How do colors convey political information and effect individual attitudes?

ANONYMISED AUTHOR(S) *Anonymised Institution(s)*

Are colors important to politics as a form of political information? In this project I argue that they are. Building upon existing theories of political information processing and common theories of information processing, attitude formation, and affect in neuroscience, I present a snap-judgement model of political information processing. In this model, colors provide automatic information about a politically-relevant object that may shape subsequent processing of more complex information that the political science literature is more familiar with. The model has important implications for how we consider the role that visual information has on political information processing and attitude formation. The model additionally provides clarity on motivations behind party branding and the ways in which information may activate partisan biases pre-consciously.

Anonymised submission.

INTRODUCTION

Are colors important to politics? This chapter argues that they are; at least that they convey information that voters and campaigns care about.

THE ROLE OF VISUAL INFORMATION IN POLITICS

As the rise of television consumption necessitated a change in the focus of the medium in the research for political communication scholars (Hall Jamieson, 2014), so too does the rise of image-based social media. For a number of methodological and disciplinary reasons, the visual aspects of television were not of much focus in the literature (Bucy & Joo, 2021). However, with the trend towards ubiquitous use of the public to use image-dominant social media platforms like TikTok and Instagram, news organizations and politicians have responded and are relatively active on these platforms as well. In response, we, as scholars, need to make this transition to integrate the role of simple visual information into our theories of political information processing (abbreviated as *pip*) and attitude formation.

A number of scholars make this same argument. An edited issue of *The International Journal of Press/Politics* is centered around making the point that visual politics is understudied; yet important (Lilleker, 2019). Those who are engaged in these sorts of question attribute these challenges to methodological and the requirement for the difficult task of interdisciplinary theorizing to engage in such questions (Bucy & Joo, 2021; Gerodimos, 2019).

How does politically-relevant visual information matter to politics? From a evolutionary-biological perspective, visual information is a common source of information for millions of years that a variety of single-and-multi-cell organisms rely upon to evaluate their environment (see Grabe & Bucy, 2009, Chapter 1 for a useful discussion). Visual information processing, as an ancient biological invention, the human brain is organized around the processing of it. Reflecting this, many scholars of neuroscience argue visual information to be the fastest form of information processing for humans. For example, even complex visual information such as the warmth expressed in someone's facial features are automatically and subconsciously processed in only about 33ms (Ames et al., 2012).

Approached from a different perspective, as humans are cognitive misers , visual information in

the realm of politics provides efficient information to voters about politically-relevant actors and events (Lilleker, 2019). Evidence suggests that voters rely on simple visual information in the background of an image to infer the ideological position (Dan & Arendt, 2021) and that their coverage reflects electability perceptions (Stewart et al., 2021) – which influences reported desire to vote for the candidate. Images posted on social media by politicians provide more personalized information about them and that they take on their own styles (Lindholm et al., 2021; Peng, 2021); reflecting that it is an alternative source of information curated to attract support.

While visual politics is enjoying more attention by social scientists, there is still little focus on the simplest visual information: color. In the context of the United States, the "Republican red" and "Democratic blue" are a relatively recent invention that likely has significant import in a era of significant effort by the parties to distinguish themselves from each other (Clifford, 2020) and where voters toe the party line (Utych, 2020). Since the 2000 presidential election, the media have consistently used the color red on their electoral maps in "horserace" journalism to represent Republicans and blue to represent Democrats (Elving, 2014). The supposed consequence of this is that Democrats now report preference for the color blue over the color red; and Republicans report a preference for the color red over the color blue (Schloss & Palmer, 2014). Beyond this however, we have yet to robustly develop and test theories about the broader impacts that color has on political information processing and attitude formation.

As the broader field of study of visual politics is under-theorized, theorizing about the use of color as a form of information is also quite limited – perhaps even more so. The literature that does exist argues that colors are a source of visual information to classify more abstract concepts for voters. For example, in western Europe, voters are better at connecting the ideological positioning of a party with the color they use in their branding, the longer-surviving and more prominent the party is (Casiraghi et al., 2022). The use of politically-relevant colors activate biases toward pre-existing ideological and partisan preferences among voters in a Spanish sample (Maestre & Medero, 2022). It remains unclear, however, what the particular psychological mechanism drives this, and how even colors as a form of political information, is organized into a schema that allow voters to quickly access to form political attitudes or how they moderate the effects of other types of political information on attitude formation.

As a jumping-off point, we can turn to the literature on political information processing (heretofore abbreviated as *pip*).

The first prominent model of *pip* is derived from rational choice perspectives. The memory-based model of *pip* views attitudes as a weighted collection of prior information (see J. R. Zaller, 1992). As individuals receive new information, they organize it into a schema that is relative to prior objects they already have encoded. With the encoding of this new information, the model predicts that individuals incorporate this new object with similar objects to form an attitude. This schema then may be more accessible in similar contexts and may then sample from its elements when prompted to express a political attitude. While the Receive-Accept-Sample (RAS) model accepts the view that expressed attitudes are based on a weighting that is most accessible at the time of attitude expression (J. Zaller & Feldman, 1992), it still presupposes that the weighting is an average of prior information.

