

## **Polarization in Comparative Perspective: Concept, Definition, and Measurement**

“The failure to explain is caused by a failure to describe.”  
– Benoit Mandelbrot<sup>1</sup>

“Once we describe the phenomenon we are interested in with precision, we come close to explaining it correctly.”  
– Ernest Gellner<sup>2</sup>

Due to its status as perhaps the most persistent and consequential case to date, political polarization in the United States has not suffered from lack of scholastic attention (Fiorina and Abrams 2008; M. J. Hetherington 2009; Lauka, McCoy, and Firat 2018; Lelkes 2016). A smaller, though not insignificant, number of studies have investigated polarization throughout Europe (Church and Vatter 2016; Evans and Need 2002; Freire 2008; Hazan 1995; Lachat 2008; Moral 2017; Picot 2012) and, more recently, the literature has branched out from its roots in industrially developed, consolidated democracies and begun to acknowledge the importance of polarization in Latin America (Alcántara and Rivas 2007; Bornschieer 2019; Brown, Touchton, and Whitford 2011; De Luca and Malamud 2010; Mallen and García-Guadilla 2017).

While much of the United States literature has been dedicated to the debate over whether or in what forms polarization actually exists, the numerous potential consequences of polarization have not been ignored. For example, some scholars have suggested that political polarization may have a significant impact on government accountability à la Key (1966) and Fiorina (1981). Lupu (2015) and Singer (2016) have argued that polarization strengthens party brands and therefore gives voters a clearer, more accurate choice at the polls. On the obverse side of the same coin, a large number of authors have presented a rather pessimistic picture of comparative polarization, arguing that it often results in democratic backsliding and legislative

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<sup>1</sup> (Hagstrom 2013, 90)

<sup>2</sup> (Gellner 2008, 133)

instability (Enyedi 2016; McCoy, Rahman, and Somer 2018; McCoy and Somer 2019; Palonen 2009; Somer and McCoy 2019; Stavrakakis 2018), the latter of which is echoed by multiple scholars of American politics (Binder 2017; Fiorina 2017; Krehbiel 2008; Mann and Ornstein 2006; Sinclair 2008). In other areas, scholars actively debate how polarization interacts with some of the most important issues in contemporary comparative politics, such as inequality (Bonica et al. 2015; Ellner and Hellinger 2003; J.-M. Esteban and Ray 1994; Iversen and Soskice 2015; Keefer and Knack 2002; McCarty, Poole, and Rosenthal 2006), party system institutionalization (Handlin 2017; Lindqvist and Östling 2010; Lupu 2016; Mainwaring 2018; Rahman 2019), and voting behavior (Carlin, Singer, and Zechmeister 2015; Crepaz 1990; Lachat 2008).

In sum, political polarization is a highly salient phenomenon with numerous causes and effects and rapidly expanding geographical reach. As is the case for any concept with such diverse consequences and applications, the academic literature on polarization should strive for conceptual clarity and uniformity. Unfortunately, such clarity and uniformity do not yet exist. I argue that the current literature – both within the United States and in comparative perspective – has been hampered by its inability to advance a clear, comprehensive definition of political polarization. Further, I suggest that much of the disagreement surrounding the identification, causes, and consequences of polarization stems from a lack of reliable, widely employed measurement techniques. Indeed, in their struggle to navigate this conceptual morass, authors frequently allow their chosen measurement – of which there are many – to simply become their definition, further entangling the causal chain and precluding agreement across studies.

I divide this paper into three main sections. In the first, I identify five primary categories into which definitions of polarization fall, as well as ways in which authors agree and disagree

with one another both within and across definitional categories, capped by a critique of each definition. Then, I highlight the diverse range of measurement strategies used in the literature. Given the lack of a cogent, cohesive definition, I argue that the current menu of measurement strategies does not accurately capture political polarization in any comprehensive sense and may even raise issues of endogeneity and auto-correlation in some studies. Finally, I offer a path forward by advancing a thorough definition and measurement of polarization. By utilizing an individual-level psychometric approach that can then be expanded to include country-level structural elements, I attempt to untangle the causal chain by circumventing any overtly political content in my measurement, thereby assuaging fears of endogeneity. I close with a brief discussion of the measure's benefits for a wide range of potential applications.

### **Conceptions and Definitions of Polarization**

I divide the political polarization literature into five main types: issue polarization, elite polarization, geographic polarization, partisan-ideological polarization, and affective polarization. While each necessarily overlaps with the others and includes additional debates amongst scholars using each definition, I identify these as the highest-order distinctions and treat each in turn.

#### **Issue Polarization**

Perhaps the most accessible entrée into the conceptual quagmire of polarization studies is issue polarization. Simply put, scholars working with this concept view polarization in terms of specific issue or policy preferences. As issue attitudes move closer to the ideological extremes or voters' issue attitudes become increasingly correlated with demographic variables such as geography or religion (A. I. Abramowitz and Saunders 2008; A. Abramowitz and McCoy 2019), scholars consider the electorate more polarized on that issue.

In a seminal study, DiMaggio et al. (1996) analyze numerous issue attitudes and demographic variables before concluding that actual polarization among the masses pales in comparison to perceived polarization, occurring only on the basis of party and attitudes toward abortion. Baldassarri and Bearman (2007) concur with this finding, arguing that the masses only appear polarized because they care strongly about particular, context-specific “takeoff issues” for a short period of time. Due to the homophilic nature of social and political interactions, individuals become less likely to be exposed to differing issue attitudes as their own attitudes increase in extremity, further exacerbating the extent of perceived polarization. Because authors working with this definition typically analyze individual issues, their analysis is often unidimensional and assumes voters know their ideology and report it accurately, which may not be a reasonable assumption (Kinder and Kalmoe 2017). Nevertheless, several authors take this approach when operationalizing polarization in an American (Gooch 2009; M. S. Levendusky 2013; Wood and Jordan 2017) or comparative context (Curini and Hino 2012; Ruiz-Rodríguez 2005).

