Supplementary materials

Bence Bago

14 January 2021

```
##                lab  n all_n
## 1          CAN_032  4   323
## 2          IND_004  1   323
## 3          IND_005  1   323
## 4          ITA_003  1   323
## 5          JPN_004  1   323
## 6          JPN_008  1   323
## 7          KEN_001  2   323
## 8          PER_002  2   323
## 9          PER_003  1   323
## 10         PSA_001 59   323
## 11         USA_037 77   323
## 12 USA_087?id=4012  2   323
## 13         USA_095 93   323
## 14         USA_145  1   323
## 15            <NA> 77   323
```

```
##       n
## 1 13359
```

1. Demographics and exclusion

2. Main replication analysis

Study 1a

Bayesian analysis

Table S1: The effect of personal force on moral dilemma judgements on Trolley dilemmas

Exclusion	Cluster	BF	RR	t	df	p
Exclusion	Eastern	1.9e+02	1.5e-02, 4.7e+01	-3.69	366.23	<.001
	Southern	2.4e+07	3.0e-08, 9.0e+06	-6.32	619.93	<.001
	Western	8.0e+01	4.0e-0.3, 1.4e+01	-3.41	553.15	<.001
Including familiar	Eastern	5.3e+05	8.0e-15, 2.0e+13	-5.54	912.65	<.001
	Southern	5.2e+11	1.0e-23, 1.9e+22	-7.76	1155.40	<.001
	Western	2.3e+08	2.0e-19, 6.0e+17	-6.58	1430.22	<.001

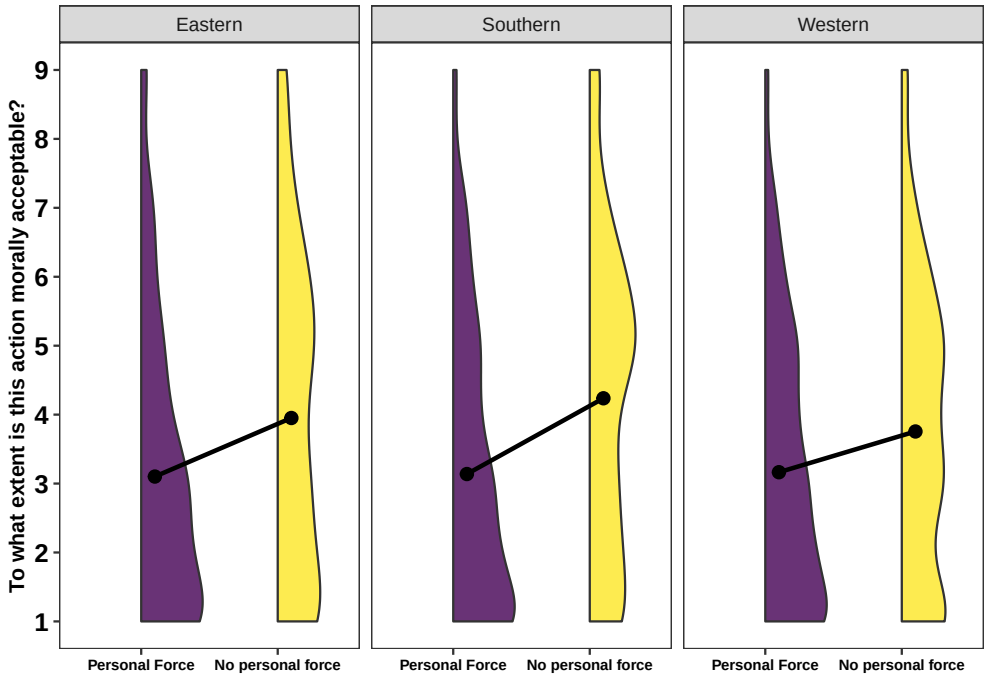

Figure S1: Results on Trolley dilemmas in Study 1 with all exclusion criteria applied. Black full circles indicate group level means.

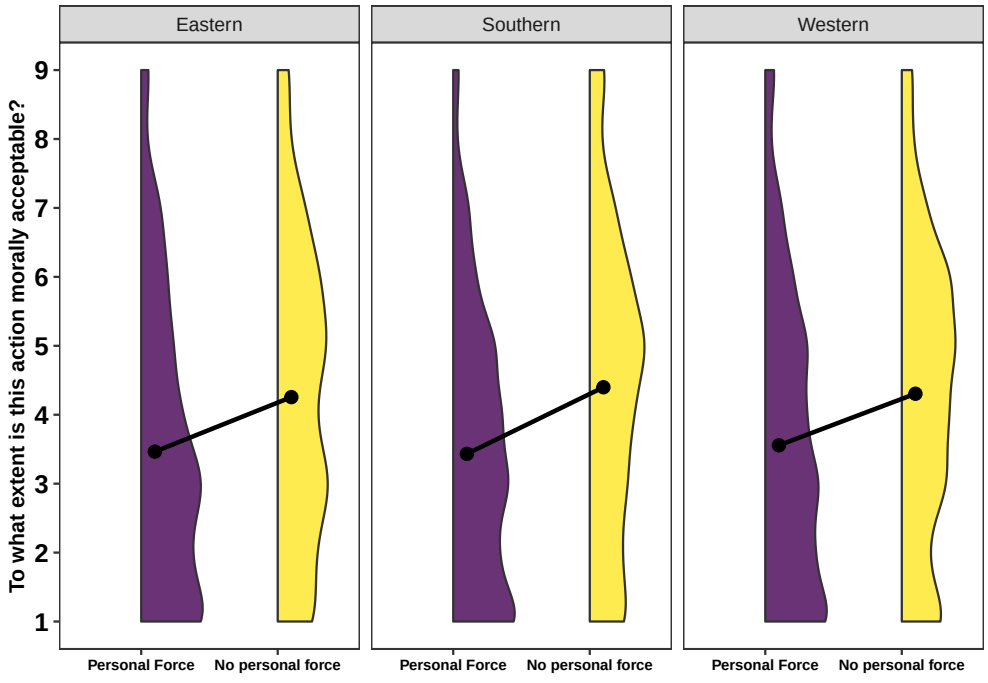

Figure S2: Results on Trolley dilemmas in Study 1 with no exclusion criteria applied. Black full circles indicate group level means.

Table S2: The effect of personal force on moral dilemma judgements on Speedboat dilemmas

Exclusion	Cluster	BF	RR	t	df	p
Exclusion	Eastern	1.2e+05	2.6e-06, 5.7e+04	-5.26	283.92	<.001
	Southern	1.0e+03	3.0e-04, 2.5e+03	-4.19	436.86	<.001
	Western	2.5e+01	6.0e-03, 4.3	-3.01	437.36	0.003
Including familiar	Eastern	2.1e+05	8.4e-10, 1.1e+08	-5.35	905.88	<.001
	Southern	3.9e+05	5.8e-18, 2.2e+16	-5.47	1162.68	<.001
	Western	1.2e+09	8.0e-18, 1.2e+16	-6.85	1431.55	<.001