The second prominent model challenges this latter point. The online model of *pip* contends that individuals do not evenly weigh information, but that whether they even store it into their long-term memory to access later is biased in the direction of supporting pre-existing attitudes (Lodge & Taber, 2013); this phenomenon is referred to as motivated reasoning by the psychology literature (Kunda, 1990). This model suggests that people ignore new information that goes against their prior beliefs and that information confirmatory of their preferences are quicker to access – referred to as hot cognition (Lodge & Taber, 2013).

The online model conceptualizes this underlying mechanism of information encoding and attitude retrieval as automatic (Lodge & Taber, 2013). This occurs as a result of the information's strong associations with valanced appraisals of the information guiding the attitude (Lodge & Taber, 2013). This brings political scientists closer to the dominant conceptualizations among neuroscientists and psychologists concerned with memory retrieval, encoding, and attitude formation (see Fazio, 2007). Namely, that memories are encoded and retrieved based on associations and are quickly done so as a result of their association with valanced appraisals (Kensinger & Fields, 2022). What remains unexplored is how visual information such as color may prime individuals to engage in motivated reasoning subconsciously, and if they do keep their attention on the object, what paths are activated by such information.

INTEGRATING COLOR INTO A MODEL OF POLITICAL INFORMATION PROCESSING

Existing models of *pip* are largely focused on complex forms of political information such as text. As individuals process visual information before other sorts of information, we might expect that they may form the snap-judgement or the initial appraisal of an object. This has a number of important implications; from suggesting that our theories of *pip* should be broadened to reconsider what constitutes politically-relevant information to what it means for our substantive understanding of how people process political information and the calculus involved in political attitude formation.

Though the online model of information processing goes a long way to inform us about the ways that our physiology engages attitude formation and retrieval, the types of information it considers necessarily limits the applicability of the theory to other forms of political information. Color and other forms of simple visual information are processed much more quickly and occurs more frequently than text-based information (Mehta & Zhu, 2009). As color and other types of visual information are processed differently, we should consider its use as political information differently as well. As visual information is affectively encoded (Cimbalo et al., 1978), this means that it has the potential to effect the affective state and processing of more complex information, such as text. That is, the visual information provides a snap-judgement or an impression of the object through faster processing and activates particular neurological processes that influence subsequent information appraisals (Ames et al., 2012). This implies that the conclusions drawn from such *pip* models may be systematically biased without considering the upstream effects of non-text information; such as simple visual information like color.

Before expanding upon the role that colors have on shaping political attitudes, let me first define an attitude as a concept. An attitude represents an accessible, valanced, evaluation of associated prior information and experiences. This conceptualization fits with that of the Object-Evaluation Associations Model (Fazio, 2007). As opposed to viewing attitudes as a latent collection of memories, as is done in the memory-based model of *pip* (J. Zaller & Feldman, 1992), it views attitudes as measurable evaluations of memories. As memories, are at the core of an attitude, the association of memories with its evaluative component (see Kensinger & Fields, 2022) contribute to the perspective that attitudes

are affective. What this implies, is that we should be able to measure attitudes but that such an operationalization requires a careful consideration of the role that the context plays on any given measure of an attitude as they are resulting from memories (Fazio, 2007).

In line with the existing models of *pip*, I conceptualize attitudes as associative. This means that attitudes may be unstable - not stochastically, though. As attitudes are associative, they manifest slightly different depending on the associative paths that are activated (Fazio, 2007). The retrieval of relevant memories to the attitude depend on a number of factors such as the recency of the event, the similarity of the context, and the importance or salience of the memory (Kahana et al., 2022). This means that the memories that are retrieved to contribute to an attitude are quite variable. However, to understand where that variability comes from, we must understand the deeper processes that influence the way information is encoded and later retrieved. This illustrates my point of the need to further develop the reigning models of *pip*. Colors may act as one such contextual feature that may lead to this variability in how a given set of political information may shape attitudes.

Colors are associative and are affectively encoded (Cimbalo et al., 1978). When individuals access a memory, they do not just recall an object but they may recall visual information such as the color of an object. As visual information like colors are quickly processed and encoded, they are also quickly retrieved with their associative memories and can do so unconsciously (Mehta & Zhu, 2009). As they are affectively encoded, their associations with particular memory contribute to the evaluative component of the memory. For example, colors like red are associated with anger, arousal (Valdez & Mehrabian, 1994); whereas blue is associated with things like happiness and pleasure (D'Andrade & Egan, 1974). What this means is that colors are particularly powerful as contextual information shaping the subsequent processing and integration of "traditional" forms of political information to construct an attitude. As the preference for a particular color correlates with political attitudes (Schloss & Palmer, 2014), they may have some causal influence upon political attitudes; rather than just a correlation with them.

