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EDITED BY

Sean Everton,
Naval Postgraduate School, United States

REVIEWED BY

Matthew Zefferman,
Naval Postgraduate School, United States
Chen-Li Huang,
National Taitung University, Taiwan

*CORRESPONDENCE

Pablo Nicolas Fernández Larrosa
✉ fernandezlarrosa@fbmc.fcen.uba.ar

[†]These authors share first authorship

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Role of ideology and the media in promoting familiarity and trust in political decisions: the case of Argentina's 2019 elections

Emilio Recart Zapata^{1,2†}, Tomas Alves Salgueiro^{1†} and Pablo Nicolas Fernández Larrosa^{1,3*}

¹Instituto de Fisiología, Biología Molecular y Neurociencias, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad de Buenos Aires, Argentina, ²Facultad de Psicología, Universidad de Buenos Aires, Ciudad de Buenos Aires, Argentina, ³Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad de Buenos Aires, Argentina

Introduction: Today's democratic systems are at a crossroads in the face of the rising "new right wing", a reactive form of political polarization. Although much research has studied the political polarization phenomenon, most focus on the United States and Europe. Previously, we have shown how repeating information or positively associating with content can cognitively induce certain political candidates' election.

Methods: We assess whether familiarity and trust can be voting predictors using the 2019 Argentinean elections as a case study. Previously, we generated two databases from surveys conducted during the 2019 Argentinean presidential election (PASO [Spanish acronym] election: 2,255 participants; general election: 1,418 participants). A logistic regression model was used to predict the probability of choosing a given candidate using the familiarity with and trust in each candidate or consumed media outlets as predictor variables (features). We also evaluate voting communities in a cluster analysis associated with ideological self-perception or media consumption.

Results and discussion: Our results show that both familiarity and trust, social variables of political interest to manipulate, are key predictors of candidate choice. We find key links between these factors and ideology, media consumption, and candidate choice. We discuss our results in light of the effects of the two-party system, ideology, the role of the media, and their cognitive effects in favoring political polarization. These mechanisms' persistence only serves to erode people's freedoms, damaging relations between different groups and the democratic system in general.

KEYWORDS

familiarity, trust, media, ideology, democracy, two-party, political polarization, Argentine elections

1 Introduction

Political polarization can be conceptualized as the radicalized positions expressed by citizens' groups that understand politics and society in terms of "us vs. them", damaging intergroup relations and democratic coexistence (Sieber and Ziegler, 2019; Jost et al., 2022). While much of the literature focuses on the underlying processes that favor polarization, it often concentrates on cases such as the United States or European countries. Political polarization occurs when individuals move away from their initial views on a given issue and radicalize their political beliefs, becoming members of social groups with strong and intense consensus (Sieber and Ziegler, 2019). In this way, ideological polarization is characterized by a shift toward the extremes and away from the center with respect to political and/or ideological beliefs (Jost et al., 2022). Citizens have their own ideological representations, which may be stronger or weaker depending on their social experiences throughout their lives. These representations involve personal beliefs, values, and social, economic, and political expectations; however, they serve as a political map for classifying different candidates or political coalitions within a left/right or progressive/conservative spectrum (Brussino et al., 2017). A particular case involves the partisan alignment within the political space. Parties are often based on social and/or cultural beliefs, expressing divisions based on social class, region, or religion beyond strictly ideological aspects. However, polarization can have an affective dimension, where members of different social groups (or political parties) share very positive (or very negative) feelings toward their own (or other) groups or common beliefs (Jost et al., 2022).

Ideological representations can serve as "anchors" that people rely on to make judgments or estimates about an uncertain situation (Tversky and Kahneman, 1974; Epley and Gilovich, 2010; de Wilde et al., 2018). These anchors could play a key role in confirmation bias when sampling information, such as that published in media or online social networks. Media news can disseminate biased information (disinformation; García et al., 2020), as well as inaccurate information or fake news (misinformation) directly, which can influence people's opinions or perceptions of trust in or familiarity with a particular political coalition or candidate (Bernal et al., 2022; Pérez et al., 2023). While misleading and (hyper)partisan content may not be entirely false or fabricated, it can be spread widely on social media (Faris et al., 2017). However, false content can influence individuals' beliefs (Guess et al., 2020). Both types of (mis/dis)information can be greatly amplified by echo chambers (Del Vicario et al., 2015), contributing to the radicalization of ideological positions, the segregation of communities, and polarization. Confirmation bias and a lack of quality information contribute to the proliferation of biased narratives, fueling mistrust and paranoia (Del Vicario et al., 2015). Thus, mediated by implicit processes, biased or false information can have an emotional impact on complex decision-making, integrating economic, political, and moral decisions (Bernal et al., 2022; Fernández Larrosa, 2023). The emotional and/or mood state may be induced by the constituent stimulus of the choice or decision (as a priming) or precede (and extend during) the decision process, conditioning it. Repeated exposure

to a stimulus can induce recognition and familiarity (repetition priming; Ellis et al., 1987; Dehaene et al., 2001; Henson et al., 2000; Logan, 1990; Neill, 1997), and some social and political research even suggests an effect on political decisions (Stern, 2019; Cistulli and Snyder, 2009; Claibourn, 2008). Previous work has shown that repetition and emotional priming could induce complex decision-making, although top-down mechanisms, adopting characteristics of more deliberative processes, might interfere with these implicit processes (Bernal et al., 2022). Emotional facial gestures were reported to be implicitly used to make inferences about competence, suggesting that automatic and unreflective processes impact voter choice (Todorov et al., 2005) or increase prosocial behaviors (Weiß et al., 2021). A retrospective study of U.S. presidential elections suggests that knowledge about candidates' biographical information could be a good predictor of results (Armstrong and Graefe, 2011). In our previous study, we also observed that familiarity and trust correlate significantly with voting probability. How frequently candidates are mentioned in the news media (weighted by subjects' reported news media consumption) correlated significantly with familiarity, while trust correlated significantly with news headlines' positive perception of each candidate (Bernal et al., 2022).

In this article, we assess whether trust, familiarity, and media consumption could predict voting during the 2019 Argentinean elections, according to our working hypotheses:

H1: Familiarity with and trust in candidates are good predictors of voting for those candidates.

H2: Media outlet consumption is also a good predictor of voting for major candidates (associated with a two-party system).

At the same time, we characterize the political communities' voting configuration for each candidate, analyzing the roles of political ideology and the consumed media outlets play, according to our hypotheses:

H3: Different candidates share ideologized populations and must compete for their votes.

H4: Certain media outlets can be clustered, and their clustering is associated with electoral preference for certain candidates.

We propose that these ideological representations are a biased cognitive basis for the media (and campaigns) to intentionally favor familiarity with and trust in particular political forces, playing a key role in forming polarized communities in a two-party system. Although these representations can be analyzed universally, each region or country may have its own particularities (e.g., Peronism/anti-Peronism in Argentina). Thus, we analyze the cognitive effects of these factors from a historical perspective using elections from 2007 through 2023. To deepen the analysis of the cognitive and social determinants of complex decisions, especially political ones, and social phenomena, such as political polarization, all this deserves to be considered in each particular case.

2 Materials and methods

2.1 2019 Argentina presidential elections

For the 2019 presidential elections in Argentina, the National Electoral Chamber defined June 22, 2019, as the deadline for

submitting lists and the entire electoral schedule (Figure 1A). Ten lists were presented, corresponding to different presidential and vice-presidential candidates from each political coalition (Figure 1B). For simplicity, we only name the presidential candidates as representatives of each political coalition: Alberto Fernandez (AF), Mauricio Macri (MM), Roberto Lavagna (RL), Nicolas Del Caño (NDC), Jose Luis Espert (JLE), and Jorge Gomez Centurión (JGC). Each political coalition can be characterized ideologically according to the ideological spectrum. The different parties that made up each coalition (and support in the 2023 election), as well as the historical movements (2007–2023) made by these parties and candidates between the different coalitions, are described in detail in [Supplementary Tables S1, S2](#) (and schematically in Figure 5B). For Argentina's political background, the [Supplementary material](#) also provides a brief historical and political characterization of the different political coalitions.

The 2019 Argentine presidential elections consisted of two stages. The first, called Simultaneous and Mandatory Open Primary Elections (PASO, Spanish acronym), was on August 11, 2019. Presidential candidates who obtained more than 1.5% of the votes in the PASO advanced to the general election. In the following, Election 1 refers to the PASO, and Election 2 refers to the general election. Figure 1C shows the results of Elections 1 and 2.

2.2 Data set building

2.2.1 Data acquisition

In previous work (Bernal et al., 2022), to complement the results of canonical cognitive experiments in an ecological context, a social study consisting of online surveys was conducted during the preelection periods: (1) Election 1 (June 6–August 8, 2019) and (2) Election 2 (September 1–October 24, 2019). The first survey was completed by 2,255 participants (1,002 women, 1,234 men, and 19 undefined; mean age: 34.2 ± 0.3 , age range: 13–93) and the second by 1,418 participants (843 women, 566 men, and 9 undefined; mean age: 37.6 ± 0.5 , age range: 11–88); all participants were residents, and all provinces in Argentina were represented. In the data analysis, 87 subjects who did not meet the inclusion criteria were excluded (Bernal et al., 2022). All participants gave informed consent, and the ethics committee of the Clinic Hospital “José de San Martín”, University of Buenos Aires, approved the study.

Both surveys recorded personal information: age, gender, residence, and social-economic self-perception. Participants' political characterization was assessed symbolically as political and ideological self-perception (Brussino et al., 2017). In this case, participants were asked whether they perceived themselves as center, left wing, or right wing. They were also asked whether they perceived themselves as being political, apolitical, or neutral; however, the analyses for this political assessment did not yield significant results, so they are not included in the current work.

Participants were then asked whether they recognized each presidential and vice-presidential candidate, how familiar they were with each candidate (familiarity), how much they trusted each candidate (trust), and how likely they were to vote for each candidate (voting probability). Familiarity, trust, and voting probability were assessed on a 9-point Likert scale. Finally,

participants were consulted about their reasons for voting and how (online social networks, media outlets, and/or others) they informed themselves about the candidates. For the media, they were presented a list of the 11 most important national-level written media in Argentina covering a broad ideological spectrum (*Ambito*, *Clarín*, *Cronista*, *InfoBae*, *La Izquierda Diario [LID]*, *La Nación*, *Página 12*, *Perfil*, *Popular*, *Prensa Obrera*, and *Tiempo Argentino*) and the nine most important audiovisual media (TV Pública, Canal 26, C5N, Canal 13, Crónica TV, Canal 9, América TV, TELEFE, and TN).

Here, we started with the two databases generated for the two 2019 presidential election periods but processed them in an original way to generate new databases used for this study's analyses. Thus, two new data sets were generated for Election 1 and Election 2.

2.2.2 Ethical approval

The study and its methods were carried out in accordance with the relevant guidelines and regulations, previously approved by the ethics committee of the Clinic Hospital “José de San Martín”, University of Buenos Aires. The study complies with the principles of the Declaration of Helsinki. All participants gave informed consent to participate in the surveys, as well as for the publication of identifying images or information in an online open-access publication. Identifying information was removed from data sets and replaced with anonymous IDs.