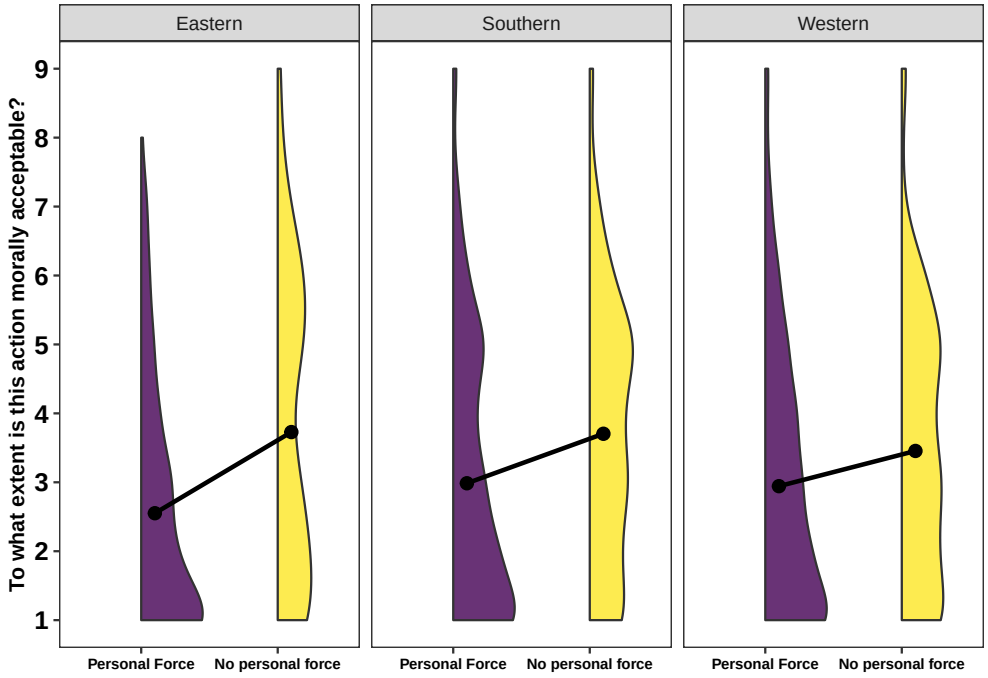

Figure S3: Results on Trolley dilemmas in Study 1 with all exclusion criteria applied. Black full circles indicate group level means.

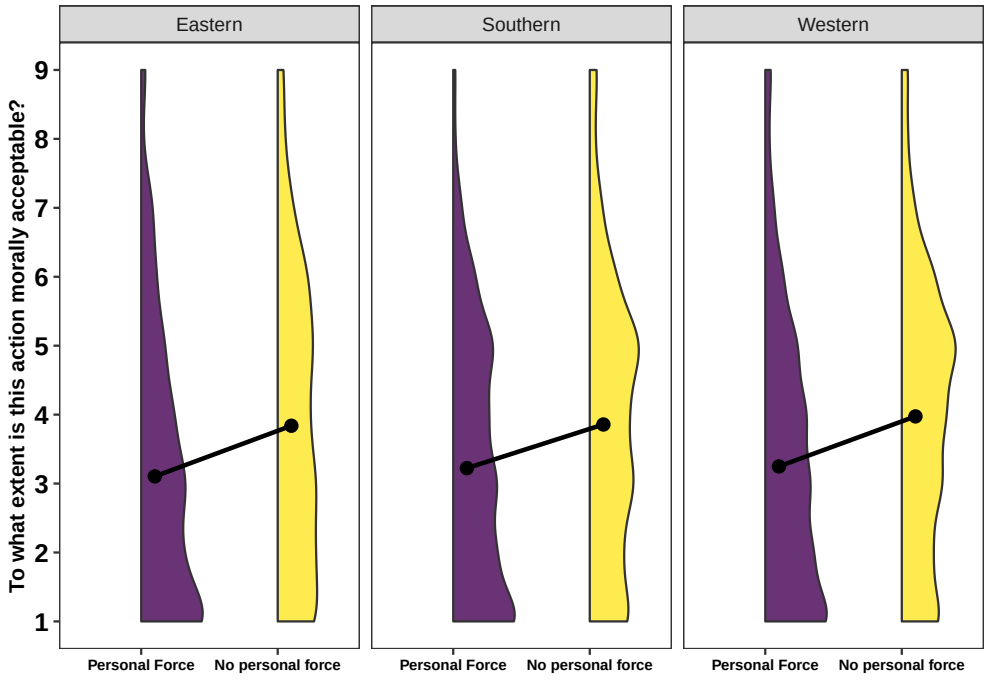

Figure S4: Results on Speedboat dilemmas in Study 1 with no exclusion criteria applied. Black full circles indicate group level means.

Study 2a and 2b

Table S3: Do personal force interact with intention on Trolley dilemmas?

Exclusion	**Cluster**	**BF**	**RR**	**F**	**df**	**p**
Exclusion	Eastern	6.0e-01	2.2e-01, Inf	0.041	1, 319	0.84
	Southern	3.8e+00	1.3e-0.2, 2.3	7.583	1, 619	0.006
	Western	8.0e+08	<1.0e-04, 3.1e+10	47.011	1, 2551	<.001
Including familiar	Eastern	1.4e+00	2.7e-0.4, 1.1e+03	2.810	1, 784	0.094
	Southern	2.2e+09	<1.0e-04, 8.9e+15	50.499	1, 1490	<.001
	Western	4.3e+37	<1.0e-04, >1.0e+18	182.352	1, 8968	<.001

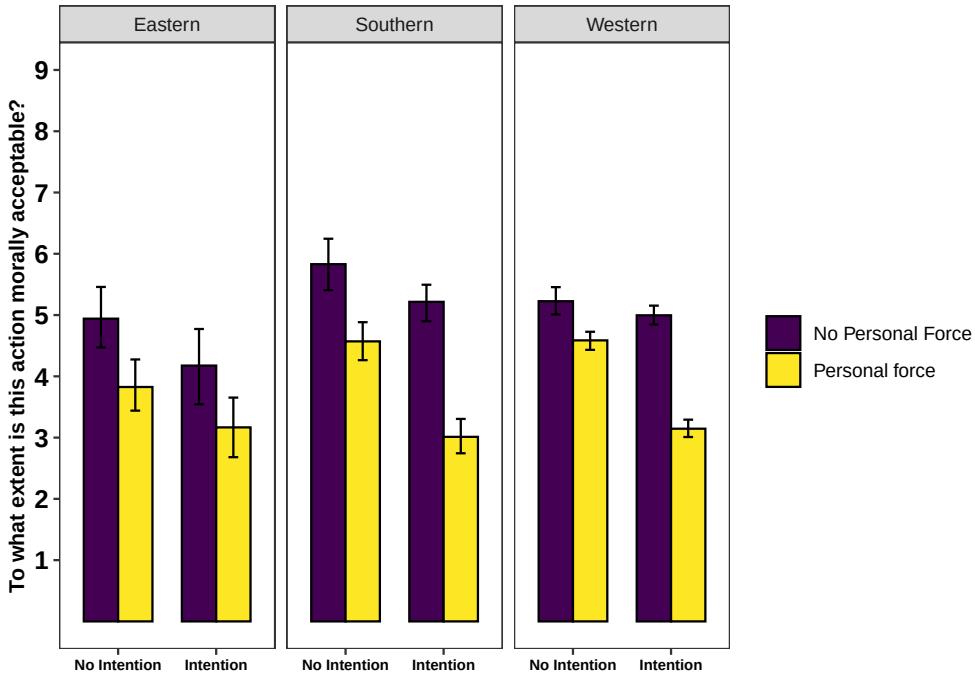

Figure S5: Results on Trolley dilemmas in Study 2 when all exclusion criteria are applied. Error bars are 95% confidence intervals on the mean.

