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Predictors of partisan strength and in-party affect: a scoping review

Recent years have seen a global surge in affective polarization, extending from the US to European and Asian democracies. Concurrently, empirical research proliferates, exploring factors driving this rise, with significant focus on aspects like partisan strength and in-party affective attitude. This scoping review sheds light on investigated predictors of partisan strength and in-party affect and associated mechanisms of influence on the two key outcomes to better our understanding of affective polarization and the current research in the field. Employing a standardized search protocol across nine databases, we reviewed 26,148 reports, yielding 32 eligible reports with 50 studies and 56 predictors. Using common themes and theories between predictors as anchors for categorization, we found that: 1) providing platform information or engaging in active political discussion strengthens partisan strength, particularly when information allows clear comparison between parties; 2) selective recall and interpretation bolster in-party affect and partisan strength, with the information's susceptibility to manipulation moderating the effect of selective interpretation or on in-party affect; 3) subjective and objective sorting strengthens the two key outcomes, but objective membership in social group is critical for effect of sorting on partisan strength, and that identity moderate each other's impact of elicited cross-pressure; 4) party identity salience and the context thereof boosts partisan strength; 5) the effect of need for closure and authoritarianism on partisan strength likely depends on voter demographics, however, the NFA and authoritarianism positively correlates to in-party affect across demographics; 6) factors enhancing group-centric thinking intensify the two key outcomes, and factors enhancing issue-based thinking (e.g., having independent parents) reduces them; 7) ideological and issue misalignment diminishes the two outcomes; 8) the structure of partisan attitude varies across partisan strength, with contrasting evidence on whether leaners are influenced primarily by instrumental or a combination of affective and instrumental attitudes towards in-party; 9) interventions aimed at enhancing interparty cohesion have limited impact on the two outcomes; 10) stronger partisans are also more consistent and loyal voters. We also identified significant limitations and opportunities in the existing research methodology. We encourage future studies to justify the use of specific operationalizations as there is now an expanding list of operationalization driven by distinct underlying theories. Studies should also perform preliminary validation of mechanisms other than theoretical explanations. Overall, our review provided a preliminary categorization of predictors to articulate empirical gaps in the literature, establish narratives to enhance systematic growth of the topic, and provide insight to drive successful interventions for reducing polarization.

A full list of authors and their affiliations appears at the end of the paper.

Introduction

Voters are becoming increasingly sorted into the corresponding social groups of their political camp (Hetherington et al. 2016; Mason, 2015a), biased and angry towards the competing parties (Bettarelli et al. 2023; Duffy et al. 2019; Iyengar et al. 2012), and attached to their partisan group (Phillips 2022), all of which signals rising affective polarization. Rising polarization yields significant impacts on governance and voters. Its growth impedes interparty consultations and legislative processes in democracies (McCoy and Somer 2019), reduces democratic efficiency and result in unnecessary economic expense (McCoy et al. 2018; The Congressional Budget Office 2019). Affective polarization is also shown to reduce interparty family gatherings, and reduce life satisfaction across generations (Chen and Rohla 2018; Merz et al. 2009; Thomas et al. 2017), raise voters support for political violence and put life of non-partisans at risk (Piazza 2023).

Two strands of literature, both centred on partisanship being a social identity, have attempted to explain the origin of the rising affective polarization. The first posits that the rise of partisan strength (Greene, 2002; M. S. Levendusky 2018) is the main cause – where greater strength of partisan attachment (i.e., partisan strength) leads to stronger biased thinking, activism and inter-party anger (Mason 2015b, 2016; Mason and Wronski 2018). While pertaining to the idea that greater partisan strength necessarily correlates with intra and inter-party attitude, the second strand places greater emphasis on how the in-party and out-party attitudes (Greene 2001) rather than voter's partisan strength influenced the rising polarization (Iyengar et al. 2012). Affective polarization, as theorized, may stem from both partisan strength and in-party or out-party affect. Consequently, changes in partisan strength or party affect could lead to changes in affective polarization.

While researchers continue to examine potential predictors of partisan strength and party affect, such as social sorting (Mason 2015a) and personality (Luttig 2017), to better our conceptual understanding of affective polarization and fund promising interventions, no literature to date has attempted to consolidate the findings to form a systematic overview of this area. Specifically, limited efforts have been made to analyse the consistency and discrepancy between past findings, categorize and connect influential predictors to their associated theories with a framework, and ultimately, summarize the status quo for insights for policymakers and future researchers. Therefore, our work seeks to 1) examine the effectiveness of predictors of partisan strength and in-party affect (the two key outcomes we look for in prior studies) and the consistency of their impact, 2) classify predictors into categories based on common theories, mechanism or themes, 3) examine key characteristics of the existing research, such as operationalization of the two key outcomes. In doing so, we hope to highlight the efficacy of existing interventions of polarization, such as interparty contact, on the two core components of polarization across studies to provide evidence for and against potential policies at this time of rising polarization, and identify what remains to be explored along the line of partisan strength and in-party affect for researchers. See Table 1 for definition of all terminologies included in this review.

Method

Search strategy and data extraction. Following the guidelines by Levac et al. (2010) and Tricco et al. (2018), all search strategies and search strings are developed a priori and included in the protocol ¹*Political Polarization, Affective Polarization, Party Sorting, Political Extreme, Ideological Sorting, Partisan and Extreme Political Ideology or Attitude*. Using the search string, we

queried title and abstract from PsychINFO (1806–2022), Embase (1974–2022), PAIS Index (1914–2022), Political Science Database (1985–2022), Worldwide Political Science Abstract (1975–2022), International Bibliography of the Social Sciences (1951–2022), Web of Science for Science Citation Index Expanded (1900–2022), Social Science Citation Index (1900–2022) and Emerging Sources Citation Index (2017–2022). We also backtracked the citation of eligible reports and relevant reviews using *citationchaser* (Haddaway et al. 2021). We followed the standard title-abstract to full-paper screening process using *Rayyan* (Ouzzani et al. 2016). All documents guiding the screening process, such as the screening criteria are produced a priori. The search ended on 2023/1/28.

Broadly, we included peer-reviewed reports that a) measured partisan strength and in-party affect as outcomes and b) conducted hypothesis testing beyond descriptive summaries, and excluded reports unrelated to affective polarization, not in English, reviews and meta-analyses. Reports that measured in-party affect solely through coalition² or social distance assessments³, and those that included independents but did not exclude them in the analysis of partisan strength or in-party affect, were also excluded. All reviewers (7 of our coauthors and 2 research assistants) were trained before actual title-abstract and full-text screening, standardized training material is accessible in the Supplementary Material. Overall, we achieved an inter-rater reliability between 0.64 to 1 for Cohen's k^4 .

Given the focus of this review, we extracted eligible reports' research method (e.g., RCT, survey experiment), conceptualization and operationalization of the predictor and the main outcome(s), and the significance and direction of the predictor effect (i.e., $p < 0.05$). See Supplementary Material for all datapoints extracted and further details of our study selection process.

Synthesis and analysis. We first conducted frequency analysis to understand which operationalization of the two key outcomes is most used by existing research. To then estimate the robustness and consistency of the relationship between each found predictor and the two outcomes, we grouped entries by predictor, analysed the significance of relationship, positive vs. negative direction of relationship, and primary vs. secondary data method within each unique predictor-outcome combination. Multiple entries were derived from a single study in a report, if the authors reported separate predictive relationship by demographic groups (e.g., partisan direction such as democrats or republicans) or by sub-components of the measure (e.g., positive and negative in-party affect in the semantic differential scale were counted as two entries). The standardization of predictors for frequency analysis inevitably leads to the loss of some details in our quantitative analysis, including sample variation and operationalization of predictor. However, quantitative analysis enables us to understand, both visually and through standardized approaches, how the same type of predictor has influenced the two key outcomes in past research, as well as the direction and consistency of its impact. To compensate for this loss of detail, we also performed additional qualitative analysis to explore the mechanism, sample variations and operationalization of predictors and the key outcomes of the predictor-outcome relationship with finer discussions.

To construct predictor categories for qualitative analyses of predictor-outcome relationship and potential explanations of inconsistency between findings, the first and second author reviewed all eligible reports and extracted the proposed mechanism and theories underlying the hypothesized relationship between the predictor and the key outcome. Predictors were

Table 1 Terminology Bank.