2.2.3 Dataset processing

To simplify the analyses, we only considered the data for the six candidates who reached the 1.5% threshold during the PASO, thus retaining the candidates subjects were more likely to vote for. With this in mind, a new variable, “CANDIDATE_LABEL,” was generated to indicate the candidate or candidates each subject gave the highest voting probability value. [Supplementary Table S3](#) presents the different frequency levels for the variable “CANDIDATE_LABEL,” showing that for most subjects, it implies a single candidate but that, for others, it implies two, three, four, five, or all six candidates equally. In this work, only cases in which one candidate corresponded to CANDIDATE_LABEL were considered for modeling.

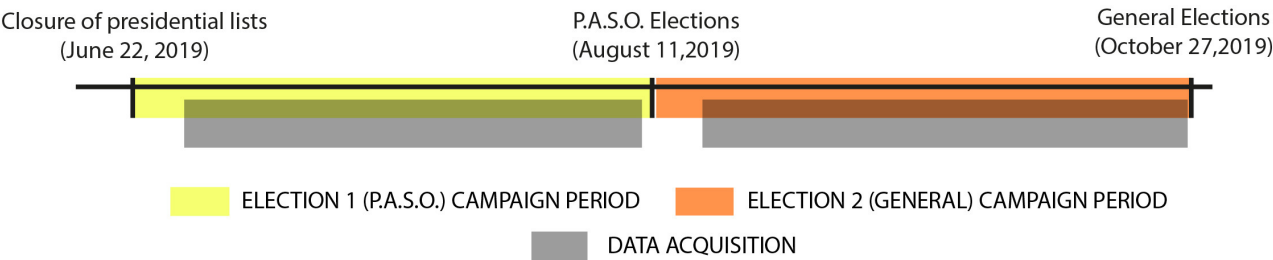
2.3 Statistical analysis of the information means

We analyzed the means participants used to inform themselves about the candidates using Kruskal–Wallis and *post-hoc* Dunn's tests. The results are shown in [Supplementary Tables S4, S5](#) as well as [Figure 1D](#).

2.4 Logistic regression models

Logistic regression was used to predict the probability of choosing a given candidate using familiarity with and trust in each candidate, information means, and written and audiovisual media

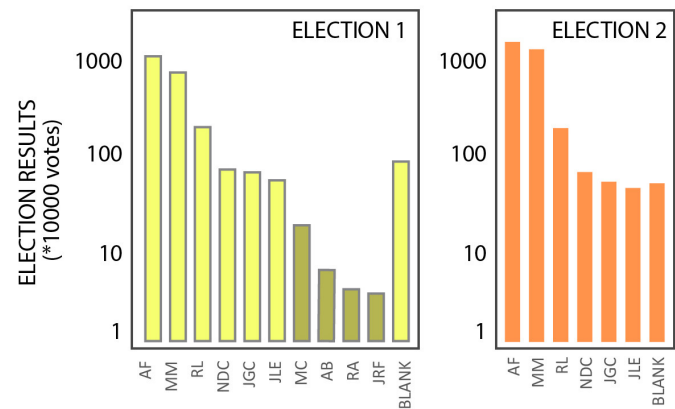
A. 2019 ARGENTINE ELECTIONS | ELECTION SCHEDULE AND DATA ACQUISITION



B. CANDIDATES

ABB.	President candidate (Political Force)	Ideological Characterization
AF	Alberto Fernandez (Frente de Todos)	Centrist progressivism
MM	Mauricio Macri (*) (Juntos por el Cambio)	Right-wing liberalism
RL	Roberto Lavagna (Consenso Federal)	Center/Right-wing liberalism
NDC	Nicolas Del Caño (FIT-U)	Left-wing
JLE	Jose Luis Espert (UNITE)	Right-wing libertarian
JGC	J. Gomez Centurion (Frente NOS)	Right-wing
MC	Manuela Castañeira (Nuevo MAS)	Left-wing
AB	Alejandro Biondini (Frente Patriota)	Extreme right-wing
RA	Raul Albarracin (Movimiento de Acción Vecinal)	Center
JRF	Jose Romero Feris (Partido Autonomista)	Right-wing

C. ELECTIONS' RESULTS



D. INFORMATION MEANS USED BY PARTICIPANTS TO FIND OUT ABOUT THE CANDIDATES

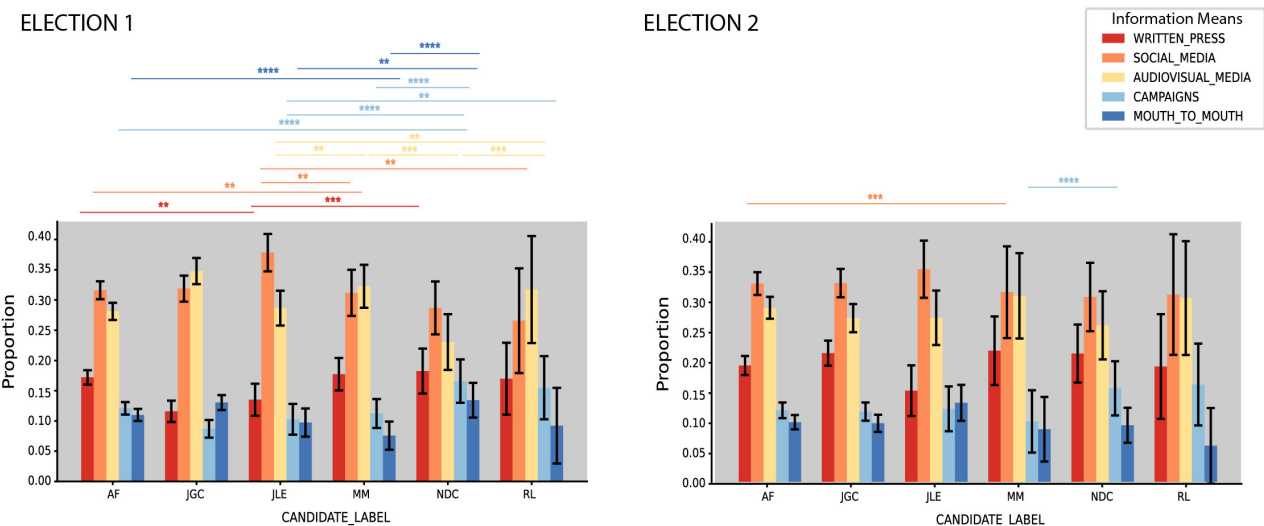


FIGURE 1
2019 Argentine presidential elections. (A) Election schedule and data acquisition. (B) Presidential candidates (political coalitions) and their ideological characterization. Candidates who did not reach the 1.5% threshold in the PASO and did not advance to the general election are in gray. (C) Elections results (expressed as a percentage of the total number of votes on an algorithmic scale). (D) Proportion of using different means to inform themselves about the candidates. Kruskal–Wallis and post-hoc Dunn's test results. ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$.

outlets as predictor variables (features); the variables for each model are detailed in [Supplementary Table S6](#). Of the data collected, 70% were used to train the model, and 30% were used for testing, and k -fold cross-validation ([Nti et al., 2021](#); [Rao and Wu, 2005](#)) was performed to evaluate our model's performance independent of the training and test data's partitioning.

The model has a nominal dependent variable (target or output variable) and independent variables (features or predictor variables) that are either continuous or categorical. Unlike conventional logistic regression models, where the target is binary, this model predicts two or more categories for the output variable. To compute this prediction, we use maximum likelihood. This statistical approximation estimates the model parameters by optimizing the likelihood of the function parameters to fit. This results in predicted categories that are as close as possible to the actual probabilities in the data. The model is categorized as a machine learning classification model, which learns by mapping the data set to a category. To address the classification problem, a one-vs.-rest logistic regression (OvR) was adopted. This methodology is used when dealing with a y variable that has more than two classes. In essence, it simultaneously and independently evaluates each class in a binary manner. That is, it involves creating multiple binary classification subproblems, one for each class considered. Within each subproblem, the binary classification model is trained, and the rate of true positives, true negatives, false positives, and false negatives associated with each class is evaluated. The accuracy and balanced accuracy scores obtained for each model are shown in [Supplementary Table S6](#).

2.4.1 Hyperparameters

For this analysis, the hyperparameters were optimized using a grid search method ([Sharma et al., 2022](#)). The method consists of evaluating various combinations of hyperparameter values to determine which configuration produces the best model performance. The following hyperparameters were adjusted: Penalty, C, Multiclass, Solver, Max Iter ([Supplementary Table S7](#)). Optimizing these hyperparameters has a considerable impact on the model's performance because using them well can improve the true-positive rate and reduce the model's bias or variance. To avoid overfitting, a lasso regularization was carried out.

2.4.2 Cross-validation analysis

Cross-validation is a method for assessing a model's accuracy by training it on different subsets of data from the same data set and assigning a weight to the performance of each analysis. It aims to assess the model's ability to classify novel data not included in the training set, thus mitigating overfitting ([Rao and Wu, 2005](#)). A k -fold cross-validation model was employed, whereby the data set is split into k subsets of roughly equal size and then the model is trained k times. The mean of every k subset's performance determines the model's performance. Precisely defining k subsets may enhance the model's performance and reduce overfitting. The literature does not agree on the optimum value of k because it depends on the machine learning algorithm employed. According to Kofi-Nti et al., a study demonstrated that utilizing a k -fold of 7 resulted in a successful performance while utilizing fewer

computational resources ([Nti et al., 2021](#)). For this analysis, we chose to use the same k -factor as Kofi-Nti et al. The obtained accuracy and balanced accuracy scores for each model and election are presented in [Supplementary Table S6](#).

2.5 Cluster models

To characterize the communities associated with each candidate and identify emerging polarized groups, we performed clustering based on political ideology and written or audiovisual media outlet consumption. The variables for each model are detailed in [Supplementary Table S8](#). Agglomerative clustering, a type of hierarchical clustering that begins by treating each observation as a single cluster, was used. The two most similar clusters are combined at each algorithm step into a new, larger cluster, a procedure repeated until the number of clusters determined by the hyperparameter k is reached.

Because clustering was performed on categorical variables and hierarchical clustering algorithms rely on distance measures to determine the similarity or dissimilarity between data points, we calculated the Gower distances between observations ([Gower, 1971](#)). The Gower distance is a metric typically used to calculate the distance between two entities consisting of a mixture of categorical and numerical values, but it is also suitable when the variables are all categorical, as in our case. The Gower distances were calculated using the Python Package Index (PyPI) package *gower* (<https://github.com/wwwjk366/gower>, MIT License Copyright (c) 2019 Michael Yan). Then we stored the values corresponding to the Gower distances into a matrix that was used as input to the AgglomerativeClustering algorithm from *sklearn* package (<https://scikit-learn.org/stable/modules/generated/sklearn.cluster.AgglomerativeClustering.html>).

The typical methods for determining the optimal number of clusters (elbow method, silhouette score, scree plot, gap statistic) are designed for use with continuous variables. Therefore, in each case, we chose the number of clusters (K) based on the graphical results, trying to choose the K that would give the least possible overlap between clusters while avoiding a K that was too high, which would lead to having a very low number of observations in each cluster.

2.6 Data availability statement

The surveys, scripts, and data sets generated and analyzed during the current study are available in the Open Science Framework (OSF) repository, <https://osf.io/ygdxt/>.

