CREP_Griskevicius.Rmd

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```
# Loading data from source
url <- "https://raw.githubusercontent.com/jorowags/crep_griskevicius/main/All%20data%20without%20extensi
data <- read.csv(url)
```

```
# Descriptive statistics for project characteristics
# Frequency tables for project code, survey language, countries, institute code, setting, and condition
frq(data$project_code)
```

```
## x <integer>
## # total N=3798 valid N=3798 mean=13.11 sd=6.63
##
## Value |   N | Raw % | Valid % | Cum. %
## --------------------------------------
##     1 | 149 |  3.92 |    3.92 |   3.92
##     2 | 107 |  2.82 |    2.82 |   6.74
##     3 | 156 |  4.11 |    4.11 |  10.85
##     4 |  82 |  2.16 |    2.16 |  13.01
##     5 | 142 |  3.74 |    3.74 |  16.75
##     6 |  70 |  1.84 |    1.84 |  18.59
##     7 | 104 |  2.74 |    2.74 |  21.33
##     8 | 265 |  6.98 |    6.98 |  28.30
##     9 | 109 |  2.87 |    2.87 |  31.17
##    10 | 106 |  2.79 |    2.79 |  33.97
##    11 | 306 |  8.06 |    8.06 |  42.02
##    12 | 101 |  2.66 |    2.66 |  44.68
##    13 | 227 |  5.98 |    5.98 |  50.66
##    14 | 286 |  7.53 |    7.53 |  58.19
##    15 | 232 |  6.11 |    6.11 |  64.30
##    16 | 175 |  4.61 |    4.61 |  68.90
##    17 | 118 |  3.11 |    3.11 |  72.01
##    18 | 108 |  2.84 |    2.84 |  74.86
##    19 |  90 |  2.37 |    2.37 |  77.22
##    20 | 102 |  2.69 |    2.69 |  79.91
##    21 | 171 |  4.50 |    4.50 |  84.41
##    22 | 204 |  5.37 |    5.37 |  89.78
##    23 | 306 |  8.06 |    8.06 |  97.84
##    24 |  82 |  2.16 |    2.16 | 100.00
##  <NA> |   0 |  0.00 |    <NA> |   <NA>
```

```r
frq(data$survey_language)
```

```
## x <character>
## # total N=3798 valid N=3798 mean=2.01 sd=0.34
##
## Value   |    N | Raw % | Valid % | Cum. %
## ----------------------------------------
## Dutch   |  204 |  5.37 |    5.37 |   5.37
## English | 3362 | 88.52 |   88.52 |  93.89
## German  |  232 |  6.11 |    6.11 | 100.00
## <NA>    |    0 |  0.00 |    <NA> |   <NA>
```

```r
frq(data$country)
```

```
## x <character>
## # total N=3798 valid N=3798 mean=4.43 sd=2.09
##
## Value           |    N | Raw % | Valid % | Cum. %
## ------------------------------------------------
## Canada          |  811 | 21.35 |   21.35 |  21.35
## Germany         |  232 |  6.11 |    6.11 |  27.46
## Iceland         |  101 |  2.66 |    2.66 |  30.12
## The Netherlands |  204 |  5.37 |    5.37 |  35.49
## UK              |  286 |  7.53 |    7.53 |  43.02
## USA             | 2164 | 56.98 |   56.98 | 100.00
## <NA>            |    0 |  0.00 |    <NA> |   <NA>
```

```r
frq(data$institute_code)
```

```
## x <integer>
## # total N=3798 valid N=3798 mean=8.95 sd=5.79
##
## Value |   N | Raw % | Valid % | Cum. %
## -------------------------------------
##     1 | 256 |  6.74 |    6.74 |   6.74
##     2 | 306 |  8.06 |    8.06 |  14.80
##     3 | 101 |  2.66 |    2.66 |  17.46
##     4 | 584 | 15.38 |   15.38 |  32.83
##     5 | 238 |  6.27 |    6.27 |  39.10
##     6 | 142 |  3.74 |    3.74 |  42.84
##     7 |  70 |  1.84 |    1.84 |  44.68
##     8 | 227 |  5.98 |    5.98 |  50.66
##     9 | 286 |  7.53 |    7.53 |  58.19
##    10 | 232 |  6.11 |    6.11 |  64.30
##    11 | 175 |  4.61 |    4.61 |  68.90
##    12 | 118 |  3.11 |    3.11 |  72.01
##    13 | 108 |  2.84 |    2.84 |  74.86
##    14 |  90 |  2.37 |    2.37 |  77.22
##    15 |  82 |  2.16 |    2.16 |  79.38
##    16 | 102 |  2.69 |    2.69 |  82.07
##    17 | 171 |  4.50 |    4.50 |  86.57
```

```
##    18 | 204 |  5.37 |     5.37 |  91.94
##    19 | 306 |  8.06 |     8.06 | 100.00
##  <NA> |   0 |  0.00 |     <NA> |   <NA>
```

