

How to make friends within polarization? The effect of political perceptions of profile images on social media

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Abstract

This paper verifies if social media users may follow or befriend others according to their perception of political ideology based on profile pictures. It consists of two studies involving 375 subjects in Brazil, between 2018 and 2022, a period of increasing political polarization and institutional crisis following the impeachment of a left-wing president and the election of a right-wing populist president. Having as stimuli the profile pictures of 240 young candidates for the Chamber of Deputies of Brazil, participants chose which ones they would befriend on social media. Political perceptions were the strongest predictor of making friends and could double the odds of friendship if the picture was perceived as left-wing. Candidates get more friends when the perceptions are accurate, demonstrating the incentives for people to signal more political cues on social media. Yet extremist attitudes decrease the likelihood of making new friends.

1. Introduction

This paper examines how images can be used to build political identities and, as a result, influence the ways people make connections and links on social media. Recent research on Political Communication has detected common patterns of political homophily on social media, with consequences to information diffusion, polarization, and media effects. This is a troubling and surprising recurrence, as political homophily is detected in most different platforms that were not built for politics. One of the main antidotes to the spread of misinformation is being exposed to different sources of information while having ties to heterophilic networks of people. Social media is a significant source of misinformation and political messages, but the scholarship has paid little attention to the mechanisms of relationships and networking on different platforms and why, in an environment with unlimited options for social ties, people choose to mingle only with those who send the same message as they do. Can digital images, and how people perceive them, have an effect on how people choose their friendships or build connections on social networking platforms, especially within a polarized society?

Images have an important role in building a digital identity on social media, while they can also convey political messages. Pictures are one of the most salient features on different platforms, as they identify one user not only on the profile page but also on every action or post published across the social media service. In some platforms, profile pictures are the main, first, or only information accessible when someone must decide to befriend or follow another user.

This paper verifies if social media users may follow or befriend others according to their perception of political ideology based on profile pictures. It consists of two studies involving 375 subjects in Brazil, between 2018 and 2022, a period of increasing political polarization and

institutional crisis following the impeachment of a left-wing president and the election of a right-wing populist president.

In the first study, participants were presented with Facebook pictures of 240 young candidates to the Chamber of Deputies without clear political visual cues. Not knowing their identity as politicians or any other information other than their images, subjects would be asked to choose whom to follow or befriend on a social media platform. In the second study, the participants would be presented with the same pictures and be asked to guess the political ideology of each candidate, either left-wing or right-wing, based only on the stimuli.

The main hypothesis is that political perceptions based on visual cues can be a source of homophily on social media networks, with consequences to the distribution of information and misinformation. Choices are based both on the cues the candidates send on their digital images and how the subjects perceive them, which can be based on stereotypes: the way one dresses, uses the hair or has a beard, is found practicing some kind of sport or activity known to be associated to a certain type of values and norms. By unraveling the mechanisms of relationships on social media, one contribution is to demonstrate how different platform designs could lead to a better environment to make connections and share diverse information in digital environments.

2. Homophily, polarization, and images

Homophily, the tendency to aggregate around common interests, is a long-standing phenomenon observed in social networks and influences the most diverse aspects of life, including information transmission, attitudes formation, adoption of behaviors and opinions, and selective interactions (Friedkin, 1984; Lazarsfeld & Merton, 1954; McPherson et al., 2001). The scholarship accumulated large evidence of homophily on social media, based on geography, college major,

advertising, personality traits, news sharing, political affiliation and attitudes, and many other common features shared by users (Barberá, 2015; Bakshy et al., 2012; Conover et al., 2012; Goel et al., 2010; Lerman & Ghosh, 2010; Lewis et al., 2008; Quercia et al., 2011).

It is worth noting that there can be some variation in homophily according to the social media platform. Some social networking services are designed for strong-tie relationships and mostly connect people who already have offline relationships with each other. These platforms will have more homophily and, not surprisingly, they will be a stronger conduit to misinformation transmission, like in messaging services (Chadwick et al., 2023; Pasquetto et al., 2022). Social media was not made for politics. Nonetheless, political homophily is a common pattern on social networking services, even in spaces with weak ties in which politics would not be the main topic of communication and interaction, such as online dating platforms (Huber & Malhotra, 2017).

Based on the literature and the large evidence that social media users have higher levels of homophily, I formulate the following hypothesis:

H1 People with higher political homophily will make more friends on social media.

Political homophily is also commonly associated with polarization in the literature about social media. As an example, Facebook users tend to be polarized concerning science and conspiracy subjects, forming distinct groups with strong homophily, in which they consume information with similar patterns (Bessi et al., 2015). Furthermore, frequent selective exposure to polarized content is associated with homophile clusters where certain kinds of rumors are more likely to spread (Bessi et al., 2016).

Some scholars find an increase in political polarization by the exposure to opposing views on social media, in which groups with homophily values may delay ideological consensus (Taylor et al., 2018). Yet others claim that interparty contact attenuates outparty hostility (Wojcieszak & Warner, 2020). There is also contrasting evidence about how social networking services' algorithmic

recommendations play their role, sometimes driving and others mitigating polarization (Morales & Cointet, 2021). Other studies demonstrate that most social media users are embedded in ideologically diverse networks and that exposure to political diversity has a positive effect on political moderation (Barberá, 2014).