3 Results

In the 2019 presidential elections, 10 lists of candidates were presented to the PASO (Election 1; August 11, 2019), and only 6 exceeded the threshold of 1.5% of votes and competed in the general election (Election 2; October 27, 2019): AF, MM, RL, NDC, JLE, and JGC. The elections' results are shown in [Figure 1C](#). For more in-depth descriptions of the political trajectories represented in the presented lists, see the [Supplementary material](#).

When evaluating the means participants used to inform themselves about the candidates, for both Elections 1 and 2, social media, audiovisual media, and written media were found to be the most popular (Figure 1D).

3.1 Familiarity and trust are good predictors for candidate election

For the Election 1 and Election 2 data sets, multi-logistic regression (OvR) models were trained on the quantitative variables of familiarity and trust for each presidential candidate to predict the voting probability for each candidate. After several exploratory analyses, for Election 1, we decided to keep only the data of the candidates who passed the PASO to compare both models.

For both Elections 1 and 2, when using trust and familiarity as features (independent variables), the model has a prediction accuracy of 0.89 (Supplementary Table S6). The accuracy varies by candidate, with good values for AF (0.94), MM (0.91), NDC (0.81), and RL (0.85), and worse values for JLE (0.69) and JGC (0.67) for the first election (Figure 2Ai); in the case of the second, similar results were observed: AF (0.95), MM (0.91), NDC (0.56), RL (0.83), JLE (0.65), and JGC (0.67; Figure 2Bi). This unbalanced accuracy could be explained by the reported support for these candidates (for Election 1: RL: 32 and JGC: 9; for Election 2: JLE: 12 and JGC: 9). Because an unbalanced data set can induce bias problems, in these scenarios, accuracy does not represent an optimal measure. As a result, we calculated a balanced accuracy that allowed us to calculate the model's performance without being affected by class imbalance. The balanced accuracy was 0.82 for Election 1 and 0.797 for Election 2 (Supplementary Table S6). To assess the predictor variables' importance in both electoral scenarios, we calculated the mean absolute value of the model coefficients across all classes of the variable we wanted to predict. The resulting metrics provided information on the features that, on average, exerted the most pronounced influence on the classification outcome. In our results, trust in MM and trust in AF showed the most substantial impact on our dependent variable, signifying their pivotal role in shaping the predictive dynamics of our models (Figure 2Aii for Election 1 and Figure 2Bii for Election 2). In this sense, our results partially support our Hypothesis 1 in the sense that familiarity with and trust in the main candidates (MM and AF, associated with the two-party system) are the most predictive cognitive variables of the election (Supplementary Table S6).

A comparative analysis between familiarity with and trust in different candidates allowed us to recognize associations between the variables, suggesting positive and negative correlations between trust in certain candidates; thus, we began to recognize common patterns between beliefs about the candidates (Figure 2Aiii for Election 1; Figure 2Biii for Election 2). Regarding common trust, we identified two opposite groups of candidates: AF and NDC (Election 1: $R = 0.35$; Election 2: $R = 0.36$); MM, JGC, and JLE (Election 1: $R_{MM-JLE} = 0.29$, $R_{MM-JGC} = 0.27$, $R_{JLE-JGC} = 0.44$; Election 2: $R_{MM-JLE} = 0.29$, $R_{MM-JGC} = 0.27$, $R_{JLE-JGC} = 0.44$).

However, for means of information, the balanced accuracy was 0.21 for Election 1 and 0.20 for Election 2

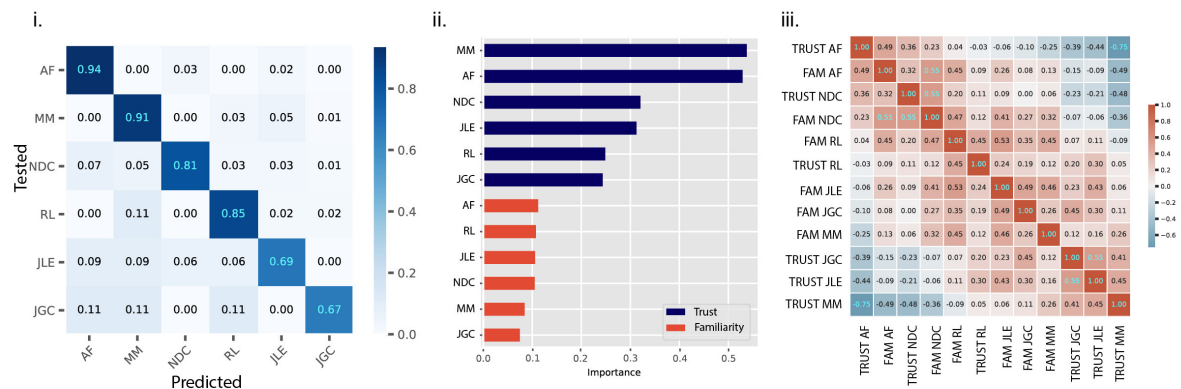
(Supplementary Table S6). Certainly, these balanced accuracy values do not make this a very good predictive model; however, calculating the importance of the independent variables (audiovisual media, written media, campaigns, social media, and mouth-to-mouth) individually allowed us to estimate their weights for each election. For Election 1, audiovisual media (importance: 0.41), campaigns (0.34), and written media (0.32) were the most important; for Election 2, campaigns (0.40) and social media (0.37) were more important. When we evaluated the audiovisual media outlets as features, the balanced accuracy was 0.32 for Election 1 and 0.23 for Election 2 (Supplementary Table S6). The accuracy values depended on the candidate: AF and MM presented good accuracy values in either Election 1 (AF: 0.73; MM: 0.57) or Election 2 (AF: 0.72; MM: 0.69). For both elections, the audiovisual media that had the most weight in predicting candidate choice were C5N and TN. Figure 2C shows the confusion matrix and the importance of each audiovisual media. For media outlets, the balanced accuracy was 0.778 for Election 1 and 0.329 for Election 2 (Supplementary Table S6). However, this depended on the candidate. Both AF and MM presented good accuracy values for both Election 1 (AF: 0.66; MM: 0.63) and Election 2 (AF: 0.7; MM: 0.59). In both elections, *Página 12* was the most important variable in the models (Figures 2Cii, Dii). Both C5N and *Página 12* are media that hold positions nearer to AF voters' positions; similarly, TN and *La Nación* are media that have positions closer to MM voters' positions. Again, our results partially support Hypothesis 2: In this case, the media associated with the winning candidate had a stronger predictive effect on the election. This can be explained in the sense that the other hegemonic media are widely consumed by the population; therefore, our methodological approach does not allow for evidence of their ideological bias.

3.2 Ideological populations underlying the election of each candidate

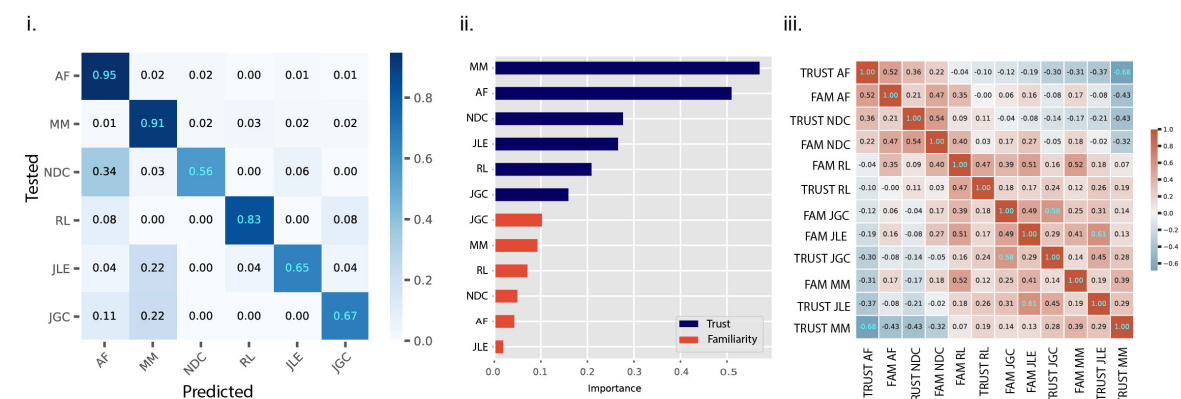
An earlier interaction analysis of trust suggested that some candidates share common potential voter populations. Here, we analyze whether communities of voters can be identified through cluster analysis based on ideological perceptions and elected candidates. After several preliminary analyses, we decided on three clusters and analyzed their ideological perception and candidate election composition (Figure 3). Cluster 1, composed of a population perceiving itself as left wing, would mostly vote for AF, and a minority would vote for NDC. Cluster 2, composed mainly of a population that self-perceives as centrist, here, included mainly populations that would vote for AF and MM and, to a lesser extent, the rest of the candidates. Finally, Cluster 3 represents the right-wing population and voters for MM, JLE, and, to a lesser extent, AF, JGC, and RL.

What can be said about this cluster analysis? Figures 3Aiii, Biii show the distribution of the self-perceived right, left, and centrist populations as potential voters for each candidate. In both elections, the two main candidates were largely elected by two different populations that self-perceive as left wing (AF's voters) or right wing (MM's voters). The first population also includes

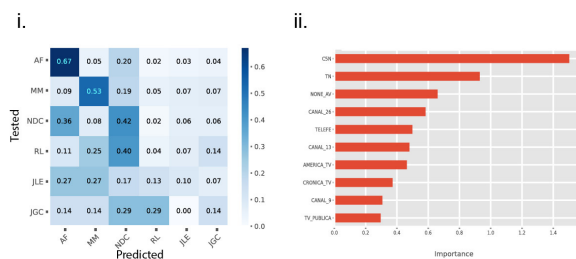
A. ELECTION 1 | CANDIDATE ELECTION PREDICTION BY FAMILIARITY AND TRUST



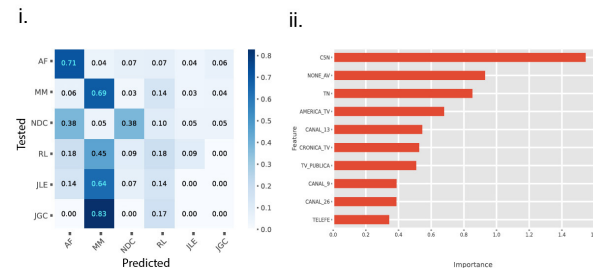
B. ELECTION 2 | CANDIDATE ELECTION PREDICTION BY FAMILIARITY AND TRUST



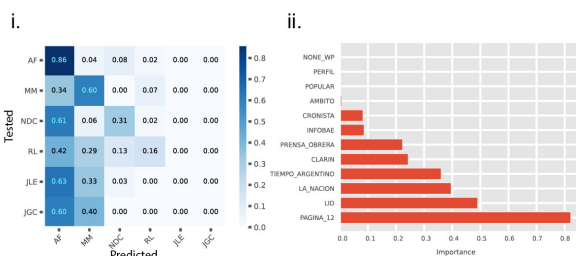
C. ELECTION 1 | CANDIDATE ELECTION PREDICTION BY AUDIOVISUAL MEDIA OUTLET CONSUMPTION