While a loss of centrist issue positions is a logical outcome of polarization, the unidimensional nature of this definition limits the extent to which it can capture and parse out the influence of multiple actors or other independent variables. It raises further issues in measurement; DiMaggio et al. find that issue attitudes ebb and flow with election cycles, making them an inconsistent and unreliable measure of the true level of polarization. In a practical sense, dealing with myriad issue attitude distributions separately is cumbersome and indexing all issue attitudes to create an overall measure for each individual may disguise any polarization in the aggregate, as individuals’ general inability to know “what goes with what” (Converse 1964) is likely to cause regression to the mean when a sufficiently high number of issue attitudes are

combined. Perhaps it is exactly this pitfall that has contributed to some authors' assertions that polarization exists only among political elites.

### **Elite Polarization**

A small but influential group of scholars ignores mass publics entirely in their definition of polarization, focusing only on elites and considering polarization to increase as elected officials' and party leaders' ideological positions and issue attitudes diverge or become more extreme. Most notably, Fiorina (2011; Fiorina and Abrams 2008) has used a wealth of data from the American National Election Survey (ANES) to argue that polarization on issues and ideology occurs only at the elite level and is only passed down to the masses in the form of partisan sorting, a process by which voters take an increasingly clear signal from political elites and change their ideology to match their partisan identity (Druckman, Peterson, and Slothuus 2013; M. Levendusky 2009) in a model similar to that proposed by Zaller (1992). Tworzecki (2019) offers a similar view in the case of Poland. In Latin America, Singer (2016) goes so far as to take elite ideological polarization as a proxy for mass polarization on the basis that elites determine the programmatic options on offer, effectively constricting the range of possible voter preferences to those dictated by elites. Similar to Baldassarri and Bearman, Bruhn and Greene (2007) focus on Mexico and argue that elites' perception of polarization among themselves is much greater than the actual polarization due to associational homophily, and Vegetti (2019) comes to a similar conclusion in Hungary. Scholars of elite polarization thus often borrow from other conceptualizations of polarization, namely, that of issue polarization.

However, these two definitions are not entirely compatible because they offer fundamentally different definitions of polarization and thus do not agree on how and where it should manifest. Nowhere is this more evident than Abramowitz and Saunders' (2008) arrival at

conclusions diametrically opposed to Fiorina's using the same ANES data. It is asinine in this case to debate which explanation is correct; they are incomparable because they utilize fundamentally different definitions of polarization and therefore present different conclusions, the truth values of which are mutually exclusive. Of course, this also precludes the use of these definitions for the analysis of polarization's causal relationships with any other variables; it is difficult to advance a field of study when its interlocutors talk past each other rather than with each other.

Additionally, the concept of elite polarization captures only a portion of the full story. It is true that elites hold significant influence in any political system, but it is the mass public – the vast majority of citizens – who ultimately consume and propagate media, make programmatic demands, and define the political dimensions of democracies when they go to the polls. Even giving scholars of elite polarization the benefit of the doubt by conceding that the masses are not polarized, the point remains that the masses still perceive themselves to be polarized (Lelkes 2016). To theoretically resolve this paradox, I evaluate the elite polarization definition at its extremes, with either an agentic or non-agentic view of mass publics. In the agentic view, elite polarization theories would suggest that citizens actively alter their ideological orientations in order to resemble party elites but also actively decide to not allow their interpersonal or voting behaviors to be affected by the perceptions of polarization both contributing to and resulting from those very ideological shifts. In the non-agentic view, elite polarization theories would suggest that citizens are merely passive receivers of political signals and information sent by elites. After registering those signals and observing that other people are receiving different signals, citizens disregard any influence of interpersonal interactions and make political decisions based only on what elites dictate. These are not compelling theses. Indeed, as I

demonstrate below, most of the work from scholars using definitions of affective polarization directly contradict both of these propositions. Citizens are not Pavlovian machines that parrot back information when prompted; interpersonal interactions, media consumption, life experiences, and personality characteristics all affect how an individual approaches politics and makes their voice heard via democratic or contentious means. Elites play an important role, but scholars of polarization ignore the masses at their own peril.

### **Geographic Polarization**

A possible contributor to elite polarization is geographic polarization, wherein scholars assert that the increasingly high correlation between political preferences and location of residence is the clearest and most operationalizable manifestation of polarization. This geographic polarization may be motivated by urban-rural disparities (Kongkirati 2019; McAllister 2007; Nall 2015), the construction of geographically bound social groups (Bishop 2008; Motyl 2016), or varying levels of subnational party penetration (Klesner 2007; Stonecash, Brewer, and Mariani 2003). Autor et al. (2016) have linked the increasingly extreme views of House of Representatives districts in the United States with relative exposure to import competition and rising international trade. In a similar vein, Sussell and Thomson (2015) show that increasing geographic polarization has led to increasing polarization in the House of Representatives. Taking these two studies together, it appears that House members are not only becoming more ideologically extreme on average, but that the average distance between any two members has also widened. Scholars of geographic polarization attribute this to increasing levels of political uniformity within communities.

A key question for this literature, and for the political geography literature more broadly, is whether geographic polarization is caused by citizens self-selecting into communities based on

political homophily (compositional effects) or geography actually acting on citizens' political attitudes (contextual effects). Multiple authors have argued rather convincingly for the preeminence of compositional effects (M. Hetherington and Weiler 2018; Maxwell forthcoming), but Enos (2014, 2016, 2017) has presented a large body of evidence that geographic space itself operates on subconscious perceptions and political attitudes, although he primarily investigates issues of race and does not address polarization directly. In broader terms, it is unclear whether geographic polarization is a cause or an effect (or both) of individuals' political preferences. Regardless, although a few scholars disagree (Mummolo and Nall 2017), geographic polarization appears to be linked to partisan-ideological polarization, to which I turn next.

