

**TITLE:** How do colors convey political information and affect individual attitudes?

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**VERSION:** 0.0.1

**PRINCIPAL INVESTIGATOR (PI):**

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**KEY PERSONNEL**

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**Role in project**: Faculty Advisor

**GENERAL RESEARCH STAFF**

NA

* **OBJECTIVES**

The study seeks to test the following hypotheses about how people interact with color as it relates to politics:

* People notice color in campaign branding.
* Red yard signs are associated with Republicans; Blue yard signs are associated with Democrats.
* Republicans support candidates using red on their yard signs; Democrats support candidates using blue on their yard signs.
* Republicans spend less time evaluating red yard signs; Democrats spend less time evaluating blue yard signs.
* **BACKGROUND AND SIGNIFICANCE**

Existing work in political science recognizes the tendency for Republicans to use the color red and for Democrats to use the color blue in the party branding. This has been quite common as a result of the standardization in election campaign coverage during the 2000 Presidential election using the color red to describe districts that Republicans have won and the use of the color blue to describe districts that Democrats won. Concurrently, the existing literature in political science has a big gap in our theorizing about how color can be used as a form of information for Americans. This project tries to fill this gap to explain this phenomenon that has been going on since 2000. It will help us understand the strategic motivations of campaigns as they continue to differentiate themselves from opponents/the other political party. It will also help us understand how voters can come to conclusions about who they are going to vote for without significant information about the candidate’s policies, but rather, based on whether the candidates have branded themselves as a Republican or a Democrat.

* **PRELIMINARY STUDIES**

In the spring of 2019, I performed a preliminary study on 400 undergraduates at Boise State University. This preliminary study showed some initial evidence supporting my first two hypotheses (noted above). This preliminary study had a number of weaknesses which necessitated an updated and more sophisticated approach to answering my questions.

* **RESEARCH STUDY DESIGN**

Participants will first complete a basic questionnaire that includes demographics, questions about party identification, factual questions to capture levels of political knowledge, and a battery of items to measure levels of patriotism. Out of concern that these questions may prime subjects, I will randomly assign participants to either view these questions before or after the treatment. Additionally, I ask participants about their sex assigned at birth and whether they have been diagnosed with any form of color blindness. I ask these questions as color blindness or visual impairment may have an impact upon the success of uptake for my treatment.

Additionally, participants will be asked to write open-ended responses to four open ended questions – these ask them to describe (1) “their first memory of politics”, (2) “what occurred in the most recent political event they heard about”, (3) how they “keep up with current events in politics”, (4) “what occurred in the most recent non-political event” they saw in the news. The goal of these four questions is to detect participants providing insincere responses; those who provide identical answers may be using similar VPN’s (which may allow me to screen out these answers so that they do not contaminate my results).

There are three trials in the experiment, each coming right after the previous one. In each trial, participants are randomly chosen to be shown two of three possible political yard signs (a Blue dominant, Red dominant, or White and Black – the placebo – yard sign). The yard signs will be partially obstructed so that participants can only see only the 8% of their screen around their cursor at a time. This is done using the mouseview.js JavaScript extension. The yard sign will be visible for 5000 milliseconds (5 seconds). After viewing each yard sign, the participants will be asked to determine whether the candidate was a “Republican”, “Democrat”, or “Neither”. After viewing the two yard signs in each trial, they will then be asked to report which candidate they intend to vote for. The trials occur the same way. The difference between trials 1,2, and 3 are the amount of red, blue, and white are on the yard signs. The total expected time for participants in the study should not be longer than about 6 minutes.

About the Data Analysis – estimates of Sample Size for the Study:

As my estimation strategy does not assume long-run convergence to the population, many assume that my Bayesian models are agnostic to the sample size (Bayesian models often eschew power analyses). However, as estimates from a Bayesian model are weighted by the observed data and my priors, I want to examine the robustness of my model specification using simulated data that vary on sample size. While I do expect that my priors will shift slightly depending on my pre-registered analyses (and upon exploratory data analysis once I collect my data), using simulated data to examine my analytical pipeline offers the opportunity to demonstrate my model specification’s ability to converge upon parameters defined by a hypothetical data generating process.

Using the fabricatr R package, I have simulated a population with an N of 1,000,000. The specified data generating processes for each of the variables are included in Listing 1 and Listing 2. I then generate 500 random samples for each sample size of 200, 400, 600, and 800 participants. This sample size is not the size of the total sample I intend to recruit but is the total sample that I have data on (after excluding those who fail attention checks and those who provide duplicate responses). Some estimate that insincere responses account for upwards of 40% of a researcher’s original sample (Kennedy et al. 2021). Therefore the total sample that I recruit from Prolific should be at most 40% larger than the total sample size used in these simulations.