D. ELECTION 2 | CANDIDATE ELECTION PREDICTION BY AUDIOVISUAL MEDIA OUTLET CONSUMPTION



E. ELECTION 1 | CANDIDATE ELECTION PREDICTION BY WRITTEN MEDIA OUTLET CONSUMPTION



F. ELECTION 2 | CANDIDATE ELECTION PREDICTION BY WRITTEN MEDIA OUTLET CONSUMPTION

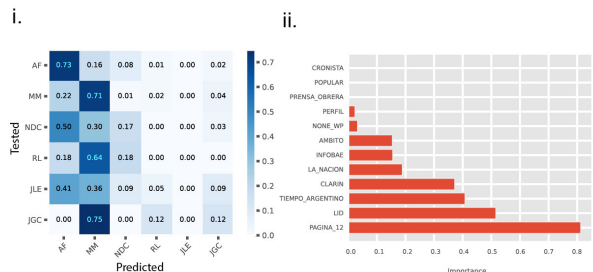
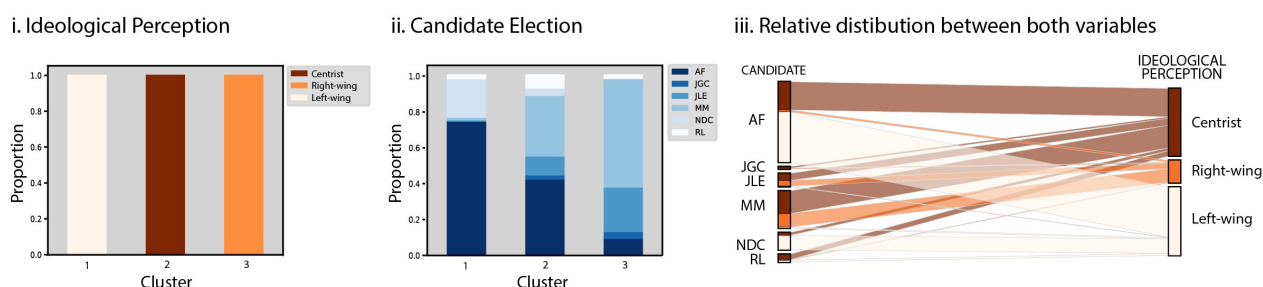


FIGURE 2

Candidate election predictors. Multiple logistic regression models were trained to predict candidate election from the familiarity with and trust in each candidate for (A) Election 1 and (B) Election 2. (i) Predicted vs. tested matrix, (ii) importance of each variable (trust and familiarity to each candidate), and (iii) correlations between the variables matrix. (C, D) Prediction models using audiovisual media outlets consumption or (E, F) written media outlet consumption as features. (i) Predicted vs. tested matrix and (ii) importance of each variable (audiovisual or written media outlets) for the model generated from Election 1 (C–E) or 2 (D–F) data.

A. ELECTION 1 | Cluster Distribution by Ideological perception and Candidate Election



B. ELECTION 2 | Cluster Distribution by Ideological perception and Candidate Election

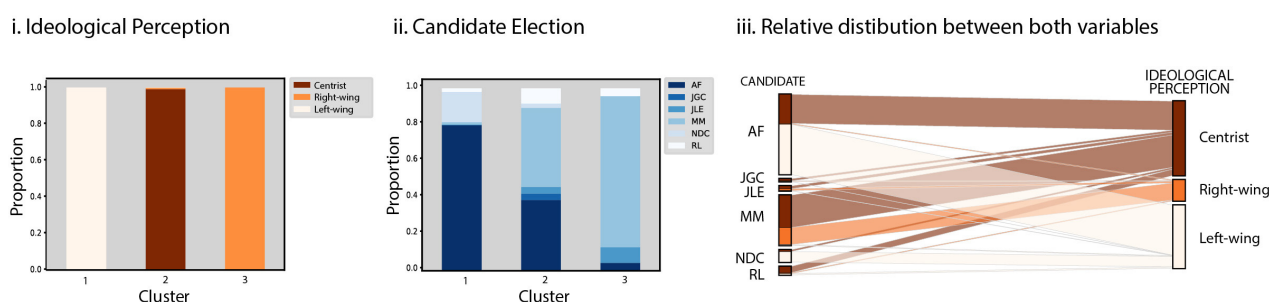


FIGURE 3

Ideological characterization of the populations electing each candidate for PASO election (A) and General election (B). To ideologically characterize the communities associated with each candidate, a cluster analysis was carried out using the variables IDEOLOGICAL_PERCEPTION and CANDIDATE_LABEL. The most interpretable model involved the generation of three clusters, which are contracted with the proportion of the three levels for the (i) IDEOLOGICAL_PERCEPTION or (ii) the six candidates. Another graphical way of looking at the relationship between the two variables is by means of the (iii) Sankey plot.

individuals who could potentially elect NDC (the properly left-wing coalition), while the second population also shares the choice for JLE and JGC (although a small proportion of AF voters also perceive themselves as right wing), in accordance with Hypothesis 3. For the second election, MM was the right-wing population's choice compared to the other candidates, suggesting that Election 2 was more polarized between AF and MM. Even this phenomenon can be observed in those in the third population who perceived themselves to be centrist. While in Election 1, voters in this population constituted similar proportions of potential voters for AF or MM and, to a much lesser extent, other candidates, in Election 2, they are more concentrated on MM and AF (and the portion of the population that chose RL persists).

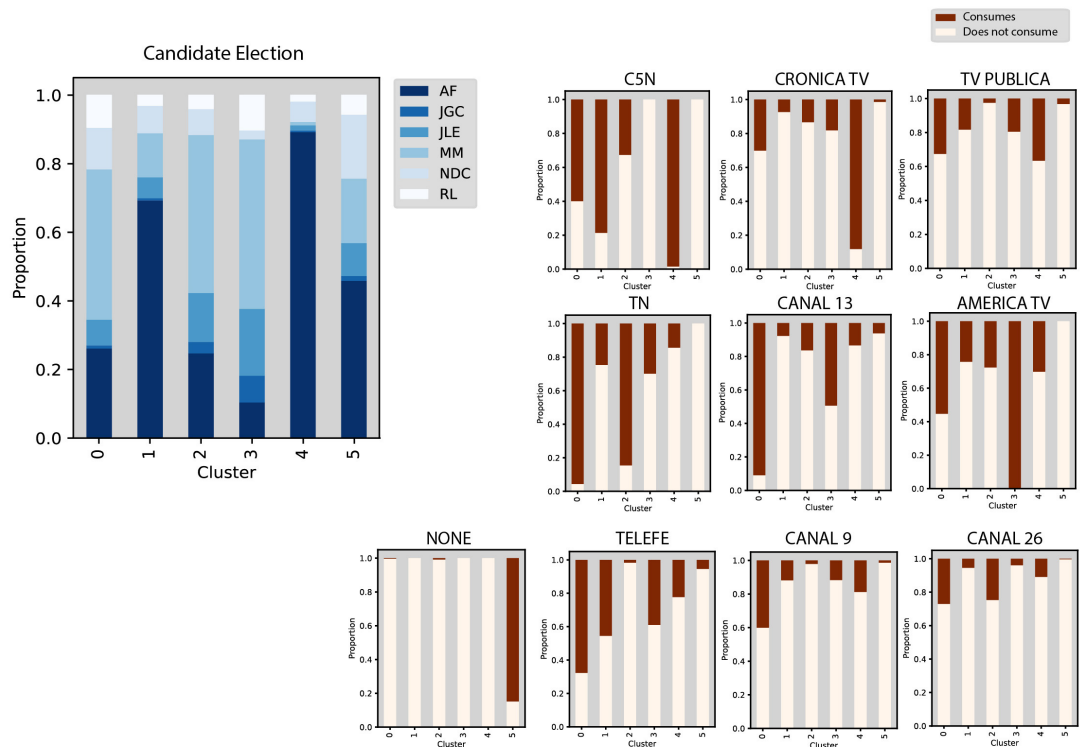
3.3 Clusters of candidate election by media consumption

When we assessed the generation of clusters in terms of candidate choice and audiovisual media consumption, the results support our previous findings. For Election 1, two main groups of audiovisual media were associated with the candidates: C5N was mainly consumed by Clusters 1 and 4, whereas the election of AF stood out; however, clusters associated with MM consumed more TN, CANAL 13, and AMERICA TV (Figure 4A). Similar results were observed for Election 2 (Supplementary Figure S1).

When we evaluated the clusters generated according to candidate choice and written media outlet consumption, the results deepen and support what was observed earlier. We can infer two main media groups being associated with the candidates. *Pagina 12* (and, to a lesser extent, *Tiempo Argentino*) is associated with AF-related clusters: Clusters 0, 1, 4, and 5 for Election 1 (Figure 4B) and Clusters 0, 2, 3, 4, and 5 for Election 2 (Supplementary Figure S1). *Clarín-La Nación* (and, to a lesser extent, *Infobae*) was associated with clusters related to MM (and JLE), as well as AF: Clusters 3 and 4 for Election 1 (Figure 4A) or Clusters 1 and 2 for Election 2 (Supplementary Figure S1). These opposing groups are most evident in the more exclusive clusters of AF voters, where the consumption of *Pagina 12* is clearly not matched by the consumption of *Clarín-La Nación* (Clusters 1 and 2 for Election 1; Cluster 5 for Election 2). Because the “pure” clusters of MM and JLE voters were not generated (nor were they for JGC and RL), inferring whether these participants consume some media more exclusively than others is difficult, although a comprehensive analysis suggests that they are mostly associated with the second group. Finally, NDC voters' groups consumed media from *LID* and *Prensa Obrera*, two media outlets associated with left-wing political parties or fronts, as well as other media outlets of both groupings (*Pagina 12*, *Clarín*, and *La Nación*).

These results partially support Hypothesis 4 and reproduce what we observed previously in the predictive models: Some candidates are strongly associated with some media outlets, while

A. ELECTION 1 | Audiovisual Media Cluster Distribution



B. ELECTION 1 | Written Media Cluster Distribution

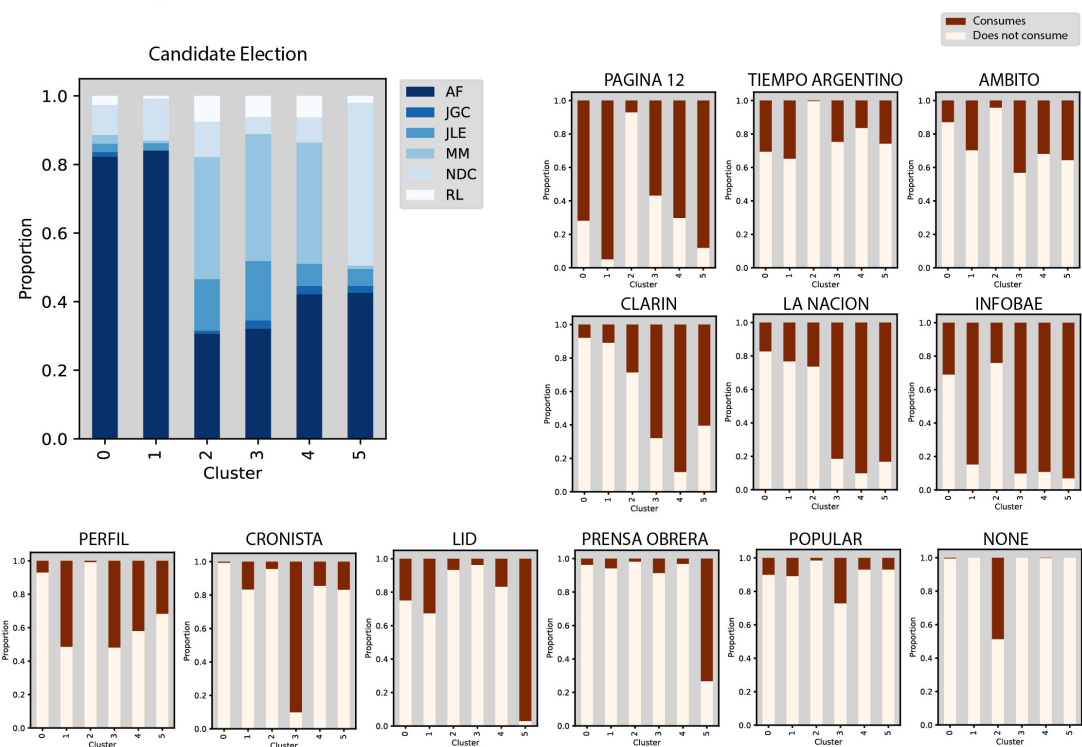


FIGURE 4
Media outlets consumption characterization of the populations electing each candidate. To characterize the audiovisual and written media consumption by the communities associated with each candidate for Election 1, a clustering analysis was carried out using the variables CANDIDATE_LABEL and each (A) audiovisual or (B) written media. The most interpretable model assumed generating six clusters, which contract with the proportion of the six candidates or with the consumption (yes or not) of each media outlet.

other media are so widely consumed that the methodology employed here does not allow us to reveal an ideological bias.