According to the literature in affective neuroscience, visual information is processed in parts of the brain such as the visual cortex (Goldstein & Brockmole, 2017). This will activate other areas of the brain and will make associated paths "hot". One such area is the amygdala. Neuroscientists

believe that as visual information is quickly and subconsciously processed, the amygdala takes such information and appraises the information based on the paths it activated; this generates a simple affective response to such information (Winkielman et al., 2011). More complex, categorical, emotion occurs later in conscious processing (Winkielman et al., 2011). This means that once politically-relevant visual information is detected, this information is passed from the retina to the brain. Once there, the brain attempts to classify the visual information by activating networks of neurons that are associated with the current information. With these activated pathways, the brain also attempts to appraise such information based on the quick classification. As memories are affectively encoded (Kensinger & Fields, 2022), these memories help areas such as the amygdala to appraise the current information.

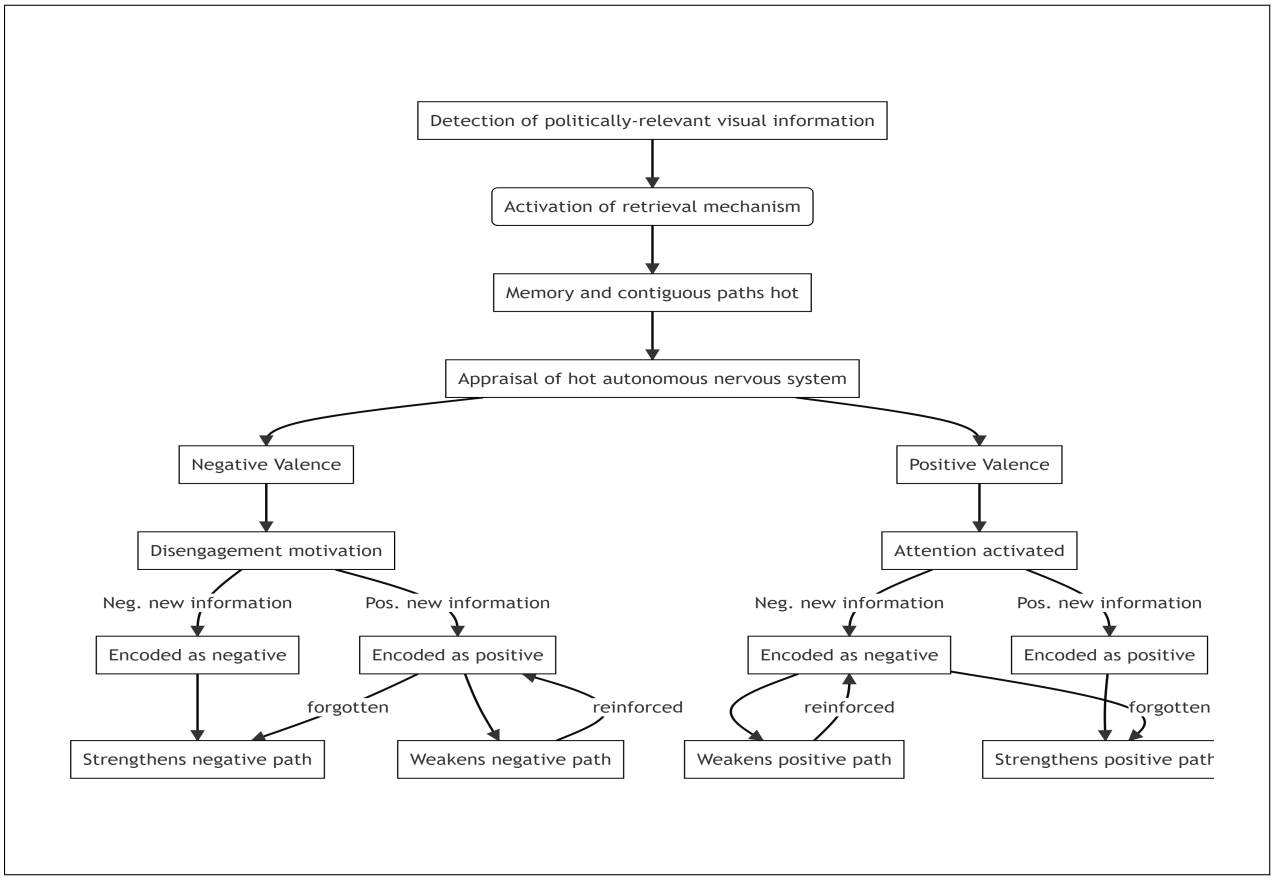
The automatic and subconscious appraisals of the visual information one encounters encourages particular behavioral and attitudinal motivations (Ralph & Anderson, 2018; Valentino et al., 2011). This has evolutionary roots for the purposes of survival (Parker, 2003; Ralph & Anderson, 2018). While emotional appraisals can lead to complex motivations such as anxiety leading to motivations for information seeking (Marcus, 2000), affective appraisals are valanced and are more automatic (Winkielman et al., 2011). These affective appraisals lead to a desire to either retract or engage more with the object (Valentino et al., 2011). We should expect then, that the snap-judgement resulting from automatic processing of politically relevant visual information will lead to an affective response that motivates either a desire to engage more with the object or to disengage.