Terminology	Definition
Affective Polarization	Introduced by Iyengar et al. (2012) to describe the core of in and out-group identity in American politics that is essentially composed of in-party favouritism and out-party hate.
Cognitive Style	Psychological or habitual preference for acquiring, perceiving, processing information and solving problems (Kozhevnikov 2007)
Cross-Sectional Study	A type of study that measured both the outcome and all other variables at the same time, often using survey without experimental design (Setia 2016). In this review, this term is used to explicitly describe survey studies that measured all variables at the same time without the use of experimental design.
Eligible Reports/Studies	In this review, this term is used explicitly to describe all reports and studies included in the reports that have passed our inclusion criteria.
Ideological Polarization	Voters becoming increasingly extreme in their political ideology on a spectrum of issue stands (Fiorina et al. 2008)
In-Party Affect	The strength of affective attitude or feelings towards in-party members or towards the symbolic representation of the in-party (Greene 2001).
Panel Study	A type of longitudinal study that measures variables on the same individual at different point in time, each collection point is called a wave (Binstock et al. 2011)
Partisan Direction	The party that partisans feel the closest to or most preferred to over the others, sometimes also referred to as partisan identity or identification (Liu and Carrington 2022)
Partisan Identification	The extent to which voters identify themselves as an independent or a partisan (Greene 2004)
Partisan Strength	The extent of one's sense of belonging and attachment to political parties (Greene 2002). The term used here does not solely account for the strength of identification from the scope of social identity theory, but also self-reported level of strength of attachment to political parties (e.g., strong to weak Democrat).
Political Polarization Predictors	An umbrella term to describe both affective and ideological polarization (Fiorina and Abrams 2008) In this review, this term is used to explicitly describe factors that potentially causes and correlates with partisan strength and in-party affect. This term is also used as a unit of examination that is smaller than a single study, i.e., a study may contain multiple predictors that have been tested.
Primary Methods/Data	Methods that have used data collected by the paper author themselves for the aim of the paper
Randomized Controlled Trials (RCT)	An in-person experiment with random assignment allocating participants to at least one of two conditions.
Report	In this review, this term is used to explicitly describe the unit of publication, i.e., a report may contain multiple studies and predictors.
Secondary Methods/Data	Methods that have used data collected by researchers other than the author of the paper
Social Polarization	Introduced by Mason (2015a) to describe the phenomenon of increasing partisan bias, activism and anger. In the same paper, the author introduced that this concept is interchangeable to the concept of Affective Polarization.
Study	In this review, this term is used to explicitly describe a smaller unit of examination than a report, i.e., a report may contain multiple studies. A study can be identified by the authors of the eligible report (e.g., explicit separation of content in the report with the subheadings indicating a new study), or by our reviewers based on sample and different operationalization of partisan strength and in-party affect (e.g., one regular study described by the authors that contains two operationalizations of partisan strength will be recorded as two studies in our analysis).
Survey Experiment	An online survey-based experiment with random assignment allocating participants to at least one of two conditions.
Time-series Study	A type of longitudinal study that collects measurements of individuals over time, in contrast to the panel study, it does not collect the measurement from the same individuals.

then categorized based on the underlying mechanism and theories (e.g., individual difference in cognitive style as an explanation for the effect of demographic groups on partisan strength). For predictors with insufficient details on mechanism and theories, we categorized them by theme (e.g., both intervention of interparty contact and national identity priming are under theme “interparty cohesion”, both issue alignment and extremism are under theme “party attitude”). We named the categories to best reflect the common theory and theme. It is noteworthy that our categorization is relatively preliminary which does not have an empirical or statistical basis. Nevertheless, it serves our goal to build a framework useful for our qualitative analyses and comparisons between findings, which ultimately leads to a summarization of the prior work on this topic that can hopefully benefit future research. See Supplementary Material for further details on synthesis.

Results

As shown in Fig. 1, our search resulted in 54,135 records, with 26,148 unique records of reports. Our title and abstract screening

excluded 25,671 records, leaving 477 for full-text retrieval. There were four records that could not be retrieved due to inaccessibility. We then conducted full-text screening on the remaining 473 records, resulting in 31 eligible reports. Both title-abstract screening and full-text screening followed a standard screening procedure, with standardized criteria (e.g., Does the abstract indicate that it is measuring partisan strength in relation to another factors? If yes, include, if no, exclude) and examples provided. Details about the procedure and specific inclusion and exclusion criteria for screening are accessible in the Supplementary Material. We then backtracked the citation of the 31 eligible reports. Only one record from their reference was found to be missed by our screening process. Two reviewers agreed upon the eligibility of this missed record, and included it in the final set of eligible reports, yielding 32 eligible reports in total (50 studies).

Study Summary Table. Description of all eligible reports and studies, including standardized predictor name, outcome operationalization, research type, sampling method, data source and country of participants, are included in Tables 2 and 3. See

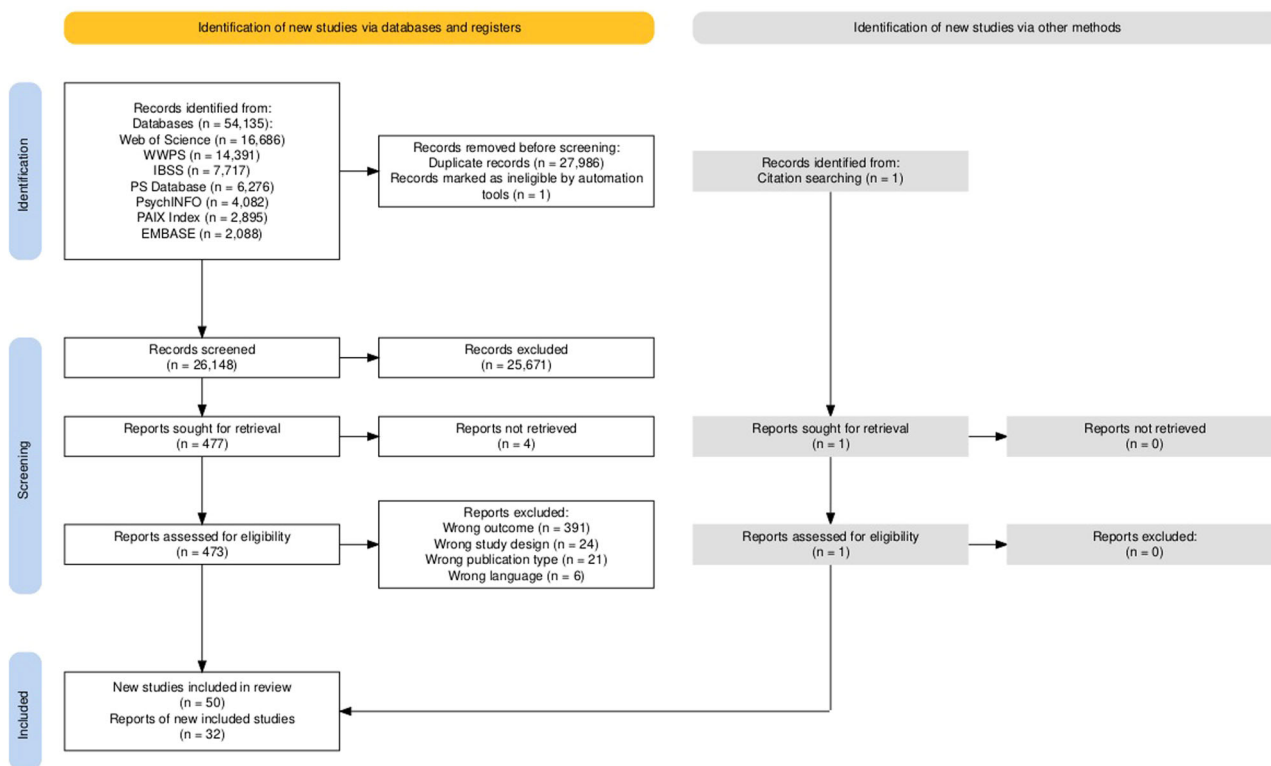


Fig. 1 PRISMA of study selection. Note: created using PRISMA 2020R Shiny App (Haddaway et al. 2022).

Supplementary Material for additional analysis on the included reports by number of interdisciplinary collaborations, and number of studies with quantitative method, sampling method and secondary data sources.

Operationalization. As shown in Table 4, for in-party affect, *Feeling Thermometer* is the most favored operationalization (78%), followed by the *Semantic Differential Scale*⁵ (12.5%) and *Dislike-Like Likert Scale*⁶ (12.5%). For measuring partisan strength, most studies use the classic *3-Tier Self-Identification* (i.e., *Folded ANES Partisan Identification Scale without Independents*), placing partisans as ‘strong,’ ‘moderate,’ or ‘weak’ (61%), followed by a set of operationalization that measures partisan strength through the lens of social identity (26%), such as Huddy et al. (2015) *Social Identity Strength Battery*. The least used operationalizations are two Likert scales: one that extends the granularity of the 3-Tier Self-Identification to a 9-point and 10-point scale with greater numbers indicating stronger self-identification (*Self-Identification on Party Strength*; 6%), and another that measures closeness to party instead (*Party Closeness Scale*; 6%).