```
frq(data$setting)
```

```
## x <character>
## # total N=3798 valid N=3627 mean=2.62 sd=1.30
##
## Value              |    N | Raw % | Valid % | Cum. %
## ----------------------------------------------------
## Lab                | 1034 | 27.22 |   28.51 |  28.51
## lab - groups       |  899 | 23.67 |   24.79 |  53.29
## lab - individual   |  101 |  2.66 |    2.78 |  56.08
## Online             | 1593 | 41.94 |   43.92 | 100.00
## <NA>               |  171 |  4.50 |    <NA> |   <NA>
```

```
frq(data$condition)
```

```
## x <character>
## # total N=3798 valid N=3791 mean=2.03 sd=0.83
##
## Value          |    N | Raw % | Valid % | Cum. %
## ------------------------------------------------
## control story | 1263 | 33.25 |   33.32 |  33.32
## no story      | 1165 | 30.67 |   30.73 |  64.05
## status story  | 1363 | 35.89 |   35.95 | 100.00
## <NA>          |    7 |  0.18 |    <NA> |   <NA>
```

```
# Counting number of unique projects, survey languages, institutes, and countries to report in manuscri
n_projects <- length(unique(data$project_code[data$project_code != "NANA"]))
n_survey_language <- length(unique(data$survey_language[data$survey_language != "NANA"]))
n_institutes <- length(unique(data$institute_code[data$institute_code != "NANA"]))
n_country <- length(unique(data$country[data$country != "NANA"]))
```

Introduction

The Collaborative Replications and Education Project (Wagge et al., 2019b), or CREP, is one of several initiatives that seeks to improve undergraduate training in research methods. CREP's role includes selecting studies to be closely replicated by students, structuring the methods for the replication, reviewing projects both before and after data collection, and facilitating the publication of a pooled analysis (such as the present paper). While CREP has a pedagogical mission, we hope to also advance science by providing additional evidence for the boundaries of published effects.

CREP participants are students and instructors at institutions around the world. We offer CREP as one alternative to the traditional undergraduate research project; while different models may work better for some instructors, institutions, and students, the CREP offers some benefits that other models may not. First, students learn methods by closely matching the work of scholars in the field. Second, students get to participate in authentic research (Grahe, CITE) that may eventually be published in a pooled analysis and will also be available on the Open Science Framework (osf.io) to meta-analytic researchers in the future.

Third, students learn the importance of many key open science practices and issues such as preregistration, replication, open methods, and open data (Kidwell et al., 2016). Fourth, students engage with reviewers

(CREP team members) external to their institution. Several CREP studies have been published (e.g., Ghelfi et al., 2020; Leighton et al., 2018; Wagge et al., 2019a) and others have been included in meta-analyses (Lehman et al., 2018).

The present report documents a pooled analysis of data collected by teams who signed up to replicate one of CREP's earliest selections for replication: Experiment 1 from Griskevicius et al. (2010).

Status competition and pro-environmental behavior

Can pro-environmental behavior be promoted by inducing status competition? In their paper, Griskevicius and colleagues (2010) reported results of three experiments suggesting that status competition can be used to promote pro-environmental behavior. Namely, authors of the original study showed that activating status motives incites people to choose green products over more luxurious non-green products. In other words, Griskevicius and his associates claim that green purchases are motivated by competitive altruism, that is the notion that people are trying to appear more altruistic when competing for status. Showing publicly pro-environmental behavior suggests people care, these altruistic tendencies are positively valued by others and it gives people prestige and status. Authors of the original study claim that people are even more motivated to shop for green products when they are costly, and not when these products are cheaper than luxurious products.

In CREP, the first experiment from the Griskevicius et al (2010) study was selected. Experiment 1 investigated how activating a motive for status influenced respondents to choose between relatively luxurious non-green and less-luxurious pro-environmental products. Importantly, the prices of both groups of products were equal. The experiment included three conditions, i.e., condition activating status motives and two control motive conditions. Non-green products were selected so they are more desirable than their green counterparts. In the experimental condition participants read a cover "status" story that elicited "a desire for social status", and it was predicted that it will increase the likelihood of choosing prosocial, green products. In the first control condition, participants read a story that elicited similar levels of affect but did not elicit status motives. It was predicted that participants will select non-green products more frequently in the control motive condition. The second control condition did not include a cover story, and participants simply selected among products. In the original paper, using a one-way analysis of variance (ANOVA) on the product composite found a large effect of status prime ($d=0.47$). To summarize, the first experiment of Griskevicius et al (2010) suggested that activating status motives inclines people towards choosing pro-environmental products over more luxurious nongreen products that might signal prosocial, self-sacrificing behavior.

Method

CREP process