While the visual information may encourage a particular immediate reaction to engage or disengage from the information, subsequent information processing and more conscious processing adjusts this initial appraisal generated by the snap-judgement (Kensinger & Fields, 2022). While subsequent information may amend one's snap-judgement, the snap-judgement nevertheless influences the processing of subsequent information by activating particular paths which is later encoded as associated with the object as it is converted to a memory (Kensinger & Fields, 2022; Lodge & Taber, 2013).

Figure 1 presents an illustration of the snap-judgement model.

What all of this means for *pip*, is that when we view political events or consume political information that has a visual component, we are going to encode visual information along with it. Taking

FIGURE 1. Snap-judgement model



expectations formed from theories of motivated reasoning (see Kunda, 1990), I'd expect that the visual information that we encode with it is likely congruent with the evaluation of the object; we are likely to be unwilling to encode the visual information that is not congruent with the visual information as we do with text-based political information (see Lodge & Taber, 2013). That is because unconsciously, we are going to experience a motivation to disengage from such information as soon as we appraise the visual aspects of an object as incongruent with existing attitudes and therefore to be uncomfortable. It should also influence how we retrieve memories when we are encountered with new information as well. This will have an effect on the attitudes that we express as a result. Additionally, this predicts that we will spend less time processing, accessing, and encoding congruent information (Lodge & Taber, 2013).

Let me illustrate the snap-judgement model with a common experience for residents of the United States. Say you are driving down a highway. At 65 miles an hour, you are traveling at about 95 feet per second at this speed. Your attention is split. Your eyes are focused on the conditions of the road in front of you, on the cars in front of you, and on the rear-view mirror where your kids are either dropping food in the crevice between the seat or are trying to grab your attention. Out of the corner of your eye, you see a sign. It is not a road sign, because it is not on the familiar white or yellow background with black lettering. It's election season. You correctly infer that it is a political yard sign. In this split second, you notice the color of the sign and may see a name: Mitch McConnell. You now are racking your brain to think about who that is. If you are politically engaged, you might come to that recognition of the name quickly or it may take you quite a bit longer if you are less politically engaged (see Kahana et al., 2022). You figure out that they are a Republican politician. You may have come to this with help by the fact that every year you've seen yard signs on this stretch of highway; and you know that when you see those electoral maps pop up on your news app on your phone that the electoral forecasts always represent Republican support with red and blue for Democrats. Once you've figured out who this person is, with the help of this other information, you have a reaction: "ugh, that guy is too loyal to Trump" or "yeah! He's loyal to Trump". You've expressed a political attitude.

What the snap-judgement model predicts is happening in your head is that as soon as the light that bounces of the sign to produce a particular wavelength hits your eyes, your brain is already trying

to make sense of this information. This is a useful tool for survival that biology has optimized for millions of years (Parker, 2003). Rather than processing the visual information slowly and you find yourself already in the jaws of a predator or to process it quickly but form the wrong impression and run away from a friend, the brain processes the information quickly and subconsciously (Newell, 1990). To make sense of such information, it accesses information that is familiar and similar to what it is currently attempting to process for efficiency (Kahana et al., 2022). This is accessing memories and contains valanced information (Kensinger & Fields, 2022): should I avoid this or is it pleasant? Once the brain has finished such processing, it can pass along its prediction to your conscious memory. Once a reflex of avoid or approach is made, this opens up space for your brain to process the more difficult information: to take the patterns of the light as shapes that construct symbols and letters. This comes later because this information not only requires access to information about what it *is*, but also what it *means*; and once you understand what it means, then you have the information necessary to evaluate it.

The snap-judgement model predicts that you first process the colors of the yard sign. You access associative memory to figure out what those particular wavelengths represent: red, white, blue? As these colors are associated with different emotional states (see Cimbalo et al., 1978) and the resulting behavioral consequences, your brain starts sending signals to the rest of your body to prepare it to react (see Dror, 2017; Sander, 2013). You now need to figure out what the rest of that information was. What were the patterns of that light? It appears that there were some white letters on the sign. There was an “E”, a “L”, an “E”, a “C”, a “T”. That creates the word “ELECT”. Meaning to vote for. There were some more letters on the sign: a “M”, an “I”, a “T”, a “C”, a “H”. A name. The full name is “Mitch McConnell”. Since it is about politics, it must be a politician named Mitch McConnell. Now imagine, the information was the same, except the color was blue. You may take more time to figure out how that Mitch McConnell person is and come to your reaction to seeing their yard sign. This is because without the color red, you first are thinking about Democrats who are named Mitch McConnell, only when you come up empty on your mental rolodex, you figure out that it is the Republican Mitch McConnell.

