xml2_1.3.6
[16] rvest_1.0.4            gridExtra_2.3          gridtext_0.1.5
[19] jpeg_0.1-10            ggsci_3.2.0            ggExtra_0.10.1
[22] ggtext_0.1.2           ggdist_3.3.2           patchwork_1.3.0
```

```
[25] ggplot2_3.5.2          broom_1.0.6            marginaleffects_0.21.0
[28] estimatr_1.0.4         grf_2.3.2              mgcv_1.9-3
[31] nlme_3.1-168           glue_1.7.0             stringr_1.5.1
[34] purrr_1.0.2            data.table_1.15.4      dplyr_1.1.4

loaded via a namespace (and not attached):
  [1] RColorBrewer_1.1-3   rstudioapi_0.16.0    jsonlite_1.8.8
  [4] datawizard_0.12.2    magrittr_2.0.3       farver_2.1.2
  [7] nloptr_2.1.1         rmarkdown_2.28       ragg_1.3.2
 [10] vctrs_0.6.5          memoise_2.0.1        minqa_1.2.8
 [13] effectsize_0.8.9     janitor_2.2.0        htmltools_0.5.8.1
 [16] distributional_0.4.0 curl_5.2.1           Formula_1.2-5
 [19] parallelly_1.38.0    sass_0.4.9           plyr_1.8.9
 [22] zoo_1.8-12           lubridate_1.9.3      cachem_1.1.0
 [25] commonmark_1.9.1     mime_0.12            lifecycle_1.0.4
 [28] pkgconfig_2.0.3      Matrix_1.7-0         R6_2.5.1
 [31] fastmap_1.2.0        future_1.34.0        shiny_1.9.1
 [34] snakecase_0.11.1     digest_0.6.37        selectr_0.4-2
 [37] colorspace_2.1-1     rprojroot_2.0.4      textshaping_0.4.0
 [40] labeling_0.4.3       fansi_1.0.6          timechange_0.3.0
 [43] httr_1.4.7           abind_1.4-8          compiler_4.5.1
 [46] bit64_4.0.5          withr_3.0.1          backports_1.5.0
 [49] psych_2.5.3          performance_0.12.2   MASS_7.3-65
 [52] gratia_0.10.0        tools_4.5.1          lmtest_0.9-40
 [55] httpuv_1.6.15        future.apply_1.11.2  promises_1.3.0
 [58] checkmate_2.3.2      reshape2_1.4.4       generics_0.1.3
 [61] gtable_0.3.5         tzdb_0.4.0           hms_1.1.3
 [64] utf8_1.2.4           tables_0.9.28        pillar_1.9.0
 [67] markdown_1.13        vroom_1.6.5          later_1.3.2
 [70] splines_4.5.1        lattice_0.22-7       bit_4.0.5
 [73] tidyselect_1.2.1     miniUI_0.1.1.1       knitr_1.48
 [76] svglite_2.1.3        crul_1.6.0           xfun_0.47
 [79] stringi_1.8.4        yaml_2.3.10          boot_1.3-31
 [82] codetools_0.2-20     ggokabeito_0.1.0     evaluate_0.24.0
 [85] httpcode_0.3.0       cli_3.6.3            parameters_0.22.1
 [88] xtable_1.8-4         systemfonts_1.1.0    munsell_0.5.1
 [91] Rcpp_1.0.13          globals_0.16.3       parallel_4.5.1
 [94] bayestestR_0.16.1    mvnfast_0.2.8        listenv_0.9.1
 [97] lme4_1.1-35.5        viridisLite_0.4.2    scales_1.3.0
[100] insight_1.4.0        crayon_1.5.3         rlang_1.1.4
[103] cowplot_1.1.3        mnormt_2.1.1
```

15 Appendix

15.1 Additional Notes

- All figures are saved in the `output/figures/` directory
- Raw data and processed datasets are available in the `data/` directory
- Python scripts for NLP processing are located in `scripts/nlp/`
- This report can be generated with or without code chunks using the `include_code` parameter

15.2 Reproducibility

To reproduce this analysis:

1. Ensure all required R packages are installed (see `libraries.R`)
2. Install Quarto if not already installed: `install.packages("quarto")` then `quarto::quarto_install()`
3. Download the data using the provided OSF repository
4. Run this Quarto file with `quarto render main_report.qmd`

The analysis can be customized by modifying the YAML parameters at the top of this document.

15.3 Alternative: R Markdown Version

For users who prefer R Markdown or don't have Quarto installed, a compatible version of this report is available as `main_report.Rmd` which uses child chunks for script execution.