The scholarship has not yet come to a consensus about the effects of social media on opinion polarization, or how the latter affects relationships in social networking services. In a thorough review of the literature about media effects on polarization, Prior (2013) concluded that ideologically one-sided news exposure may be largely confined to a small, activist segment of people, who hold disproportionate political influence but are disconnected from centrist and disengaged masses. Another review found that pro-attitudinal media exacerbates polarization (Kubin, & von Sikorski, 2021). As there is no consensus in the literature about how polarization affects social media connections, I present a research question:

RQ1 What is the effect of polarization on the choices of friendships on social media?

One aspect that deserves more attention from the scholarship is the role of images in how people meet and connect with others on social networking services. Images and videos are an increasing feature in the structure of social media platforms, taking a larger and more crucial role in online communication and content sharing. Studies show that profile pictures are important to build a digital identity, presenting differences according to age and gender (Dhir et al., 2016). There is evidence that selecting profile pictures has become an addictive behavior related to social networking services (Griffiths et al., 2014; Kircaburun & Griffiths, 2018). Another study demonstrated that friends' profile pictures and behavior on Facebook influence perceptions of individuals (Walther et al., 2008), or otherwise inspire negative sentiments (Krasnova et al., 2013).

Depending on the platform design, profile pictures are the main, first, or only information one gets about a prospective friend or node to be connected to. Very often, profile pictures portray political messages and symbols, from more subtle to “in-your-face” stereotyped visual cues, varying

from spontaneous individual initiatives to curated collective action campaigns (Chapman & Coffé, 2016; Schossboeck, 2017).

It has been long recognized in psychological and social science studies that political partisans not only have different reactions to visual stimulus; but also can be recognized by other people based on their pictures (Rule & Ambady, 2010). Studies from several countries have shown that people can do better than chance at guessing others' party identification or ideology based on facial appearance in photographs (Chang et al., 2018; Roberts et al., 2011; Samochowiec et al., 2010; Tal-Or & Waisman-Manor, 2018). The strength of this effect varies and the mechanisms at work are obscure, though since long ago psychologists have known that there is consensus in attributing social and personality characteristics to facial appearance (Todorov et al., 2015). A theoretically likely explanation for how people accomplish this task involves highly nuanced in-group or out-group categorization, or both.

Previous research has demonstrated that voters can use images of candidates as a cue for conservatism in low-information elections (Berggren et al., 2017). Political facial stereotypes predict a candidate's electoral success especially among right-leaning voters (Olivola et al., 2012). Inferences of candidate ideology based on appearance can be observed in different contexts, while there are also different effects according to voters' characteristics (Herrmann & Shikano, 2016).

As an example, perceivers are more accurate when they rate politicians whose attitudes oppose their position, reflecting a more liberal criterion for out-group than for in-group members (Franklin & Zebrowitz, 2016; Rule & Ambady, 2010). In the United States, perceivers' beliefs about who is a Democrat and a Republican may be based on perceptions of traits stereotypically associated with the two political parties. The guidance of these stereotypes may lead to categorizations of others' political affiliations at rates significantly more accurate than chance guessing.

There is a vast literature on neuroimaging, demonstrating that people have different reactions to images according to their political ideology. Studies show that conservatives take more time watching unpleasant pictures, and they have stronger physiological responses to negative visual

stimuli, which activate different parts of the brain (Dodd et al., 2016; Landau-Wells & Saxe, 2020; Leong et al., 2020; Tritt et al., 2016; Hibbing et al., 2014). Neurobiological mechanisms of the conservative complex include negativity bias, threat, disgust, and avoidance (Mendez, 2017).

Following the literature on visual perceptions of images and political ideology or partisanship, I propose a research question:

RQ2: Do social media users follow or befriend others according to their perception of political ideology based on profile pictures?

Considering that visual features of profile pictures can drive more attention from potential friends, I propose the following hypotheses:

H2a. Images with people smiling will drive more attention and be chosen more as friends.

H2b. Images with people staring at the camera will drive more attention and make more friends.

Other than political perceptions and the visual cues and features of pictures, I test alternative explanations about how people might choose friends on social media depending on whether and how strongly they are involved or not with politics. Political ideology, extremism, and political talk can be expected to moderate the choices of friends on social media and will be used as controls, together with other predictors from stimuli and subjects.