How do you react to the color and then to the name? Social groupings are not simply abstract

concepts invented by social psychologists. They are also reflected in our neurobiology. For example, researchers find activation of parts of the brain such as the anterior insula when we see someone in our social group outperformed by someone from the out-group (see Zink & Barter, 2012). The anterior insula activity is associated with physical and emotional pain; not just for ourselves but also for others (Adolphs & Vanessa, 2011). Others have also observed that when seeing someone part of a high-status social group, that there is an increase in activity in the sensorimotor cortex and supplementary motor area indicating more activity in the areas of the brain that encourage movement (Zink et al., 2008). Visual information of someone in your social group speeds up processing, is more salient, and demands more attention than visual information of an object outside of your social group (Zink & Barter, 2012).

There is significant evidence in support of the theory that our partisan identification reflects more than just our attitudes about politics, but that it is a social identity (see Campbell et al., 1960; Mason, 2018) that guides our attitudes (see Achen & Bartels, 2016; White et al., 2014; also Bullock, 2011). As our political attitudes reflect shared views among co-partisans (Pickup et al., 2020), our reactions to such political information contains influence by the congruency to which that political information aligns with our partisan identification. This means that the visual information we glean from politics is likely to motivate those neurological features of social groups and will explain resulting behavioral manifestations reacting to such information. That information is also likely to be processed at different rates as well. That is, while visual information carries affective associations that are quite general, we should also expect that politically-relevant colors and visual information are associated to the structures represented by our partisan identification.

From this discussion, I expect the following: that individuals do pay attention to the colors used in campaign branding (H_1); that these colors that they notice shape perceptions about the person and ideological symbol represented in the branding – meaning that they express different levels of preference for receiving more information that is similar to what they saw and their levels of preference for supporting such a campaign (H_2); that more positive perceptions are explained by the consistency of information – simple visual information with more complex "traditional" information (H_3); this positive and consistent information is processed quicker than negative and inconsistent, negative and

consistent, and positive and inconsistent information (H_4); and finally that campaigns make strategic choices about their branding to attract voters (H_5) in line with their primary objective of reelection (Fenno, 1973; Mayhew, 1974).

STUDY 1

In Study 1, I examine the effects of color in a common form of campagin branding – yard signs – on the attitudes of the observer. In this study, I test the first 4 hypotheses I derive from the snap-judgement model. First, Study 1 tests the claim that individuals do indeed notice color on electoral yard signs. Next it tests the claim that these colors that individuals detect influence the viewer's evaluations of the yard sign and candidate represented on it. Study 1 then tests the claim that the effects on perception are moderated by how consistent the color is with the more complex information displayed on the yard sign. And finally, Study 1 then examines whether positive information that contains consistency is processed quicker than negative or inconsistent information. That is, do partisans quickly detect and encode information from a clearly co-partisan political candidate?

Design

I recruit 1,000 participants from Prolific.[1] After providing informed consent to participate in the study, participants are redirected to Pavlovia[2] and are provided with a demographics and political attitudes questionnaire. This questionnaire includes common questions about the participant's ascriptive and descriptive characteristics along with questions about the participant's political ideology, partisan identification, interest in politics, and political knowledge.

I include those questions in the questionnaire due to expectations that they may act as confounds in

[1]Participants are paid at a rate of $12.00 per hour. On top of the price per participant, Prolific charges a 30% servicing fee and an additional fee to guarantee a nationally representative sample.

[2]Pavolovia allows for researchers to host and run open source experiments for about $0.20 per participant (to cover their server costs). I use it primarily for the purposes of integrating the JavaScript components for my experimental design.

my hypotheses. As political knowledge is deeply intertwined with the strength to which an individual identifies with a political party (**delli-carpini_keeter_2016**), I expect that political knowledge is an important confounder in my tests of H_2, H_3, and H_4. Therefore, I include a common battery for assessing political knowledge. As political knowledge is shaped by levels of interest in politics as well (**delli-carpini_keeter_2016**), I include the common question to assess levels of self-reported interest in politics. I additionally include a number questions collecting information on participants' ascriptive and descriptive characteristics such as age, education, gender identity, and racial identity as a number of these are correlates with partisan identification (see Campbell et al., 1960; Mason, 2018). Additionally, I include a question about the respondent's sex assigned at birth and about whether they have received a diagnosis of any type of color blindness. As some individuals may possess undiagnosed colorblindness, asking about their sex assists in covariate balance.

I then present participants with an instruction screen informing them of the task for the experiment. In the first trial of the experiment, participants are randomly presented with two of three possible yard signs; one at a time. These yard signs are simple with the text "Vote for Riley" and a solid background color of either "Republican Red", "Democratic Blue", or White.[3] There is an added component to this, however.