To examine my analytic strategy’s ability to converge upon the population’s data generating process for respondents’ perceptions of the fictional candidate’s partisanship, I specify an ordinal logistic regression where I set relatively constrained priors upon the beta coefficients, as depicted in the equation below.

𝛼 ∼ 𝑆𝑡𝑢𝑑𝑒𝑛𝑡 − 𝑇 (3, 0, 2.5)

𝛽𝑖 ∼ 𝑁 𝑜𝑟𝑚𝑎𝑙(0, 1)

𝑃𝑎𝑟̂𝑡𝑦𝑖 = 𝐶𝑢𝑚𝑢𝑙𝑎𝑡𝑖𝑣𝑒(𝑙𝑜𝑔𝑖𝑡−1(𝛼1 + 𝛼2

+𝛽1 × 𝑅𝑒𝑑𝑇 𝑟𝑒𝑎𝑡𝑚𝑒𝑛𝑡 + 𝛽2 × 𝐵𝑙𝑢𝑒𝑇 𝑟𝑒𝑎𝑡𝑚𝑒𝑛𝑡

+𝛽3 × 𝑎𝑔𝑒 + 𝛽4 × 𝑅𝑒𝑑𝑡𝑟𝑒𝑎𝑡𝑚𝑒𝑛𝑡 × 𝑎𝑔𝑒 + 𝛽5 × 𝐵𝑙𝑢𝑒𝑡𝑟𝑒𝑎𝑡𝑚𝑒𝑛𝑡 × 𝑎𝑔𝑒

+𝛽7 × 𝐴𝑡𝑡𝑒𝑛𝑡𝑖𝑜𝑛 + 𝛽7 × 𝐾𝑛𝑜𝑤𝑙𝑒𝑑𝑔𝑒))

These priors suggest that I believe 68% of my beta coefficients, given the data, should be between -1 and 1; with the median of the estimates at 0. After fitting each model, I construct 95% high density interval credible intervals from the model’s posterior draws. I then record a value of 1 if the credible interval does not contain zero (true positive) and a value of 0 if the credible interval does (false negative) for each parameter. Once I have run each of my

models for the specified sample size, I calculate the average of true positive and false negatives. This gives me a percentage of the time that I would come to the correct conclusion that there is a non-zero effect on that parameter.

The results of my simulation suggest that I should aim for a sample of 600 respondents once I have excluded those that do not meet the inclusion criteria (i.e., fail attention checks, duplicated IP addresses and provide insincere responses to the open-ended prompts). I should aim to recruit a total of 1000 participants for the study.

|  |  |
| --- | --- |
| Name of procedure/instrument/tool | Purpose (i.e., what data is being collected?) |
| Mouseview.JS (Treatment | * The latitude and longitude (in pixels) the cursor is at. * How long that cursor stays at that particular spot on the screen. * Perception of party identification of candidate owning the yard sign * Preference between yard signs viewed. |
| Demographics questions | * Age * Race * Gender identity * Sex * Education |
| Politics questions | * Party identification * Political knowledge * Open-ended questions |

* **FUNDING**

The Department of Political Science here at CU will cover the cost of the experiment up to $2057.

* **ABOUT THE SUBJECTS**

I aim to have 1000 subjects participate in the study. The population of interest are adults (18+) with a U.S. citizenship. Participants will be asked to use a web browser other than Safari (as this interferes with the tracking software).

|  |  |
| --- | --- |
| Subject Population(s) | Number to be enrolled in each group |
| U.S. Adults | 1000 |
|  |  |

* **VULNERABLE POPULATIONS**

NA

* **RECRUITMENT METHODS**

Participants will be recruited through the online survey experiment platform Prolific. Participants are those who have signed up themselves to earn money by participating in online surveys and survey experiments. The recruitment settings I have on Prolific require that my study shows up on the list of studies that individuals can opt into only for those that are citizens of the United States – this aids in my goal of having a nationally representative sample.

Participants will be taken to the informed consent page if they choose my study. For those who agree to participate, they will be redirected to Pavlovia, a program that runs my study and collects the data on the participants. For those who disagree to participating after reading the Informed Consent statement, they will be able to return back to the page on Prolific listing possible studies they can participate in. At any time participants, can close their browser to leave my study, even if they have agreed to the Informed Consent. Only participants that complete the study will be considered as part of my sample and will be compensated after being redirected to Prolific after completion on Pavlovia – this is noted in the informed consent.

|  |
| --- |
| List recruitment methods/materials and attach a copy of each in eRA |
| * Prolific |
|  |
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* **COMPENSATION**

Upon completion of the study, participants will be automatically redirected to Prolific. Once there, participants will be compensated through their Prolific account according to their policies. Compensation will be calculated based on a $12.00/hour rate using the amount of time participants took to complete the study (as determined by Prolific). I anticipate the average participant should take no more than 6 minutes, on average, to complete my study, which means ~$1.2 per participant.