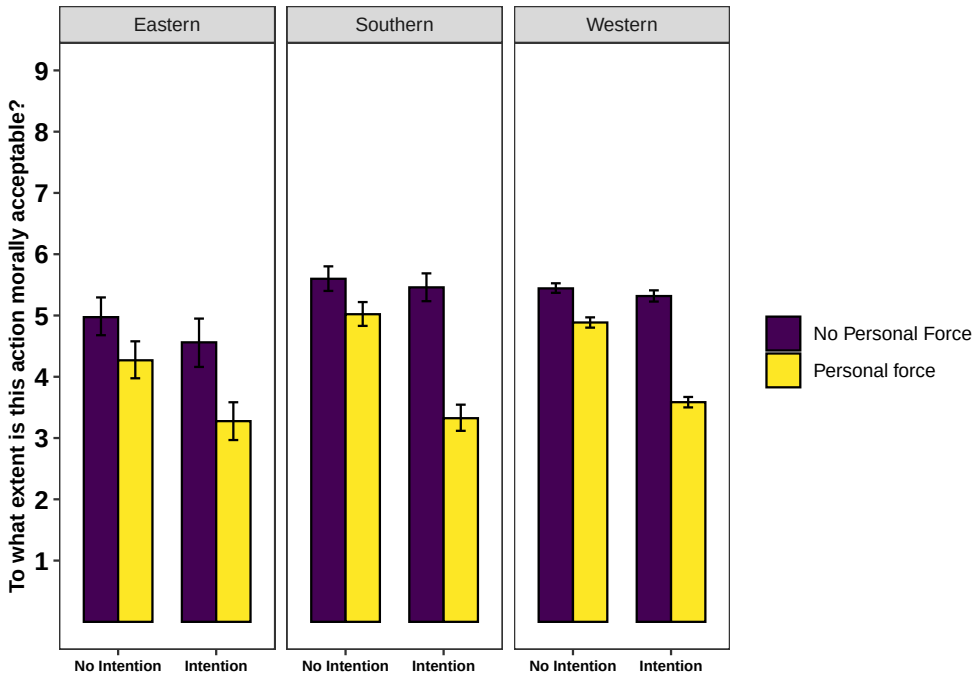

Figure S6: Results on Trolley dilemmas in Study 2 when no exclusion criteria are applied. Error bars are 95% confidence intervals on the mean.

Table S4: Do personal force interact with intention on Speedboat dilemmas?

Exclusion	Cluster	BF	RR	F	df	p
Exclusion	Eastern	0.4	0, 2.8e-0.1	0.003	1, 273	0.959
	Southern	0.4	2.2e-01, Inf	0.002	1, 514	0.963
	Western	160.0	1.2e-03, 1.5e+01, 3.1e+10	13.748	1, 2331	<.001
Including familiar	Eastern	1.0	8.0e-02, Inf	1.574	1, 784	0.21
	Southern	0.8	0, 3.5e-01	2.250	1, 1490	0.134
	Western	12.0	2.0e-0.3, 7.8e-01	9.120	1, 8968	0.003

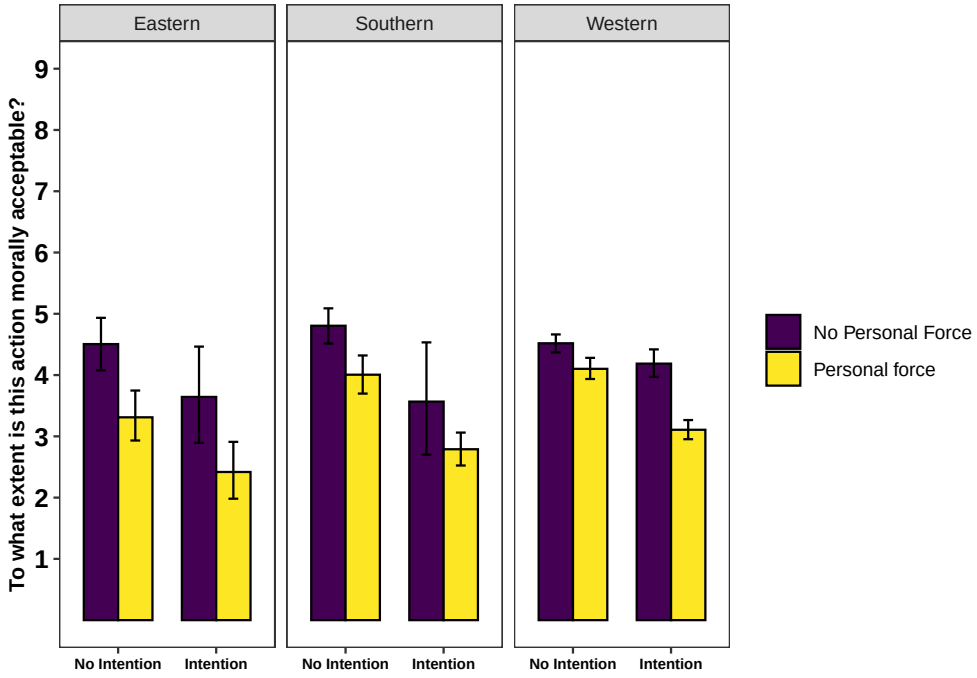

Figure S7: Results on the Speedboat dilemmas in Study 2 when all exclusion criteria are applied. Error bars are 95% confidence intervals on the mean.

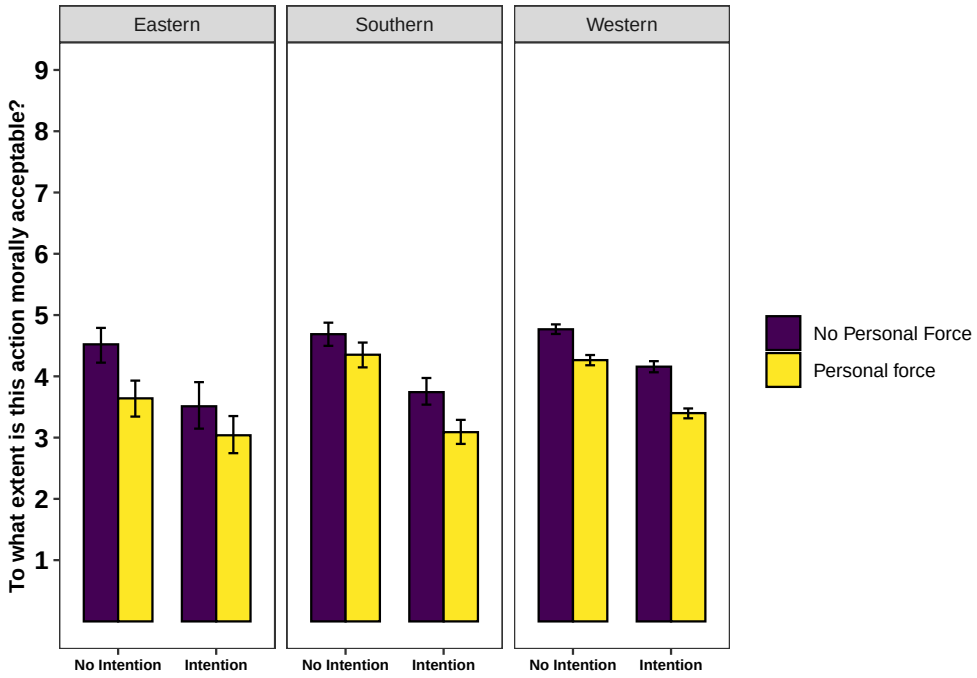

Figure S8: Results on the Speedboat dilemmas in Study 2 when no exclusion criteria is applied. Error bars are 95% confidence intervals on the mean.