This study was selected for replication using the process outlined in Wagge and colleagues (2019). Briefly, in 2014, CREP volunteers located citations for the most-cited 2010 papers from the flagship empirical journals in psychology and its subdisciplines. In this way, CREP was able to both narrow down the pool for selection while also guaranteeing that the paper we selected was both recent and high-interest. The goal was not to find the best paper for replication in terms of the field's specific needs, but rather to find a set of recent, high-interest papers (good candidates for replication). Once the pool of citations had been gathered, CREP coders read the Method section for each paper and indicated whether it was feasible for student teams to replicate in a semester (on a scale of 1-5) and also whether they thought it would be interesting to students (again, on a scale of 1-5) – the feasibility ratings were used to narrow down a final pool, while the interest ratings were used in the final decision-making process if all other factors weighed equally. Documentation of the coding process can be found here: https://osf.io/9kzje/wiki/home/. Once a final pool of papers was narrowed down, CREP recruited professors to look again at the feasibility and interest to narrow it down more, and then the CREP leadership team engaged in internal conversation to select the study or studies that would be selected that year. The process in 2014 resulted in several selected studies, including Experiment 1 from Griskevicius and colleagues.

Once this study was selected, the CREP leadership team sent an email to Dr. Griskevicius as the corresponding author of the original work. The CREP team communicated our process and goals, and asked for input on possible extension hypotheses and guidance for replication teams. The key parts of the correspondence from Dr. Griskevicius can be found here: https://osf.io/vdo0i/wiki/home/. There are two key notes from this correspondence that will be discussed in the context of our results in this paper: first, Dr. Griskevicius noted that the effect may not replicate if participants didn't equate "green" choices with prosocial behavior. Second, Dr. Griskevicius noted that the connection between "green" choices and status was unique to politically liberal groups. The first note will provide us with a lens through which we will interpret our results, while the second provides some context for why many student teams included political ideology in extension hypotheses.

CREP project process

Groups signed up for the project and prepared OSF project pages for pre-data collection review. Prepared pre-data collection project pages had to include materials, analytical strategy, video of procedure, and IRB approval. Project pages were reviewed by two reviewers and the executive reviewer. After revisions, project pages were reviewed again and after obtaining positive feedback, groups were cleared for data collection. Groups had to pre-register project pages before data-collection. After data-collection was completed, project pages were reviewed again by two reviewers and the executive reviewer. At this stage, project pages were revised to include the dataset, a short report about the obtained results, and a completion pledge. Following a positive review, replication was considered successful and the project was completed. Since 2013, 49 groups from nine different countries expressed interest in conducting CREP Griskevicius et al (2010). Eleven groups did not provide their data and one group did not provide the codebook with us, five groups did not complete data collection, three groups did not create the OSF page, four groups dropped out before data collection, and one group did not follow the CREP procedure. The final sample of completed projects included data collected by 24 groups from 6 different countries: USA, UK, Germany, Canada, Netherlands, and Iceland. The overview of groups participating in this project is provided in Table XX in Supplementary materials (https://osf.io/vc5rh/). Over the years, this particular project included about 30 reviewers, 3 CREP assistants, and 3 executive reviewers.

Target sample size The sample size for each group was set to 82 respondents. In CREP, for each project, the sample size was determined to be at least half of the original N. For this study, the targeted sample size was set to 84, but unfortunately, in the documentation file, there was a typo (N=82). However, with multiple groups collecting data, and in this particular case with close to 3,800 participants, we have adequate statistical power to detect a very small focal effect.

Differences from the original study The original study was conducted in a lab, where participants were tested in small groups. Replications were conducted both in the lab and online. Some groups conducted direct replication and some groups included extension variables. Characteristics of the replications are given in Table XX in Supplementary materials (https://osf.io/7zybp/).

Disclosures

Preregistrations Each lab preregistered its materials, protocol, and analytical strategy on Open Science Framework (OSF) before data collection. Additionally, this meta-analysis was pre-registered: https://osf.io/ach3n.

Data, Materials and Resources The authors of the original study provided materials for replications. All groups who completed data collection, uploaded data, analysis, and a short description of results to their OSF project page. All datasets, materials, analytical scripts, and other materials can be found on the central project OSF page (https://osf.io/rh2nw/). The complete codebook for the dataset is available at https://osf.io/7nkhq/.

Reporting We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study.

Ethical approval Data were collected in accordance with the Declaration of Helsinki. This research was approved under an "umbrella" ethics proposal at the University of Belgrade, Serbia. Overarching IRB approval was obtained from the IRB of the Department of Psychology, University of Belgrade, Serbia (https://osf.io/pcwhg/). In addition, all groups obtained local IRB approvals which are available on our OSF project page: https://osf.io/4bfwu/

Sample