3. Populism, polarization and social media in Brazil

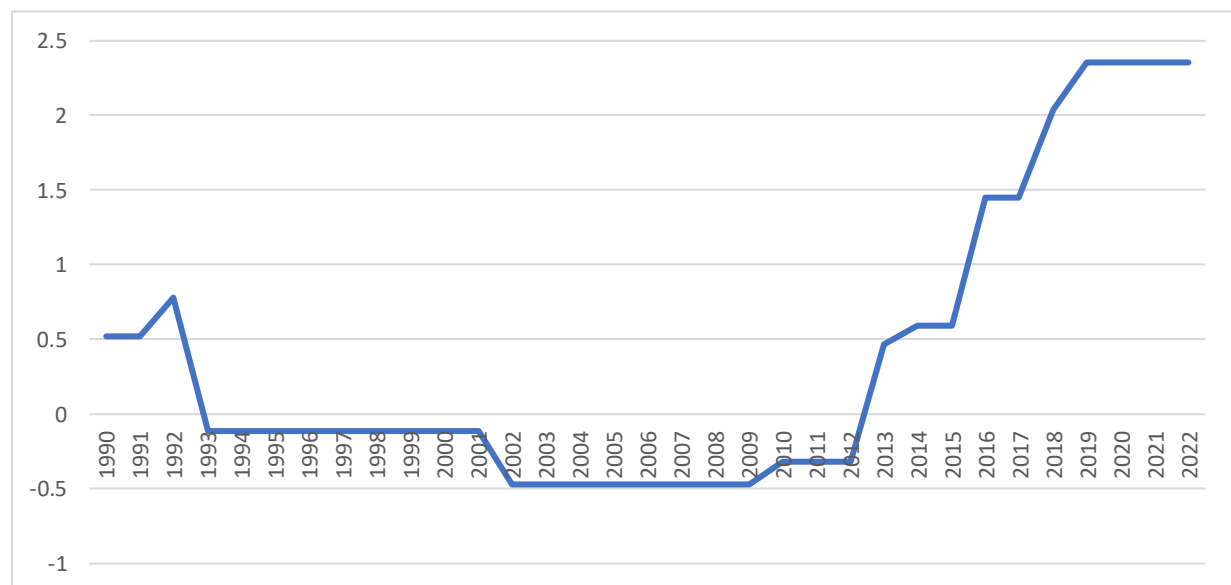
Brazil experienced a conservative and negotiated democratic transition in the 1980s, in which the continuity of the latter authoritarian regime personnel, weakness of political institutions, and intensification of anti-institutional practices threatened the stability and durability of the new regime (Power, 2010a). Divided at the end of the military regime, the conservative elites regrouped, and a

center-right-wing coalition ruled the country until the election of the left-wing president Luiz Inacio Lula da Silva, from the Worker's Party, in 2002 (Baker & Greene, 2011; Power, 2010b). Brazil's left turn was softer than in other Latin American countries, where left-wing governments were often associated with populism (Castañeda, 2006; Seligson, 2007). Considered a thin and limited ideology that separates "the pure people" versus "the corrupt elite" (Mudde, 2004), populism has been a long-lasting trait of Latin American politics, both in left-wing and right-wing variations, since the earliest experiments with democracy in the region (Conniff, 2012; Laclau, 1978; Mudde & Kaltwasser, 2013). Differently to more extreme trends on the Latin-American left-wing tide, Lula's leftism supported free trade and admitted close ties with the United States.

Nevertheless, the 13-year term of the Worker's Party in office ended with increasing political polarization, starting with the wave of massive social protests in 2013, preceding the organization of the Football World Cup in Brazil (Conde, 2022; Jiménez-Martínez, 2020). As represented in Graph 1., the Political Polarization Index measured by V-Dem rose from -0.3 in 2012 to 0.5 in 2013 (Coppedge et al., 2023). The numbers would not stop climbing in the following years, with a troubling economy, the investigation of government corruption by Operation Car Wash (Moro, 2018), the impeachment of President Dilma Rousseff in 2016 (Melo, 2016), and the arrestment of former president Lula under corruption charges in 2018, right before the elections (Bähre & Gomes, 2018).

An analysis shows that the polarization among the Brazilian politicians at the Chamber of Deputies increased after December 2015, together with the launch of the impeachment proceedings (Moreira et al., 2020). According to the same study and based on Twitter data, the population was more polarized than the representatives. Politicians who made their opinions clear about the impeachment became more popular on the media platform. Just like the June 2013 protests, the social mobilization pro-impeachment took millions to the streets and was largely organized through social media (Cardoso et al., 2016; Castells, 2015; Santos, 2016)

According to Hunter and Power (2019), the economic and political crises in Brazil damaged establishment parties, while Bolsonaro spread an anticorruption message that strongly resonated with the public. In addition to resentment against the Worker's Party, moral issues and strict views on law and order influenced Bolsonaro's voters, among other contentious topics. The polarized political environment reached its climax when Bolsonaro was stabbed in a campaign rally, almost one month before the first round of elections. If the stab hurt his possibilities of campaigning on the streets, it also increased public attention to his homemade Facebook videos and exclusive interviews on TV, which largely contributed to his victory (Brandao, 2022).



Graph 1. Political Polarization rising in Brazil. Source: V-Dem

Right-wing populist leaders use new media platforms to represent the relationship between them and “the people”, justify the exclusion of outgroups, elaborate populist ideology, develop a populist identity, and circumvent the traditional media (Krämer, 2017). Populism is particularly well-suited to be communicated through new media in three ways: (1) populist anti-elitism ideology is more convincing when directly addressing the people, in a media that favors non-elite actors; (2)

populist style of simplification, emotionalization, and negativity, are in line with the internet's attention economy (3) the internet provides populist leaders with personalized communication that allows them to exert their charisma (Engesser et al., 2017).