3. Individualism-collectivism analysis

With all exclusions

Table S5: Is the interaction of personal force and intention affected by individualism/collectivism on Trolley dilemmas?

variable	BF	b	p
Country-level collectivism	1.5360	-5.632	0.301
Vertical Individualism	1.2410	-0.102	0.247
Horizontal Individualism	0.9105	0.035	0.744
Vertical Collectivism	0.8625	0.025	0.791
Horizontal Collectivism	1.4120	-0.074	0.487

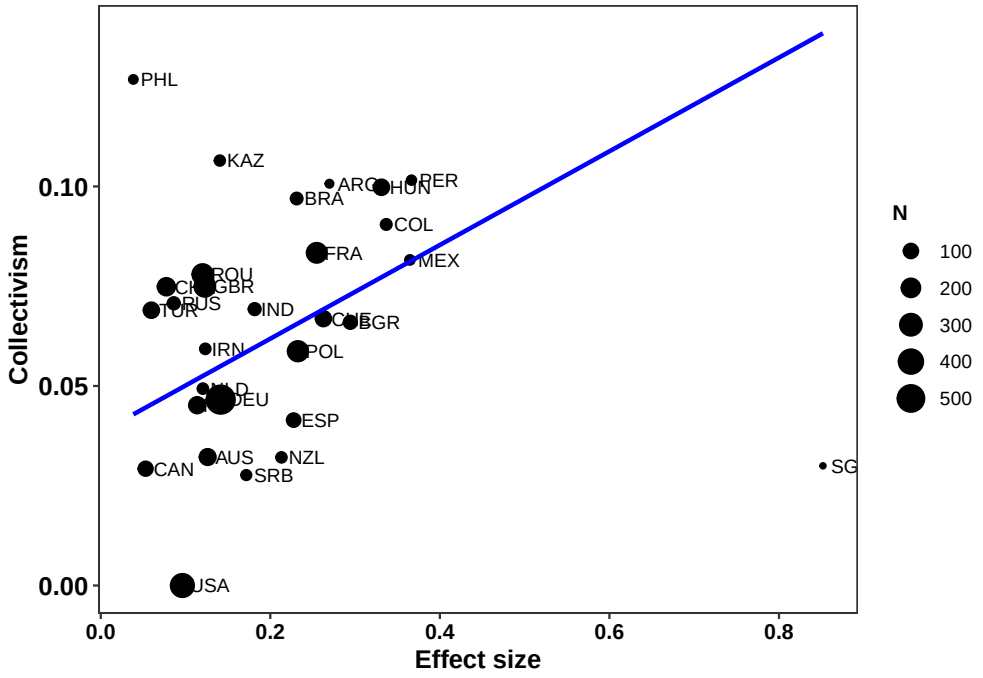

Figure S9: Correlation between country-level individualism/collectivism and the effect of personal force in Eta sqaured on the Trolley dilemmas

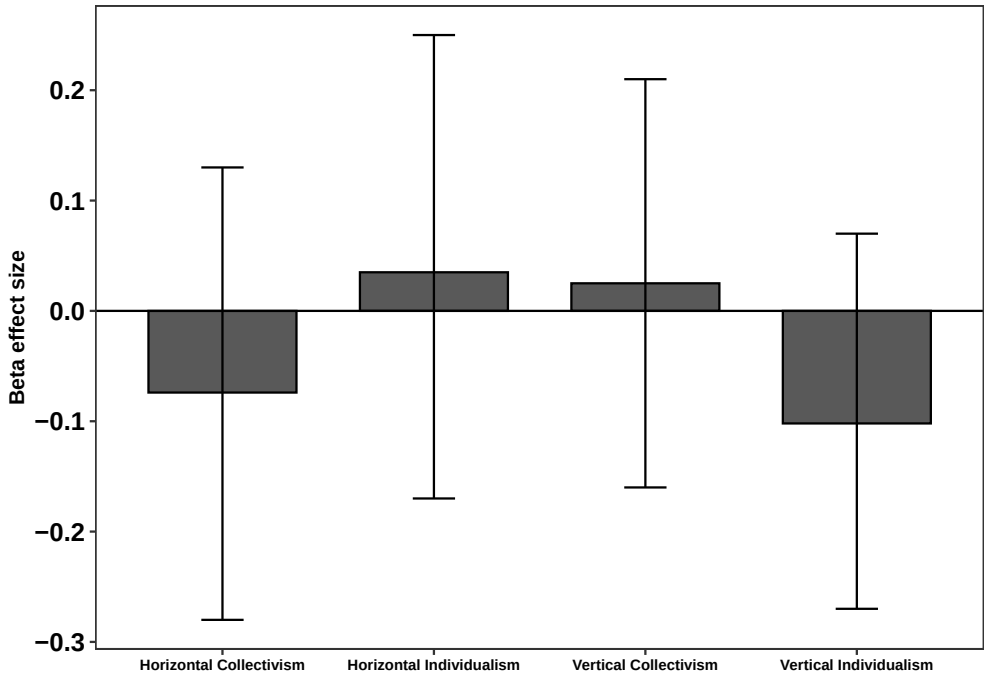

Figure S10: Personal level individualism/collectivism effects on the interaction of personal force and intention (trolley dilemmas)

Table S6: Is the interaction of personal force and intention affected by individualism/collectivism on Speedboat dilemmas?

variable	BF	b	p
Country-level collectivism	2.6170	2.172	0.692
Vertical Individualism	0.8783	-0.030	0.749
Horizontal Individualism	2.6240	-0.104	0.360
Vertical Collectivism	1.9940	0.119	0.245
Horizontal Collectivism	1.8690	-0.147	0.204

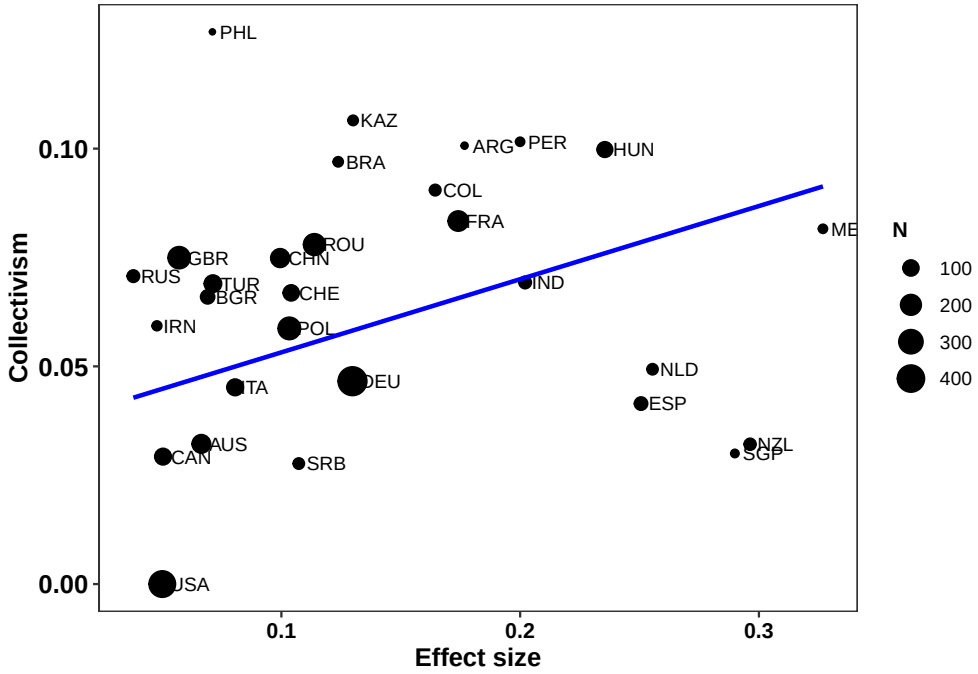

Figure S11: Correlation between country-level individualism/collectivism and the interactional effect of personal force and intention in Eta squared on Speedboat dilemmas