* **INFORMED CONSENT**

Before beginning the study, participants will be presented with the Informed Consent document. Before participants can begin the study, they will need to “Agree” to participate in the study. For those that do not want to participate in the study after viewing the informed consent agreement, they can instead click “Disagree”, at which point they will be returned back to the previous screen on Prolific.

* **PROCEDURES**

Participants will be recruited through Prolific. Participants will be presented with Informed Consent. Once Informed Consent is provided, participants will be redirected to Pavlovia to complete the rest of the study.

The participants will answer the Political Attitudes Questionnaire which will comprise of self-reported answers to their party affiliation, their knowledge about politics, and their interest in politics. They will also complete the demographics and background questions, which comprises of self-reported answers to their age, education, race and ethnic identity, their gender identity, their sex, and whether they have been diagnosed with visual impairments.

Participants will then be exposed to three trials for the experiment. While exposed to the treatments, data will be collected on the location of the screen their cursor is on and the amount of time the cursor spends in that location. This data will only be collected when viewing the yard signs (the treatments). The participants will also provide self-reported data on their perceptions of the party identification of the owner of the yard signs, as well as their own preference for each pair of treatments they view.

At the end of the study, participants will be debriefed then and directed back to Prolific.

|  |  |  |  |
| --- | --- | --- | --- |
| Visit # | Procedures/Tools | Location | How much time the visit will take |
| 1 | * Political attitudes questionnaire * Demographics and background questionnaire * Treatment | * Pavlovia after being redirected from Prolific | 5 minutes |
|  |  |  |  |
|  |  |  |  |

* **SPECIMEN MANAGEMENT**

NA

* **DATA MANAGEMENT**

The Data Security Risk Level for this study is Standard. The data will be collected on Pavlovia and deidentified data will be downloaded in a database format. The database with the deidentified data will be stored on a password-protected device in a locked office. As individuals are recruited through Prolific, I have minimal interaction with participants – the platform is providing the respondents, like other providers (Mechanical Turk, YouGov, etc.).

* **PROVISIONS TO PROTECT THE PRIVACY INTERESTS OF PARTICIPANTS**

The data of the participants will be collected mostly through self-reports. The only data not explicitly provided by participants will be cursor tracking information that is collected only while viewing the treatments, but at no other point. This data only includes the latitude and longitude (in pixels) that a cursor is on their screen at any point in time, along with the amount of time (in milliseconds) their cursor sits at that location on the screen.

Participants can take the study in the setting of their choosing, on a device of their choosing.

* **WITHDRAWAL OF PARTICIPANTS**

Once participants have provided informed consent, the researchers will not withdraw participants. Any premature completion the study on behalf of the participants will be their choice or if they face technical problems (e.g., disconnection from the internet).

* **RISKS TO PARTICIPANTS**

I anticipate minimal risks to participants. As the subject material is about politics, participants may experience slight psychological discomfort, but no part of the study intends to induce discomfort/more discomfort than people may normally experience when coming across political materials in the everyday world.

* **MANAGEMENT OF RISKS**

NA (minimal risk)

Informed consent is obtained, and a statement at the end of the study provides additional information on the purpose of the study.

* **POTENTIAL BENEFITS**

There is no direct benefit to the subjects.

The study hopes to contribute to our collective understanding of how colors may convey politically-relevant information to individuals. I hope that this will explain the effects of political polarization coming from such information, how voters can use such simple sources of information to make decisions about which candidates to vote for, and how the choice to use particular colors in politics may cue (either accurately or inaccurately) policy preferences of candidates.

* **PROVISIONS TO MONITOR THE DATA FOR THE SAFETY OF PARTICIPANTS**

NA (minimal risk)

* **MEDICAL CARE AND COMPENSATION FOR INJURY**

NA

* **COST TO PARTICIPANTS**

Participation should take only about 5 minutes. Participants should have internet access and can perform the study on a laptop, desktop, tablet, or mobile device. There are no required additional costs to the participant.

* **DRUG ADMINISTRATION**

NA

* **INVESTIGATIONAL DEVICES**

NA

* **WORKING WITH OTHER INSTITUTIONS**

NA

* **SHARING OF RESULTS WITH PARTICIPANTS**

During debriefing, participants are welcomed to email the researchers about the study and are told that I am happy to share results and papers that use the data from this study.

* **REFERENCES**