While populist parties appeal to distrusting voters, there is also evidence to suggest that populist parties might further fuel discontent, in a cycle of continuing rise in levels of discontent (Hooghe et al., 2011). The polarizing aspect of populism can also further the spread of misinformation, making it harder to identify accurate and inaccurate information (Swire et al. 2017). The literature points out a positive correlation between populist attitudes and conspiracy beliefs, regardless of political ideology (Eberl et al., 2021).

Based on a survey of Brazilian households and the age distribution of voters, I estimate that 100.7 million voters had internet access in 2018, about 68% of the total registered to vote (Brazilian Internet Steering Committee, 2018; Brazil Superior Electoral Court, 2020). Among internet users, 75.5 million (51% of voters) were on social media, and 7 million (5%) used Twitter. The Latinobarómetro Survey (2018) found out that 58.8% of the population used Facebook; 37% watched videos on YouTube, and 65.9% exchanged messages on WhatsApp.

The context of increasing political polarization, in a communication environment in which social media is widely used for political campaigns, participation, and mobilization, justifies the choice of Brazil to study the effects of political perceptions on social media. Initially, the experiment planned to measure these effects in contexts of higher and lower polarization, which presumably would come after the 2018 elections. However, polarization increased even more during Bolsonaro's term, with more protests supporting and attacking the populist government, and reaching the maximum index of 2.4 in 2022, his last year in office.

4. Data and measures

4.1. Stimuli

To select the stimuli, I started from a pool of 1,198 candidates to the Chamber of Deputies of Brazil in the 2018 national elections, who were under 35 years old; self-identify as white; who were not from Brasilia; and were not running for re-election or held another public position before. This approach has two intentions: (1) to make the pictures more relatable to the subjects, who are also young; (2) to avoid politicians who could be easily identified. We limited the sample to white candidates to control for choices based on ethnicity and also because there was not a significant number of candidates from other ethnicities.

I then selected candidates who had campaign pages available on Facebook, and whose profile pictures did not present strong political signals or cues. In some cases, I admitted images that might lead to conclusions about one's political identity when those cues were ambiguous or contradicting. As an example, using a football jersey from the Brazilian national squad or having a Brazilian flag can be a signal of right-wing leaning, as those symbols were widely used during the impeachment protests against the leftwing president Dilma Rousseff, between 2015 and 2016. In one selected picture, a left-wing candidate is wearing a football jersey from the Brazilian national squad and has a Brazilian flag in the background.

Other criteria were to select pictures involving a more natural setting, and avoiding images that looked staged or appeared to be taken by a professional photographer inside a studio. It is worth noting that this wasn't a thick filter for choosing, as many candidates would have pictures that looked like they were taken by themselves, as selfies. I also excluded images in which the faces of other people than the actual candidate could be identified.

The sample was stratified by Brazilian administrative regions and an equal number of left-wing and right-wing politicians, according to the Party Ideology Scores by Baker and Greene (2011). The

result was a number of 240 profile pictures, 144 male candidates and 96 female, half-half belonging to right-wing – left-wing parties. Candidates were on average 29 years old ($SD=3.7$), with a range from 19 to 34 years old. Of all 240, 70 were married (29%), and 163 had a university education (68%).

In each study, the pictures were aggregated in five different electronic forms, each one with 48 candidates - half of them left-wing, and the other half right-wing. Each picture was presented on one individual page, with a random order among left-wing and right-wing candidates. Two forms had only female pictures and the other three only males.

One female form had only pictures of candidates from the South and Southeast of Brazil, and the other form from the North, Northeast, and Center-West. Two male forms had only candidates from the South and Southeast of Brazil, and the other form from the North, Northeast, and Center-West. I aggregated the pictures by Brazilian administrative regions because, in the last decades, South and Southeast voters overwhelmingly supported right-wing candidates in the national elections. This might bring consequences to how left-wing and right-wing candidates build their digital identities and present themselves visually.

Each electronic form was sent to the subjects on different days, following a random order - as an example, some subjects would start the experiment receiving the form with female candidates from the South and Southeast, while others would get a form with male candidates from the North, Northeast, and Center-West. Despite the recommendation to answer each form on the same day, not everyone would follow this direction. The subjects would only receive another form when the whole group finished the task.

4.2. Subjects

The research design was peer-reviewed at the University of Brasilia and followed the institution's ethical guidelines for participating human subjects. There was an element of deception:

until concluding the experiment, subjects were not informed that the pictures were of politicians, and what was the actual purpose of the studies.

The participant information sheet, presented both verbally during the recruitment section and electronically at the beginning of each form, would only say that the study was about social perceptions and that they would be asked about how they perceive others, based on images, and answer questions about the characteristics of the people in the pictures. They were also informed about their rights as participants, including the right to not answer questions or to withdraw completely from the study at any time and without any penalty. All their personal information was anonymized, and only non-identifiable demographic information was collected.