```
frq(data$recoded_race)
```

```
## x <character>
## # total N=3798 valid N=1890 mean=8.51 sd=2.56
##
## Value                                |    N | Raw % | Valid % | Cum. %
## ---------------------------------------------------------------------
## African                              |    1 |  0.03 |    0.05 |   0.05
## American Indian or Alaska Native     |   14 |  0.37 |    0.74 |   0.79
## Asian or Asian Indian                |  131 |  3.45 |    6.93 |   7.72
## Black or African American            |  133 |  3.50 |    7.04 |  14.76
## Hispanic or Latino                   |  153 |  4.03 |    8.10 |  22.86
## Middle Eastern or North African      |   28 |  0.74 |    1.48 |  24.34
## Multiracial                          |    8 |  0.21 |    0.42 |  24.76
## Native Hawaiian or Pacific Islander  |    5 |  0.13 |    0.26 |  25.03
## Other                                |   71 |  1.87 |    3.76 |  28.78
## White                                | 1346 | 35.44 |   71.22 | 100.00
## <NA>                                 | 1908 | 50.24 |    <NA> |   <NA>
```

```
frq(data$gender)
```

```
## x <character>
## # total N=3798 valid N=3317 mean=1.61 sd=0.94
##
## Value                          |    N | Raw % | Valid % | Cum. %
## ----------------------------------------------------------------
## Female                         | 2318 | 61.03 |   69.88 |  69.88
## gender variant/non-conforming  |    2 |  0.05 |    0.06 |  69.94
## Male                           |  981 | 25.83 |   29.57 |  99.52
## non-binary or transgender      |    4 |  0.11 |    0.12 |  99.64
## Other                          |    9 |  0.24 |    0.27 |  99.91
## Prefer not to say              |    3 |  0.08 |    0.09 | 100.00
## <NA>                           |  481 | 12.66 |    <NA> |   <NA>
```

Data were collected by student groups in USA, UK, Germany, Canada, Netherlands, and Iceland who participated in the CREP project. In total, the merged dataset contained data collected from 3798 participants. We use datasets collected by 24 groups. All individual datasets are available here: https://osf.io/vc5rh/. All groups collected at least 82 respondents, except for one that collected 70 participants. Nine groups did not collect data on at least one of the following: age, gender, or race/ethnicity. Details about the missing data are available here. The complete dataset is available here: https://osf.io/azq76/.

Procedure

Data were collected in the lab, or online. Each group documented the type of data collection. Respondents were recruited from the student or general population. Each group underwent a pre-data-collection review procedure by CREP reviewers and executive reviewers and made preregistration of their project. After data collection was completed, project pages were again reviewed (post-data-collection review) by the executive reviewer and CREP reviewers. Descriptions of individual datasets, along with all deviations are available in Table XX in Supplementary materials (https://osf.io/vc5rh/).

Treatment of missing data, data preparation, and data analysis

> JORDAN TO-DO: work on this section, address comments from Nate: "What does this mean? What metrics were used to determine if the data from a given study was of a sufficient quality to be included in the analysis? Were there any datasets that did not surpass these metrics? Also, how does the online versus in lab data collection impact the data quality? Were there any methods to ensure online data collection consisted of high quality respondents? Were online participants students from universities, or recruited from crowdsourcing platforms?"

We exclude participants without values on the dependent variables. No replacement of missing values was performed. To create a merged dataset, all individual datasets were accessed and data quality was checked. We contacted groups to obtain information on whether the dataset was raw or transformed and to obtain codebooks when missing. We left missing data as missing. The merged dataset is available on the OSF project page (ADD LINK HERE). Codebook with all variables collected as part of the project is available on https://osf.io/7nkhq/. We report descriptive statistics for each group participating in the project and overall. It includes a number of participants, country, institution, race, gender, conditions, and extension variables if used. As part of confirmatory analyses, we use ANOVA to explore differences between settings (online/lab, testing in-group/testing individually). To note, the original study conducted data collection in a computer lab and tested participants in small groups. For each product (car, soap, and dishwater) we report percentages by condition, Chi-square tests, and Phi coefficients. We also compute a composite green score and run ANOVA across conditions (story, no story, and control story) and report effect size and posthoc comparisons using the LSD test.

We also conduct exploratory analyses to test the moderating role of political orientation. We run 2 x 2 factorial ANOVA to determine whether political orientation (liberal or conservative) interacts with the condition in its association with the composite green score.

Results

Confirmatory Analyses

```
# Original paper: In
# addition to examining the influence of status motives on each
# product individually, we also analyzed the effect of status when the
# three products were combined into a composite. As predicted, a
# one-way analysis of variance (ANOVA) on the product composite
# showed a significant effect of status, F(1, 166) = 8.53, p = .004,
# d = 0.47.