Predictor categories and relationship with outcome. In total, the 50 studies included 56 unique predictors. Figures 2 and 3 show the summarized relational plots depicting the significance, direction, and basic categorization of the effect of each predictor on the two key outcomes.

The following sections summarize our qualitative findings with the relevant predictor categories driven by theories and mechanisms. Given the positive statistical but distinct conceptual relationship between the two key outcomes (i.e., partisan strength and in-party affect) across sample size, operationalization, and party system (Bougher 2017; Greene 2000, 2004; Reiljan and Ryan 2021), we will provide, whenever necessary, an explanation of

how predictors are theorized or found to influence the two outcomes separately.

Information exposure. The revisionist perspective proposes that voters gain a more nuanced understanding of party issue stands over time. This enables voters to better discern the differences between parties, identify which party best aligns with their preferences, and reinforce their ideological alignment and partisan strength (Achen 1992; Fiorina 1978). Indeed, Lupu’s (2013) study on key issues in economics, security, and federalism issues in Argentina demonstrated that voters who have been *passively* exposed to platform information reported a 10% increase in partisan strength. Likewise, Roscoe and Christiansen (2010) observed that individuals with more *active* exposure to balanced political information—those who actively engage in political discussions—also tend to exhibit greater partisan strength than those with lesser engagement, suggesting that both passive and active exposure to platform information and balanced political information boosts partisan strength, presumably via the mechanism theorized by the revisionists.

Nevertheless, the link between exposure to platform information and partisan strength disappears when examining the voters in Bulgaria, Hungary, Moldova, Poland, and Russia across operationalizations, despite using a similar strategy of *passive* exposure to Lupu’s (2013) (Brader and Tucker 2018). We argue that this discrepancy stems from differences in the way information was presented. Unlike Lupu (2013), Brader and Tucker (2018) provided voters with greater volume of information associated with each party. Situations when too much relevant information is presented (i.e., information overload) are known to cause avoidance of information and difficulty focusing (Bawden and Robinson 2020; de Bruin et al. 2021; Goyanes et al. 2023), leading to the observed null effect of exposure. Additionally, without explicit clarification of the overarching topic (e.g., national security, economics) surrounding the party

Table 2 Summary description of reports and studies (#) on Partisan Strength.

Report	#	N	Predictor	Measurement of Outcome	Type of Study	Sampling Method	Data Source (if secondary)	Country of Participants
Bowler et al. (1994)	1	682	- (D) Having ideologically extreme party compete locally with enough threat to in-party's electoral success*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	N/R	Johnston (1990)	Canada
	2	1616	- (D) Having ideologically extreme party compete locally with enough threat to in-party's electoral success*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	N/R	Berger (2016)	Germany
	3	1684	- (D) Having ideologically extreme party compete locally with enough threat to in-party's electoral success*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	N/R	McAllister et al. (2019), McAllister and Mughan (1987)	Australia
Bowler and Lanoue (1996)	1	786	- (C) Local competition by ideologically similar party*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	N/R	Johnston (1990)	Canada
Brader and Tucker (2018)	1	4983	- (D) Exposure to Party Issue Position - (D) Reflection of Issue Proximity between self and in-party	Self-Identification on Party Closeness	Survey Experiment	Probability Sampling	N/A	Bulgaria, Hungary, Moldova, Poland, Russia, UK
	2	4983	- (D) Exposure to Party Issue Position - (D) Reflection of Issue Proximity between self and in-party	Folded ANES Partisan Identification Scale without Independents	Survey Experiment	Probability Sampling	N/A	Bulgaria, Hungary, Moldova, Poland, Russia, UK
	3	4983	- (D) Exposure to Party Issue Position - (D) Reflection of Issue Proximity between self and in-party	Huddy et al. (2015) self-report identity strength battery	Survey Experiment	Probability Sampling	N/A	Bulgaria, Hungary, Moldova, Poland, Russia, UK
Burden and Klofstad (2005)	1	326	- (D) Think (1) vs. Feel (0) Priming for Partisan Strength Operationalization	Folded ANES Partisan Identification Scale without Independents	Survey Experiment	N/R	N/A	US
	2	329	- (D) Think (1) vs. Feel (0) Priming for Partisan Strength Operationalization	Folded ANES Partisan Identification Scale without Independents	Survey Experiment	N/R	N/A	US

Table 2 (continued)

Report	#	N	Predictor	Measurement of Outcome	Type of Study	Sampling Method	Data Source (if secondary)	Country of Participants
Cassese (2020)	1	3038	- (D) Female x Evangelical Cross-Pressure Interaction*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	Multistage Probability Sampling	ANES 2022	US
Greene (2000)	1	274	- (C) In-Party Social Identity* - (C) General attitude towards the in-party* - (C) Affective Discrepancy: Discrepancy between general attitude and affective attitude towards the in-party* - (C) Instrumental Discrepancy: Discrepancy between general attitude and instrumental attitude towards the in-party* - (C) Antiparty* - (D) Having at least 1 independent parent* - (D) Female*	Folded ANES Partisan Identification Scale without Moderate and Independents	Cross-sectional Study	Random Mailing Sampling	N/A	US
Greene (2001)	1	302	Mael and Tetrick's (1992) Identification with a Psychological Group (IDPG) scale		Cross-sectional Study	Random Mailing Sampling	N/A	US
Hohman et al. (2010)	1	125	- (D) Uncertainty about oneself and place in the world	Self-identification on Party Strength	RCT	University Participant Pool	N/A	US
Horwitz and Nir (2015)	1	13005	- (C) Level of Political Parallelism* - (C) Level of Media Exposure*	Self-identification on Party Closeness	Survey Experiment	Stratified sampling	European Social Survey European Research Infrastructure (ESS ERIC) 2023	Italy, Greece, Austria, Germany, UK, Ireland
Kane et al. (2021)	1	1002	- (D) Objective Sorting (extended to non-objectively membered in/out-party social group)*	Huddy et al. (2015) self-report identity strength battery	Survey Experiment	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US

Table 2 (continued)

Report	#	N	Predictor	Measurement of Outcome	Type of Study	Sampling Method	Data Source (if secondary)	Country of Participants
Lupu (2013)	1	1199	- (D) Exposure to Party Issue Position* - (D) Exposure to Party Convergence* - (D) Exposure to Party Issue Position and Convergence* - (C) Level of Authoritarianism Trait*	Self-Identification on Party Strength	Survey Experiment	Multi-Stage Clustered Random Sampling	N/A	Argentina
Luttig (2017)	1	329	- (C) Level of Authoritarianism Trait*	Huddy et al. (2015) self-report identity strength battery	Cross-sectional Study	Stratified sampling	N/A	US
	2	318	- (C) Level of Authoritarianism Trait*	Huddy et al. (2015) self-report identity strength battery	Cross-sectional Study	Stratified sampling	N/A	US
	3	929	- (C) Level of Authoritarianism Trait*	Folded ANES Partisan Identification Scale without Independents Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	Multistage Probability Sampling	ANES 2022	US
	4	1186	- (C) Level of Authoritarianism Trait*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	Multistage Probability Sampling	ANES 2022	US
	5	1703	- (C) Level of Authoritarianism Trait*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	Multistage Probability Sampling	ANES 2022	US
	6	1714	- (C) Level of Authoritarianism Trait*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	Multistage Probability Sampling	ANES 2022	US
Luttig (2018)	1	881	- (C) Need for Closure* - (C) Issue Extremism* - (C) Ideological Extremism*	Huddy et al. (2015) self-report identity strength battery	Cross-sectional Study	Stratified sampling	N/A	US
Mason and Wronski (2018)	1	655	- (C) Objective Sorting (restricted to groups with objective membership) *	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US
	2	834	- (C) Objective Sorting (restricted to groups	Folded ANES Partisan	Cross-sectional Study	Stratified sampling		US

Table 2 (continued)