Every electronic form would also present a section in which, based on the information sheet and consent form, subjects would check a box demonstrating that they voluntarily agreed to take part in the studies. Participants were recruited at the Intro to Political Science seminar, a gateway course for undergraduates at the University of Brasilia, attended mostly by first-year students from Law School. Participation in the studies was offered as an alternative form of evaluation to obtain 30% of the grade. The other option was to write an essay, based on a topic discussed during the seminar. However, only 6% of the students made that choice.

In total, the studies consisted of seven rounds with different time periods and groups of students. The initial purpose was to intercalate periods of high polarization, during election time, with other moments of lower political polarization, which were expected to come after the electoral campaign finished and the public debate came back to normality. Unfortunately, with the election of populist candidate Jair Bolsonaro, that moment never came, and polarization only increased through his term, with massive social protests organized to support or attack the government.

The first wave of the studies was organized from October to November 2018, during the second round of national elections in Brazil; the second wave was between March and October 2019; the third was between August and November 2019. Because of the coronavirus pandemic and the

interruption of university activities, the fourth round was realized only in November-December 2020; with the subsequent instalments in May-June 2021; October-November 2021; and the last one in April-May 2022.

In total, 309 subjects participated in study 1 and 267 in study 2, summing up 375 participants, as the students could decide to answer only one of the studies or both. Of the 375 participants, 45% were female and 48% self-identify as white. The age of subjects was on average 19 years old ($SD = 0.5$, $min = 18$, $max = 48$).

4.3 Variables

The dependent variable of “friendship on social media” was measured during study 1 based on two different questions, randomly assigned to each picture: (1) “Look at this picture. Would you accept this person if you received a friend request on social media?” or (2) “Look at this picture. Would you invite this person to be your friend on social media?”. There were three different answer options: “Confirm/Add to friends”, “Exclude/Remove” or “I know this person or can’t answer”. The wording of the options reproduces what is commonly stated on Facebook while people are making social connections, which can involve two different processes: (1) one passively getting an invitation of friendship from another user; (2) one actively taking the initiative to ask another user for a friendship. Though both dimensions were accounted for in this measure, there was not a significant difference among the answers according to each question framing. This variable is based on 62,976 choices made by 309 subjects, in which 44% of the choices are equivalent to 1 (“confirming or adding to friends”). Those who marked “I know this person or can’t answer” were counted as NA.

In study 1, there were exactly $k = 27,656$ friendships, under a number of trials $n = 62,976$, in which the probability p of making a friend is 0.5. There is a significant difference between the

observed k value and what would be expected in a null hypothesis of subjects randomly choosing friends (Z-Score = -30.54, p-value = 7.7e-205). For right-wing subjects, there were 6,333 friendships in 13,6342 trials (Z-Score = -8.27, p-value = 1.3e-16). For left-wing subjects, k = 13,351 and n = 27,216 (Z-Score = -3.12, p-value = 0.002). In both cases, there is a significant difference between observed and expected in random choice.

Based on the friendship choice, I also created two more dependent variables:

In-grouping: Friendship choices in which the subject and the stimuli have the same party ideology (both left-wing and both right-wing). This variable does not include 22,128 choices by subjects who declared to be centrists or did not declare to have left-right partisanship.

Out-grouping: When the subjects reject a friendship with stimuli having a different party ideology (one is left-wing and the other is right-wing). This variable does not include 22,128 choices by subjects who declared to be centrists or did not declare to have left-right partisanship.

Political perceptions of the stimuli were only measured in Study 2, which was conducted after the conclusion of Study 1. This variable is based on the question: "Look at this picture. Can you guess what is the political partisanship of this person?" Possible answers were "Left-wing", "Right-wing" or "I know this person or can't answer". The result was 53,856 guesses by 267 subjects. According to the answers, the following dependent variables were attributed to the pictures:

Correct Guess – Percentage of correct guesses of an individual image (M = 0.40, SD = 0.24).

Perception of left – Percentage of respondents who perceive a candidate as left-wing (M=0.44, SD = 0.26).

Right perception by left - Percentage of left-wing respondents who perceive this candidate as right-wing (M=0.55, SD = 0.27).

Left perception by right - Percentage of left-wing respondents who perceive this candidate as left-wing (M=0.45, SD = 0.26).

Right perception by right- Percentage of left-wing respondents who perceive this candidate as right-wing ($M=0.54$, $SD = 0.26$).