Rather than use eye-tracking devices and software, I instead use Mouseview.js (see Anwyl-Irvine et al., 2022) which either blocks out or blurs a large portion of the participant's screen and encourages them to move their mouse to view different parts of the screen in isolation. As the participants move their cursor around the screen, it tracks the coordinates of the cursor along with the "dwell" time of the cursor in that particular coordinate. One primary benefit of Mouseview.js is that it allows for researchers to field their experiments outside of a lab-based setting – while providing results that are robustly correlated with the results from a design employing eyetracking (Anwyl-Irvine et al., 2022). This opens up the flexibility for researchers to rely less on convenience samples; which are common with eye-tracking studies. For my design in particular, I am concerned about reliance on a convenience sample due to variation in participants' ability to detect and process color in the U.S. population relative to a student sample. This means that Mouseview.js is a particularly useful tool for

[3]See the supplementary information to view all of the stimuli used in Study 1.

my study. A published pilot version of the experiment used in Study 1 is published on Pavlovia.

When viewing each of the yard signs in the first trial, there is a blur over a substantial portion of the screen. At any given point in time, participants can view only 10% of the image without an obstruction. Participants move their cursor to explore the yard sign and are given only 2000 ms to do so until the image goes away to encourage a consistent and short duration to explore the image. After exploring each image, participants are asked what colors were on the yard sign and whether they felt that the candidate represented on the yard sign was a Democrat, a Republican, or Neither. After viewing both images, they are then asked to indicate their preference among the two images.

There are three more trials that are much like the first trial. What is different between the two other trials is that I vary the amount of color that are on the yard signs (trials 2 and 3) and I provide more textual information that deviates from the association of Republicans with red and Democrats with blue (trial 4).

Do individuals notice color in political branding?

Do colors shape perceptions of political objects?

Do these perceptions require consistency between information types?

Do partisans process co-partisan branding faster?

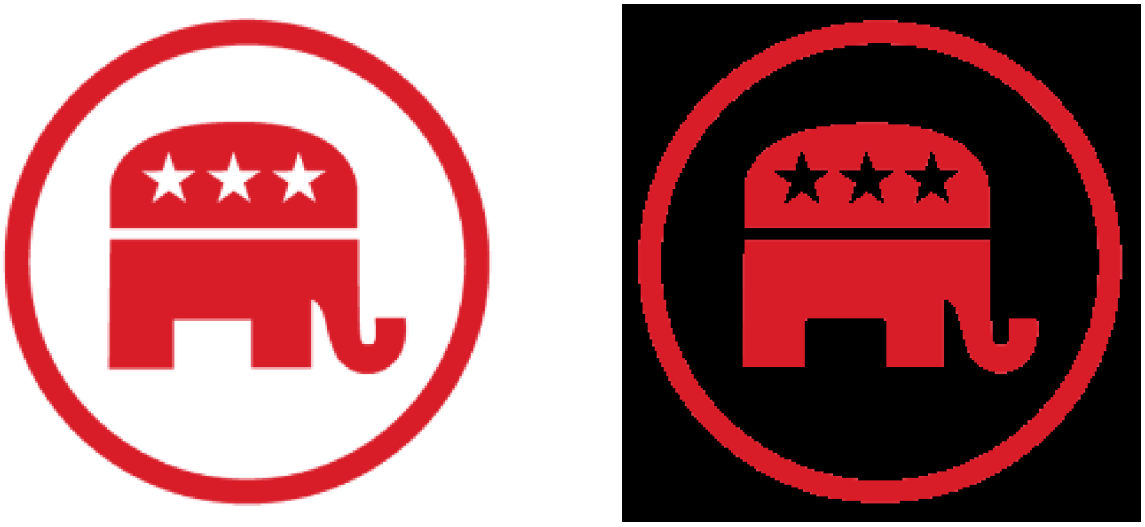
STUDY 2

Do branding choices reflect electoral context?

To examine whether the use of colors on yard signs vary in systematic ways depending on electoral context, I collect images from the 2018, 2020, and 2022 Congressional elections for the House of Representatives across the United States. These yard signs are pulled together on one website by the Center for American Politics and Design[4]. From this website, I am able to extract over 1,100 images for these three elections. I then combine this information with district-level data provided by the MIT

[4]See: https://www.politicsanddesign.com/

FIGURE 2. Detecting colors in the GOP logo



(a) Resized original image **(b) Masked**

election lab on election returns for candidates in these House elections [5].

With these data, I detect the percentage of the "Republican Red" and "Democratic Blue" on the yard signs and examine whether the 5-year smooth moving average of Democratic candidate vote share in that given district correlate. The purpose of this analysis is to examine the hypothesis that campaigns respond to the preferences of partisan voters and adjust their branding as a result. In this case, the branding being the color on the yard sign.