Although the results for the audiovisual media are more convincing and show greater polarization (or bias), analyzing the content produced by them is methodologically very difficult. Hence, in addition to assessing the association between consumption and candidate preference, the written press analysis allows an evaluation of whether the contents produced imply disinformation or partisan information. Based on our previous results (Bernal et al., 2022; Pérez et al., 2023), analyses on how frequently each candidate was mentioned and headline sentiment strongly suggest that the national written media have an ideological bias.

Although this type of analysis does not allow causal relationships to be established *per se*, it enables a more complex description of different intersections that impact the political phenomenon under study.

4 Discussion

In the face of political polarization, the world's democracies are in crisis. While both extremes are being radicalized, more recent phenomena are characterized by increased activity in right-wing-identified populations (Kessler and Vommaro, 2021; Falkenberg et al., 2022; Gronow and Malkamäki, 2024). Recognizing the actors behind such radicalization, the mechanisms by which it is produced, and the most susceptible populations is a vitally important task to defend and improve democratic systems.

The relevant literature has assessed the role of political representations (Costa, 2021; Kashima et al., 2021; Rogowski and Sutherland, 2016), social media (Azzimonti and Fernandes, 2023), mass media (Kashima et al., 2021; Campante and Hojman, 2013; Prior, 2013), and hyper-partisan news and fake news (Faris et al., 2017; Azzimonti and Fernandes, 2023; Bago et al., 2020) in inducing polarization (among other proposed causes; Qureshi et al., 2020). Political/ideological representations can serve as anchors at the individual cognitive level to evaluate certain information in a relative way, but as a political map to identify certain options by associating them with certain personal and social beliefs. Since the collapse of the USSR and what seemed to be the “end of a polar world”, the canonical “left/right” categories need to be rethought (Brussino et al., 2017), while the polarization phenomenon reemerging raises the perspective that such a map is more dynamic than we thought. In this sense, the increasing right-wingization of the electoral discourses and policies afterward would qualitatively support this current shift to the right on the map. But who defines which policies are the most relevant and thus installs the beliefs associated with right-wing discourses? Who dictates what should be done (in an explicit or implicit manner)?

4.1 Familiarity and trust as cognitive mediators of information exposure

In our previous work, we showed that merely repeating a stimulus (repetition priming) or associating it with positively

valenced semantic content (emotional priming) promotes choosing some options over others. When we analyzed variables equivalent to this priming in an ecological design (taking advantage of the 2019 Argentinean presidential elections), we observed that continuous exposure to information (an equivalent of repetition priming) or its association with positive emotionality (emotional priming) promotes choosing certain candidates. We also observed that this mechanism could favor those political coalitions that have more resources (or alliances with media) at their disposal (Bernal et al., 2022). The main goal of the present study was to assess whether participants' familiarity with and trust in each candidate, probably generated through exposure to information about the candidates, can predict their political choice. In this sense, we proposed that familiarity and trust are cognitive mediators of exposure to information and its positive emotional association to favor certain candidates over others. Thus, by what means does such exposure to information occur? When participants were asked about the means they use to inform themselves about candidates, social media and audiovisual and written media were prominent. Here we analyzed how the consumption of audiovisual or written media outlets predicts the election of a given candidate and whether these media outlets can be grouped into clusters.

During Election 2, the publicity expenditures of the two main candidates were 9 (MM) and 5 (AF) times more than the average of the other candidates, where the proportion of private contributions exacerbated the asymmetry (61 times for MM and 27 times for AF compared to other forces; Camara Nacional Electoral, 2020). This was not an exceptional case: as seen in Figure 5A, the number of votes obtained by the different political coalitions in the 2011, 2015, and 2019 elections correlates very well with the publicity expenditure of each coalition. A further increase in advertising spending can impact not only campaigns but also social media and media diffusion directly. In this sense, in line with what has been shown previously, greater exposure to informative content about each candidate acts as repetition priming, or the visual and semantic associations with positive emotionality act as emotional priming, promoting the electorate's selection of these candidates (Bernal et al., 2022). Through these means, repeated exposure to a piece of information over time can influence people's value judgments, making it more truthful regardless of its actual veracity (Hasher et al., 1977; Pennycook et al., 2018) or even if, previously, correct but contradictory information was presented (Fazio et al., 2015). While we previously found associations between familiarity or trust and voting probability, in the present study, we could predict the elected candidate by using the familiarity with and trust in the main candidates, providing further favorable evidence for our hypothesis. The putative role of media deserves to be highlighted. Previously, significant correlations were found between familiarity and how frequently each candidate was mentioned by the main written media outlets, as well as the trust and positive perception those new headlines generated (Bernal et al., 2022; Pérez et al., 2023). This led us to take a closer look at the local media's role in shaping the positions for or against each candidate. When we generated predictive models of the election based on the written media outlets consumed by the participants, we found a good predictive capacity for the election of AF and MM (Figures 2E, F). This is not the case for the other candidates.

This result suggests that specific written media outlets are mainly associated with the voter populations for these two candidates. The media clustering analysis confirms that two media groupings can indeed be generated, differentially associated with MM (and JLE) and AF (Figure 4B, Supplementary Figure S1). When we analyzed the audiovisual media as a predictor of the candidate of choice, the results were similar (Figures 2C, D). Here, too, we found clusters of media associated with AF and MM voter populations (Figure 4A, Supplementary Figure S1).

Our results suggest the media's possibly crucial role in favoring population distribution in bipartisanship. At the same time, these media could behave as channels of biased information (García et al., 2020; Bernal et al., 2022; Pérez et al., 2023) with highly partisan profiles whose content can veer to the right, contributing directly to the rightward shift in voter populations of both political forces. The media's role in generating and disseminating biased, false, inaccurate, or hyper-politicized information, thus defining a political agenda, has been proposed and analyzed previously (Bernal et al., 2022; Pérez et al., 2023). Given the difficulty of evaluating the content of audiovisual media, we focused first on evaluating the tone (positive or negative) of written media content, especially if it is a favorable perception of a candidate. This analysis allowed us to propose that media narratives contribute to favoring trust in particular candidates, ideologically aligned or allied with those media, impacting the cognitive factors that imprint different political/ideological representations on the population. From a communication aspect, the media can induce agenda setting (Hyun and Moon, 2016) in line with the economic/political interests of each media outlet.

The role of social media also deserves attention (Figure 1D). On one hand, with the development of new technologies, a series of digital platforms are involved in which audiovisual and written media content is widely disseminated and amplified. As this amplification in online social networks involves people interacting, it results in biased amplification and the formation of echo chambers (Recuero et al., 2021; Ross Arguedas et al., 2022). Analyzing the Argentinean voting population in 2019, it has been observed that online social network users tend to predominantly share news related to issues biased toward their preferred candidates and that coincides with their political beliefs, despite accessing media with diverse political orientations (Pozo et al., 2024). This can radicalize content and even spread fake news (Azzimonti and Fernandes, 2023), which contributes to false memories that impact people's evaluative processes regarding their decisions (Greene et al., 2021; Murphy et al., 2019) that are filtered through (and validated with) confirmation bias (Klayman, 1995). On the other hand, online social networks are often used to generate content, thus increasing voters' exposure to information about the candidates. In our analysis, we observe significant differences between the two main candidates (AF and MM), and in Election 1, the role of online social networks stands out for the libertarian candidate (JLE).

Using online social networks to communicate politically constitutes a change in the political paradigm, known as Politics 2.0 (Domínguez, 2012). In this sense, for politics, using digital strategies has been described as an important factor in different Latin American elections (Lupu et al., 2020). Their use was

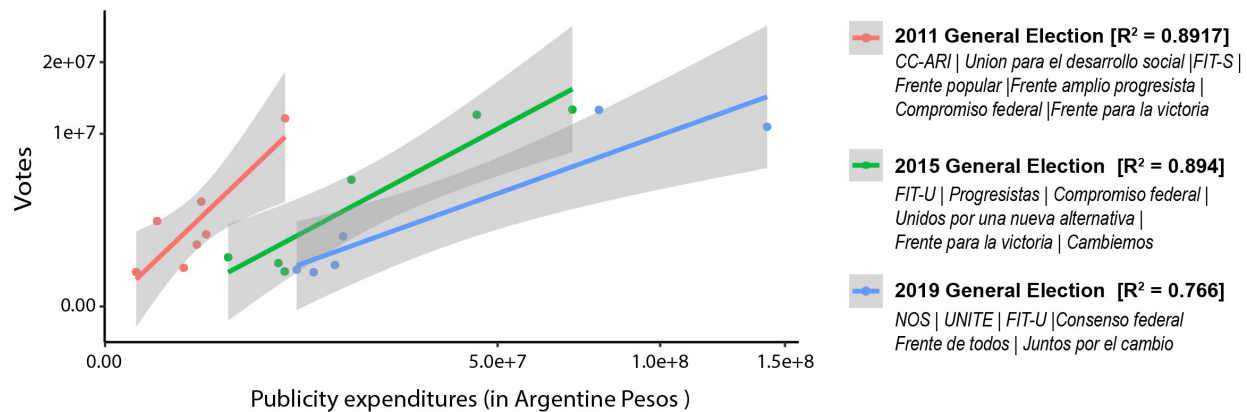
associated in Argentina with the main political coalitions, both the main opposition right (MM) and Kirchnerism (Návaro et al., 2019; Annunziata et al., 2018; Di Tella et al., 2021), and has played a key role in the viralization of digital content associated with the libertarian right [La Libertad Avanza (LLA)—Milei] in the 2021 and 2023 elections (Vivanco, 2023; Ariza et al., 2023). It cannot be ruled out that the isolation during the COVID-19 outbreak and the circulation of highly politicized information about the pandemic and public health policies (Qureshi et al., 2020; Recuero et al., 2021; Ross Arguedas et al., 2022) may have played an amplifying role in the formation of online social network communities that functioned as echo chambers and deepened anti-officialism positions, in our case, AF as officialism. In this sense, the increasingly predominant strategy of the new right wing is using online social networks, trolls, and influencers. Evidence of this is indeed the dissemination of hate speech, anti-gender rights, and anti-science content, which constitutes an art of dominant discourses for these political coalitions (Cotik et al., 2020; Domenech et al., 2023).