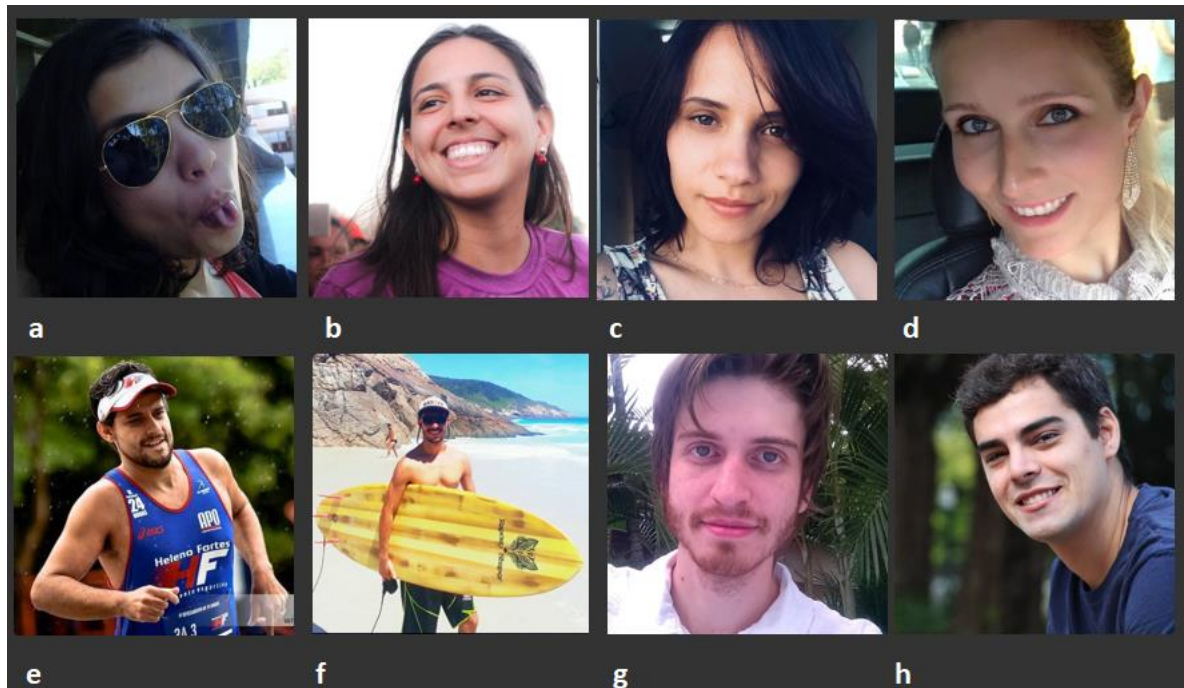


Image 1. Gaze and smile of Brazilian candidates

In the examples above, profile pictures c, d, g, h were classified as Gaze; b, d, f, h with Smile.

Besides sex, education, and party affiliation, other variables for stimuli were:

Smile - A dummy variable in which 1=smile. To code smile unambiguously, this variable only measured smiles in which candidates show their teeth, zeroing out questionable "Monalisa smiles" (see examples on Image 1). Left-wing candidates smiled slightly more than right-wing candidates (67 against 59). Women also smiled more than men (61% against 46%).

Gaze - A dummy variable in which 1 represents candidates looking directly at the camera, and not turning their gaze away from the viewer. Candidates staring at the camera represent 73% of right-wing pictures, 70% of left-wing; 75% of women, and 69% of men.

Subjects who agreed to participate in the study answered a preliminary form with social and demographic questions and other dependent variables:

Political salience – The respondents answered the question: "And what about people with whom you have friends on social networking services? How much of what they post, or share is related to politics or political issues? Answers were coded on a 0-4 scale, in which 0 represents "nothing" and 4 is "everything or almost everything" ($M = 2.3$; $SD = 0.75$).

Political homophily – The question: "How often do you agree with political views or political content that your friends post on social media pages?" Answers on a 0-3 scale, from "never" to "always or almost always" ($M = 1.5$, $SD = 0.7$).

Political talk – Answers to the question: "Please mark how frequently you talk about politics, on a 1-5 scale in which 1 means 'never' and 5 means 'every day'" ($M = 3.2$, $SD = 1.1$).

Right-Left scale – A scale from -3 to 3, in which -3 = "strong right-wing" and 3 = "strong left-wing". The scale was structured according to the answers to three related questions: (1) "In general, you think of yourself as left-wing, right-wing, centrist or other?" (2) follow-up to those who answered "left-wing" or "right-wing" on the first questions: "Would you say you are a strong (L/R) or moderate (L/R)?" (3) follow-up to those who answered "centrist" on the first question: "Would you say you are closer to left-wing or right-wing?" From the 375 subjects, 108 were classified as weak, moderate or strong right-wing and 259 as weak, moderate or strong left-wing, and only 3 centrists ($M = 1.0$, $SD = 0.11$).

Extremism – A 0-3 scale in which 0 represents a centrist subject and 3 means the subject is strong left-wing or strong right-wing. Only 104 of the subjects were coded as strong partisans, 18 right-wingers, and 86 left-wingers, while the average was classified as moderate ($M = 2.1$, $SD = 0.07$).

Social Economic Status – This measure has a 1-7 Likert scale, based on the following question: "People define community in different ways. Please define it in whatever way is meaningful to you. At the top of the ladder are the people who are better off, those who have more money, more

education, and better jobs. At the bottom are the people who are doing the worst, those who have less money, less education, worse jobs, or no jobs at all. Where would you place yourself with your immediate family on that ladder?" ($M=3.81$, $SD =0.07$).