### **Partisan-Ideological Polarization**

It is by now a near-truism to say that “political parties created democracy and that modern democracy is unthinkable save in terms of the parties” (Schattschneider 1942, 1). Certainly, there is some level of justification for applying this logic to political polarization as well; such is the argument of scholars advocating for a partisan-ideological definition of polarization. As this definition arguably structures the entire polarization literature, I provide an overview of the concept in its broadest form before highlighting three debates within this sub-literature: differential effects on the politically engaged versus the politically unengaged, the influence of social cleavages and the extent to which they can be represented on one dimension, and the positive and negative effects of polarization.

Proponents of a partisan-ideological definition of polarization take as their point of departure the idea that parties have unique ideological dispositions, adopt issue positions in line with their ideological orientation, and act as a cohesive unit in the promulgation of those issue



positions. As parties' ideological orientation gradually shifts over time, so should their issue positions and ideological composition of their members. When parties' ideological orientations both diverge from one another and cluster more tightly within the parties, partisan-ideological polarization occurs (A. I. Abramowitz 2010; Bafumi and Herron 2010; Baumer and Gold 2010; Handlin 2017). Polarization is thus considered to be a function of ideological distance between two parties (A. I. Abramowitz 2013; Jones 2015; Rehm and Reilly 2010). Scholars disagree, however, on the effect of multi-party systems on polarization (Crepaz 1990; Dalton 2008; Dalton and Tanaka 2007; Hazan 1995; Sigelman and Yough 1978) and on what level of party membership drives these changes in ideology and thus is the proper unit of measurement. This debate largely mirrors that of elite or mass polarization; some believe that because parties ultimately structure the masses, polarization is a phenomenon of the average party voter (Ezrow, Tavits, and Homola 2014; M. J. Hetherington, Long, and Rudolph 2016; M. S. Levendusky and Malhotra 2016) while others believe, in line with Zaller (1992), that the masses merely take cues from the elites and that polarization is therefore best understood as ideological distance between party elites, often operationalized through roll call voting or similar manifestations of official party positions (Handlin 2018; Layman and Carsey 2002; Thomsen 2014).

Disagreements within this sub-literature also arise on the question of the role political engagement plays in exacerbating or tempering polarization. Abramowitz (2010) argues that partisan-ideological polarization is greatest among the politically engaged. Note that this does not necessarily mean party elites; the variation with which scholars are concerned in this debate primarily occurs in the masses. Abramowitz also notes that polarization itself can actually increase political engagement by clarifying choices and increasing stakes in elections, a view corroborated by Klar and Krupnikov (2016). However, other scholars offer evidence that might

be cause for caution. In their comprehensive treatise on American political ideology, Ellis and Stimson (2012) demonstrate a disconnect between ideological self-identification and observed political behavior. Observing a sizable group of voters who are fiscally or culturally liberal but nevertheless identify as conservative, they posit that a large subset of Americans are conservative in lifestyle and that, in the absence of high political engagement, this lifestyle gets blindly translated in political conservatism regardless of individual policy preferences. As this effect is particularly high for the politically unengaged, the level of polarization captured by studies such as Abramowitz's may be inflated, as the politically unengaged self-identify their ideology with a high degree of error and thus exaggerate the extent of ideological polarization. Hetherington and Weiler (2009) note that the masses are polarizing in vote choice and party perception but not issue positions, corroborating the findings of Ellis and Stimson and lending further credence to the belief that citizens largely do not have coherent ideologies (Kinder and Kalmoe 2017). While these findings are important for positing the existence of a more affective, identity-based approach to polarization (see below), they are not consistent with a partisan-ideological approach.

Although partisan-ideological definitions of polarization attempt to collapse multiple societal dimensions into a single cleavage, scholars disagree on the extent to which this is reasonable. This debate is perhaps best embodied by the concept of conflict extension proffered by Layman, Carsey, and their coauthors (Layman and Carsey 2002; Layman et al. 2010; Layman, Carsey, and Horowitz 2006). They assert that public opinion remains distinct on separate issue dimensions, but that elite polarization causes the masses to perceive the parties as consistently liberal or conservative (Davis and Dunaway 2016; Prior 2013; Saeki 2016). The masses thus bring their own opinions in line according to the cues they take from elites and elite

polarization on one issue may subsequently cause perceived polarization on many other issues. Polarization, in this view, is not occurring in a uni-dimensional framework, but it is nevertheless being perceived that way. Baldassarri and her coauthors seem to echo this view; consistent with their idea of “takeoff issues” (Baldassarri and Bearman 2007), they argue that polarization can occur either by extreme partisanship on one issue or moderate partisanship on many issues, but that only the former is found in the United States (Baldassarri and Gelman 2008; M. J. Hetherington and Weiler 2015). In comparative perspective, however, authors have disagreed with this view. Chakravarty (2015) offers a definition and measure of social polarization that incorporates numerous dimensions. Arugay and Slater (2019; Slater and Arugay 2018) reject the view that polarization depends on social cleavages, but nevertheless conceptualize it with multiple dimensions of democratic accountability, similar to O’Donnell’s formulation of democracy (2001; Power 2014; Vargas Cullell 2014). In Greece, Andreadis and Stavrakakis (2019) evaluate party polarization on multiple issues within the context of economic crisis. It is on this debate in particular that a comparative evaluation of polarization may be beneficial in determining the extent to which party systems polarize on multiple dimensions or whether those dimensions can be collapsed into a single cleavage.