# Our results:
```

```
# Combine no story & control story into a new variable, control

data$new_condition <- recode(data$condition, "control story" = "Control", "no story" = "Control", "statu

# Compute composite green score; recode Y as 1 and N as 0 for green products
# Jordan -> write tetrachoric correlation for internal consistency of composite scale-> or some way of

data$greencar <- recode(data$greencar, "Yes" = 1, "No" = 0)
data$greendishwasher <- recode(data$greendishwasher, "Yes" = 1, "No" = 0)
data$greensoap <- recode(data$greensoap, "Yes" = 1, "No" = 0)

data$total <- data$greencar + data$greendishwasher + data$greensoap
describe(data$total)
```

Composite Green Score

```
##    vars    n mean sd median trimmed  mad min max range  skew kurtosis   se
## X1    1 3750 1.64  1      2    1.67 1.48   0   3     3 -0.12    -1.05 0.02
```

```
mean.composite <- mean(data$total, na.rm = TRUE)
sd.composite <-sd(data$total, na.rm = TRUE)

# Do ANOVA by condition (status, no story, control story)
ungrouped.aov <- aov(data$total ~ condition, data = data)
summary(ungrouped.aov)
```

```
##                 Df Sum Sq Mean Sq F value Pr(>F)
## condition      2      6  3.0604   3.093 0.0455 *
## Residuals   3740   3700  0.9894
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 55 observations deleted due to missingness
```

```
ungrouped.out <- apa_print(ungrouped.aov)
```

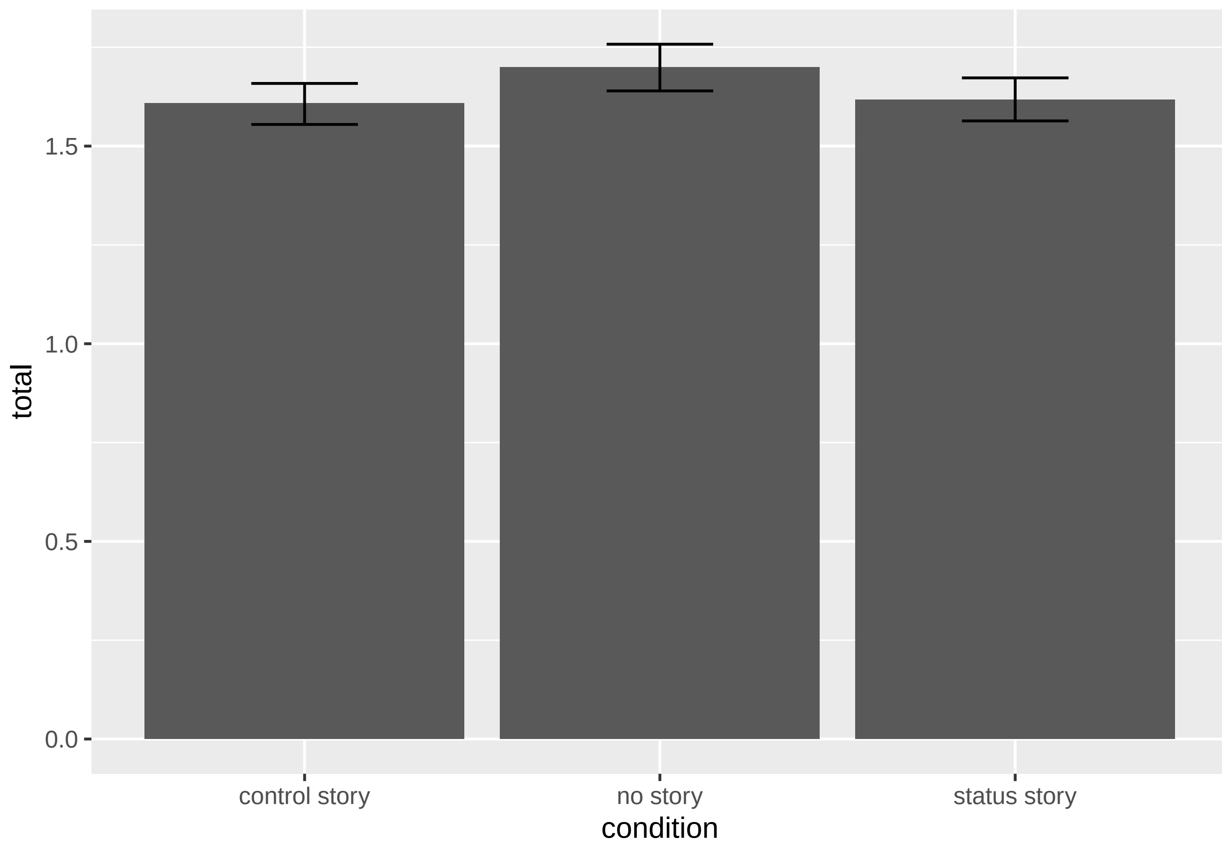
```
## For one-way between subjects designs, generalized eta squared is equivalent to eta squared.
## Returning eta squared.
```

```
# post hoc testing
TukeyHSD(ungrouped.aov)
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = data$total ~ condition, data = data)
##
## $condition
##                                   diff          lwr        upr     p adj
## no story-control story      0.09130435 -0.003922932 0.18653163 0.0635188
## status story-control story  0.00800830 -0.083835889 0.09985249 0.9772226
## status story-no story      -0.08329605 -0.176810370 0.01021827 0.0923446
```