Report	#	N	Predictor	Measurement of Outcome	Type of Study	Sampling Method	Data Source (if secondary)	Country of Participants
Phillips (2022)	1	30780	with objective membership) * - (D) Data collection time period* - (C) Age* - (C) Cohort *	Identification Scale without Independents Folded ANES Partisan Identification Scale without Moderate and Independents	Cross-sectional Study Cross-sectional Study	Multistage Probability Sampling	Cooperative Congressional Election Study ANES	US
Roscoe and Christiansen (2010)	1	328	- (C) Difference between out-party & in-party instrumental attitude* - (C) Difference between out-party & in-party affective attitude* - (C) Extent of Political Activity* - (C) Relative weight of instrumental attitude in explaining overall in-party attitude* - (C) Correlation between affective and instrumental in-party attitude* - (D) Whether voted in last election* - (D) Whether split vote between president and senate* - (D) Whether vote for the same party throughout their life*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	Random Digit Dailing Sampling	N/A	US
1		37513	- (D) Compulsory Voting System*	Folded ANES Partisan Identification Scale without Independents	Cross-sectional Study	N/R	Comparative Study of Electoral Systems Modula 1 and 2	Albania, Australia, Belgium, Brazil, Bulgaria, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Israel, Italy, Japan, Lithuania, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, South Korea, Slovenia, Spain, Sweden,

Table 2 (continued)

Report	#	N	Predictor	Measurement of Outcome	Type of Study	Sampling Method	Data Source (if secondary)	Country of Participants
Singh and Thornton (2019)	1	N/R	- (C) Period of Political Salience (as number of days passed from the election day) *	Folded ANES Partisan Identification Scale without Independents	Time-series Study	Online survey/exp distribution (e.g., Prolific, Mturk)	Comparative Study of Electoral Systems	Switzerland, Taiwan, United Kingdom, United States, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Japan, Mexico, Netherlands, New Zealand, Norway, Philippines, Poland, Romania, Russia, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, Ukraine, United Kingdom, United States, Uruguay, US
West and Iyengar (2022)	1	1266	- (D) Period of Political Salience	Luitanen and Crocker (1992)'s Social Identity Battery	Panel Study	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US
	2	3824	- (D) Self-Affirmation	Luitanen and Crocker (1992)'s Social Identity Battery	Survey Experiment	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US

Predictors are either (D)ichotomous or (C)ontinuous, except for Phillips (2022), where (C) is Categorical; N/R Not Reported, N/A Not Applicable; * is used to indicate correlational predictors; ANES stands for American National Election Study.

Table 3 Summary description of reports and studies (#) on In-Party Affect.

Report	#	N	Predictor	Measurement of Outcome	Type of Study	Sampling Method	Data Source (if secondary)	Country of Participants
Arceneaux and Vander Weelen (2013)	1	1006	- (D) High/Low Need for Affect (Low/High Need for Cognition)*	Feeling Thermometer to Party	Cross-Sectional	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US
Bougher (2017)	1	1083	- (C) Partisan Strength	7-step Dislike/Like Scale	Panel Study	Multi-Stage Clustered Random Sampling	ANES 1999, 2010	US
Druckman et al. (2019)	1	5031	- (D) Exposure to in-party uncivil media - (D) Exposure to out-party uncivil media	Feeling Thermometer to Party	Survey Experiment	Stratified sampling	N/A	US
Fishkin et al. (2021)	1	484	- (D) Interparty Contact and Deliberation	Feeling Thermometer to Party	RCT	Stratified Sampling	N/A	US
	2	379	- (D) Interparty Contact and Deliberation	Feeling Thermometer to Party	RCT	Stratified Sampling	N/A	US
Greene (2001)	1	302	- (D) Being Female*	Crites, Fabrigar, and Petty (1994)'s 8-item 7-step semantic differential measurement scale	Cross-Sectional	Random Mailing Sampling	N/A	US
Greene (2004)	1	302	- (C) Partisan Strength* - (C) Independent Social Identity*	Feeling Thermometer to Party	Cross-Sectional	Random Mail Sampling	N/A	US
Hansen and Kosiar-Pedersen (2017)	1	8434	- (D) Period of Political Sallence	Feeling Thermometer to Party	Panel Study	N/R	Online Panel of Electoral Campaigning	Denmark
Levendusky (2013)	1	93	- (D) Exposure to in-party media - (D) Exposure to out-party media	Feeling Thermometer to Party	Survey Experiment	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US
Levendusky (2018)	1	772	- (D) National Identity Priming	Feeling Thermometer to Party	Survey Experiment	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US
	2	1049	- (D) National Identity Priming*	Feeling Thermometer to Party	Cross-Sectional	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US
	3	1729	- (D) National Identity Priming	Feeling Thermometer to Party	Survey Experiment	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US

Table 3 (continued)

Report	#	N	Predictor	Measurement of Outcome	Type of Study	Sampling Method	Data Source (if secondary)	Country of Participants
Luttig (2017)	1	1686	- (C) Level of Authoritarianism Trait*	Feeling Thermometer to Party	Cross-Sectional	Multistage Probability Sampling	ANES 2022	US
	2	1720	- (C) Level of Authoritarianism Trait*	Feeling Thermometer to Party	Cross-Sectional	Multistage Probability Sampling	ANES 2022	US
	3	928	- (C) Level of Authoritarianism Trait*	Feeling Thermometer to Party	Cross-Sectional	Multistage Probability Sampling	ANES 2022	US
	4	1186	- (C) Level of Authoritarianism Trait*	Feeling Thermometer to Party	Cross-Sectional	Multistage Probability Sampling	ANES 2022	US
Marchal and Watson (2022)	1	4748	- (C) Issue Proximity between self and in-party*	11-step Dislike/Like Scale	Cross-Sectional	N/R	British Election Study 2019 pre-election	UK
Mason and Wronski (2018)	1	655	- (C) Objective Sorting (restricted to groups with objective membership) * - (C) Objective Sorting (restricted to groups with objective membership) * - (C) Subjective Sorting *	Feeling Thermometer to Party	Cross-Sectional	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US
	2	834	- (C) Subjective Sorting x Objective Sorting Interaction* - (D) National Identity Priming - (D) Civic Norm Priming	Feeling Thermometer to Party	Cross-Sectional	Stratified sampling	Cooperative Congressional Election Study	US
Mullinix and Lythgoe (2023)	1	1073	- (D) National Identity Priming - (D) Civic Norm Priming	Feeling Thermometer to Party	Survey Experiment	Online survey/exp distribution (e.g., Prolific, Mturk)	N/A	US
Neo and Johnson (2020)	1	286	- (D) Direct Effect of Pro-Attitudinal Book Rating (1) vs. Counter-Attitudinal (0) - (C) Mediated through third-person perception - (C) Mediated through perceived manipulation - (C) In-party prototypicality - (C) Perceived interparty conflict - (C) Out-party hate - (C) Perceived hostile opinion climate	Positive 4-item 5-step semantic differential measurement scale	Survey Experiment	University Participant Pool	N/A	US

Table 3 (continued)

Report	#	N	Predictor	Measurement of Outcome	Type of Study	Sampling Method	Data Source (if secondary)	Country of Participants
	2	780	- (D) Direct Effect of Pro-Attitudinal Book Rating (1) vs. Counter-Attitudinal (0) - (C) Mediated through third-person perception - (C) Mediated through perceived manipulation - (C) In-party prototypicality - (C) Perceived interparty conflict - (C) Out-party hate - (C) Perceived hostile opinion climate - (D) Natural changes in given period* - (D) Age* - (D) Cohort * - (C) Partisan Strength* - (C) Issue Extremism on the left-right spectrum* - (D) Strategy Coverage	Positive 4-item 5-step semantic differential measurement scale	Survey Experiment	University Participant Pool	N/A	US
Phillips (2022)	1	30780		Feeling Thermometer to Party	Cross-Sectional	Multistage Probability Sampling	Pooled ANES Study	US
Reiljan and Ryan (2021)	1	N/R		11-step Dislike/Like Scale	Cross-Sectional	Probability Sampling	National SOM surveys 2010-2016	Sweden
Zoizner et al. (2021)	1	678		Feeling Thermometer to Party	Survey Experiment	Online survey/ exp distribution (e.g., Prolific, Mturk)	N/A	US
	2	678	- (D) Strategy Coverage	Feeling Thermometer to Party Member	Survey Experiment	Online survey/ exp distribution (e.g., Prolific, Mturk)	N/A	US
	3	1001	- (C) Strategy Coverage*	Feeling Thermometer to Party	Cross-Sectional	Online survey/ exp distribution (e.g., Prolific, Mturk)	N/A	US

Predictors are either (D)iscrete or (C)ontinuous, N/R Not Reported, N/A Not Applicable; * is used to indicate correlational predictors; ANES stands for American National Election Study.

Table 4 Type of Operationalization from Eligible Studies.