The final debate I highlight within the partisan-ideological polarization literature is that of the positive and negative effects of polarization. With respect to elections themselves, several comparative scholars argue that polarization increases turnout and general political engagement by increasing the stakes of elections and clarifying party positions (Crepaz 1990; Lupu 2015; Moral 2017; Smidt 2017), although Lachat (2011) argues that electoral competitiveness actually decreases the salience of party identification. Following elections, scholars writing on both American and comparative cases argue that elected officials are actually best able to represent

their constituents in a context of polarization (Ahler and Broockman 2018; Bornschieer 2019). Other scholars posit additional positive consequences; LeBas (2018) argues that, under the right conditions, polarization can allow officeholders to build stronger mobilization networks and thus contribute to institutional consolidation in new democracies while Brown, Touchton, and Whitford (2011) believe polarization increases popular perceptions of corruption and thus leads democracies to implement additional anti-corruption measures to check their opponents' power. Other scholars directly refute this rosy view of polarization in young democracies, however. Klar and Krupnikov (2016) link polarization to an increase in contentious politics; as partisan-ideological polarization reaches a high level, parties gradually begin to represent only the views of the most extreme members of their parties. This causes increasing party defection among voters closer to the center, leading to party system decay and increased social mobilization in the absence of formal channels for political expression. This mirrors events in Venezuela surrounding Chávez's rise to power (García-Guadilla 2003; Roberts 2003). Relatedly, Somer and McCoy (2018; Somer 2019) highlight a voluminous literature linking polarization to democratic backsliding.

Numerous sub-literature debates aside, the take-home point is this: Even when using the same definition and conceptualization, scholars of partisan-ideological polarization do not agree on basic aspects of polarization and its relation to possible consequences. I argue that this is partially due to the conceptual inadequacy of the definition and measurement strategy; partisan-ideological polarization can be considered either a cause or an effect and it is presently being measured as both, making causal inference extremely difficult. As Lee (2009) and Theriault (2015) note, roll call voting – the theoretical manifestation of partisan-ideological polarization – is inherently fraught with measurement error, as roll call voting decisions are more frequently the

result of key strategy decisions than they are a natural representation of politicians' true ideology. As already noted, individuals at the level of the masses rarely have coherent ideologies and, even to the extent that those ideologies can be measured directly or approximated with issue positions, those measurements are mediated by party identification (Campbell et al. 1960; M. Levendusky 2009), are typically inconclusive, and are highly sensitive to contexts such as election cycles (DiMaggio, Evans, and Bryson 1996; Lachat 2008). On the spectrum of feasibility, this puts the measurement of mass programmatic polarization somewhere between "highly error-prone" and "nearly pointless."

Further, the partisan-ideological definition of polarization partly rests on the assumption that elites and voters alike view politics through a rational lens and make decisions in line with spatial theories of voting (Curini and Hino 2012; Downs 1957; Key 1966; Rabinowitz and Macdonald 1989). A particularly egregious example of this is found in Lindqvist and Östling's (2010; Azzimonti and Talbert 2014; Grechyna 2016) attempt to connect polarization to government spending. They rely heavily on Meltzer and Richard's (1981) model of redistribution, which assumes that citizens develop informed policy positions, vote according to their position on the income distribution, and thus directly dictate the marginal tax rates enacted by elected officials. Huber and Stephens (2012) deliver a cogent rebuke of this ahistorical, asociological view of politics. While I concede that economic calculations are part of all political dynamics, I must flatly state that I believe the Meltzer-Richard model and its theoretical offshoots to be empirically indefensible. Politics does not occur in a vacuum; political rhetoric aims to incite emotion and even the ideologically innocent masses have strong moral attachments to certain ideas and convictions (Graham, Haidt, and Nosek 2009; Haidt 2012; Ryan 2017), regardless of whether those convictions are ideologically coherent. Absent emotional rhetoric,

partisan-ideological polarization is little more than people disagreeing on programmatic issues, a feature hardly unique to polarized political systems. It is this affective element that provides the final piece necessary for what McCoy and Somer (2019) describe as “pernicious polarization,” and it is the element to which I turn for the final definition of polarization.

### **Affective Polarization**

Political disagreement is not always benign; it often boils over into interpersonal hostilities, whether that be in relatively harmless manifestations such as a breach in legislative decorum or more harmful ones such as outright conflict. Ideological divergence does not always strike an emotional chord among the masses, but when societal cleavages align to produce a toxic social environment divided along political lines, that society is affectively polarized (Iyengar et al. 2019; M. S. Levendusky 2018; Mason 2016; Roberts 2003; Rogowski and Sutherland 2016). In such a society, an attack on one’s politics is an attack on one’s identity, which has direct consequences for the emotional lens through which one approaches politics. Put simply, affective polarization is not merely a function of political disagreement; it is a function of how one feels toward those with whom they disagree. In line with social identity theory (Brewer 2001; Efferson, Lalive, and Fehr 2008; Huddy 2001; Tajfel and Turner 1979), this affective dimension of politics often becomes increasingly pernicious in societies that are more fragmented along racial, ethnic, or religious lines (Brady and Han 2006; J. Esteban and Ray 2008; Evans and Need 2002; Southall 2019). Critically, Iyengar, Sood, and Lelkes (2012) found that the relationship between affective polarization and policy issues is inconsistent, suggesting that affective polarization is not merely an extension of issue or partisan-ideological polarization but rather a separate (yet related) feature of social distance.

Mallen and García-Guadilla (2017; García-Guadilla and Mallen 2019) give an excellent example of affective polarization in the Venezuelan case. After spending much of the twentieth century as the wealthiest and most democratic country in Latin America, Venezuela slipped into severe polarization following the collapse of import-substitution industrialization in the late 1980s and early 1990s (Ellner 2003). While economic inequality exacerbated an already tenuous political climate, Mallen and García-Guadilla contend that democracy was the cleavage around which the Venezuelan polarization was structured. Divergent social groups gradually adopted conflicting views of democracy, which Mallen and García-Guadilla term “representative” and “participatory-protagonist,” similar to the contrast drawn by Mutz (2006) in the United States. Much like the dynamic documented by Hetherington and Weiler (2018), that cleavage became translated over time into the social sector (Lozada 2014; McCoy and Diez 2011). Everyday choices such as the food one chose to eat, where one chose to shop, or the movies one chose to see became laden with political meaning. As social and political dynamics became inextricably linked, all social interactions came to be viewed through the lens of political antagonism and a loss in the political sphere came to represent a loss of one’s way of life. Citizens therefore no longer disagreed with their political adversaries; they despised, on a moral basis, their adversaries’ lifestyle and worldview. This is the essence of affective polarization.

