**Does polarization increase participation? A systematic literature review and meta-analysis**

Supplementary materials

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Contents

[1. PRISMA diagram 2](#_Toc197540085)

[1.1. Reports excluded because of ineligibility 3](#_Toc197540086)

[2. Data structure 4](#_Toc197540087)

[3. Overview of articles 5](#_Toc197540088)

[4. Supplementary heterogeneity analysis 8](#_Toc197540089)

[5. References 9](#_Toc197540090)

[6. Meta-analyzed articles 9](#_Toc197540091)

# PRISMA diagram

**Identification of studies**

Records removed before screening:

Duplicate records removed (n = 464)

Records identified from:

Scopus (n = 731)

Web of Science (n = 820)

**Identification**

Records screened

(n = 1087)

Records excluded (n = 999)

Reports not retrieved (n = 1)

Reports sought for retrieval

(n = 88)

**Screening**

Reports excluded because of ineligibility (n = 63)

Not in English (n = 1)

No quantitative analysis (n = 10)

Not general population (n = 3)

Does not examine the effect of interest (n = 48)

Errors detected in the data (n = 1)

Reports assessed for eligibility

(n = 87)

**Studies included in review: 25**

From database search (n = 24)

From reference search (n = 1)

**Included**

Reference search (n = 1)

Figure A1. PRISMA flow diagram.

##  Reports excluded because of ineligibility

Studies (n = 63):

* did not examine the effect of interest as their main goal (n = 48); this category includes studies that claimed to be measuring polarization but in fact measured partisanship, extremism, or included separate measures of in-party likes and out-party dislikes instead of a single polarization measure (e.g. Bankert, 2021; Serani, 2022), did not predict participation (but, e.g., political interest, Miller et al., 2023), and where the analysis of the effect of polarization on participation was not the main goal of the study (i.e., not reflected in one of the hypotheses), when the model predicting participation with polarization was an interim step to a different target analysis (e.g. Phillips, 2004), or when all models included an interaction between polarization and another variable (e.g., Moral, 2017),
* did not include a quantitative analysis (n = 10),
* did not include an analysis of the general population (but e.g. analyzed samples of social media users; n = 3),
* the full text was not in English (n = 1), or the analysis contained a data error (n = 1).

# Data structure

The data have a multilevel structure with coefficients nested in models, studies, and articles. Characteristics on the level of articles (n=25) include author names, the DOI, article title, journal name, year of publication, and the presence of an on-line supplement and replication materials. For 15 articles some type of additional online materials are available. Replication materials are available for seven papers.

The 25 articles include 32 studies, where a study is defined as one or more models based on the same data source. 21 articles include one study each, and of the remaining four articles two have two studies each, one has three study, and one has four. The characteristic at the study-level is the name of the data source and geographical scope.

Each study may present one or more models, i.e. a set of coefficients from one statistical analysis. Characteristics of models include the type of model, the number of observations, as well as the number of control variables. For some analyses this information is not easily retrievable, if either the numbers of observations or the full list of control variables are not provided in the regression tables. Sometimes the article document only includes a box-and-whiskers plot for the effects of interest, while regression tables are provided in appendices. An additional complicating factor with regard to the number of control variable is that the so called fixed effects for geographical units or time are routinely omitted from regression tables and their number is not always reported.

The selection of models for the meta-analysis requires some explanation. Increasingly, studies report multiple models to demonstrate the robustness of findings to model specification. A common strategy is also to present several models adding control variables in a step-wise fashion. Some meta-analyses take coefficients from models that have the largest set of control variables, arguing that the provide the most conservative estimates (e.g., Scheiring et al., 2024). We believe the problem is more complicated than that: without knowing the theoretical model, it is not at all clear if models with the greatest number of control variables are best at identifying the effect of interest. This, in addition to the fact that authors rarely justify their choice of control variables (cf. Kohler et al., 2024), makes selecting the best regression model a non-trivial task. Hence, for this meta-analysis, we selected coefficients from all analyses presented in the main article text that estimate the effect of polarization on participation, while omitting analyses presented only in supplements.