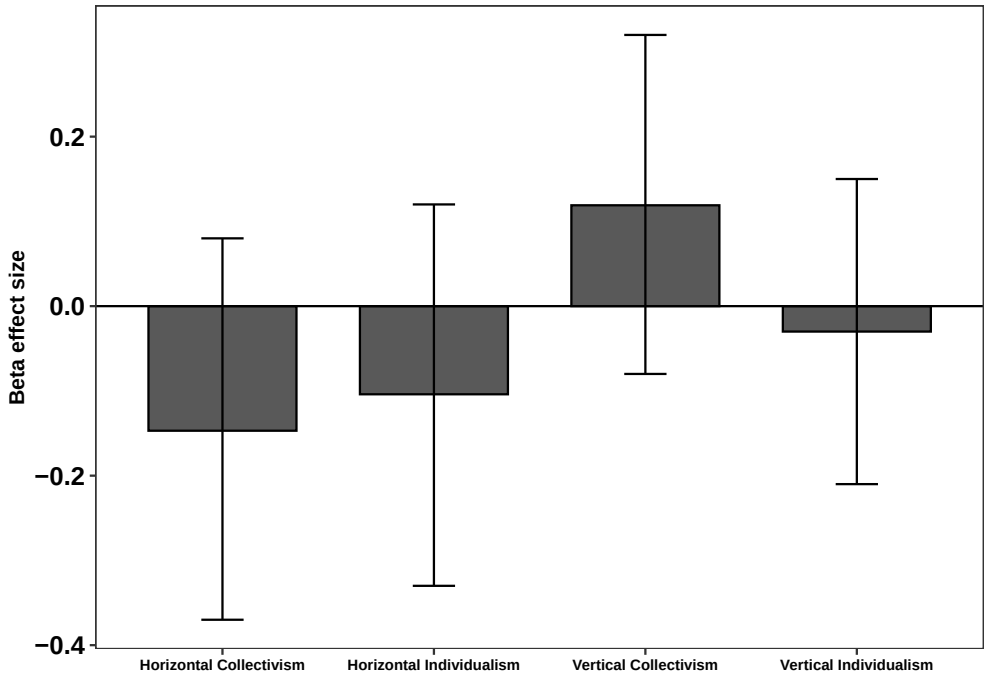

Figure S12: Personal level individualism/collectivism effects on the interaction of personal force and intention (speedboat dilemmas)

Including familiar participants

Table S7: Is the interaction of personal force and intention affected by individualism/collectivism on Trolley dilemmas?

variable	BF	b	p
Country-level collectivism	5.5980	-6.071	0.019
Vertical Individualism	0.3889	0.003	0.944
Horizontal Individualism	0.3530	0.031	0.606
Vertical Collectivism	0.6903	-0.022	0.663
Horizontal Collectivism	25.4400	-0.166	0.005

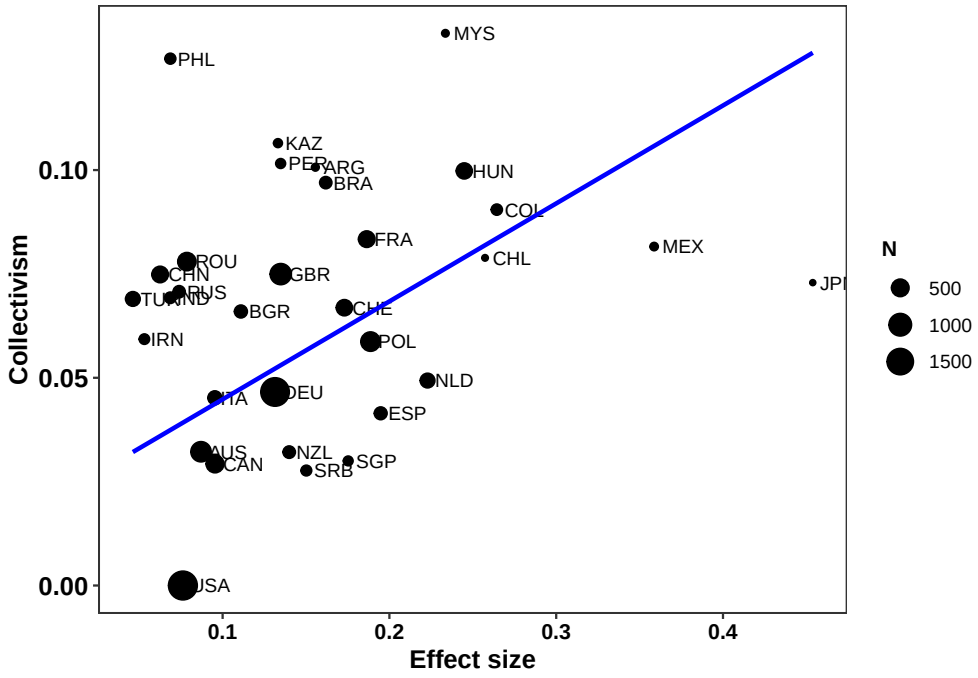

Figure S13: Correlation between country-level individualism/collectivism and the effect of personal force in Eta sqaured on the Trolley dilemmas

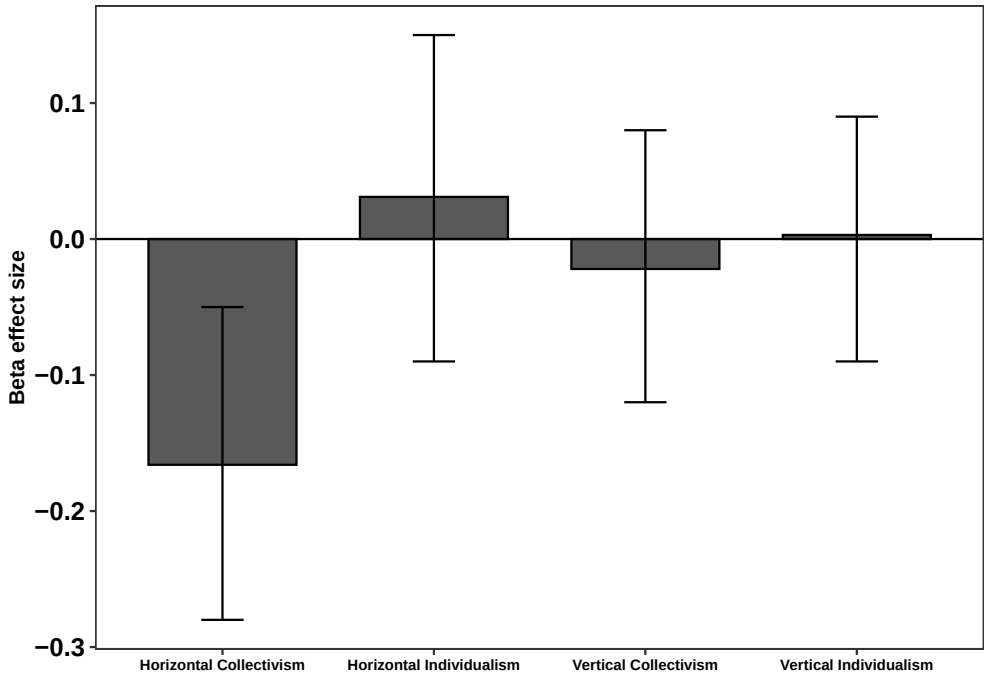

Figure S14: Personal level individualism/collectivism effects on the interaction of personal force and intention (trolley dilemmas)