In-Party Affect Measurements	N (%)	Partisan Strength Measurements	N (%)
Feeling Thermometer	21 (78)	3-Tier Self-Identification Scale	19 (61)
Semantic Differential Measurement Scale	3 (11)	Huddy et al. (2015) Social Identity Strength Battery	5 (16)
Dislike-like scale	3 (11)	Party Closeness Scale	2 (6)
		Self-Identification on Party Strength	2 (6)
		Luhtanen and Crocker (1992)'s Social Identity Battery	2 (6)
		Mael and Tetrick (1992) Identification with a Psychological Group (IDPG) scale	1 (3)

One study may be counted multiple times if it contains measurement for both in-party affect and partisan strength.

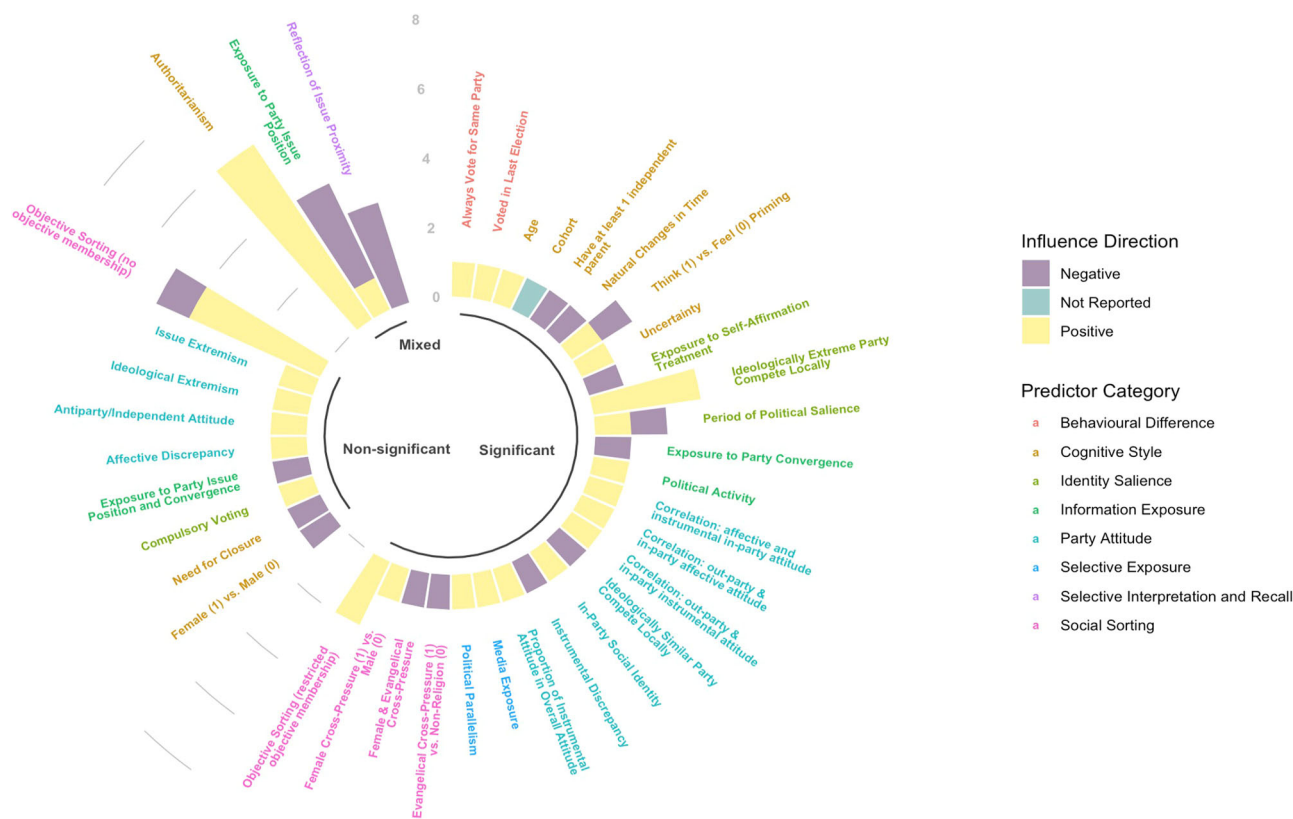


Fig. 2 Plot depicting the category and consistency of significance, statistical direction of predictors in relation to partisan strength.

stands on issues, their approach might not have provided the necessary clarity for voters to differentiate between parties effectively—a key process that underlies the effect of information provision on partisan strength. Lupu (2013) showed that when voters are presented with cues suggesting party alliances, which blur party differences, they report a 14% decrease in partisan strength.

Selective interpretation and recall. The dual-processing model of information argues that individuals often resort to a more intuitive and heuristic-based approach to process information (Kahneman, 2012). Thus, the perception of information falls strongly onto the heuristics that guide voters’ perception of the information. Of the many heuristics, the eligible studies focused primarily on selective recall (selectively recall portions of information from the stimuli that is in favour of their prior views; Bothwell and Brigham 1983; Faber and Storey 1984), and selective interpretation (negatively interpret or discard counter-attitudinal information; Weeks and Garrett 2014; Westen et al. 2006). For example, when voters encountered a book favouring in-party that is rated poorly, selectively interpreting the rating as

manipulation by the opposition intensified their in-party affect by 21 percentage points (pp) — contrasting with their reaction to the same book with higher ratings (Neo and Johnson 2020). Similarly, selective recall of the book favouring in-party with great rating to be highly representative of their in-party, their in-party affect grew by 17 pp. In contrast, exposure to critical content from opposition media may have little to no impact as voters simply ignore (or ‘tune out’ from) such content (Levendusky 2013).

Conditions where the counter-attitudinal information comes from a source that is perceived to be less susceptible to manipulation or alteration reduce the opportunity for selective interpretation (DeAndrea 2014). Druckman et al. (2019) found that those exposed to highly uncivil news from in-party sources, which tend to be seen as less susceptible to manipulation and more credible, reported a small but significant reduction in their in-party affect (by 3 points on a 100-point scale). Conversely, exposure to uncivil coverage from the out-party sources had the reverse effect that boosted their in-party affect by 3 points (Druckman et al. 2019).

Since partisans would selectively recall snippets of information that is consistent with their views, we should also expect



Fig. 3 Plot depicting the category and consistency of significance, statistical direction of predictors in relation to in-party affect.

partisans, when prompted to reflect on the distance between their issue stand and the party’s policy position, to practise selective recall and provide a consonant image between the two, thereby, boosting their partisan strength or in-party affect, especially that the reflected information coming from self-cognition should theoretically be less susceptible to manipulation. However, Brader and Tucker (2018) found a contradictory result, whereby partisans reported a 0.05 point decline (out of 1) in their partisan strength after being asked to reflect their issue proximity to in-party. The contrast between Druckman et al. (2019) and Brader and Tucker (2018) suggest that moderation effect of susceptibility to manipulation may be limited to selective interpretation or to the effect on in-party affect. Nevertheless, given how both studies relate to susceptibility to manipulation only theoretically without direct measurement or manipulation, studies with direct measurement of susceptibility to manipulation as the moderator is needed to afford a conclusion.

Selective exposure. Furthermore, partisans also anticipate and actively seek out agreeable sources (e.g., exposure to specific media) to reinforce their beliefs (i.e., selective exposure), which further enhances their partisan strength. Horwitz and Nir (2015) show that voters from countries that allow voters to more easily source party-aligned media content (i.e., high political parallelism, e.g., Italy and Greece) exhibit higher partisan strength than those from countries offering fewer media sources along the party lines (e.g., UK and Germany). The finding remains after controlling for voters’ extent of media exposure, further suggesting that the quality of information consumption (e.g., selective

exposure) rather than extent of information consumption (or provision) is the main driver of the observed effect.

Moreover, the anticipation of favourable content, as a component of selective exposure (Hart et al. 2020), appears to also amplify partisan strength. By surveying voters at different dates randomly, Hansen and Kosiara-Pedersen (2017) observed that Denmark partisans experienced the largest boost in partisan strength after the campaign cycle for national election was announced, but before the campaign actually started (by 0.38 points on a 10-point scale). While it is not possible to eliminate the possibility that partisans have searched and been exposed to favourable media content before the campaign, the evidence offers a unique potential that anticipation of favourable content (e.g., in-party campaigns) also drives the effect of selective exposure on partisan strength. Nevertheless, with the current field lacking in evidence that disentangle anticipation of and exposure to favourable information from the concept of selective exposure, our conclusion provides only one of the possibility further study can ensue.

While the literature is limited on whether anticipation influences in-party affect, exposure to like-minded content is not found to influence in-party affect, as exposing partisans to real like-minded content did not induce significant changes to voters’ in-party affect (Levendusky 2013).

