CREP\_Griskevicius.Rmd

Jordan Wagge

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url <- "https://raw.githubusercontent.com/jorowags/crep\_griskevicius/main/All%20data%20without%20extension%20variables.csv"  
data <- read.csv(url)

data[data == ""] <- NA

# Descriptive statistics for project characteristics  
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>

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>

frq(data$countries)

## NULL

frq(data$institute\_code)

## x <integer>   
## # total N=3798 valid N=3015 mean=6.63 sd=3.96  
##   
## Value | N | Raw % | Valid % | Cum. %  
## --------------------------------------  
## 1 | 256 | 6.74 | 8.49 | 8.49  
## 2 | 306 | 8.06 | 10.15 | 18.64  
## 3 | 101 | 2.66 | 3.35 | 21.99  
## 4 | 584 | 15.38 | 19.37 | 41.36  
## 5 | 238 | 6.27 | 7.89 | 49.25  
## 6 | 142 | 3.74 | 4.71 | 53.96  
## 7 | 70 | 1.84 | 2.32 | 56.29  
## 8 | 227 | 5.98 | 7.53 | 63.81  
## 9 | 286 | 7.53 | 9.49 | 73.30  
## 10 | 232 | 6.11 | 7.69 | 81.00  
## 11 | 175 | 4.61 | 5.80 | 86.80  
## 12 | 118 | 3.11 | 3.91 | 90.71  
## 13 | 108 | 2.84 | 3.58 | 94.30  
## 14 | 90 | 2.37 | 2.99 | 97.28  
## 15 | 82 | 2.16 | 2.72 | 100.00  
## <NA> | 783 | 20.62 | <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 | 1363 | 35.89 | 35.95 | 100.00  
## <NA> | 7 | 0.18 | <NA> | <NA>

n\_projects <- length(unique(data$project\_code[data$project\_code != "NANA"]))  
  
n\_survey\_language <- length(unique(data$survey\_language[data$survey\_language != "NANA"]))  
  
# JORDAN -> WTF IS THIS OUTPUT  
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, 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 over their green counterparts. In 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 control motive condition. Second control condition did not include cover story and participants simply selected among products. However, the original study did not find a difference between two control conditions, thus it was decided to replicate the experiment in CREP with only the first control condition.

## 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.

### This 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. After data-collection, project pages were revised to include the dataset, short report about the obtained results and completion pledge. After obtaining a positive review, replication was considered successful and the project was completed. Since 2013, 32 groups from eight different countries expressed interest in conducting CREP Griskevicius et al (2010). Five groups dropped out before data collection, and two groups did not follow the CREP procedure. In addition, six groups obtained positive pre-data collection review but, due to COVID-19 pandemic, had to cancel the data collection project. Final sample of completed projects included data collected by 24 groups from 6 different countries. Overview of groups participating in this project is provided in Table XX. Over the years, this project included about 30 reviewers, 3 CREP assistants and 3 executive reviewers.

### Disclosures

#### Preregistrations

Each lab preregistered their materials, protocol and analytical strategy on Open Science Framework (OSF) before data collection (ADD osf PAGE HERE).

#### Data, Materials and Resources

All groups who completed data collection, uploaded data, analysis, and 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 (add OSF project page here).

#### Ethical approval

Each lab obtained Institutional Review Board or similar institution approval before starting with data collection (individual approvals are available on groups’ project pages). All data were collected in accordance with the Declaration of Helsinki. We also obtained ethical approval for meta-analysis from the IRB of the Department of Psychology, University of Belgrade (Protocol #2021-69).

### Participants

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=3602 mean=3.15 sd=1.97  
##   
## Value | N | Raw % | Valid % | Cum. %  
## ---------------------------------------------------------------  
## female | 400 | 10.53 | 11.10 | 11.10  
## Female | 1918 | 50.50 | 53.25 | 64.35  
## gender variant/non-conforming | 2 | 0.05 | 0.06 | 64.41  
## male | 150 | 3.95 | 4.16 | 68.57  
## Male | 831 | 21.88 | 23.07 | 91.64  
## non-binary or transgender | 2 | 0.05 | 0.06 | 91.70  
## None given | 106 | 2.79 | 2.94 | 94.64  
## None given | 179 | 4.71 | 4.97 | 99.61  
## other | 3 | 0.08 | 0.08 | 99.69  
## Other | 6 | 0.16 | 0.17 | 99.86  
## Prefer not to answer | 1 | 0.03 | 0.03 | 99.89  
## Prefer not to say | 2 | 0.05 | 0.06 | 99.94  
## Transgender | 2 | 0.05 | 0.06 | 100.00  
## <NA> | 196 | 5.16 | <NA> | <NA>

### Procedures

### Materials

## Results

### Confirmatory Analyses

#### Composite Green Score

# 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", "Status" = "Status")  
  
# 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  
  
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)

## 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

# JORDAN INSERT EFFECT SIZE MEASURE  
# DO GRAPH TO LOOK AT DIFFS BTW GROUPS  
  
   
# 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

data$total<- as.numeric(data$total)  
cohen.d(total ~ new\_condition, data = data)

## Call: cohen.d(x = total ~ new\_condition, data = data)  
## Cohen d statistic of difference between two means  
## lower effect upper  
## total -0.1 -0.04 0.03  
##   
## Multivariate (Mahalanobis) distance between groups  
## [1] 0.036  
## r equivalent of difference between two means  
## total   
## -0.02

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 (two levels: control and status) on the composite score, *F*(1, 166) = 8.53, *p* = .004, *d* = 0.47. The same test using our data did not reveal a significant effect, *F*(1, 3741) = 1.13, *p* = 0.29, *d* = -0.04.

#### Green car

# 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 by condition   
car\_table <- table(data$new\_condition, data$greencar)  
prop.table(car\_table, 1)

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

# 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

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. However, we were unable to detect the effect of condition on green selection, chi2(1, N = 2801) = 0.06, p = .81, phi = -0.005.

#### Green cleaner

# 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)  
prop.table(soap\_table, 1)

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

# 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

# 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, while we were unable to detect this effect, chi2(1, N = 2800) = 3.81, p = .051, phi = -0.038.

#### Green dishwasher

# 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)  
prop.table(dishwasher\_table, 1)

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

# 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

# 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, chisq(1, N = 2804) = 0.23, p = .63, phi = -0.01.

### Exploratory Analyses

JORDAN: Work on incorporating revisions from collaborators Ask Nate Green to write the exploratory analyses he suggested

When we 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 = 550 participants identified as conservative, while n = 744 participants identified as liberal.

#### Liberal/conservative

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* = XXX, *SD* = XXX) than participants who identified as conservative (*M* = XXX, *SD* = XXX), *F*(XXX) = XXX, *p* < XXX, eta^2 = XXX As we found earlier, there was also no main effect of condition (following approach by Griskevicius et al., we merged control and “no story” conditions into one status and control, with no story and control story grouped together). There was also no interaction between the two variables, *F*(XXX) = XXX, *p* = XXX

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

#### Democrat/republican

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* = XXX, *SD* = XXX) than participants who identified as Republican (*M* = XXX, *SD* = XXX), *F*(1, XXX) = XXX, *p* < XXX, eta^2 = XXX There was, however, no interaction between political party and condition, *F*(1, XXX) = XXX, *p* = XXX

## Discussion

## References

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