Table S8: Is the interaction of personal force and intention affected by individualism/collectivism on Speedboat dilemmas?

variable	BF	b	p
Country-level collectivism	0.09943	1.936	0.438
Vertical Individualism	0.44100	0.021	0.646
Horizontal Individualism	1.82200	0.031	0.592
Vertical Collectivism	1.67600	0.068	0.156
Horizontal Collectivism	1.95700	-0.090	0.117

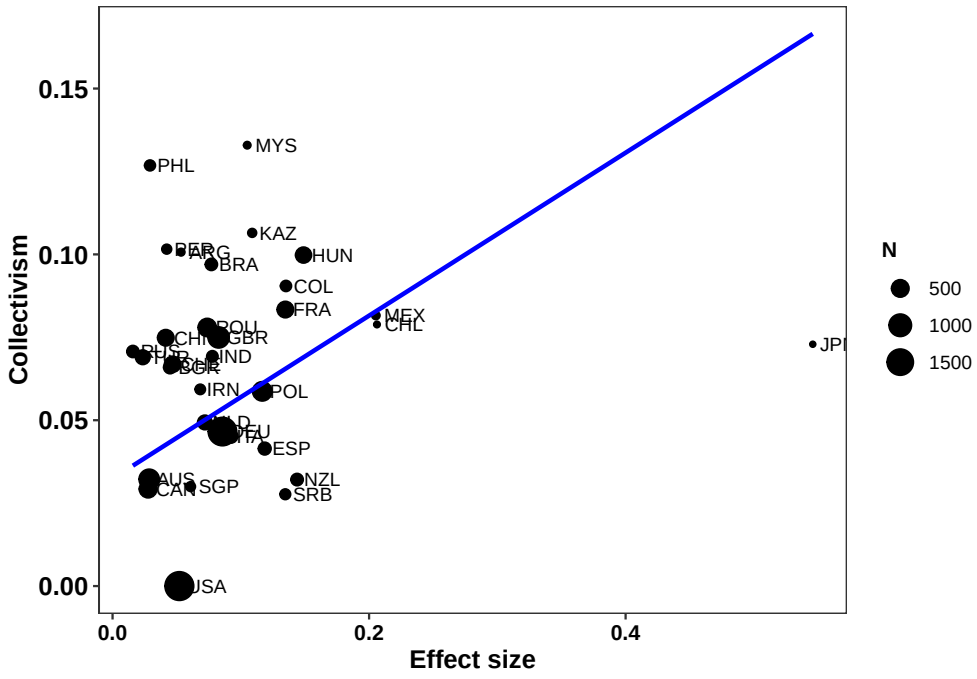

Figure S15: Correlation between country-level individualism/collectivism and the interactional effect of personal force and intention in Eta squared on Speedboat dilemmas

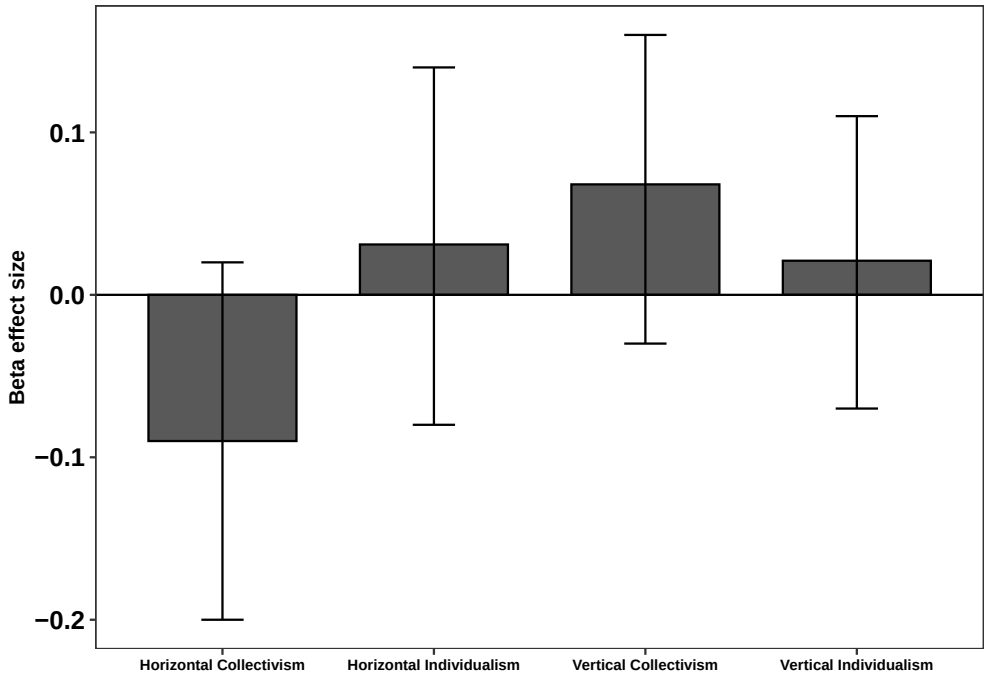

Figure S16: Personal level individualism/collectivism effects on the interaction of personal force and intention (speedboat dilemmas)

4. Additional analysis

Familiar participants

Table S9: The effect of personal force on participants familiar with the trolley problem.

Dilemma	Cluster	BF	t	df	p
Trolley	Eastern	9.1e+01	-3.46	536.88	0.0006
	Southern	7.2e+06	-6.01	876.02	0.0000
	Western	5.2e+05	-5.54	971.30	0.0000
Speedboat	Eastern	7.7e+00	-2.53	534.73	0.0120
	Southern	3.1e+05	-5.42	874.62	0.0000
	Western	2.7e+07	-6.27	970.94	0.0000

Table S10: The interaction effect of personal force and intention on familiar participants.

Dilemma	Cluster	BF	F	df	p
Trolley	Eastern	4.4e+00	5.428	1, 354	0.020
	Southern	7.0e+08	48.052	1, 832	0.000
	Western	1.7e+27	133.567	1, 6275	0.000
Speedboat	Eastern	8.0e-01	0.319	1, 354	0.573
	Southern	8.7e+01	12.110	1, 832	0.001
	Western	1.0e+00	3.827	1, 6275	0.050

Table S11: Effect of Physical Contact and Intention

Cluster	Dilemma	Comparison	t	Bf	df	p
Southern	Trolley	Physical Contact	0.80	2.60e-01	733.86	0.42
Southern	Speedboat	Physical Contact	1.04	3.20e-01	735.00	0.30
Southern	Trolley	Intention	-8.49	2.37e+13	875.54	0.00
Southern	Speedboat	Intention	-6.33	1.62e+07	860.86	0.00
Western	Trolley	Intention	-12.32	4.23e+32	1,094.80	0.00
Western	Speedboat	Intention	-9.20	2.09e+17	1,119.27	0.00
Western	Trolley	Physical Contact	-0.32	1.30e-01	1,232.24	0.75
Western	Speedboat	Physical Contact	-1.78	5.80e-01	1,260.90	0.08
Eastern	Trolley	Physical Contact	0.99	3.80e-01	320.98	0.32
Eastern	Speedboat	Physical Contact	0.37	2.60e-01	320.50	0.71
Eastern	Trolley	Intention	-3.74	1.64e+02	415.26	0.00
Eastern	Speedboat	Intention	-3.78	1.53e+02	432.41	0.00