Social sorting. Politicized social group identities (e.g., race, religion), each with varying degrees of party affiliation, contribute to perceived differences between parties, thereby influencing partisan strength (Mason 2015a; Roccas and Brewer 2002). Greater

attachment to in-party-aligned social groups (i.e., objective sorting) and greater perceived closeness between objective social group and in-party (i.e., subjective sorting) foster greater perceived difference between the in-party and out-parties. This, in turn, boosts partisan strength (Mason 2015a; Roccas and Brewer 2002). Conversely, having sets of identities that do not neatly align with the party leads to greater cross-pressure, reducing partisan strength. Indeed, Mason and Wronski (2018) demonstrated that for American voters, stronger alignment with in-party aligned race, religion, and ideology (i.e., objective sorting) significantly increased partisan strength by 45 percentage points (pp) and in-party affect by 31 pp. Stronger perceived alignment between in-party social group identities and the in-party (i.e., subjective sorting) also enhanced in-party affect by 18 pp. The same finding is reaffirmed using another sample recruited through online crowdsourcing services, where partisans from both parties saw a 0.2-point (out of 1) boost in their partisan strength, and a 0.39-point and a 0.26-point boost in their in-party affect with rising objective and subjective sorting.

Specific social identities also moderate the impact of cross-pressure exerted by other identities. Cassese (2020) argued that for Republican voters, female identity placed an especially high cross-pressure during the Access Hollywood tape scandal and evangelical identity moderates the level of cross-pressure. Evangelical identity generated embracement of sexist remarks and feminine stereotype as how it is prescribed by God, thereby shifting female identity to a highly aligned identity to Republicans when the Republican candidate stressed sexist views on television. As expected, non-religious female republican who would face greater cross-pressure due to the lack of selective interpretation of the scandal, from their nonreligious identity exhibited significantly lower partisan strength than their evangelical counterpart.

Mason (2015a)'s social sorting model, contends that effect of sorting is restricted to objectively member groups (e.g., female is an objectively member group to female republican, and male is not a member group to female republican), however, Kane et al. (2021)'s group sentiment model argues that the effect is extendable to non-member in-party-aligned social groups, such that hate towards a non-membered in-party-aligned social group would generalize to decline of in-party affect. Contrary to their expectation, voters aware of an alignment between a negatively evaluated group and their in/out-party did not show significantly different partisan strength from those who believed the group was neutral (Kane et al. 2021). This finding was echoed in two Mechanical Turk studies, suggesting that objective membership is essential in the model of social sorting.

Identity salience. West and Iyengar (2022) argued that one's in-party identity, as a social identity, is an integral part of one's self-concept. Self-concept could be made of many identities, with the identity having the highest salience and thereby accessibility at the time of decision-making exerting the greatest influence on behaviour (Baumeister 1999). Using the period of political salience (i.e., political campaigns) as a proxy for salience of in-party identity, West and Iyengar (2022) found that voters reported 16% higher partisan strength during midterm election campaigns compared to a month later, agreeing with the direction of effect according to their argument. Such effect of in-party identity salience disappears when voters were instead asked to rank themselves on a series of values (e.g., wisdom and knowledge) in order to boost their individual identity, though conditional on voters being Democrats (West and Iyengar 2022).

Singh and Thornton (2019) expanded on this finding using data from 86 countries, finding that the likelihood of identifying as a weak partisan increased as more days elapsed post-election, becoming significant after 150 days. Singh and Thornton (2013)

further explored the effects of identity salience when salience is introduced by structural changes, such as by introducing compulsory voting that reinforce social learning and heightens identity salience (Converse 1969). Indeed, compulsory voting doubled the likelihood of someone being a strong partisan and reduced the probability of being a weak partisan by 31%.

Threatening situations may also increase salience of in-party identity, raising partisan strength as a defensive mechanism. Bowler et al. (1994) proposed that having a threatening competition by an extremist party locally would raise the perceived electoral stake by partisans of other parties, thereby, making the interparty competition and their in-party identity salient, reinforcing partisan strength. They demonstrated this behaviour using the Australian National Election Studies in 1987 and 1990, the Canadian National Election Study in 1988, and the German National Election Study in 1983. Compared to the regions that exists no competition of an extremist party that is perceived to hold enough power to run for national office, partisans from regions with existing competitions are significantly more likely to report higher partisan strength.

Cognitive style. Individuals with a high need for closure or authoritarianism trait are thought to favour a group-centric cognitive style, as stronger attachment to social groups prescribe less ambiguous actions and attitudes (Luttig 2017, 2018). However, there are mixed findings about the effect of personality on partisan strength. Luttig (2018) found that need for closure only affected partisan strength among Republicans, not Democrats. Meanwhile, this effect was moderated by political knowledge. Amongst those with a higher level of political knowledge, high need for closure led to a 0.79 point (out of 1 point) rise in partisan strength. The effect of need for closure became negative on partisan strength when voters hold little political knowledge (by 0.56 points out of 1 point).

Similarly, the influence of authoritarianism varies across ANES samples, showing either a consistently positive effect across partisan direction (ANES 2022), limited to a specific party (ANES 2022), or/and moderated by education (ANES Panel 2000 – 2004) (Luttig 2017). Given how partisan strength fluctuates significantly depending on the year of collection (Phillips 2022), it's possible that the impact of these personality traits on partisan strength, while depending on partisan direction, education and political knowledge, is also moderated by the time in which voters were surveyed.

Whether party affiliation moderates the effect of priming that elicits the state of group-centric cognitive style on partisan strength is also mixed. On one hand, the state of uncertainty about oneself, motivate individuals to reflect how they should behave and interact with others, embracing group-centric thinking and greater partisan strength to dissipate uncertainty (Hogg 2000). Indeed, voters primed to feel uncertain about themselves reported 27% higher partisan strength than certain voters, regardless of their party affiliation. On the other hand, priming that fosters a group-centric thinking by replacing the word "think" in the operationalization of partisan strength with the word "feel" boosted Republican's partisan strength, but reduced Democrats' partisan strength (Burden and Klostad 2005). Nevertheless, given how Burden and Klostad (2005) compared the *percentages* of strong and weak identifiers between conditions, the effect of priming on voters from one party affiliation *necessarily* influence the effect on voter from the opposing affiliation. Evidence comparing partisan strength within the same partisan direction using the Burden and Klostad (2005)'s priming method would help to further elucidate a more affirmative conclusion.

Contrary to partisan strength, the effect of personality on in-party affect, via differences in cognitive style, seems to follow a

distinct psychological route that is less dependent on voter demographics. For instance, in-party affect is consistently, significantly and positively correlated with voters' authoritarianism trait (by 6.5 point in a 100-point scale on average) across multiple years of ANES samples and across demographics (Luttig 2017). Those with low need for cognition (NFC) and higher need for affect (NFA), who tends to possess a strong directional thinking (e.g., criticizing out-group when in-group is criticized, and enforce criticism of out-group when out-group is criticized) in understanding social identities, also exhibited a 26% (on average) increase in-party affect after exposure to negative out-party information regardless of voters' partisan direction.

Demographic variables like age, gender, and parental partisanship also contribute to shaping cognitive style and thus partisan strength and in-party affect. Older voters tend to exhibit stronger community-oriented mindsets, leading to increased partisan strength and in-party affect, with a peak and subsequent stabilization after age 70 (Phillips 2022). Female voters, contrary to the expectations that female gender roles emphasize harmony and group connection, report lower in-party positive affect than males, but no difference in partisan strength (Greene 2001). Additionally, having political independent parents reduces partisan strength (Greene 2000), theoretically by boosting the development of an issue-based approach in defining partisanship (Beck 1974, p. 19).

Party attitude. This set of predictors examines how a voter's attitudes towards party systems, issues, and the alignment between their own and their party's stances impact partisan strength and in-party affect. For instance, those with higher extremism are theorized to perceive higher ideological distinction between their in-party and the out-party, raising the perceived election stake, and heightening the two key outcomes. However, Reiljan and Ryan (2021) and Luttig (2018) failed to find significant correlations between issue and ideological extremism and the key outcomes. In contrast, divergence rather than extremism in voters' issue attitudes from their perceived in-party stance, as shown by Marchal and Watson (2022), still significantly diminishes in-party affect. Local competition from ideologically similar parties that would elicit voters to reconsider their issue alignment with the in-party also reduces partisan strength (Bowler and Lanoue 1996).