4.2 Political ideology as a substrate for such mediations

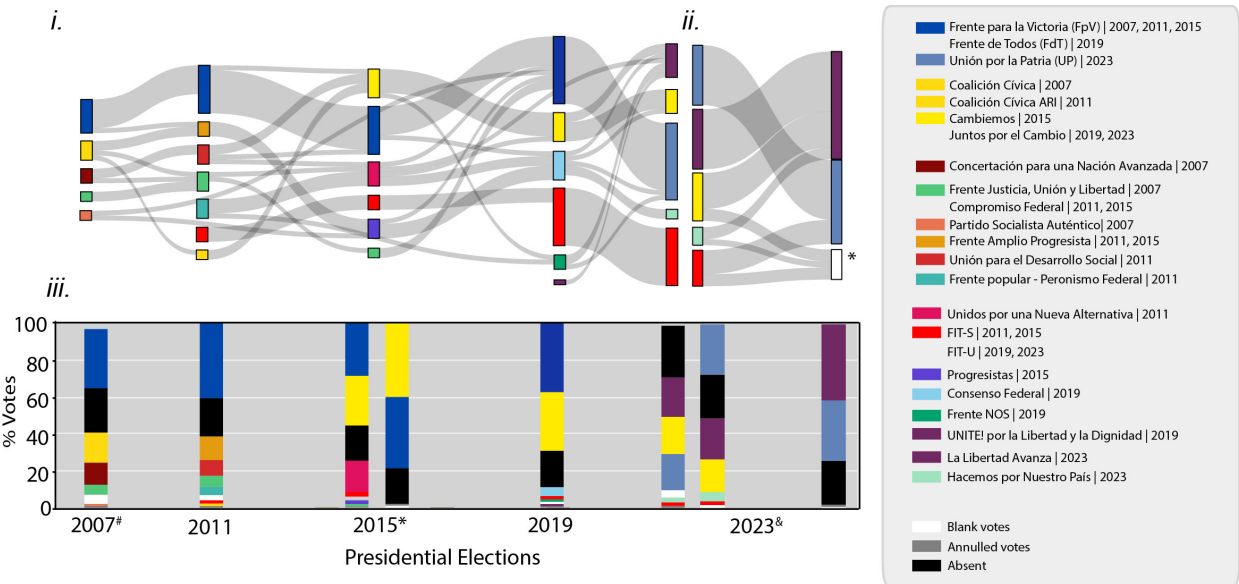
The cognitive manipulation that the media or online social networks can exert on people to induce them to make certain decisions only makes sense if they find similar beliefs in them. After all, people may choose to consume media more favorable to their preferred candidate. In this sense, we propose that people's preexisting political and ideological beliefs act as a necessary substrate for such manipulations to operate in a certain direction. Thus, evaluating the ideological self-perception of each candidate's voters is critical for seeing how much their ideological and political representations impact their elections.

Beyond the classic symbolic categories (left wing vs. right wing), to understand the particular ideological spectrum of Argentine society, situating it in historical political disputes is necessary. In Argentina, the two-party system takes the antagonistic form of Peronism/anti-Peronism. In the last two decades, the former was mainly represented by Kirchnerism, which governed from 2003 to 2015, while the anti-Peronist opposition crystallized with the coalition that formed and brought MM to government in 2015 (Figure 5A). In 2019, MM, RL, JLE, and JGC competed mainly for right-wing populations. MM and RL competed for moderate right-wing or centrist voters, while JLE identified with libertarian right-wing positions, and JGC was more of the nationalist order. The ideological closeness of MM's and JLE's voter populations was confirmed by the correlation analysis between trust and both candidates (Figure 2). It is not surprising then that in the 2023 P.A.S.O. elections, JLE joined MM's political coalition; in the ballotage election (November 29, 2023), MM and part of his political coalition lent support to Milei (Figure 5Bii), and later, during the Milei government, Juntos por el Cambio (JxC) candidates took up executive positions directly. The population that perceives itself as centrist, which may well reflect a centrist or an unrecognized right-wing position, tended to mainly vote for AF, MM, JLE, and RL (Figure 3). AF, the elected president in

A. Publicity expenditures and votes of different political forces in 2011, 2015 and 2019 presidential elections



B. Flow of political parties (and supports) within different political coalitions during different presidential elections (2007-2023)



C. Possible role of Media in polarizing political and ideological positions

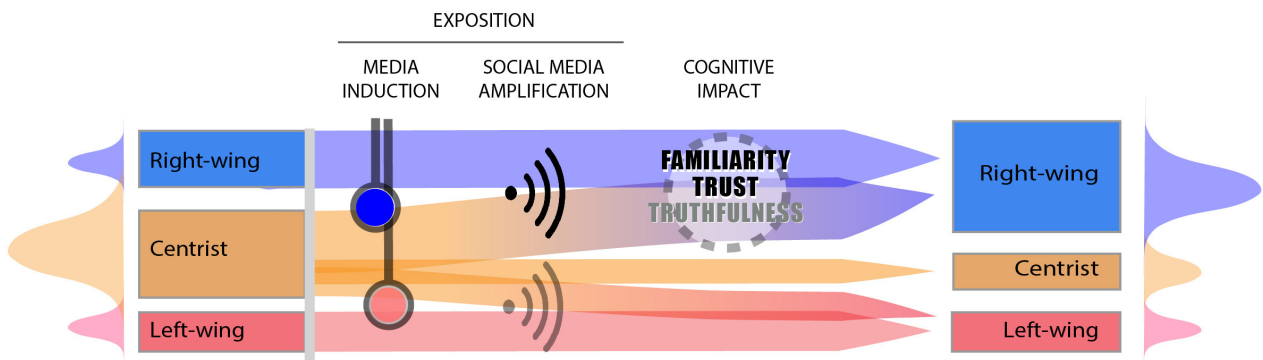


FIGURE 5
Historical elections; data supporting our hypothesis and possible role of media in political polarization. **(A)** Correlation between publicity expenditure and the number of votes of political forces in the 2011, 2015, and 2019 elections. The legend shows the respective data for each election, along with the correlation coefficient. In italics, the political coalitions involved in each election are shown, ordered from lowest to highest publicity expenditure. **(B)** The composition of the electoral alliances by different political parties was analyzed and how these parties were rearranged among the different coalitions presented in the 2007, 2011, 2015, 2019 and 2023 elections (more detailed information in [Supplementary Table S1](#)) (i). Given that once the list of parties that compose an alliance has been formally presented, it cannot be modified for the ballotage election, in this case we
(Continued)

FIGURE 5 (Continued)

evaluated the political supports of the different political forces to those that competed in the ballotage (the asterisk on the white bar represents those that did support neither of the two candidates; detail information in [Supplementary Table S2](#)) (ii). At the bottom (iii), percentages of votes of each coalition at each election, according to the proportion of the population voting (or non-voting in the case of abstentions). (C) Proposed scheme modeling the role of ideology and information (media, social media) in generating a cognitive impact (familiarity, trust, trustfulness) that induces mainly a shifting to the right of the centrist population. #In 2007, there was no PASO, but only political coalitions with more than 1.5% of the votes are represented. *In 2015, the general election and ballotage are represented. &At 2023, PASO, general election, and ballotage are represented.

2019, was the candidate of Kirchnerism/Peronism. Interestingly, the population perceiving itself as left-wing mainly chose AF or, to a lesser frequency, NDC [candidate of the left-wing front Frente de Izquierda de los Trabajadores - Unidad (FIT-U)], a relationship that can also be inferred from the positive correlation between trust and both candidates ([Figure 2](#)). Although political ideology in this article is measured symbolically and not operationally ([Brussino et al., 2017, 2021](#)), it allows us to suggest that there are no cases of a unique association between ideology and a candidate or political force. Thus, polarization does not seem to be determined only by the growth of a single political party that drives and radicalizes strongly ideologized populations. On the contrary, the current polarization seems to be a deepening of the Peronism/anti-Peronism polarity, after decades of erosion of progressive experiences ([Fernández Larrosa, 2023](#)).

4.3 Insights from Argentina

While the political polarization observed in Argentina is not, in itself, different from what can be observed in countries such as the United States or in Europe, its historical particularities present an opportunity to study the emergence of a new libertarian right-wing bloc (as a form of right-wing populism), which emerges as a critical opposition to the preexisting system but, at the same time, rapidly integrating itself into the previous form of bipartisanship. In this sense, Argentina is a peripheral case in which such radicalization has been occurring progressively within the two-party framework but has notoriously deepened since 2019. The ongoing polarization seems to have reached a new peak in the recent 2023 Argentina elections, where the right-wing libertarian candidate, Javier Milei ([Miron, 2023](#); in 2019, supporting JLE) surprised observers by obtaining the highest proportion of positive votes ([Fernández Larrosa, 2023](#)). But the rise of an extreme libertarian right is not the only polarization indicator generated by the growth of right-wing positions. The discourses of the main two political coalitions' candidates during the 2023 election [Massa for Frente de Todos (FdT), Bullrich for JxC] were more oriented, to a lesser or greater extent, toward deepening security measures, shrinking the state, and against social mobilizations. This would suggest that both political forces were seeking to capture the votes of more right-wing populations that saw such measures as favorable and necessary. Although Milei's party, LLA, emerged as a third force in the two-party system, it clearly capitalized on the discontent with the existing system the best, proposing such policies to the extreme but, at the same time, ended up incorporating part of the JxC in its alliances, becoming the new opposition to Kirchnerism/Peronism. The 2019 elections constituted a pivotal point at which, outside bipartisanship, a neoliberal political sector began to emerge that is integrating itself progressively.