```
# Ungrouped bar graph
ggplot(data[!is.na(data$condition), ], mapping=aes(x=condition, y=total))+
  stat_summary(fun.data=mean_sdl, geom="bar") +
  stat_summary(fun.data=mean_cl_boot, geom="errorbar", width = 0.3)
```

```
## Warning: Removed 48 rows containing non-finite values (stat_summary).
## Removed 48 rows containing non-finite values (stat_summary).
```




```
# Do ANOVA by new condition (control v status)
grouped.aov <- aov(data$total ~ new_condition, data = data)
summary(grouped.aov)
```

```
##                  Df Sum Sq Mean Sq F value Pr(>F)
## new_condition     1      1  1.1206   1.131  0.288
## Residuals      3741   3705  0.9905
## 55 observations deleted due to missingness
```

```
grouped.out <- apa_print(grouped.aov)
```

```
## For one-way between subjects designs, generalized eta squared is equivalent to eta squared.
## Returning eta squared.
```

```
data$total<- as.numeric(data$total)
```

Following the procedure used in the original study, we computed a composite green score by assigning the value "1" to all "green" selections and a score of "0" to all non-"green" selections. Because participants had three dichotomous choices for three products, scores ranged from 0 (no "green" products) to 3 (all "green" products). The mean composite score was 1.6370667 ($SD = 0.9965328$).

Griskevicus and colleagues reported a significant effect of status on the composite score when the status prime condition was compared to both control conditions (control story and no story) together, $F(1,\, 166) = 8.53$, $p = .004$, $d = 0.47$. The same test using our data did not reveal a significant effect, $F(1, 3, 741) = 1.13$, $p = .288$, $\hat{\eta}^2_G = .000$, 90% CI $[.000, .002]$. However, when we examined our three conditions (control story, status story, and no story), a small effect was found, $F(2, 3, 740) = 3.09$, $p = .045$, $\hat{\eta}^2_G = .002$, 90% CI $[.000, .004]$. Post hoc testing using Tukey's HSD correction for multiple pairwise comparisons resulted in no pairwise comparisons with a $p < .05$.

The rest of our analyses combine the "control story" and "no story" conditions into one control group.

```
# From Experiment 1:
# Original paper: 37.2% of participants chose the green
# car in the control condition, 54.5% of participants chose it in the
# status condition, chi2(1, N = 168) = 4.56, p = .033, phi = .165

# Our results
# Percentage selected green car



# Percentage selected green car by condition
car_table <- table(data$new_condition, data$greencar)
prop.table(car_table, 1)
```

Green car

```
##
##                    0         1
##   Control 0.4445368 0.5554632
##   Status  0.4515648 0.5484352
```

```
print(car_table)
```

```
##
##              0    1
##   Control 1070 1337
##   Status   606  736
```

```
# Chi square test with Phi
chisq.test(car_table)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
```

```
##
## data:  car_table
## X-squared = 0.14491, df = 1, p-value = 0.7035
```

```r
phi(car_table, digits = 3)
```

```
##      phi
## -0.00678
```

The original paper found that the green car selection was higher in the status condition (54.5%) than in the control condition (37.2%), chi2(1, N = 168) = 4.56, p = .033, phi = .165. In our sample, 55.55% of control participants selected the green car, compared to 54.84% of the status participants. We were unable to detect an effect of condition on green selection, chi2(1, N = 3749) = 0.14, p = .70, phi = -0.007.

```r
# Original paper: choice of the green cleaner increased from 25.7% in the
# control condition to 41.8% in the status condition, chisq(1, N =
# 168) = 4.52, p = .034, phi = .164

# Our results:
# Percentage selected green soap by condition
soap_table <- table(data$new_condition, data$greensoap)
print(soap_table)
```

Green cleaner

```
##
##              0    1
##   Control 1037 1370
##   Status   603  738
```

```r
prop.table(soap_table, 1)
```

```
##
##                   0         1
##   Control 0.4308268 0.5691732
##   Status  0.4496644 0.5503356
```

```r
# Chi square test
chisq.test(soap_table)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  soap_table
## X-squared = 1.1664, df = 1, p-value = 0.2801
```

```r
# Phi coefficient
phi(soap_table, digits = 3)
```

```
##     phi
## -0.0182
```

Similarly, the original paper found that participants in the status condition selected the green cleaner more frequently than participants in the control condition (41.8% and 25.7%, respectively), chisq(1, N = 168) = 4.52, p = .034, phi = .164. In our sample, 56.92% of the control and 55.03% of the status participants selected the green cleaner. As with the "car" selection, we were unable to detect an effect of condition on choice of cleaner, chi2(1, N = 3748) = 1.17, p = 0.28, phi = -0.02.