5. Findings

As the dependent variable of friendship on social media is a binary vector, I used Bayesian discrete choice models for further analysis and inference of the different parameters related to the stimuli and to the subjects. Estimation is based on Gibbs sampling where the Markov chain Monte Carlo algorithms are based on the latent variable representations and boosting algorithms (Zens et al., 2020). I built three different models with (1) all subjects choosing all friendships; (2) subjects choosing friendships with the same party ideology – in-grouping; and (3) subjects rejecting friendships with different party ideology – out-grouping.

To estimate in-grouping, I subset the data with only the friendship choices offered between a subject and a candidate with the same political ideology, whether they would be both left-wing or right-wing. The model for out-grouping involved testing the friendship choices offered between a subject and a candidate with different political ideologies, in which one is left-wing and the other is right-wing.

The perception of a picture of a left-wing candidate is the strongest predictor of friendship on social media, with an estimate of 0.70 ($SD = 0.05$), as observed in Table 1. That means that **a one-unit increase in being perceived as left-wing can double the odds of friendship**. In the opposite direction, an image more broadly perceived as belonging to a right-wing candidate would have a negative estimate of -0.70. The results also show that correctly guessing the partisanship of a picture has a stronger effect on choosing (Coefficient of 0.36, with a 43% increase in the odd). However, the

actual political ideology of subjects or candidates did not have as strong an influence on how people choose friends on social media. Belonging to the poles of the right-left scale, either as a right-wing extremist or a left-wing extremist, decreases the likelihood of choosing a friend, with a negative coefficient of -0.15.

People who have more friends on social media talking about politics also make fewer friends (coefficient = -0.09, SD=0.02). Yet trusting in what people talk about politics and aggregating more with what their friends post or share on social media (political homophily) increases the chances of making a friend. Among the stronger social and demographic predictors, women are less likely to choose friends but, paradoxically, have stronger odds to be chosen. Being white and having a higher socioeconomic status doesn't help to make friends on social media. The visual aspects were also important in the decisions. As predicted, smiling on the profile picture can increase the number of friends on social media, but gazing has a negative effect. Candidates who smile have 35% greater odds of friendship. Candidates who were elected, have higher education, or are single also get more friends.

The model for In-grouping has similar predictors, with the difference that the effect of political perceptions is slightly stronger (coefficient of 0.74, SD = 0.07). In this model, candidates belonging to a left-wing party tend to be less accepted by friends from the same ideology, demonstrating that right-wing social media users have a greater in-grouping effect. Also, images with wrong guesses have higher in-grouping (Coefficient of 0.13), and being single is no longer significant (CI including zero). When one falsely guesses the ideology of a potential friend from a different party, it is less likely to reject him (Coefficient of -0.90), while perceptions of images being left-wing have a negative effect on rejecting someone from a different ideology. This means that right-wing social media users can accept friendships with others whom they perceive as left-wing, while at the same time, left-wing social media users are more likely to reject friendships with those who they think are right-

wing. Extremism has a positive effect on out-grouping (Coefficient of 0.25). Talking about politics and the actual political ideology of candidates are not significant in the out-grouping model.

Table 1 How to make friends on social media with visual stimuli

	Friendship ~	In-grouping ~	Out-grouping ~
Intercept	-0.63 (0.09)*	-0.24 (0.15)	0.57 (0.14)*
Perception Left	0.7 (0.05)*	0.74 (0.07)*	-0.42 (0.07)*
Correct Guessed	0.36 (0.04)*	-0.13 (0.07)*	-0.9 (0.07)*
Subjects			
Right-Left Scale	0.04 (0.01)*	0.07 (0.02)*	-0.08 (0.02)*
Extremism	-0.15 (0.01)*	-0.13 (0.02)*	0.25 (0.02)*
Political Salience	-0.09 (0.02)*	-0.09 (0.02)*	0.13 (0.02)*
Political Talk	0.03 (0.01)*	0.05 (0.01)*	0 (0.01)
Trust in Political Talk	0.1 (0.02)*	0.08 (0.03)*	-0.1 (0.03)*
Political Homophily	0.11 (0.02)*	0.14 (0.03)*	-0.08 (0.03)*
White	-0.59 (0.02)*	-0.58 (0.03)*	0.62 (0.03)*
Female	-0.27 (0.02)*	-0.28 (0.03)*	0.29 (0.03)*
Social Economic Status	-0.11 (0.01)*	-0.11 (0.01)*	0.13 (0.01)*
Stimuli			
Left Candidate	-0.07 (0.02)*	-0.27 (0.09)*	0.02 (0.08)
Female Candidate	0.35 (0.02)*	0.33 (0.03)*	-0.37 (0.03)*
Candidate Education	0.16 (0.01)*	0.14 (0.02)*	-0.19 (0.02)*
Elected	0.3 (0.04)*	0.44 (0.06)*	-0.2 (0.05)*
Married	-0.09 (0.03)*	-0.05 (0.03)	0.1 (0.03)*
Smile	0.33 (0.02)*	0.35 (0.03)*	-0.3 (0.03)*
Gaze	-0.1 (0.02)*	-0.14 (0.03)*	0.06 (0.03)
log-likelihoods	-27214.23 (df=19)	-13290.21 (df=19)	-13249.12 (df=19)
N	41064	20164	20186

Cell entries are posterior means of Bayesian Logit models with standard deviation

in parentheses. * 95% Credible Interval excludes zero.