But what lessons can we learn from the 2019 electoral scenario to understand this ongoing polarization? Beyond the personalism of some candidates, each political coalition has two major resources to impose itself in elections: ([Sieber and Ziegler, 2019](#)) the ideological representation evoked in the population that will or will not vote for them and ([Jost et al., 2022](#)) the ability to have private financing to amplify its reach to federal populations. As we analyzed previously, ideological representations seem to operate as a fertile substrate for media manipulations, campaigns, and online social networks to operate more effectively at a cognitive level. In 2019 (and previously; see [Figure 5A](#)), greater access to funding sources (through private contributions from companies; [Camara Nacional Electoral, 2020](#)) probably allowed for greater exposure of information about candidates and their coalitions, operating as repetition and/or emotional priming (generating a perception of familiarity and trust), thus favoring the main candidates' election. However, Milei's party (LLA) did not have a large campaign budget for the 2021 legislative elections (where it obtained a very favorable result for the first time) or the 2023 presidential elections ([Camara Nacional Electoral, 2020](#)), which supports the idea that its main communication strategy was using online social networks. But how did Milei manage to achieve a favorable electoral result without sufficient funding? What lies behind his result is this libertarian right wing politically capitalizing on certain factors, such as the erosion of progressive experiences, in recent years. On one hand, the media set the agenda and presented a discourse opposing the health policies proposed by the government during the pandemic while highlighting the media exposure of certain candidates in favor of these policies. Preliminary results (not yet published) suggest that 60% of media mentions of presidential candidates in the 2023 elections refer to Milei [with the second-most mentioned being the Union por la Patria (UxP) candidate, formerly a member of FdT, with 29%]. On the other hand, the same social isolation (due to the pandemic) promoted a greater consumption of online social networks, favoring the formation of echo chambers, which allowed the ideas of anti-vaccine, anti-science, and anti-state intervention groups to expand. Consuming mis- or disinformation has even been addressed as a problem in the post-truth age ([Buckingham, 2019](#); [Vos and Thomas, 2018](#); [Fischer and Klazar, 2020](#)). The increase in null votes, blank votes, and abstentions ([Figure 5Biii](#)) suggests a growing skepticism, cynicism, or distrust toward democratic institutions ([Lau et al., 2007](#); [Pinkleton et al., 2002](#); [Bradley et al., 2007](#)). In Latin America, people who use online social networks more frequently seem to be, on average, more politically tolerant and more supportive of democracy in the abstract. But they also tend to be less satisfied with the functioning of democracy in their own country. At the same time, they are more distrustful of democratic institutions: the president, Congress, the Supreme Court, local governments, elections, and the media ([Lupu et al., 2020](#)). These negative psychological effects could be caused by

some affairs: the failure to keep electoral promises, the inability of governments (especially progressive ones) to solve the population's basic problems, and even the continuous movement of candidates or parties between different political coalitions (Figure 5Bi) or political support (Figure 5Bii), with some of them even seemingly opposed to each other.

4.4 Final remarks

While political ideology continues to contribute as a map of political or ideological coordinates, these movements and supports seem to respond to a certain pragmatism or political opportunism rather than to the original “right/left” dichotomic representations. Right-wing positions are replicated at a rate that is ever less compatible with Adorno's perspective on the authoritarian personality (Adorno, 2019). In this theoretical muddle, our humble contribution is evidence of some implicit cognitive mechanisms, such as priming, to induce perceptions of familiarity and trust that could not only favor the election of one candidate over another but could also set a political agenda. The role played by the media in generating this impact on the cognition of populations deserves, in our view, particular attention (Figure 5C). Although we do not provide empirical evidence of political polarization (in particular, toward the right) in this article, the analysis of the last presidential elections (Figure 5B) clearly shows an average shift to the right for the population, with a libertarian right-wing party winning in 2023. Based on the literature, a qualitative analysis of the factors that have eroded trust in democratic institutions (especially, in our case, after the experience of progressive party governments) could explain the receptiveness to right-wing biased information (and fake news) that could contribute to this polarization. In this sense, we propose that the current mechanisms of information production, the excess of information, the associated cognitive saturation, and the lack of criteria to filter relevant information could contribute to the automation of cognitive processes related to political decisions and dilution of the coherence beyond the cognitive process (Fernández Larrosa, 2023). Compatible with this theoretical proposal, and in relation to dual-processes theories (Evans and Frankish, 2009; Pennycook, 2017), these contents appeal to a clear emotionality (Gyurak et al., 2011), above all associated with fear and anger (Wollebæk et al., 2019).

In the face of this unfortunate “bipolar” problem, investigating these implicit mechanisms and the actors behind the massive control of information that promotes developing right-wing positions, in particular in the analyzed case, is essential. Thus, we would like to contribute to thinking about future public policies—or possible practices that society could adopt—to minimize these manipulation processes of the political subjects' degrees of freedom.

4.5 Limitations and perspectives

These approaches have several limitations. First, we do not assess how each candidate is perceived directly but indirectly

through familiarity and trust, two variables subject, to a certain degree, by participants' interpretations. In the same sense, this work evaluates political ideology in a symbolic rather than operative way (Brussino et al., 2011). The main limitation of this study is that each subject may have a different perception of what “left-wing” or “right-wing” is. Using the 2023 elections, we conducted an experiment to deepen ideology's role in the decisions, for which we use symbolic and operative instruments.

Due to the impossibility of asking directly about the vote, this variable was inferred from the higher probability of voting, which implied that a percentage of subjects tended to have the same voting probability for more than one candidate. To simplify the analyses, we did not assess these populations. We only analyzed participants' exposure to print or digital media but not audiovisual media (which often have a significant social impact). The analyses do not allow us to conclude causal relationships between variables in political decision-making processes or polarization. However, they allow us to provide strong support for our working hypotheses at both cognitive and social levels, previously tested with controlled experiments (Bernal et al., 2022).

During the 2023 election, we ran experiments during the electoral process that will allow us to assess the role of ideology in the valuation of information in current voting populations, while we are also studying the impact of fake news and refutation texts on complex decision-making.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found in the article/Supplementary material.

Ethics statement

The studies involving humans were approved by Ethics Committee of the Clinic Hospital “José de San Martín”, University of Buenos Aires. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

EZ: Data curation, Formal analysis, Investigation, Methodology, Resources, Validation, Visualization, Writing – review & editing. TA: Data curation, Formal analysis, Investigation, Methodology, Resources, Supervision, Validation, Visualization, Writing – review & editing. PF: Conceptualization, Formal analysis, Funding acquisition, Investigation, Project administration, Supervision, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsps.2025.1448677/full#supplementary-material>

References

- Adorno, T. (2019). *The Authoritarian Personality*. London and New York: Verso Books.
- Annunziata, R., Ariza, A. F., and March, V. R. (2018). “Gobernar es estar cerca” Las estrategias de proximidad en el uso de las redes sociales de Mauricio Macri y María Eugenia Vidal. *Revista Mexicana de Opinión Pública*. 24, 71–93. doi: 10.22201/fcpys.24484911e.2018.24.61520
- Ariza, A., March, V., Torres, S., Ariza, A., March, V., Torres, S., et al. (2023). La comunicación política de Javier Milei en TikTok. *Intersecc. Comun.* 2, 6–6.
- Armstrong, J. S., and Graefe, A. (2011). Predicting elections from biographical information about candidates: a test of the index method. *J. Bus. Res.* 64, 699–706. doi: 10.1016/j.jbusres.2010.08.005
- Azzimonti, M., and Fernandes, M. (2023). Social media networks, fake news, and polarization. *Eur. J. Polit. Econ.* 76:102256. doi: 10.1016/j.ejpolco.2022.102256
- Bago, B., Rand, D. G., and Pennycook, G. (2020). Fake news, fast and slow: Deliberation reduces belief in false (but not true) news headlines. *J. Exp. Psychol.* 149:1608. doi: 10.31234/osf.io/29b4j
- Bernal, F. A., Alves Salgueiro, T., Brzostowski, A., Recart Zapata, E., Carames, A., Pérez, J. M., et al. (2022). Top-down modulation impairs priming susceptibility in complex decision-making with social implications. *Sci. Rep.* 12:17867. doi: 10.1038/s41598-022-22707-x
- Bradley, S. D., Angelini, J. R., and Lee, S. (2007). Psychophysiological and memory effects of negative political ads: aversive, arousing, and well remembered. *J. Advert.* 36, 115–127. doi: 10.2753/JOA0091-3367360409
- Brussino, S., Acuña, M. I., Alonso, D., Dreizik, M., Etchezahar, E., Imhoff, D., et al. (2017). Políticamente. Contribuciones desde la Psicología Política en Argentina. In: *Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)*. Available online at: <https://rdu.unc.edu.ar/handle/11086/4910> (accessed May 24, 2023).
- Brussino, S., Alonso, D., Cupani, M., Imhoff, D., Paz García, P., Rabbia, H. H., et al. (2021). Dimensiones de la ideología política. Un abordaje operativo desde la Teoría de Respuesta al Ítem. *Acta Colombiana de Psicología* 24, 9–22. doi: 10.14718/ACP.2021.24.2.2
- Brussino, S., Rabbia, H. H., Imhoff, D., and García, A. P. P. (2011). Dimensión operativa de la ideología política en ciudadanos de Córdoba - Argentina. *Psicología Política*. 43, 85–106.
- Buckingham, D. (2019). Teaching media in a ‘post-truth’ age: fake news, media bias and the challenge for media/digital literacy education/La enseñanza mediática en la era de la posverdad: fake news, sesgo mediático y el reto para la educación en materia de alfabetización mediática y digital. *Cultura y Educación* 31, 213–231. doi: 10.1080/11356405.2019.1603814
- Camara Nacional Electoral (2020). *Financiamiento de Campañas*. Available online at: <https://www.electoral.gob.ar/financiamiento/> (accessed May 15, 2024).
- Campante, F. R., and Hojman, D. A. (2013). Media and polarization: evidence from the introduction of broadcast TV in the United States. *J. Public Econ.* 100, 79–92. doi: 10.1016/j.jpubeco.2013.02.006
- Cistulli, M., and Snyder, L. B. (2009). *Priming, Repetition, and the Effects of Multiple Messages on Perceptions of a Political Candidate*. Boston, MA: Boston University, 44.
- Claibourn, M. P. (2008). Making a connection: repetition and priming in presidential campaigns. *J. Polit.* 70, 1142–1159. doi: 10.1017/S0022381608081115
- Costa, M. (2021). Ideology, not affect: what Americans want from political representation. *Am. J. Pol. Sci.* 65, 342–358. doi: 10.1111/ajps.12571
- Cotik, V., Debandi, N., Luque, F. M., Miguel, P., Moro, A., Pérez, J. M., et al. (2020). *A Study of Hate Speech in Social Media During the COVID-19 Outbreak*. Available online at: <https://openreview.net/forum?id=01eOESDbhSW> (accessed November 15, 2024).
- de Wilde, T. R. W., Ten Velden, F. S., and Dreu, C. K. W. (2018). The anchoring-bias in groups. *J. Exp. Soc. Psychol.* 76, 116–26. doi: 10.1016/j.jesp.2018.02.001
- Dehaene, S., Naccache, L., Cohen, L., Bihan, D. L., Mangin, J. F., Poline, J. B., et al. (2001). Cerebral mechanisms of word masking and unconscious repetition priming. *Nat. Neurosci.* 4, 752–758. doi: 10.1038/89551