To provide an example of how the color detection works, I collected the GOP logo used on their official Twitter account during the 2022 midterm election cycle. I load this image and convert it to a three-dimensional array that contains information about the GBR (reversed RBG) values for the pixels in that image. I then resize the images to be a standardized 224 *x* 224 pixels. The computer is trained to detect a range of GBR values that encompass the official "Republican Red"[6]. For the broader exercise, I do it for the color white[7] and "Democratic blue"[8]. Once this range of values is specified, the computer detects the pixels that do not contain values within this pre-specified range and converts those values to represent the color black. Figure 2 presents this process.

[5]See: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/IG0UN2

[6]lower values: (93, 9, 12), higher values: (236, 69, 75)

[7]upper and lower values: (255, 255, 255)

[8]lower values: (0, 18, 26), higher values: (102, 212, 255)

I then extract the values in the array that are non-black and calculate the percentage of non-black pixels (as depicted in Equation 1).

$$\text{Color\%} = \frac{\text{Non-black}}{\text{Transformed}} \times \frac{\text{Original}_{\text{Height}} + \text{Original}_{\text{Width}}}{2\text{Transformed}_{\text{Height}} + 2\text{Transformed}_{\text{Width}}} \tag{1}$$

For the example in Figure 2, about 32.26 of the image is red.

REFERENCES

Achen, C. H., & Bartels, L. M. (2016). *Democracy for realists: Why elections do not produce responsive government*. Princeton University Press.

Adolphs, R., & Vanessa, J. (2011). Emotion recognition. In J. Decety & J. T. Cacioppo (Eds.), *The oxford handbook of social neuroscience*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195342161.013.0016

Ames, D. L., Fiske, S. T., & Todorov, A. T. (2012). Impression formation: A focus on others' intents. In J. Decety & J. T. Cacioppo (Eds.), *The oxford handbook of social neuroscience*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195342161.013.0013

Anwyl-Irvine, A. L., Armstrong, T., & Dalmaijer, E. S. (2022). Mouseview.js: Reliable and valid attention tracking in web-based experiments using a cursor-directed aperture. *Behavior Research Methods*, *54*, 1663–1687. https://doi.org/10.3758/s13428-021-01703-5

Bucy, E. P., & Joo, J. (2021). Editors' introduction: Visual politics, grand collaborative programs, and the opportunity to think big. *The International Journal of Press/Politics*, *26*(1). https://doi.org/10.1177/1940161220970361

Bullock, J. G. (2011). Elite influence on public opinion in an informed electorate. *American Political Science Review*, *105*(3), 496–515. https://doi.org/10.1017/s0003055411000165

Campbell, A., Converse, P. E., Miller, W. E., & Stokes, D. E. (1960). *The american voter*. John Wiley; Sons, Inc.

Casiraghi, M. C., Curini, L., & Csumano, E. (2022). The colors of ideology: Chromatic isomorphism and political party logos. *Party Politics*. https://doi.org/10.1177/13540688221080539

Cimbalo, R. S., Beck, K. L., & Sendziak, D. S. (1978). Emotionally toned pictures and color selection for children and college students. *The Journal of Genetic Psychology*, *133*(2), 303–304.

Clifford, S. (2020). How moral motives link party stereotypes. *Political Behavior*. https://doi.org/10.1007/s11109-020-09634-1

Dan, V., & Arendt, F. (2021). Visual cues to the hidden agenda: Investigating the effects of ideology-related visual subtle backdrop cues in political communication. *The International Journal of Press/Politics*, *26*(1), 22–45. https://doi.org/10.1177/1940161220936593

D'Andrade, R., & Egan, M. (1974). The colors of emotion. *American Ethnologist*, *1*, 49–63.

Dror, O. E. (2017). Deconstructing the "two factors: The historical origins of the schachter-singer theory of emotions. *Emotion Review*, *9*(1), 7–16.

Elving, R. (2014). The color of politics: How did red and blue states come to be?

Fazio, R. H. (2007). Attitudes as object-evaluation associations of varying strength. *Social Cogition*, *25*(5), 603–637. https://doi.org/10.1521/soco.2007.25.5.603

Fenno, R. F. (1973). *Congressmen in Committees*. Little Brown.

Gerodimos, R. (2019). The interdisciplinary roots and digital branches of visual political communication research. In *Visual political communication*. Palgrave Macmillon. https://doi.org/10.1007/978-3-030-18729-3

Goldstein, E. B., & Brockmole, J. R. (2017). *Sensation & perception* (Tenth Edition). Cengage Learning.

Grabe, M. E., & Bucy, E. P. (2009). *Image bite politics: News and the visual framing of elections*. Oxford University Press.