Effect of physical contact and intention

In every cluster and for both types of dilemma we found good enough evidence supporting the alternative hypothesis when testing the effect of physical contact and the effect of intention. The summary of the results can be found in Table X.

```
# Additional analysis after all exclusions
additional_res_1_excluded <-
  trolley %>%
  filter(include_study1a | include_study1b | include_study2a | include_study2b) %>%
  select(survey_name, survey_id, matches("trolley_[0-9]_rate|speedboat_[0-9]_rate")) %>%
  pivot_longer(matches("_rate"), names_to = "task", names_pattern = "(.*)_rate", values_to = "rate") %>%
  mutate(comparison = case_when(task %in% c("trolley_1", "trolley_4") ~ "trolley_physical",
                                task %in% c("speedboat_1", "speedboat_4") ~ "speedboat_physical",
                                task %in% c("trolley_3", "trolley_2") ~ "trolley_intention",
                                task %in% c("speedboat_3", "speedboat_2") ~ "speedboat_intention",
                                TRUE ~ NA_character_)) %>%
  drop_na(rate, comparison) %>%
  nest(data = c(survey_id, task, rate)) %>%
  mutate(bf_res = map(data, ~ ttestBF(formula = rate ~ task, data = .x, rscale=0.26)),
         bf = map_dbl(bf_res, ~ round(my_bf_extractor(.x)$bf, 2)),
         freq_res = map(data, ~ t.test(rate ~ task, data = .x,  paired = FALSE) %>% broom::tidy()),
         t = map_dbl(freq_res, ~ round(.x$statistic, 2)),
         p = map_dbl(freq_res, ~ round(.x$p.value, 2)),
         df = map_dbl(freq_res, ~ round(.x$parameter, 2)))
```

```
## Warning: Problem with `mutate()` input `bf_res`.
## i data coerced from tibble to data frame
## i Input `bf_res` is `map(data, ~ttestBF(formula = rate ~ task, data = .x, rscale = 0.26))`.

## Warning: data coerced from tibble to data frame

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## i Input `bf_res` is `map(data, ~ttestBF(formula = rate ~ task, data = .x, rscale = 0.26))`.

## Warning: data coerced from tibble to data frame

## Warning: Problem with `mutate()` input `bf_res`.
## i data coerced from tibble to data frame
## i Input `bf_res` is `map(data, ~ttestBF(formula = rate ~ task, data = .x, rscale = 0.26))`.

## Warning: data coerced from tibble to data frame
```

```r
additional_res_1_excluded %>%
  filter(str_detect(comparison, "intention|physical")) %>%
  separate(comparison, into = c("Dilemma", "Comparison"), sep = "_") %>%
  transmute(Cluster = str_remove(survey_name, "^[^_]*_"),
            Dilemma = str_to_title(Dilemma),
            Comparison = case_when(Comparison == "physical" ~ "Physical Contact",
```

Table S12: Effect of Physical Contact and Intention

Cluster	Dilemma	Comparison	t	Bf	df	p
Eastern	Trolley	Intention	-3.08	1.69e+01	251.17	0.00
Eastern	Speedboat	Intention	-2.07	1.69e+00	263.92	0.04
Eastern	Trolley	Physical Contact	-0.11	3.30e-01	157.21	0.92
Eastern	Speedboat	Physical Contact	-0.14	3.30e-01	162.08	0.89
Southern	Trolley	Intention	-7.40	3.99e+09	498.00	0.00
Southern	Speedboat	Intention	-6.04	3.49e+06	462.53	0.00
Southern	Trolley	Physical Contact	0.55	2.80e-01	411.52	0.59
Southern	Speedboat	Physical Contact	0.32	2.60e-01	420.94	0.75
Western	Trolley	Physical Contact	0.17	1.80e-01	664.44	0.87
Western	Speedboat	Physical Contact	-0.58	2.10e-01	682.22	0.56
Western	Trolley	Intention	-9.08	1.76e+16	543.82	0.00
Western	Speedboat	Intention	-8.59	1.90e+13	585.38	0.00

Table S13: Comparing the Standard Switch and Standard Footbridge Dilemmas

Cluster	Dilemma	t	Bf	df	p
Southern	Trolley	15.04	5.72e+40	737.80	0.00
Southern	Speedboat	11.21	2.65e+23	736.95	0.00
Western	Trolley	30.47	2.28e+181	4,538.49	0.00
Western	Speedboat	23.42	3.91e+110	4,536.37	0.00
Eastern	Trolley	7.40	3.91e+09	401.59	0.00
Eastern	Speedboat	6.90	1.98e+08	399.79	0.00

```
                                  Comparison == "intention" ~ "Intention"),
            t,
            `Bf` = scales::scientific(bf),
            df,
            p) %>%
  papaja::apa_table(
    caption = "Effect of Physical Contact and Intention",
    escape = TRUE)
```

Comparing the standard switch and standard footbridge dilemmas

When comparing the standard switch and standard footbridge dilemmas in all clusters for the trolley and the speedboat tasks we found good enough evidence in every case for the support of the alternative hypothesis. The summary results of each comparison separately can be found in Table X.

```
#Additional analysis after all exclusions
additional_res_2_excluded <-
  trolley %>%
  filter(include_study1a | include_study1b | include_study2a | include_study2b) %>%
  select(survey_name, survey_id, matches("trolley_[0-9]_rate|speedboat_[0-9]_rate")) %>%
  pivot_longer(matches("_rate"), names_to = "task", names_pattern = "(.*)_rate", values_to = "rate") %>%
  mutate(comparison = case_when(task %in% c("trolley_3", "trolley_4") ~ "trolley_standard",
                                task %in% c("speedboat_3", "speedboat_4") ~ "speedboat_standard",
                                TRUE ~ NA_character_)) %>%
  drop_na(rate, comparison) %>%
  nest(data = c(survey_id, task, rate)) %>%
```

```
  mutate(bf_res = map(data, ~ ttestBF(formula = rate ~ task, data = .x, rscale=0.26)),
         bf = map_dbl(bf_res, ~ round(my_bf_extractor(.x)$bf, 2)),
         freq_res = map(data, ~ t.test(rate ~ task, data = .x,  paired = FALSE) %>% broom::tidy()),
         t = map_dbl(freq_res, ~ round(.x$statistic, 2)),
         p = map_dbl(freq_res, ~ round(.x$p.value, 2)),
         df = map_dbl(freq_res, ~ round(.x$parameter, 2)))
```

```
## Warning: Problem with `mutate()` input `bf_res`.
## i data coerced from tibble to data frame
## i Input `bf_res` is `map(data, ~ttestBF(formula = rate ~ task, data = .x, rscale = 0.26))`.

## Warning: data coerced from tibble to data frame

## Warning: Problem with `mutate()` input `bf_res`.
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## Warning: data coerced from tibble to data frame

## t is large; approximation invoked.

## Warning: Problem with `mutate()` input `bf_res`.
## i data coerced from tibble to data frame
## i Input `bf_res` is `map(data, ~ttestBF(formula = rate ~ task, data = .x, rscale = 0.26))`.

## Warning: data coerced from tibble to data frame

## t is large; approximation invoked.
```

```
additional_res_2_excluded %>%
  filter(str_detect(comparison, "standard")) %>%
  separate(comparison, into = c("Dilemma", "Comparison"), sep = "_") %>%
  transmute(Cluster = str_remove(survey_name, "^[^_]*_"),
            Dilemma = str_to_title(Dilemma),
            t,
            `Bf` = scales::scientific(bf),
            df,
            p) %>%
  papaja::apa_table(
    caption = "Comparing the Standard Switch and Standard Footbridge Dilemmas",
    escape = TRUE)
```