Several scholars document a similar spillover effect, wherein political divides manifest in the apolitical realm. Settle (2018) meticulously documents this spillover effect on social media. She also notes that the socially removed nature of social media may allow this effect to be exacerbated. Engelhardt and Utych (forthcoming) demonstrate that the affective spillover from politics distorts in-person social interactions and Iyengar and Westwood (2015) show that this discriminatory attitude toward the political outgroup is not only activated by apolitical cues, but

also that it is stronger than that toward the racial outgroup. McConnell et al. (2018) extend this finding to business settings, finding that fully three-quarters of partisans will willingly forego additional income in order to avoid making a small donation to the opposite political party and that participants in both labor and commodity markets will sacrifice an opportunity for income to avoid doing business with a member of the opposite party. Affective polarization is not an inconsequential curiosity constrained to the minds of only the most extreme partisans. It has direct consequences in the apolitical arena, which may engage in a positive feedback loop with polarization itself. This literature also demonstrates the crucial importance of affect in any theory of polarization; polarization itself is important, but how citizens perceive that polarization also matters for how they respond to it (Baker 2013). Curiously, for all the focus on polarization from a behavioral perspective, scholars have made little attempt to measure polarization at the individual level in such a way that it might incorporate this affective component and allow for application in behavioral studies. Before suggesting that a psychometric measurement strategy might achieve just that, I review the range of measurement strategies currently on offer in the polarization literature.

### **Measurements of Polarization**

I divide this review of measurement strategies into two parts: data and measures. I distinguish the two in order to highlight the benefits and drawbacks of each, to emphasize the importance of selecting the right data to feed into the measure, and to showcase the fine line authors often toe between measuring a concept based on a definition and defining a concept based on a measure.

#### **Data**



I identify three broad classes of data from which scholars draw to measure polarization: political, social, and psychological. While there are certainly sub-classifications in each, my purpose here is to stress the pros and cons of each data generating process, so I keep my comments general for the sake of brevity.

### *Political Data*

The list of scholars turning to political data to measure polarization is nearly endless, and for good reason. It is the most sensical and most readily available data to examine in the analysis of a political phenomenon. However, I argue that scholars should approach this data with caution, as using it to both approximate polarization and estimate its relationship to other political variables (whether as a cause or an effect) can easily introduce issues of endogeneity. It also allows authors to become lazy in their theoretical analysis, as the definition of polarization quickly slips into congruence with whatever data are used to measure it.

The most common political data used to measure polarization are those describing ideology. In the United States, this manifests either as the masses' self-identified ideology in the American National Election Studies (ANES) (A. I. Abramowitz 2013; A. I. Abramowitz and Saunders 2008; M. J. Hetherington, Long, and Rudolph 2016; Lelkes 2016; M. S. Levendusky and Malhotra 2016) or the elites' or parties' inferred ideology via DW-NOMINATE scores (Autor et al. 2016; Bonica et al. 2015; M. J. Hetherington and Weiler 2009; Jones 2015; McCarty, Poole, and Rosenthal 2006; Saeki 2016). I have already noted why roll call voting is a problematic data source in this context (Lee 2009; Theriault 2015), but using individuals' self-identified ideology can also produce flawed results because individuals' ideology can track closely with policy preferences or other potential dependent variables. This places additional constraints on causal inference, as it becomes more difficult to know whether it is ideology or

polarization itself that is operating on whatever dependent variable is under scrutiny.

Additionally, reliance on only one survey item exacerbates the potential pitfalls that are omnipresent in survey research, such as social desirability and non-response biases.

Comparative scholars have generally focused on party systems and their relation to voters in their political measurements of polarization, employing data ranging from party ideologies (Alvarez and Nagler 2004; Andreadis and Stavrakakis 2019; Brown, Touchton, and Whitford 2011; Curini and Hino 2012; Dalton 2008; Handlin 2017; Klingemann 2005; Singer 2016) to individual-level policy preferences (Azzimonti and Talbert 2014; Bornschier 2019; Grechyna 2016; Lindqvist and Östling 2010) to the share of voters or parties occupying the ideological center (Hazan 1995; Iversen and Soskice 2015). To be clear: these may be areas in which polarization manifests, but they are effects, not causes. If we take polarization to be a treatment that has some effect on a dependent variable, considering an effect of the treatment as an approximation of the treatment itself skips over a key step in the causal chain and likely causes the dependent variable to be endogenous to the treatment. This problem is attenuated if we instead take polarization as the dependent variable, but that introduces additional issues of endogeneity when using any political phenomena as explanatory variables. Of course, none of this is a problem in studies concerned with relating polarization to non-political explanatory or dependent variables, but we are most often interested in the effects that polarization exacts upon the political realm. The point remains that any variable determined through transformations of other variables is necessarily autocorrelated with those variables, making even associative claims problematic.

*Social Data*

Dating back to Berelson, Lazarsfeld, and McPhee's (1954) classic treatise on voting and public opinion, scholars have found significant utility in treating political trends as the manifestation of social dynamics. By measuring how citizens relate to one another in political and even apolitical settings, scholars of both American and comparative polarization have documented the relationship between political polarization and interpersonal behavior (Ellner 2003; Engelhardt and Utych forthcoming; Freire 2008; Mason 2016, 2018; McConnell et al. 2018). Others have extended this approach to geographic polarization (Bishop 2008; Maxwell forthcoming; Motyl 2016; Sussell and Thomson 2015) and racial and ethnic cleavages (Evans and Need 2002; Wood and Jordan 2017). In one of their oft-cited formulations of polarization measures, Esteban and Ray (2008) consider polarization to be a function entirely of social antagonisms. The benefit of this approach is obvious; it is one step removed from the political expressions of polarization and thus avoids many of the endogeneity and survey bias effects discussed in the previous section. Nevertheless, I still contend that the social effects included in this type of measure are themselves effects of polarization. Their use as approximations of polarization itself thus continues to be problematic as it diminishes the ability of this type of measure to be used in estimating the effect of polarization on social variables or even certain types of policy preferences.