```r
# Original paper: Choice of the green dishwasher
# also increased from 34.5% in the control condition to 49.1% in the
# status condition, chisq(1, N = 168) = 3.30, p = .069, eff size .140

# Our results:
# Percentage selected green dishwasher by condition
dishwasher_table <- table(data$new_condition, data$greendishwasher)
print(dishwasher_table)
```

Green dishwasher

```
##
##              0    1
##   Control 1136 1273
##   Status   648  695
```

```r
prop.table(dishwasher_table, 1)
```

```
##
##                   0         1
##   Control 0.4715650 0.5284350
##   Status  0.4825019 0.5174981
```

```r
# Chi square test
chisq.test(dishwasher_table)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  dishwasher_table
## X-squared = 0.37087, df = 1, p-value = 0.5425
```

```r
# Phi coefficient
phi(dishwasher_table, digits = 3)
```

```
##     phi
## -0.0105
```

Finally, the original paper also reported greater that selection of the green dishwasher was more likely in the status condition than the control condition (49.1% and 34.5%, respectively), chisq(1, N = 168) = 3.30, p = .069, eff size .140, while we found no such effect when comparing the 52.84% of control participants who selected the green dishwasher to the 51.75% of status prime participants who did the same, chisq(1, N = 3752) = 0.37, p = .54, phi = -0.01.

Exploratory Analyses

JORDAN TO-DO:

1. Make a variable that combines lab, lab individual and lab groups and compare results across that with in-person
2.

When the CREP team first contacted the original authors about the replication, they recommended examining political orientation as a possible extension variable. Therefore, many groups decided to add a question about political orientation (liberal/conservative) and others added a question about political party (Republican/Democrat/Independent); some groups added both questions, and some groups added questions with responses that were more fitting to their particular country (e.g., Canada). We decided to use this data to compare liberal/conservative on green selections. Some institutions measured this with a scale (from very liberal to very conservative, for example), while others measured it with categorical response types (e.g., liberal, conservative, neutral). We collapsed over these responses to create a variable with one category for "liberal" that included all responses indicating any degree of being liberal, another category for "conservative" that included any response indicating being conservative, and excluded any "neutral" or "other" responses from this variable.

```
n.conservative = sum(data$LiborCon=='Conservative', na.rm = TRUE)
n.liberal = sum(data$LiborCon=='Liberal', na.rm = TRUE)
```

Using this method of collapsing data, we found that n = 556 participants identified as conservative, while n = 744 participants identified as liberal.

```
# Insert 2 x 2 factorial ANOVA with condition & political orientation on composite green score

aov.out <- aov(total ~ LiborCon * new_condition, data = data)
apa_anova <- apa_print(aov.out)



mean.liberal <- mean(data$total[data$LiborCon=="Liberal"], na.rm = TRUE)
mean.conservative <- mean(data$total[data$LiborCon=="Conservative"], na.rm = TRUE)

sd.liberal <- sd(data$total[data$LiborCon=="Liberal"], na.rm = TRUE)
sd.conservative <- sd(data$total[data$LiborCon=="Conservative"], na.rm = TRUE)

mean.control <- mean(data$total[data$new_condition=="Control"], na.rm = TRUE)

mean.status <- mean(data$total[data$new_condition=="Status"], na.rm = TRUE)

sd.control <- sd(data$total[data$new_condition=="Control"], na.rm = TRUE)

sd.status <- sd(data$total[data$new_condition=="Status"], na.rm = TRUE)
```

Liberal/conservative

> Note from Michał in google doc: this tool isn't really described in such a way that a reader could use it in their own research. I suggest to either describe it here in more detail, including the response format, or do it in the Appendix (I think this option will be even better, as those are exploratory analysis, so these should not occupy too much of the main body of the article).

We conducted a 2 x 2 factorial ANOVA (political orientation: liberal vs. conservative; condition: control vs. experimental) to determine whether political orientation (liberal or conservative) interacted with condition in its association with the composite green score. As predicted, we did find a main effect of political orientation such that participants who identified as liberal selected significantly more green products on average ($M = 1.87214$, $SD = 0.9760289$) than participants who identified as conservative ($M = 1.2495479$, $SD = 0.9683042$), $F(1, 1, 292) = 129.76$, $p < .001$, $\hat{\eta}^2_G = .091$, 90% CI $[.068, .117]$. As we found earlier, there was also no main effect of condition; the mean scores for participants in the grouped control condition (M = 1.6527893, SD = 0.9936127) did not differ from those in the status condition (M = 1.616704, SD = 0.9981273), $F(1, 1, 292) = 0.48$, $p = .490$, $\hat{\eta}^2_G = .000$, 90% CI $[.000, .004]$. There was also no interaction between the two variables, $F(1, 1, 292) = 0.34$, $p = .560$, $\hat{\eta}^2_G = .000$, 90% CI $[.000, .004]$.