Table S14: Comparing the Standard Switch and Standard Footbridge Dilemmas

Cluster	Dilemma	t	Bf	df	p
Eastern	Trolley	5.24	1.40e+04	208.09	0.00
Eastern	Speedboat	5.20	1.23e+04	207.50	0.00
Southern	Trolley	12.64	2.70e+27	418.91	0.00
Southern	Speedboat	9.25	1.36e+15	420.65	0.00
Western	Trolley	20.15	1.21e+78	1,906.02	0.00
Western	Speedboat	15.93	1.03e+50	1,907.39	0.00

Oxford utilitarianism Scale

```
# Prepare data for plotting
plot_data <-
  trolley_proc %>%
  select(survey_name, lab, ResponseId, contains("oxford_")) %>%
  pivot_longer(
    contains("oxford_"),
    names_to = "item_no",
    values_to = "rate",
    names_prefix = "oxford_utilitarian_") %>%
  mutate(item_no = as.integer(item_no),
         subscale = case_when(item_no == 1L ~ "Impartial Beneficence",
                              item_no == 2L ~ "Instrumental Harm",
                              item_no == 3L ~ "Impartial Beneficence",
                              item_no == 4L ~ "Instrumental Harm",
                              item_no == 5L ~ "Impartial Beneficence",
                              item_no == 6L ~ "Instrumental Harm",
                              item_no == 7L ~ "Impartial Beneficence",
                              item_no == 8L ~ "Instrumental Harm",
                              item_no == 9L ~ "Impartial Beneficence",
                              TRUE ~ NA_character_),
         survey_name = str_remove(survey_name, "PSA006_")) %>%
  drop_na(rate)

# Create plot
plot_data %>%
  ggplot() +
  aes(
    x = subscale,
    y = rate,
    width = 0.7) +
  geom_boxplot() +
  facet_wrap(facets = vars(survey_name)) +
  labs(
    y = "Rating",
    x = "Subscale") +
  scale_y_continuous(
    breaks = 1:7,
    labels = as.character(1:7)) +
  theme_bw() +
  theme(
```

```
    panel.grid.major = element_blank(),
    panel.grid.minor = element_blank(),
    plot.title = element_text(hjust = 0.5, vjust = 0.5, face = "bold", size = 17),
    axis.title.x = element_blank(),
    axis.title.y = element_text(face = "bold", size = 10),
    axis.text.x = element_text(face = "bold", size = 7, colour = "Black"),
    axis.text.y = element_text(face = "bold", size = 12, colour = "Black"),
    legend.title = element_blank(),
    legend.text = element_text(size = 9))
```

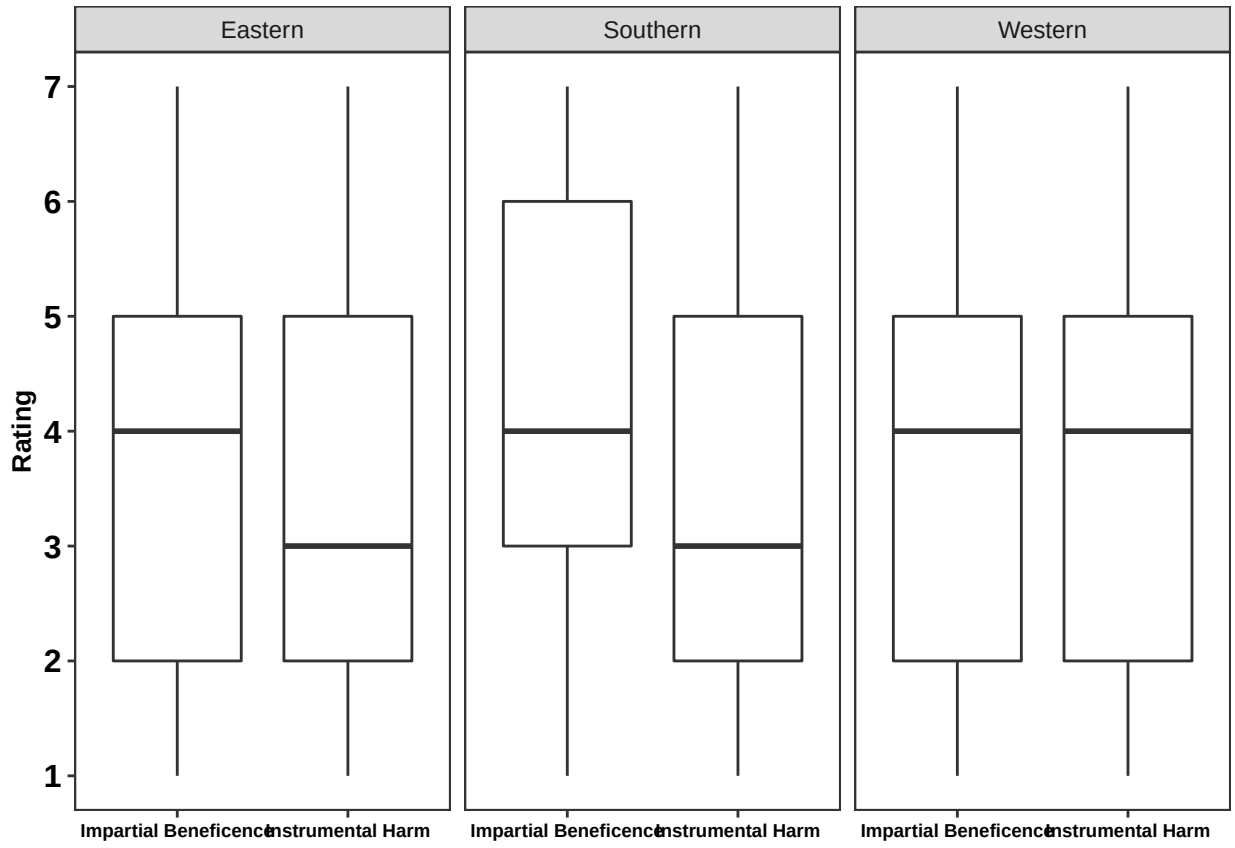

Table 1

```
### Some country codes are not standard iso codes; replace
custom_countries <-
  c("LEB" = "LBN",
    "BUL" = "BGR",
    "SPA" = "ESP",
    "SWT" = "CHE",
    "PSA" = "USA")

# Transform data for the table
## Table 1 represents the countries who collected data for the study
## in the three investigated clusters
table_data <-
```

Eastern
China, India, Iran, Japan, Lebanon, Malaysia, North Macedonia, Pakistan, Thailand, United Arab Emirates, United Kingo

```
  trolley_raw %>%
  select(survey_name, lab) %>%
  drop_na(lab) %>%
  mutate(country3 = str_extract(lab, "[A-Z]+") %>%
              recode(., !!!custom_countries),
         region = str_remove(survey_name, "PSA006_"),
         Country = countrycode(sourcevar = country3,
                                     origin = "iso3c",
                                     destination = "country.name"))
# GBR_001!
# Check the number of countries per region
table_data %>%
  distinct(region, Country) %>%
  count(region)
```

```
##     region  n
## 1  Eastern 11
## 2 Southern 12
## 3  Western 24
```

```
# Missing coutnries since the Stage 1 manuscript:
# Western: South Africa
# Southern: El Salvador
# Eastern: Indonesia

table_data <-
  table_data %>%
  distinct(region, Country) %>%
  group_by(region) %>%
  arrange(Country) %>%
  summarise(countries = str_c(Country, collapse = ", ")) %>%
  pivot_wider(names_from = region, values_from = countries)
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
# Create APA formatted table
papaja::apa_table(
  table_data,
  caption = "The Cultural Classification of Countries of Participating Labs Following Awad et al.",
  escape = TRUE
)
```