### *Psychological Data*

Psychological data should theoretically be one step further away from political trends than even social data, and many scholars find considerable efficacy in its use for just that reason. In a sense, psychological studies allow us to analyze the underlying causes of the social and political behavior measured by social data (Schwartz 1994; Webster 2018). In particular, several authors operationalize personal values as an approximation of polarization (Alcántara and Rivas

2007; Baker 2013; Bartels 2013; M. J. Hetherington and Weiler 2009; M. Hetherington and Weiler 2018) while others focus on the cognitive aspects of psychological polarization itself (Dalton 1984; Garcia 2019; Iyengar, Sood, and Lelkes 2012; Iyengar and Westwood 2015; Settle 2018) and still others argue that American politics is less polarized than it is perceived (Ahler 2014; Ahler and Sood 2018). Perhaps unsurprisingly, I consider the data generating process used in the psychological analysis of polarization to be more promising than both the political and social data strategies. It ameliorates a large number of endogeneity concerns, allows the independent measurement of treatments, and often avoids survey-induced biases when applied in an experimental research design. The question now is, “what type of psychological data is most effective?” In the final section of the paper, I argue for a psychometric approach grounded in moral foundations theory (Graham, Haidt, and Nosek 2009; Haidt 2012) and identify particular characteristics of polarization that a measurement strategy must capture. First, however, I review the measurement strategies currently on offer.

## **Measurements**

While the measurement strategies used in the polarization literature are numerous, most represent only small deviations from other measures of the same basic type. I divide them into five main categories, in order of increasing complexity: distribution, difference, variance, concentration, and bimodality. I treat each in turn and identify sub-types within each category.

### *Distribution*

Studies using distributional measurements of polarization are methodologically simple and typically rely solely on graphical representations and descriptive statistics. Often grounded in spatial theories of voting, many authors – including the notable debate between Abramowitz (2010; A. I. Abramowitz and Saunders 2008) and Fiorina (2011, 2017; Fiorina and Abrams

2008) – visually demonstrate polarization (or lack thereof) by showing the extent to which various ideological distributions overlap. This approach may also take the form of calculating ideal points given ideological distributions (Ahler and Broockman 2018; Bafumi and Herron 2010; Bruhn and Greene 2007) or tracking voting and attitude patterns across different parties (Autor et al. 2016; M. J. Hetherington, Long, and Rudolph 2016; Hooghe and Marks 2018; Klesner 2007; Sussell and Thomson 2015). As ideological distributions diverge or party coalitions become more homogenous, scholars using distributional measurements consider those societies to be polarizing. In experimental settings, this analysis manifests in simple difference-of-means tests (Iyengar and Westwood 2015). Distributional representations of polarization are excellent illustrations, but they involve little actual measurement by themselves and are necessarily imprecise. They must therefore be used in conjunction with additional strategies, most commonly measures of difference.

### *Difference*

Measures of difference are the most popular in the polarization literature, for obvious reasons: They render a measure of distance – a crucial component of polarization for scholars working with any of the myriad definitions enumerated above, they are simple, and they are universally applicable. Subtracting the ideological or policy positions of one party from another or of one individual from another, scholars say that polarization increases as the difference increases (Baldassarri and Gelman 2008; Baumer and Gold 2010; Beck et al. 2001; Keefer and Stasavage 2003). Some scholars weight this difference by the share of votes earned by each party in order to capture the relative size and influence of each party (Boxell, Gentzkow, and Shapiro 2017; Lupu 2015, 2016; Rehm and Reilly 2010). The major drawback to this tactic is that it can

only be conducted on one dimension at a time, leaving the researcher to decide which dimension or data source is most germane to the topic at hand.

More methodologically advanced researchers allow differences to occur on multiple issue dimensions by using the Euclidean distance (Baldassarri and Bearman 2007; Chakravarty 2015), but this may still only be calculated between two points at a time and does not allow for dimensions to interact with one another, only coexist. Additionally, as several scholars have pointed out, polarization is not merely an increase in distance between the extremes; it also implies some level of concentration around the emerging poles (Druckman, Peterson, and Slothuus 2013; Lachat 2011; Smidt 2017; Vegetti 2014). There can be a wide distance between the two most extreme parties in a given party system but, if voters are evenly dispersed throughout the policy space, that party system likely would not appear polarized. Measures of difference are fundamentally incapable of capturing this crucial dimension of polarization.

### *Variance*

The most common attempt to account for this variation within and around the poles is the use of variance among individuals or parties. On its face, this seems reasonable; a higher variance could indicate that voters are far away from each other and thus are polarized. This is the view taken by DiMaggio, Evans, and Bryson (1996) and Gooch (2009). Other scholars use standard deviation (Azzimonti and Talbert 2014; Grechyna 2016), which is a truly inexplicable measurement choice; Lindqvist and Östling (2010) even admit that it measures dispersion and that dispersion is not polarization. As with weighted difference, a larger number of scholars weight this variance (Hazan 1995; Lachat 2008; Sigelman and Yough 1978; Singer 2016; Vegetti 2019) or standard deviation (Handlin 2018; Rehm and Reilly 2010) by vote share or other proportional representations of the salience of an issue or the dominance of a party. The

most popular measure in this category and perhaps the most popular polarization measure in the comparative literature overall is that of Dalton (2008; Curini and Hino 2012; Dalton and Tanaka 2007; Singer 2016), who takes this exact approach to weighted variance of party ideology and vote shares. Relatedly, Selway (2011) makes a formal case for using a measure based on the chi-squared statistic, but he situates it within a broader framework of measurement strategy and does not claim its validity in isolation.