```r
n.republican = sum(data$RorD=='Republican', na.rm = TRUE)
n.democrat = sum(data$RorD=='Democrat', na.rm = TRUE)
```

```r
# Insert 2 x 2 factorial ANOVA with condition & political party on composite green score

aov.out2 <- aov(total ~ RorD * new_condition, data = data)
apa_anova2 <- apa_print(aov.out2)



mean.rep <- mean(data$total[data$RorD=="Republican"], na.rm = TRUE)
mean.dem <- mean(data$total[data$RorD=="Democrat"], na.rm = TRUE)

sd.rep <- sd(data$total[data$RorD=="Republican"], na.rm = TRUE)
sd.dem <- sd(data$total[data$RorD=="Democrat"], na.rm = TRUE)
```

Democrat/republican

> Suggestion from Aleksandra in doc: describe how dem/rep collapsed

Similarly, when we grouped participants into "Republican" ($n = 182$) and "Democrat" ($n = 333$) categories, we did find a main effect of political party such that participants who identified as Democrat selected significantly more green products ($M = 1.7703927$, $SD = 1.0247688$) than participants who identified as Republican ($M = 1.122905$, $SD = 0.8588472$), $F(1, 506) = 51.66$, $p < .001$, $\hat{\eta}^2_G = .093$, 90% CI $[.056, .135]$. There was, however, no interaction between political party and condition, $F(1, 506) = 0.12$, $p = .724$, $\hat{\eta}^2_G = .000$, 90% CI $[.000, .001]$, and as reported in the "Liberal/Conservative" subsection above, there was no main effect of condition (control: $M = 1.6527893$, $SD = 0.9936127$; status: $M = 1.616704$, $SD = 0.9981273$), $F(1, 506) = 0.76$, $p = .385$, $\hat{\eta}^2_G = .001$, 90% CI $[.000, .012]$.

Discussion

References

Frank, M. C., & Saxe, R. (2012). Teaching replication. Perspectives on Psychological Science, 7(6), 600-604.

Ghelfi, E., Christopherson, C. D., Urry, H. L., Lenne, R. L., Legate, N., Ann Fischer, M., Wagemans, F. M. A., Wiggins, B., Barrett, T., Bornstein, M., de Haan, B., Guberman, J., Issa, N., Kim, J., Na, E., O'Brien, J., Paulk, A., Peck, T., Sashihara, M., … Sullivan, D. (2020). Reexamining the effect of gustatory disgust on moral judgment: A multilab direct replication of Eskine, Kacinik, and Prinz (2011). Advances in Methods and Practices in Psychological Science, 3–23. https://doi.org/10.1177/2515245919881152

Grahe, J. E., Reifman, A., Hermann, A. D., Walker, M., Oleson, K. C., Nario-Redmond, M., & Wiebe, R. P. (2012). Harnessing the Undiscovered Resource of Student Research. Perspectives on Psychological Science, 7(6), 605–607. https://doi.org/10.1177/1745691612459057

Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going green to be seen: status, reputation, and conspicuous conservation. Journal of personality and social psychology, 98(3), 392.

Kidwell, M. C., Lazarević, L. B., Baranski, E., Hardwicke, T. E., Piechowski, S., Falkenberg, L. S., … & Nosek, B. A. (2016). Badges to acknowledge open practices: A simple, low-cost, effective method for increasing transparency. PLoS biology, 14(5), e1002456.

Leighton, D. C., Legate, N., LePine, S., Anderson, S. F., & Grahe, J. (2018). Self-esteem, self disclosure, self-expression, and connection on Facebook: A collaborative replication meta-analysis. Psi Chi Journal of Psychological Research, 23(2). https://doi.org/10.24839/2325-7342.JN23.2.94

Lehmann, G. K., Elliot, A. J., & Calin-Jageman, R. J. (2018). Meta-analysis of the effect of red on perceived attractiveness. Evolutionary Psychology, 16(4), 1474704918802412.

Perlman, B., & McCann, L. I. (2005). Undergraduate research experiences in psychology: A national study of courses and curricula. Teaching of Psychology, 32(1), 5-14.

R Core Team. (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing. https://www.R-project.org/

R Studio Team. (2016). RStudio: Integrated Development for R. RStudio Inc. http://www.rstudio.com/

Standing, L. G., Grenier, M., Lane, E. A., Roberts, M. S., & Sykes, S. J. (2014). Using replication projects in teaching research methods. Psychology Teaching Review, 20(1), 96-104.

Wagge, J. R., Baciu, C., Banas, K., Nadler, J. T., Schwarz, S., Weisberg, Y., IJzerman, H., Legate, N., & Grahe, J. E. (2019a). A demonstration of the Collaborative Replications and Education Project: Replication attempts of the red-romance effect. Collabra: Psychology, 5(1), 5. https://doi.org/10.1525/collabra.177

Wagge, J. R., Brandt, M. J., Lazarevic, L. B., Legate, N., Christopherson, C., Wiggins, B., & Grahe, J. E. (2019). Publishing research with undergraduate students via replication work: The collaborative replications and education project. Frontiers in psychology, 10, 247

Wagge, J. R., Hurst, M. A., Brandt, M. J., Lazarevic, L. B., Legate, N., & Grahe, J. E. Teaching Research in Principle and in Practice: What Do Psychology Instructors Think of Research Projects in Their Courses?.