- Del Vicario, M., Bessi, A., Zollo, F., Petroni, F., Scala, A., Caldarelli, G., et al. (2015). Echo chambers in the age of misinformation. *arXiv preprint arXiv:150900189*. doi: 10.48550/arXiv.1509.00189
- Di Tella, R., Gálvez, R. H., and Schargrodsky, E. (2021). "Does social media cause polarization? Evidence from access to Twitter echo chambers during the 2019," in *Argentine Presidential Debate*. Cambridge, MA: National Bureau of Economic Research.
- Domenech, L., Pérez, J. M., Rosati, G., and Kozłowski, D. (2023). *Gender Biases and Hate Speech: Promoters and Targets in the Argentinean Political Context*. Available online at: <https://osf.io/preprints/socarxiv/6cts8/> (accessed April 15, 2024).
- Domínguez, N. (2012). Política 2.0: el uso de las redes sociales en la política argentina. *Anu. Electron. Estud. Comun. Soc. Disert.* 5, 77–104.
- Ellis, A. W., Young, A. W., Flude, B. M., and Hay, D. C. (1987). Repetition priming of face recognition. *Quart. J. Exp. Psychol. Section A*. 39, 193–210. doi: 10.1080/14640748708401784
- Epley, N., and Gilovich, T. (2010). Anchoring unbound. *J. Consumer Psychol.* 20, 20–4. doi: 10.1016/j.jcps.2009.12.005
- Evans, J. S. B., and Frankish, K. E. (2009). *In Two Minds: Dual Processes and Beyond*. Oxford: Oxford University Press.
- Falkenberg, M., Galeazzi, A., Torricelli, M., Marco, N. D., Larosa, F., Sas, M., et al. (2022). Growing polarisation around climate change on social media. *arXiv [preprint] arXiv:2112.1213*. doi: 10.1038/s41558-022-01527-x
- Faris, R., Roberts, H., Etling, B., Bourassa, N., Zuckerman, E., Benkler, Y., et al. (2017). *Partisanship, Propaganda, and Disinformation: Online Media and the 2016 US Presidential Election*. Berkman Klein Center Research Publication, 6.
- Fazio, L. K., Brashier, N. M., Payne, B. K., and Marsh, E. J. (2015). Knowledge does not protect against illusory truth. *J. Exp. Psychol.* 144:993. doi: 10.1037/xge0000098
- Fernández Larrosa, P. N. (2023). La Democracia en la era de la Post-Coherencia. *Revista Sociedad*. 47, 2–24.
- Fischer, R., and Klazar, E. (2020). Facts, truth, and post-truth: access to cognitively and socially just information. *Int. J. Inform. Divers. Inklus.* 4, 5–19. doi: 10.33137/ijidi.v4i3/4.33678
- García, A. P. P., Brussino, S., and Alonso, D. (2020). Efectos del tratamiento periodístico sesgado ideológicamente en el procesamiento cognitivo de información política. Un abordaje experimental. *Opinião Pública*. 26, 351–376. doi: 10.1590/1807-01912020262351
- Gower, J. C. (1971). A general coefficient of similarity and some of its properties. *Biometrics* 27, 857–871. doi: 10.2307/2528823
- Greene, C. M., Nash, R. A., and Murphy, G. (2021). Misremembering Brexit: Partisan bias and individual predictors of false memories for fake news stories among Brexit voters. *Memory*. 29, 587–604. doi: 10.1080/09658211.2021.1923754
- Gronow, A., and Malkamäki, A. (2024). Political polarisation in turbulent times: tracking polarisation trends and partisan news link sharing on Finnish Twitter, 2015–2023. *arXiv [preprint] arXiv:2403.03842*. doi: 10.48550/arXiv.2403.03842
- Guess, A. M., Lockett, D., Lyons, B., Montgomery, J. M., Nyhan, B., Reifler, J., et al. (2020). "Fake News" May Have Limited Effects Beyond Increasing Beliefs in False Claims. Harvard Kennedy School Misinformation Review.
- Gyurak, A., Gross, J. J., and Etkin, A. (2011). Explicit and implicit emotion regulation: a dual-process framework. *Cogn. Emot.* 25, 400–412. doi: 10.1080/02699931.2010.544160
- Hasher, L., Goldstein, D., and Toppino, T. (1977). Frequency and the conference of referential validity. *J. Verbal Learning Verbal Behav.* 16, 107–112. doi: 10.1016/S0022-5371(77)80012-1
- Henson, R., Shallice, T., and Dolan, R. (2000). Neuroimaging evidence for dissociable forms of repetition priming. *Science* 287, 1269–72. doi: 10.1126/science.287.5456.1269
- Hyun, K. D., and Moon, S. J. (2016). Agenda setting in the partisan TV news context: Attribute agenda setting and polarized evaluation of presidential candidates among viewers of NBC, CNN, and Fox News. *J. Mass. Commun. Q.* 93, 509–529. doi: 10.1177/1077699016628820
- Jost, J. T., Baldassarri, D. S., and Druckman, J. N. (2022). Cognitive-motivational mechanisms of political polarization in social-communicative contexts. *Nat. Rev. Psychol.* 1, 560–576. doi: 10.1038/s44159-022-00093-5
- Kashima, Y., Perfors, A., Ferdinand, V., and Pattenden, E. (2021). Ideology, communication and polarization. *Philos. Trans. R. Soc. B, Biol. Sci.* 376:20200133. doi: 10.1098/rstb.2020.0133
- Kessler, G., and Vommaro, G. (2021). *Polarización, consensos y política en la sociedad argentina reciente*. Available online at: <https://fund.ar/wp-content/uploads/2021/11/Fundar-Polarizacion-consensos-y-politica-1.pdf> (accessed June 3, 2024).
- Klayman, J. (1995). Varieties of confirmation bias. *Psychol. Learn. Motiv.* 32, 385–418. doi: 10.1016/S0079-7421(08)60315-1
- Lau, R. R., Sigelman, L., and Rovner, I. B. (2007). The effects of negative political campaigns: a meta-analytic reassessment. *J. Polit.* 69, 1176–1209. doi: 10.1111/j.1468-2508.2007.00618.x
- Logan, G. D. (1990). Repetition priming and automaticity: common underlying mechanisms? *Cognit. Psychol.* 22, 1–35. doi: 10.1016/0010-0285(90)90002-L
- Lupu, N., Bustamante, M. V. R., and Zechmeister, E. J. (2020). Social media disruption: messaging mistrust in Latin America. *J. Democr.* 31, 160–171. doi: 10.1353/jod.2020.0038
- Miron, J. (2023). *Is Javier Milei a Libertarian?* Washington, DC: Cato Institute. Retrieved from <https://coillink.org/20.500.12592/nr46ww> (accessed April 7, 2025).
- Murphy, G., Loftus, E. F., Grady, R. H., Levine, L. J., and Greene, C. M. (2019). False memories for fake news during Ireland's abortion referendum. *Psychol. Sci.* 30, 1449–1459. doi: 10.1177/0956797619864887
- Názaro, A., Crozzoli, F., and Álvarez Nobell, A. (2019). Comunicación política digital en Instagram: los casos de Cristina Fernández de Kirchner y Mauricio Macri en Argentina. *Revista Internacional de Relaciones Públicas*. 9, 5–28. doi: 10.5783/revrpp.v9i18.620
- Neill, W. T. (1997). Episodic retrieval in negative priming and repetition priming. *J. Exp. Psychol.* 23, 1291–1305. doi: 10.1037/0278-7393.23.6.1291
- Nti, I. K., Nyarko-Boateng, O., and Aning, J. (2021). Performance of machine learning algorithms with different K values in K-fold cross-validation. *J. Inf. Technol. Comput. Sci.* 6, 61–71. doi: 10.5815/ijitcs.2021.06.05
- Pennycook, G. (2017). "A perspective on the theoretical foundation of dual process models," in *Dual process theory* 20. London: Routledge, 5–27.
- Pennycook, G., Cannon, T. D., and Rand, D. G. (2018). Prior exposure increases perceived accuracy of fake news. *J. Exp. Psychol.* 147:1865. doi: 10.1037/xge0000465
- Pérez, J. M., Zapata Recart, E., Alves Salgueiro, T., Furman, D., and Fernández Larrosa, P. N. A. (2023). Spanish dataset for Targeted Sentiment Analysis of political headlines. *Electronic J. SADIO*. 22, 53–66. doi: 10.24215/15146774e004
- Pinkleton, B. E., Um, N. H., and Austin, E. W. (2002). An exploration of the effects of negative political advertising on political decision making. *J. Advert.* 31, 13–25. doi: 10.1080/00913367.2002.10673657
- Pozo, S. M., del Pinto, S., Serafino, M., García, L., Makse, H. A., and Balenzuela, P. (2024). Analyzing user ideologies and shared news during the 2019 argentinian elections. *EPJ Data Sci.* 13:54. doi: 10.1140/epjds/s13688-024-00493-y
- Prior, M. (2013). Media and political polarization. *Ann. Rev. Politi. Sci.* 16, 101–127. doi: 10.1146/annurev-polisci-100711-135242
- Qureshi, I., Bhatt, B., Gupta, S., and Tiwari, A. A. (2020). Causes, symptoms and consequences of social media induced polarization (SMIP). *Inform. Syst. J.* 2020:11.
- Rao, C. R., and Wu, Y. (2005). Linear model selection by cross-validation. *J. Stat. Plan. Inference*. 128, 231–240. doi: 10.1016/j.jspi.2003.10.004
- Recuero, R., Soares, F. B., and Zago, G. (2021). Polarization, Hyperpartisanship, and Echo Chambers: How the disinformation about COVID-19 circulates on Twitter. *Contracampo-Brazil. J. Commun.* 40:45611. doi: 10.22409/contracampo.v40i1.45611
- Rogowski, J. C., and Sutherland, J. L. (2016). How ideology fuels affective polarization. *Polit. Behav.* 38, 485–508. doi: 10.1007/s11109-015-9323-7
- Ross Arguedas, A., Robertson, C., Fletcher, R., and Nielsen, R. (2022). *Echo Chambers, Filter Bubbles, and Polarisation: A Literature Review*. Reuters Institute for the Study of Journalism.
- Sharma, M., Agarwal, S. K., and Bunde, M. (2022). Decisive analysis of multiple logistic regression apropos of hyper-parameters. *Indian J. Comput. Sci. Eng.* 13, 188–196. doi: 10.21817/indjce/2022/v13i1/221301190
- Sieber, J., and Ziegler, R. (2019). Group polarization revisited: a processing effort account. *Pers. Soc. Psychol. Bull.* 45, 1482–1498. doi: 10.1177/0146167219833389
- Stern, C. (2019). "Priming in political judgment and decision making," in *Oxford Research Encyclopedia of Politics*. New York, NY: Oxford University Press.
- Todorov, A., Mandisodza, A. N., Goren, A., and Hall, C. C. (2005). Inferences of competence from faces predict election outcomes. *Science* 308, 1623–1626. doi: 10.1126/science.1110589
- Tversky, A., and Kahneman, D. (1974). Judgment under uncertainty: heuristics and biases. *Science* 185, 1124–1131. doi: 10.1126/science.185.4157.1124
- Vivanco, B. (2023). "It's social media, stupid! A study of the narrative and discursive elements of Argentinian libertarians on Twitter," in *Showcase of Undergraduate Research and Creative Endeavors (SOURCE)*. Available online at: https://digitalcommons.winthrop.edu/source/SOURCE_2023/allpresentationsandperformances/2 (accessed April 15, 2023)
- Vos, T. P., and Thomas, R. J. (2018). The discursive construction of journalistic authority in a post-truth age. *J. Stud.* 19, 2001–2010. doi: 10.1080/1461670X.2018.1492879
- Weiß, M., Hein, G., and Hewig, J. (2021). Between joy and sympathy: smiling and sad recipient faces increase prosocial behavior in the dictator game. *Int. J. Environ. Res. Public Health* 18:6172. doi: 10.3390/ijerph18116172
- Wollebæk, D., Karlsen, R., Steen-Johnsen, K., and Enjolras, B. (2019). Anger, fear, and echo chambers: the emotional basis for online behavior. *Social Media+ Soc.* 5:2056305119829859. doi: 10.1177/2056305119829859