Additionally, voters' psychological attitudes toward their party, split into affective and instrumental components, also affect partisan strength (Crites et al. 1994). Greene (2000) argued that given leaners tend to have less amount of affective view of the partisanship adapted from their independent parents, their overall attitude towards the in-party (e.g., my party is good, desirable) should be more occupied by the instrumental value of the in-party (e.g., my party is useful, beneficial). Indeed, while the relative weight of affective attitude in composing the overall in-party attitude remained similar between leaners and strong partisans, the relative weight of instrumental attitude differed significantly, with leaners showing higher relative reliance on their instrumental assessment (Greene 2000). A replication by Roscoe and Christiansen (2010) found a contrasting findings, where it is the strong partisans that showed greater reliance on instrumental assessment. Such discrepancy of finding might stem from how their replication reduced the ambiguity of the instrumental attitude items from semantic differential scale and their use of thermometer for the overall attitude.

Such discrepancy may be due to two reasons. First, instead of using single abstract words to measure instrumental attitude like Greene (2000), Roscoe and Christiansen (2010)'s measurement provided specific examples for instrumental assessment (e.g., my party is effective from keeping us out of war, provides effective leadership) that necessarily reduced the ambiguity surrounding instrumental terms. However, Roscoe and Christiansen (2010)

maintained the semantic differential scale for measuring affective attitude, which left ample ambiguity for where affective attitude may be sourced. Second, while Greene (2000) measured voter's overall attitude using ambiguous terms such as good and desirable, Roscoe and Christiansen (2010) simply allowed voters to rate their party on a 100-point scale. In both cases, the level of ambiguity surrounding the instrumental and overall attitude seems to be pivotal in delineating the attitudinal difference across partisan strength levels. Nevertheless, empirical validations are necessary to advance this argument further.

Interparty cohesion. This category of predictors examines how efforts aimed at enhancing interparty cohesion influences in-party affect. The majority of studies exploring interparty cohesion yielded non-significant results. Levendusky (2018) and Mullinix and Lythgoe (2023) showed that emphasizing American identity or civic norm, did not significantly influence their in-party affect across varying sample sizes, demographics and recruitment methods. Attempts to bridge interparty difference using strategy-coverage also failed to find significant impact (Zoizner et al. 2021), while attempts to motivate interparty contact only increased Democrats but not Republicans' in-party affect (Fishkin et al. 2021).

Behavioural difference. Compared to weaker partisans, self-identified "strong" partisans are 15% more likely to be consistent voters throughout their lifetimes, 144% more likely to always vote for the same party across elections, and 79% less likely to engage in split-ticket voting between presidential and congressional candidates (Roscoe and Christiansen 2010).

Discussion and conclusion

Our scoping review highlighted the relationship between multiple predictors and partisan strength and in-party affect. Namely, we found that: 1) providing platform information or engaging in active political discussion strengthens partisan strength, particularly when information allows clear comparison between parties; 2) selective recall and interpretation bolster in-party affect and partisan strength, with the information's susceptibility to manipulation moderating the effect of selective interpretation or on in-party affect; 3) subjective and objective sorting strengthens the two key outcomes, but objective membership in social group is critical for effect of sorting on partisan strength, and that identity moderates each other's impact of elicited cross-pressure; 4) party identity salience and the context thereof boosts partisan strength; 5) the effect of need for closure and authoritarianism on partisan strength likely depends on voter demographics, however, the NFA and authoritarianism positively correlate to in-party affect across demographics; 6) factors enhancing group-centric thinking intensify the two key outcomes, and factors enhancing issue-based thinking (e.g., having independent parents) reduces them; 7) ideological and issue misalignment diminishes the two outcomes; 8) the structure of partisan attitude varies across partisan strength, with contrasting evidence on whether leaners are influenced primarily by instrumental or a combination of affective and instrumental attitudes towards in-party; 9) interventions aimed at enhancing interparty cohesion have limited impact on the two outcomes; 10) stronger partisans are also more consistent and loyal voters.

Additionally, we found that the operationalization of partisan strength varies greatly between studies, but few have justified why the specific operationalization is preferred. Although all measures to some degree one's strength of party attachment, these operationalization entails distinct underlying theories of partisanship. For instance, the Social Identity Strength Battery emphasizes the

social identity property of partisanship, the classic 3-tier self-identification does not require such theorization and emphasis. We also found a lack of testing for proposed mechanism by respective authors, despite many predictors claiming to rely on the said mechanism to exert influence on the two outcomes. We therefore strongly advocate future studies to justify the use of operationalizations whenever appropriate and deploy testable mechanism with empirical attempts to justify the theorized influence. Additionally, we encourage empirical studies to expand the bank of existing predictors by borrowing insights from existing studies on ideological polarization and populism. For instance, by investigating whether the use of fear in political speech influences partisan strength and in-party affect whilst influencing voter's perception of democratic ideal (Balsa-Barreiro and Rossi 2019).

By summarizing, structuring and critically examining the existing predictors of partisan strength and in-party affect, our review offers several implications: First, our review provided a preliminary categorization of predictors to articulate empirical gaps in the literature, and establish narratives to enhance systematic growth of the topic. Second, our review enables policymakers to recognize the limited efficacy of deliberation and identity priming in reducing the two core elements of polarization. By outlining predictors that is effective, such as selective recall and interpretation, our review help policymakers to develop relevant strategies in reducing affective polarization, such as by reducing perceived susceptibility of manipulation of state information. Alternatively, our review helps policymaker to identify the demographic in which intervention may be more needed, such as older adults, and rethink about the framing of state-motivated campaigns (e.g., in health sectors) in an era of political uncertainty that may predispose higher partisan strength. Overall, our review restructures the understanding of partisan strength and in-party affect in relation to affective polarization and highlights the key theories, mechanism and moderators guiding the effect on partisan strength and in-party affect.

Our review also has flaws. First, to ensure a concise and targeted approach, our inclusion criteria may have been overly restrictive. Our exclusion of studies that included independents may limit our findings to provide insights into the origin of partisan strength. The exclusion of "bloc" measurement for in-party affect or partisan strength may have excluded studies targeting multi-party systems, limiting our findings' generalizability. Secondly, though we referred to all factors correlating or causally linking to the two outcomes as predictors, we cannot draw causal conclusions with our qualitative findings. Thirdly, the scope of our review is limited to affective polarization and partisan strength and in-party affect. In this regard, our review does not cover predictors that are not relevant to partisan strength and in-party affect, even if they shape other types of polarization, such as ideological polarization, and variables that are linked to it, such as populism. For instance, Bail et al. (2018) suggested that self-selected exposure to out-party bots and their political tweets increased ideological extremity of partisans, and Balsa-Barreiro and Rossi (2019) argued that fear is a rhetoric strategy to incite populism and democratic backslide. We encourage future reviews to explore the predictors and correlators of other forms of polarization and political ideologies.

Lastly, since the scope of our review and the selection of studies for the review is motivated by the past observation of how the increasing (affective) polarization shapes partisan dynamics and global democracies, we wish to acknowledge the accumulating literature that sheds further light to the effect of affective polarization. Recent findings by Broockman et al. (2023), Westwood et al. (2019, 2022) suggest that the effect of affective polarization, or negative partisanship, may be limited, at least for boosting support

of violence and changing democratic norms. We encourage future work to be more cautious in placing motivation in ongoing works such as the direct implication of affective polarization. We also hope that such debate, including our review findings, incite further experimental studies and discussions on affective polarization and the interdisciplinary field of partisan strength.⁷

Data availability

All data extracted from eligible reports and studies, and frequency analysis conducted on extracted data are included in the OSF repository.

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Notes

- 1 Accessible at <https://osf.io/feq5>
- 2 Since in-party affect defines the preferred party as the sole recipient of voter's affective attitude, including in-coalition affect would dilute our conclusion.
- 3 In-party affect and social distance are correlated but distinct concepts (Druckman and Levendusky 2019).
- 4 Our Cohen's Keppa reports the inter-rater reliability on how much agreement for inclusion was reached between the coders on their assigned screening batches after full-text screening. Given that different coders were paired and assigned to different batches of the reports for screening, each group of two had their own Keppa score for inter-rater reliability, therefore, we have a range of Keppa scores rather than a specific Keppa score for all coders.
- 5 The scale originated from Crites et al. (1994)'s Semantic Differential Measurement System. This original 8-item scale was used by Greene (2001), this scale was then altered by Neo & Johnson (2020) to capture positive in-party affect, thus only half (4-items) of the measurement system was used.
- 6 This family of scales asks the voters to rate their level of like to dislike on an 11 or 7-point Likert scale.
- 7 Accessible at <https://osf.io/feq5>