Finally, each model may include one or more estimates that pertain to the effect of polarization. In most cases there is just one estimate of interest per model, but occasionally authors test the effects of one aspect of polarization net of another aspect of polarization. The characteristic of the estimate is the reported information from among the following: coefficient value, odds ratio, standard error, t-statistic, p-value, confidence interval for the coefficient or the odds ratio. In most cases the articles provide enough information to calculate the remaining pieces, although sometimes the precision is low (e.g. rounding to two decimal points, where the standard error may have the value “0.00”, or providing significance levels with asterisks only.

# Overview of articles

Table A1. Overview of articles.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Article ID | Geo | Data | Polarization type | Polarization level | Participation type | Summary of results\* |
| Rossteutscher & Stövsand 2024 | Cross-national | Repeated cross-sectional survey (CSES) | ideological | both | electoral | “party-system polarization, and the sharp conflicts associated with it, depresses turnout because many citizens are put off by extreme party positions and unrewarding polemics (…) . By contrast, the individual perception of differences between parties increases turnout because more citizens can find a party that is close to their own position and identify others as being further away” |
| Ellger 2023 | Cross-national, Germany | Country panel (CSES and country-level), repeated cross-sectional survey (local elections database) | ideological | both | both | “Spatial polarization of parties diversifies electoral options at the ballot, while affective polarization mobilizes based on emotional considerations” |
| Lee, Choi, & Ahn 2023 | South Korea | Panel survey | affective | individual | non-electoral | “affective polarization stimulates political participation rather than the reverse path” |
| Ahn & Mutz 2023 | USA | Repeated cross-sectional survey (ANES), panel survey | affective | individual | electoral | “polarized judgments are related to pre-election intent to vote, as well as to post-election self-reported voter turnout (…) polarization in evaluations of both parties and candidates includes an expressive component that does not necessarily translate into political action” |
| Harteveld & Wagner 2023 | Germany, Spain, Netherlands | Repeated cross-sectional survey (Politbarometer), panel survey (E-DEM, LISS) | affective and ideological | both | both | Affective polarization has a positive effect on turnout even after accounting for reverse causality and for the confounding impact of positive partisanship and ideological polarization. |
| Bettarelli, Close, & van Haute 2022 | Belgium | Cross-sectional pre-election survey | affective | individual | non-electoral | “affective polarization is a key driver of protest behavior”Mechanism: emotions. |
| Romero & Romero 2021 | USA | 18 US elections, country-level | ideological | system | electoral | Polarization increases negative advertising, which increases turnout.  |
| Simas & Ozer 2021 | USA | Repeated cross-sectional survey (CCES) | ideological | both | both | “results suggest that rather than demobilizing potential voters, polarization is instead motivating individuals by clarifying which candidate they do not want” |
| Wagner 2021 | Cross-national | Repeated cross-sectional survey (CSES) | affective | individual | both | “affective polarization is consistently associated with a higher likelihood of turning out to vote and with greater participation in politics” |
| Muñoz & Meguid 2021 | France | Repeated cross-sectional survey (CSES) | ideological | individual | electoral | “party polarization leads to higher participation when the voter is close to one party and far from another” |
| Béjar, Moraes, & López-Cariboni 2020 | Cross-national | Country panel (IDEA, PELA) | ideological | system | electoral | “strong statistical support for the elite polarization-turnout hypothesis”Mechanism: polarizing policy proposals. |
| Kleiner 2020 | Cross-national | Repeated cross-sectional survey (ESS) | ideological | system | both | Regional ideological polarization predicts higher non-electoral participation, while there is no such effect on voting.Mechanism: relative deprivation; ideological polarization threatens individuals’ normative notions. |
| Enders & Armaly 2019 | USA | Repeated cross-sectional survey (ANES) | ideological | individual | both | “perceived polarization is more strongly relatedto negative affective evaluations of out-parties and out-party candidates, voting, participation, trust, and efficacy than is actual polarization, which shares much weaker relationships with these constructs” |
| Hobolt & Hoerner 2020 | Cross-national, Germany | Repeated cross-sectional survey (CSES, election surveys) | ideological | both | both | Perceived ideological party polarization is associated with higher reported turnout. |
| Ward & Tavits 2019 | Cross-national | Repeated cross-sectional survey (CSES) | affective | individual | electoral | Affective polarization is positively associated with a greater perceived importance of voting and election result, and hence in a higher probability of turning out.Mechanism: Social identity theory. |
| Kleiner 2018 | Cross-national | Repeated cross-sectional survey (ESS) | ideological | system | non-electoral | Polarization in attitudes about homosexuality and about economic inequality increase the probability of protest participation, but polarization in attitudes about immigration do not. Mechanism: relative deprivation; ideological polarization threatens individuals’ normative notions. |
| Wang & Shen 2018 | Hong-Kong | Cross-sectional survey (online post-election survey) | ideological | individual | mix | Perceived ideological party polarization positively predicts political knowledge and internal efficacy, which positively predict turnout. |
| Wilford 2017 | Cross-national | Country panel (IDEA, CMP) | ideological | system | electoral | “Highly polarized systems (…) spur individuals to vote”Mechanism: spatial argument and opinion expression |
| Rogowski 2014 | USA | Repeated cross-sectional survey (CPS), cross-sectional survey (CCES) | ideological | system | electoral | “The results indicate that rather than stimulate political participation, increasing policy differences between candidates significantly reduce voter turnout.” |
| Steiner & Martin 2012 | Cross-national | Country panel (CMP, election turnout) | ideological | system | electoral | System-level ideological polarization is positively associated with turnout.Mechanism: spatial argument and opinion expression |
| Dodson 2010 | USA | Repeated cross-sectional survey (ANES) | mix | individual | electoral | Individual perceptions of polarization are positively associated with reported turnout.Mechanism: spatial argument. |
| Dalton 2008 | Cross-national | Across countries (CSES) | ideological | system | electoral | The argument is that countries with higher polarization see higher turnout, but the empirical analysis does not support this claim.Mechanism: spatial voting argument. |
| Abramowitz & Saunders 2008 | USA | Cross-sectional survey (ANES) | affective | individual | both | “polarization energizes the electorate and stimulates political participation”. Higher affective polarization is positively associated with reported turnout.Mechanism: elite polarization increases mass polarization, which increases turnout. |
| Abramowitz & Stone 2006 | USA | Cross-sectional survey (ANES) | affective | individual | both | Higher affective polarization is positively associated with reported turnout.Mechanism: elite polarization increases mass polarization, which increases turnout. |
| Crepaz 1990 | Cross-national | Across countries (turnout, polarization) | ideological | system | electoral | “countries with a high party polarization have significantly higher turnout rates than countries with a rather narrow political spectrum”Mechanism: opportunities for political expression. |