To calculate the probabilities of friendship choice, I use a picture with a high probability of a correct guess ($p=0.8$), of a male left-wing candidate who is smiling and gazing, was elected, is single,

and has a university degree. Other than that, 80% of subjects have a perception that this stimulus is left-wing. In the case of a hypothetical social media user who is also a male and has a weak left-wing ideology (1 on a 0-3 scale), whose friends share few posts about politics, always or almost always agrees with his friend's posts about politics on social media, trusts in what others talk about politics, never talks about politics, the probability of choosing the candidate, only having the picture as the information, would be of 72% in a credible interval between 70%, on the 0.025 quantiles, and 75% on the 0.975 quantiles.

Maintaining all conditions equal but if, instead of 80%, only 20% of subjects have a perception the stimulus is left-wing, the probability of friendship falls to 63%, varying from 60% to 66%. All conditions from before equal but within a 0.2 chance of making a correct guess, the probability of friendship goes from 72% to 68%, with intervals from 65% to 70%. When the conditions of low probability of correct guess and low perception of left-wing visual cues are taken together, then the probability of friendship would be only 58% (intervals from 55% to 61%).

Keeping these conditions, if the subject is a left-wing extremist, the probability of choosing the image decreases to 52%. If he is a right-wing extremist, even more, declining to 47%. If together with the condition of being a left-wing extremist, his friends always post about politics on social media, the probability decays again to 46%. If he doesn't trust what others say about politics, there is another fall in the probability of making friends, to 43%. If instead of always agreeing with his friends on social media, he never agrees with them (political homophily = 0), the probability of friendship is down to 35%.

Changes in the picture would also affect the choice. If the candidate does not smile, the probability of friendship drops from 35% to 28%. Not gazing has the opposite effect, changing from 35% to 38%. Smiling and gazing but having a lower level of education means a 20% probability of friendship. Back in the condition of obtaining a university degree, but not being elected, this candidate has a 29% chance of getting a friend.

With the same initial conditions but with a right-wing candidate image, with high visual perceptions as right-wing (80%), and a weak right-wing hypothetical individual, the probability of making a friend is 62%. If this individual is a right-wing extremist, the probability drops to 53%. It is lower than the probability of a friendship from a moderate left-wing subject, with 57%.

6. Conclusion

Politics, in a polarized context, poisons relationships on social media. In the experiment, subjects who have friends posting more about politics on social media, and with more extremist attitudes are less likely to make friends. On the other hand, those with more trust in political talk and political homophily tend to make more friends. This gives evidence that, in a polarized context, people might want to avoid conflict and, while politicized individuals are more cautious in expanding their social networks, others will be more comfortable making friends and connections when they are used to a trusting environment and interactions with similar others.

These two different mechanisms will have consequences for political homophily on social media. When a more polarized social media user tends to choose fewer friends, it decreases her chances of making new weak-tie connections which would bring her more diverse information and, perhaps, broaden her perspectives and modulate their political views with more moderation. Others with political salience, by making fewer new friends, will continue getting large amounts of information from people they already know and, probably, have stronger ties and similar views and beliefs. On the other hand, those who trust in political talk and are more likely to make new friends will have the hard task of finding others who are also trustful and trustworthy. Users with political homophily, though open to new relationships, need to receive offers from friends who have

dissimilar political views, so they can not remain limited to other nodes who will share the same ideology.

The most significant variable for choosing a friend is how they are perceived by left-wing or right-wing subjects. Actual political partisanship is not as important, either for subjects who are making the choices of friendship or candidates who are being chosen. If people are right about guessing political partisanship with the help of visual cues and information, then the probability of getting new friends increases significantly. This is an incentive for social media users to signal a digital identity with more political visual cues and portray more symbols or explicit political messages to make them more attractive to potential new friends. This will also affect political homophily on social networking services.

Though finding the effects of images on how people connect on social media, we should not blame individuals for their choices. Social media users are only reacting to a polarized environment. Sadly, these reactions will only increase and reinforce political homophily and can even bring more consequences to polarization. Possible solutions for this problem can only become available by changes in platform design. Following are some recommendations:

- (1) Policing for trustworthy and accessible political information. As demonstrated in the model, people who trust more on political talk make more friends on social media.
- (2) Social media platforms should recalibrate the options of friends on social media to offer more people with different attitudes and interests.
- (3) Social media platforms should filter profile pictures and other images on social media to avoid portraying symbols of extremist or violent political movements.
- (4) Invitations for friendships should not rely only on visual cues but mainly convey meaningful information based on shared interests other than politics. Political homophily is demonstrated to be

a predictor of friendship on social media, but these relationships can be based on different types of homophily than politics.

A lot more needs to be investigated when it comes to the image effects on relationships in social media. Once those platforms are increasingly relying on videos and images for social interactions and building digital identities, political communication scholars should expect wider and stronger effects of visual cues and their perceptions on social networking services, with more consequences for politics and society shortly.

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