This is a commendable but still overly simplistic attempt to capture the concentration aspect of polarization. Because it is simply a squared distance adjusted for sample size, high variance does not necessarily imply polarization or even anything close to bimodality. Imagine two hypothetical distributions with the same number of observations. Distribution A takes a uniform distribution with evenly dispersed observations, none of which are particularly extreme. Distribution B takes a binomial distribution, with observations equally divided amongst the two extreme points. Given the right range of the x-axis, the variance of Distribution A could equal the variance of Distribution B, but no one would consider Distribution A to be polarized by any definition. Variance does not show the concentration of observations that its proponents claim it does.

### *Concentration*

Other scholars have attempted to capture this concentration more directly by using ratios. The most straightforward and common method is to employ the Hirschman-Herfindahl index of fractionalization (Baldassarri and Gelman 2008; Chakravarty 2015; Selway 2011). However, this and other fractionalization indices have been criticized for time-invariance, exclusion of mediating factors, and lack of conceptual validity or reliability (Laitin and Posner 2001). Moreover, fractionalization has little to do with polarization. It may apply to party system

institutionalization, but scholars of comparative polarization do not agree on the relationship between number of parties and level of polarization (Crepaz 1990; Dalton 2008; J. Esteban and Ray 2008).

A sizable number of scholars attempt to capture the concentration of responses by calculating the correlation between ideology and policy preferences and often relating them to party positions (A. Abramowitz and McCoy 2019; Baldassarri and Gelman 2008; Bornschier 2019; Boxell, Gentzkow, and Shapiro 2017; DiMaggio, Evans, and Bryson 1996; M. J. Hetherington, Long, and Rudolph 2016). I contend that correlations do not measure polarization, but rather issue constraint (Converse 1964). It is feasible to expect high issue constraint to result from polarization but, as previously noted, individuals lack coherent ideologies even in polarized societies and approximating a cause by way of its effect almost certainly introduces autocorrelation. Moreover, even polarized parties can change their issue positions, particularly on those issues about which the masses care little (Baldassarri and Bearman 2007; M. J. Hetherington and Weiler 2015; Key 1966). Correlation-based measures would have us believe that parties are not polarized while they are in the midst of that platform transition, though that is likely not the case.

Lauka, McCoy, and Firat (2018) take a novel approach to constructing a proportion by taking the product of the proportion of voters who would vote for a given party and the proportion of voters who would never vote for that party, adjusted by number of parties. Interesting application to party system fractionalization notwithstanding, this measure opens itself to criticisms of unidimensionality and endogeneity in some contexts, for reasons discussed above. Further, simply showing that parties have loyal bases does not imply that they are polarized. For that, we need some treatment of bimodality.



*Bimodality*

It is difficult to quantitatively measure bimodality of distribution related to polarization because no true test for bimodality exists. Authors have thus taken varied approaches to approximating bimodality, often in a methodologically intensive framework. Some authors have used kurtosis in this vein, arguing that higher kurtosis indicates a higher degree of polarization (Baldassarri and Bearman 2007; DiMaggio, Evans, and Bryson 1996; Gooch 2009). This is indicative of the popular misconception concerning the nature of kurtosis. It is often presented in statistics textbooks as a measure of “peakedness,” skewness, or even bimodality, but this is not necessarily true. Rather, it is a measure of the proportion of observations contained in the tails of the distribution. The degree of kurtosis is wholly unrelated to the degree of bimodality exhibited by the distribution (Westfall 2014). Again imagine two distributions with the same number of observations; Distribution A is bimodal with thin tails and Distribution B is unimodal with heavy tails. Given the right distribution of observations, those two distributions may have equal kurtosis, though no one would consider Distribution B emblematic of polarization by any definition.

Other scholars have attempted to formulate their own approximations of bimodality. Lelkes (2016; Freeman and Dale 2013; Pfister et al. 2013) uses the bimodality coefficient but notes that it cannot test for divergence between two groups, which gives it little efficacy in the measurement of polarization. Lupu, Selios, and Warner (2017) borrow the Earth Mover’s Distance (EMD) from computer science and use it to measure the degree of congruence between elite and mass populations, essentially offering a quantification of the graphical representations offered by scholars taking the distributional approach noted above. In the particular formulation offered by Lupu, Selios, and Warner, however, EMD is still constrained to one dimension at a

time and does not capture the interaction between correlated variables, such as preferences on multiple issues.

Alcántara and Rivas (2007) offer a particularly intriguing solution to this problem. They use a multivariate technique called HJ-Biplot (Aitchison 1982) to estimate the effects between five separate dimensions of polarization in Latin America. This is a useful strategy for determining how different variables affect each other in a multidimensional space, as opposed to correlations (which only operate in a two-dimensional space) or correlation coefficients in a multiple linear regression (which exist in a multidimensional space but measure the effect of each explanatory variable on the dependent variable after controlling for the other explanatory variables, not the effect of each explanatory variable on the others). However, HJ-Biplot does not output a single value to describe the multivariate distribution as a whole and it cannot be used to estimate a value of distance for each observation, precluding its use in individual-level, behavioral analysis. To return to my original point, even the fanciest methodological innovations cannot account for lack of theory or definition, which is often the first deficit of the polarization literature.

### **A Psychometric Approach to Polarization**

As I have demonstrated, the political polarization literature is at present fragmented and incohesive. The field would benefit from a cogent, widely applicable definition of polarization and a measurement strategy that avoids endogeneity while fitting the conceptual requirements of the definition. In this final section, I present a comprehensive definition of polarization, taking care to avoid theory-building while also providing a definition applicable to both developed and developing nations. Then, I suggest that a psychometric measurement strategy offers the best chance of ameliorating the problems enumerated in the preceding pages.

**Definition**

I define political polarization as a compound manifestation of psychological distance. By “compound” I mean that polarization is multifaceted and involves multiple dynamics. A polarizing society is one in which individual-level attitudes are clustering in identifiable groups and those groups are increasing both in extremity and concentration. Polarization is thus both a state and a process, often both at the same time.