Data: Country panel = country-year level data; Across countries = country-level data.

Polarization type: “mix” refers to an index of perceptions of polarization that includes items referring to ideological and affective polarization.

Participation type: “both” indicates separate analyses explaining electoral and non-electoral participation in the same paper; “mix” indicates that the dependent variable combined electoral and non-electoral participation.

ANES = American National Election Survey; CCES = Cooperative Congressional Election Study; CMP = Comparative Manifesto Project; CPS = Current Population Survey; CSES = Comparative Study of Electoral Systems; E-DEM = Torcal et al. (2020); ESS = European Social Survey; IDEA = International Institute for Democracy and Electoral Assistance; LISS = Longitudinal Internet Studies for the Social Sciences; PELA = Programa de Elites Parlamentarias de América Latina.

\* Summary of results: Excerpts in quotes come from the respective papers.

# Supplementary heterogeneity analysis

Table A2. Results of supplementary heterogeneity analysis among studies of individual-level affective polarization, between studies that use panel survey data and those that use cross-sectional survey data.

|  |  |
| --- | --- |
| Coefficient | Model A1 |
| Constant | 0.044\*\*\* |
|  | (0.001) |
| SE(ri)2 | 24.859 |
|  | (15.983) |
| Panel studies | 0.027 |
|  | (0.062) |
| Adjusted R2 | 0.023 |

+p<0.1; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001. N = 38.

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