References

- Achen CH (1992) Social psychology, demographic variables, and linear regression: Breaking the iron triangle in voting research. *Political Behav* 14(3):195–211. <https://doi.org/10.1007/BF00991978>
- American National Election Studies (2022). Time Series Cumulative Data File (1948–2020) [Dataset]. <https://electionstudies.org/data-center/anes-time-series-cumulative-data-file/>
- American National Election Studies (2010). 2008–2009 Panel Study [Dataset]. <https://electionstudies.org/data-center/2008-2009-panel-study/>
- American National Election Studies (1999). 1992–1997 Merged File [Dataset]. <https://electionstudies.org/data-center/1992-1997-merged-file/>
- Arceneaux K, Vander Wielen RJ (2013) The Effects of Need for Cognition and Need for Affect on Partisan Evaluations. *Political Psychol* 34(1):23–42. <https://doi.org/10.1111/j.1467-9221.2012.00925.x>
- Bail CA, Argyle LP, Brown TW, Bumpus JP, Chen H, Hunzaker MBF, Lee J, Mann M, Merhout F, Volfovsky A (2018) Exposure to opposing views on social media can increase political polarization. *Proc Natl Acad Sci* 115(37):9216–9221. <https://doi.org/10.1073/pnas.1804840115>
- Balsa-Barreiro J, Rossi E (2019) The Common Enemy: How the Rhetoric of Fear is Subverting Democracies. *J Int Aff*. <https://jia.sipa.columbia.edu/news/common-enemy-how-rhetoric-fear-subverting-democracies>
- Baumeister RF (1999) Self-concept, self-esteem, and identity. In *Personality: Contemporary theory and research*, 2nd ed (pp. 339–375). Nelson-Hall Publishers
- Bawden D, Robinson L (2020) Information Overload: An Introduction. In *Oxford Research Encyclopedia of Politics*. <https://doi.org/10.1093/acrefore/9780190228637.013.1360>
- Beck PA (1974) A socialization theory of realignment. In RG Niemi, *The Politics of Future Citizens* (pp. 199–219). Jossey-Bass
- Berger M, Gibowski WG, Roth D, Schulte W (2016) Election Study 1983 (Representative Federal Surveys)Wahlstudie 1983 (Repräsentative Bundesumfragen) (Version 3.0.0) [Dataset]. GESIS Data Archive. <https://doi.org/10.4232/1.12449>
- Bettarelli L, Reiljan A, Van Haute E (2023) A regional perspective to the study of affective polarization. *Eur J Political Res* 62(2):645–659. <https://doi.org/10.1111/1475-6765.12548>

- Mason L (2015b) "I Disrespectfully Agree": The Differential Effects of Partisan Sorting on Social and Issue Polarization: Partisan sorting and polarization. *Am J Political Sci* 59(1):128–145. <https://doi.org/10.1111/ajps.12089>
- Mason L (2016) A Cross-Cutting Calm: How Social Sorting Drives Affective Polarization. *Public Opin Q* 80(S1):351–377. <https://doi.org/10.1093/poq/nfw001>
- Mason L, Wronski J (2018) One Tribe to Bind Them All: How Our Social Group Attachments Strengthen Partisanship. *Political Psychol* 39(S1):257–277. <https://doi.org/10.1111/pops.12485>
- McAllister I, Jones R, Papadakis E, Gow D (2019) Australian Election Study, 1990 [Dataset]. ADA Dataverse. <https://doi.org/10.4225/87/KPVA0F>
- McAllister I, Mughan A (1987) Australian Election Study, 1987 [Dataset]. Australian Data Archive. <https://doi.org/10.25911/5C7CA10AB0849>
- McCoy J, Somer M (2019) Toward a Theory of Pernicious Polarization and How It Harms Democracies: Comparative Evidence and Possible Remedies. *ANNALS Am Acad Political Soc Sci* 681(1):234–271. <https://doi.org/10.1177/0002716218818782>
- McCoy J, Rahman T, Somer M (2018) Polarization and the Global Crisis of Democracy: Common Patterns, Dynamics, and Pernicious Consequences for Democratic Polities. *Am Behav Scientist* 62(1):16–42. <https://doi.org/10.1177/0002764218759576>
- Merz E-M, Schuengel C, Schulze H-J (2009) Intergenerational Relations Across 4 Years: Well-being Is Affected by Quality, Not by Support Exchange. *Gerontologist* 49(4):536–548. <https://doi.org/10.1093/geront/gnp043>
- Mullinix KJ, Lythgoe T (2023) Priming Norms to Combat Affective Polarization. *Political Res Q* 76(1):186–199. <https://doi.org/10.1177/10659129211073319>
- Neo RL, Johnson BK (2020) Online products and consumers: Partisan ratings and mechanisms for affective polarization. *Telemat Inf* 54:101467. <https://doi.org/10.1016/j.tele.2020.101467>
- Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A (2016) Rayyan—A web and mobile app for systematic reviews. *Syst Rev* 5(1):210. <https://doi.org/10.1186/s13643-016-0384-4>
- Phillips J (2022) Affective Polarization: Over Time, Through the Generations, and During the Lifespan. *Political Behav* 44(3):1483–1508. <https://doi.org/10.1007/s11109-022-09784-4>
- Piazza JA (2023) Political Polarization and Political Violence. *Security Studies*, Forthcoming. <https://doi.org/10.2139/ssrn.4156980>
- Reiljan A, Ryan A (2021) Ideological Tripolarization, Partisan Tribalism and Institutional Trust: The Foundations of Affective Polarization in the Swedish Multiparty System. *Scand Political Stud* 44(2):195–219. <https://doi.org/10.1111/1467-9477.12194>
- Roccas S, Brewer MB (2002) Social Identity Complexity. *Personal Soc Psychol Rev* 6(2):88–106. https://doi.org/10.1207/S15327957PSPR0602_01
- Roscoe DD, Christiansen ND (2010) Exploring the Attitudinal Structure of Partisanship. *J Appl Soc Psychol* 40(9):2232–2266. <https://doi.org/10.1111/j.1559-1816.2010.00657.x>
- Setia MS (2016) Methodology Series Module 3: Cross-sectional Studies. *Indian J Dermatol* 61(3):261–264. <https://doi.org/10.4103/0019-5154.182410>
- Singh S, Thornton J (2013) Compulsory voting and the dynamics of partisan identification. *Eur J Political Res* 52(2):188–211. <https://doi.org/10.1111/j.1475-6765.2012.02071.x>
- Singh S, Thornton J (2019) Elections Activate Partisanship across Countries. *Am Political Sci Rev* 113(1):248–253. <https://doi.org/10.1017/S0003055418000722>
- The Congressional Budget Office (2019) The Effects of the Partial Shutdown Ending in January 2019. <https://www.cbo.gov/publication/54937>
- Thomas PA, Liu H, Umberson D (2017) Family Relationships and Well-Being. *Innov Aging* 1(3):igx025. <https://doi.org/10.1093/geroni/igx025>
- Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, Moher D, Peters MDJ, Horsley T, Weeks L, Hempel S, Akl EA, Chang C, McGowan J, Stewart L, Hartling L, Aldcroft A, Wilson MG, Garrity C, Straus SE (2018) PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med* 169(7):467–473. <https://doi.org/10.7326/M18-0850>
- Weeks BE, Garrett RK (2014) Electoral Consequences of Political Rumors: Motivated Reasoning, Candidate Rumors, and Vote Choice during the 2008 U.S. Presidential Election. *Int J Public Opin Res* 26(4):401–422. <https://doi.org/10.1093/ijpor/edu005>
- West EA, Iyengar S (2022) Partisanship as a Social Identity: Implications for Polarization. *Political Behav* 44(2):807–838. <https://doi.org/10.1007/s11109-020-09637-y>
- Westen D, Blagov PS, Harenski K, Kiltz C, Hamann S (2006) Neural Bases of Motivated Reasoning: An fMRI Study of Emotional Constraints on Partisan Political Judgment in the 2004 U.S. Presidential Election. *J Cogn Neurosci* 18(11):1947–1958. <https://doi.org/10.1162/jocn.2006.18.11.1947>
- Westwood SJ, Peterson E, Lelkes Y (2019) Are there Still Limits on Partisan Prejudice? *Public Opin Q* 83(3):584–597. <https://doi.org/10.1093/poq/nfz034>
- Westwood SJ, Grimmer J, Tyler M, Nall C (2022) Current research overstates American support for political violence. *Proc Natl Acad Sci* 119(12):e2116870119. <https://doi.org/10.1073/pnas.2116870119>
- Zoizner A, Shenhav SR, Fogel-Dror Y, Sheaffer T (2021) Strategy News Is Good News: How Journalistic Coverage of Politics Reduces Affective Polarization. *Political Commun* 38(5):604–623. <https://doi.org/10.1080/10584609.2020.1829762>

Author contributions

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The authors declare no competing interests.

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