Hall Jamieson, K. (2014). Creating the hybrid field of political communication: A five-decade-long evolution of the concept of effects. In K. Kenski & K. Hall Jamieson (Eds.), *The oxford handbook of political communication*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199793471.013.27

Kahana, M. J., Diamond, N. B., & Aka, A. (2022). Laws of human memory. In H. L. Roediger III & O. Uner (Eds.), *Oxford handbook of human memory*. Oxford University Press. https://memory.psych.upenn.edu/Oxford%5C_Handbook%5C_of%5C_Human%5C_Memory

Kensinger, E. A., & Fields, E. (2022). Affective memory. In H. L. Roediger III & O. Uner (Eds.), *Oxford handbook of human memory*. Oxford University Press. https://memory.psych.upenn.edu/Oxford%5C_Handbook%5C_of%5C_Human%5C_Memory

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, *108*(3), 490–498.

Lilleker, D. G. (2019). The power of visual political communication: Pictoral politics through the lens of communication psychology. In *Visual political communication*. Palgrave Macmillon. https://doi.org/10.1007/978-3-030-18729-3

Lindholm, J., Carlson, T., & Högväg. (2021). See me, like me! exploring viewers' visual attention to and trait perceptions of party leaders on instagram. *The International Journal of Press/Politics*, *26*(1), 167–187. https://doi.org/10.1177/1940161220937239

Lodge, M., & Taber, C. S. (2013). *The Rationalizing Voter*. Cambridge University Press.

Maestre, R. L., & Medero, R. S. (2022). Color war. does color influence the perception of political messages? *Psychological Reports*. https://doi.org/10.1177/00332941221114418

Marcus, G. E. (2000). Emotions in politics. *Annual Review of Political Science*, *3*, 221–250.

Mason, L. (2018). *Uncivil Agreeement*. University of Chicago Press.

Mayhew, D. R. (1974). *Congress: The Electoral Connection* (Second Edi). Yale University Press.

Mehta, R., & Zhu, R. ((2009). Blue or red? exploring the effect of color on cognitive task performances. *Science*, *323*, 1226–1229.

Newell, A. (1990). *Unified theories of cognition*. Harvard University Press.

Parker, A. (2003). *In the blink of an eye: How vision sparked the big bang of evolution*. Perseus.

Peng, Y. (2021). What makes politicians' instagram posts popular? analyzing social media strategies of candidates and office holders with computer vision. *The International Journal of Press/Politics*, *26*(1), 143–166. https://doi.org/10.1177/194016220964769

Pickup, M., Kimbrough, E. O., & de Rooij, E. A. (2020). Expressive politics as (costly) norm following. *Political Behavior*. https://doi.org/10.1007/s11109-020-09667-6

Ralph, A., & Anderson, D. J. (2018). *The neuroscience of emotion*. Princeton University Press.

Sander, D. (2013). The cambridge handbook of human affective neuroscience. In J. Armony & P. Vuilleumier (Eds.). Cambridge University Press.

Schloss, K. B., & Palmer, S. E. (2014). The politics of color: Preferences for republican red versus democratic blue. *Psychonomic bulletin & review*, *21*(6), 1481–1488.

Stewart, P. A., Eubanks, A. D., Hersom, N., & Hearn, C. A. (2021). Visual priming and framing during the 2020 democratic presidential debates: Electoral status predicts favorable camera treatment. *The International Journal of Press/Politics*, *26*(1), 256–276. https://doi.org/10.1177/1940161220952736

Utych, S. M. (2020). A voter-centric explanation of the success of ideological candidates for the us house. *Electoral Studies*, *65*, 102137.

Valdez, P., & Mehrabian, A. (1994). Effects of color on emotions. *Journal of experimental psychology*, *123*.

Valentino, N. A., Brader, T., Groenendyk, E. W., Gregorowicz, K., & Hutchings, V. L. (2011). Election night's alright for fighting: The role of emotions in political participation. *The Journal of Politics*, *73*(1), 156–170.

White, I. K., Laird, C. N., & Allen, T. D. (2014). Selling out?: The politics of navigating conflicts between racial group interest and self-interest. *American Political Science Review*, *108*(4), 783–800. https://doi.org/10.1017/S000305541400046X

Winkielman, P., Berridge, K. C., & Shlomi, S. (2011). Emotion, consciousness, and social behavior. In J. Decety & J. T. Cacioppo (Eds.), *The oxford handbook of social neuroscience* (pp. 196–211). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195342161.001.0001

Zaller, J., & Feldman, S. (1992). A simple theory of the survey response: Answering questions versus revealing preferences. *American Journal of Political Science*, *36*(3), 579–616.

Zaller, J. R. (1992). *The Nature and Origins of Mass Opinion*. Cambridge University Press.

Zink, C. F., & Barter, J. F. (2012). Neural representation of social hierarchy. In J. Decety & J. T. Cacioppo (Eds.), *The oxford handbook of social neuroscience*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195342161.013.0046

Zink, C. F., Tong, Y., Chen, Q., Bassett, D. S., Stein, J. L., & Meyer-Lindenberg, A. (2008). Know your place: Neural processing of social hierarchy in humans. *Neuron*, *58*(2), 273–283. https://doi.org/10.1016/j.neuron.2008.01.025