By “manifestation” I mean that, while polarization is primarily a psychological phenomenon, it is rooted in characteristics of both political and social arenas. These characteristics can vary widely from one society to another but may include issue attitudes, candidate or party loyalty, or conceptions of democracy in the political arena and inequality, racial tensions, or moral values in the social arena. These are the observable implications with which citizens conceive of polarization and with which the dynamics of extremity and concentration can be seen in concrete terms. As more of these characteristics align with and reinforce one another, society appears increasingly polarized. They also provide a language in which citizens communicate politics and evaluate the psychological distance between themselves and their interlocutors.

By “psychological” I mean that polarization is a function of deeply rooted attitudinal differences, affective responses to political stimuli, and perceptions of the level of polarization in a society. Inherent psychological characteristics such as moral values and personality traits affect the way each individual approaches the social and political world around them. Extremity and concentration of those psychological characteristics lay the foundation for, but are not deterministic of, extremity and concentration in the real-world manifestations of polarization. When citizens communicate in social or political terms, they provide a window into these moral

values or personality traits, generating an affective response. A stronger degree of positive affective response to the political ingroup and a stronger degree of negative affective response to the political outgroup leads to a perception of stronger polarization. The more polarized citizens view their society to be, the more their actions are likely to reflect a polarized society and the more their opinions and affective responses will be filtered through a lens of polarization. Simply put, it matters that citizens view themselves as polarized, even if the social and political manifestations themselves do not appear to be so.

By “distance” I mean that polarization is, at its core, a function of distance between individuals and between segments of the population divided along political lines. This distance may be seen in the social and political manifestations of polarization or it may be a purely psychological phenomenon wherein citizens view themselves as both far from the political outgroup and close to their political ingroup. Polarization occurs when the actual or perceived distance between groups increases and the actual or perceived distance between members within each group decreases.

### **Measurement**

Given the definition advanced above, an appropriate measure of polarization must capture five components: distance between individuals and groups, concentration of individuals within groups, dimensions of social and political conflict that may vary by country, alignment and reinforcement of social and political dimensions, and perceived polarization. Additionally, it must incorporate a data source that allows a wide variety of applications without introducing endogeneity and provide polarization measures at both the country and individual level. I argue that this can be accomplished by utilizing data approximating individuals’ worldviews and moral predispositions and analyzing it using k-means clustering algorithms.

Following moral foundations theory (Graham, Haidt, and Nosek 2009; Haidt 2012), I suggest quantifying individuals' worldview by distinguishing between separate dimensions affecting the way in which individuals approach the world around them. Most important, these dimensions must be estimated using non-political survey items. Citizens may answer politically charged questions with a reference to their own perception of polarization, but by removing all references to political topics, a psychometric approach measuring worldview traits significantly decreases the likelihood of endogeneity when relating the resulting polarization measure to other social and political phenomena that could be hypothesized as causes or effects. Additionally, by evaluating polarization along multiple dimensions with multiple survey items each, common issues such as social desirability bias and nonresponse bias can be at least partially attenuated. In a sense, psychometric data also allows scholars to get as close as possible to the beginning of the causal chain. Because psychometric data approximates the manner in which an individual views the world before their judgement is clouded by any social or political experiences, it gives a baseline estimation of the level of polarization in a society that is causally prior to political attitudes.

That foundation for polarization is important but it is not the full story. I suggest using additional, structural data to incorporate the level of conflict along relevant social and political dimensions. The United States, for example, should be able to take race into account in the measurement of its polarization. In developing nations, income inequality may be especially salient. By incorporating this type of data but not relying on it exclusively, it can be omitted from calculations in which it may introduce autocorrelation between the polarization measure and the dependent or explanatory variables. A final benefit of using these two types of survey data is that

the data entering the model is measured at the individual level, allowing application to behavioral contexts given an appropriate quantification strategy.

I contend that k-means clustering algorithms provide the information and flexibility necessary to allow this individual-level measurement. K-means clustering is a type of unsupervised machine learning algorithm designed to partition a space with at least two dimensions into segments such that each observation is closer to the mean of its segment than to the mean of any other segment. In more precise terms, the algorithm minimizes the within-cluster sum of squares for all clusters. Following from the law of total variance, the algorithm thus simultaneously maximizes the between-cluster sum of squares (Hartigan and Wong 1979; MacKay 2003). These are the dynamics stipulated in my definition of polarization; decreasing within-group distance and increasing between-group distance. Because the algorithm naturally outputs cluster means for each dimension, total between-cluster sum of squares, and within-cluster sum of squares for each cluster, measurements of polarization can easily be computed in the aggregate or at the individual level. It also allows the researcher to approximate the extent to which distributions overlap, offering a method of quantifying reinforcing and cross-cutting cleavages. K-means clustering is a computationally expensive exercise (Aloise et al. 2009; Kriegel, Schubert, and Zimek 2017), but an open-source R package applies the algorithm with reasonably accessible syntax and it typically converges rather quickly.

### **Conclusion**

Polarization is a complex, multifaceted, and persistent force in modern politics. Given its wide range of potential benefits and consequences, it is important to understand how it comes about, what perpetuates it, how it operates in the minds of citizens, and how to prevent it from exacting damage on the political system. To accomplish this, the literature requires a coherent,

comprehensive definition of polarization that can be quantified using a scalable, widely-applicable measurement technique. I contend that the five main categories of polarization literature (issue, elite, geographic, partisan-ideological, and affective) each describe only a fraction of polarization as it exists around the world and that the current menu of measurement strategies on offer do not capture polarization in any conceptually or methodologically rigorous manner. To remedy this shortcoming and provide a common path forward for the literature, I define polarization as a compound manifestation of psychological distance, detail its constituent parts, and propose k-means clustering algorithms to capture this comprehensive definition.

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