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The Space of American Public Opinion: Ideological Dimensionality in Models of Political Behavior*

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Abstract

We use a novel approach to study how citizens structure their political preferences in ideological space. Specifically, we analyze belief systems in relational terms, modeling citizens' patterns of policy disagreements using nonmetric multidimensional scaling. The results support the proposition that a basic ideological space (consisting of a small number of interwoven policy domains) anchors the policy component of mass voting behavior. We show that voters—especially those meeting a minimum threshold of political sophistication—neither lack meaningful attitudes nor hold distinct preferences across a wide range of issues. Rather, they organize policy attitudes alongside relevant core values and affective evaluations in a common, low-dimensional cognitive space. A unidimensional approximation of these belief structures often exhausts the explanatory power of vote choice models, though our approach can also detect dimensions that may be relevant for certain voters or have the potential to evolve into meaningful cleavages.

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For the real environment is altogether too big, too complex, and too fleeting for direct acquaintance. We are not equipped to deal with so much subtlety, so much variety, so many permutations and combinations. And although we have to act in that environment, we have to reconstruct it on a simpler model before we can manage with it. To traverse the world men must have maps of the world.

Walter Lippmann (1922, p. 16)

1 Introduction

V.O. Key (1966, p. 8) famously characterized the analysis of public opinion as a “task not unlike coming to grips with the Holy Ghost.” Less colorfully, Philip Converse (1964, p. 206) wrote that “[b]elief systems have never surrendered easily to empirical study or quantification.” Despite the challenges, the importance of understanding, explaining, and interpreting political behavior has kept scholarly interest in nature of public opinion alive for decades.

In this paper, we focus on the dimensional structure of public opinion. Ultimately, the health of mass-elite representative linkages hinges on citizens’ ability to navigate the low-dimensional political choice space organized by elite actors. In this view—articulated in the “basic space” theory of ideology (Hinich and Munger, 1994)—democratic accountability requires ideology because it provides a realistic means by which voters can organize political information, reach decisions in line with their underlying preferences, and ultimately hold elites accountable (e.g., Sniderman, 2017; Lupton, Smallpage and Enders, 2020).

However, recent work has challenged the ability of citizens to structure their political preferences in a basic ideological space on dual fronts. One side reasserts the “ideological innocence” thesis, contending that voters’ belief systems (to the extent they can be characterized as “systems”) remain at most weakly ideological (Achen and Bartels, 2016; Kinder and Kalmoe, 2017; Lenz, 2012). According to this view, contemporary polarization has reshaped other aspects of mass political behavior (such as partisan voting and affective evaluations of the out-party), but voters remain generally non-ideological and continue to hold nonattitudes on most policy matters.

Conversely, others are more optimistic about the existence of meaningful policy attitudes in the mass electorate, but argue that these attitudes are not connected to each other (i.e., constrained)

by a larger ideological web. The disjoint issue perspective has been implicitly assumed in many past studies of issue voting over past decades (Lewis-Beck et al., 2008), but Broockman (2016) makes an explicit case in its favor. He finds a non-negligible proportion of voters who take extreme and ideologically inconsistent stances on specific policy issues (for example, voters who favor outlawing the sales of all firearms and cutting all government spending on health care). If this is the case, unidimensional or domain-specific ideological measure are not valid measurement instruments since they run the risk of canceling out such differences and mistaking these voters as moderates.

The contributions of this paper derive from our use of a novel approach to measure the dimensionality of mass preferences. We incorporate Broockman's (2016) insight that most existing unidimensional scaling methods (whether simple additive scales or more sophisticated IRT-based models) conflate respondents who hold moderate views with those whose opinions include extreme liberal and conservative preferences across issues. Accordingly, we employ an approach that organizes traditional survey response data in the form of a respondent-by-respondent "disagreement matrix." We then use nonmetric multidimensional scaling (MDS) (Borg and Groenen, 2010) to estimate a geometric configuration of respondents in which the distances between voters are proportional to their observed level of policy disagreement. Critically, this method is agnostic as to the sources of citizens' policy disagreements. Voters may differ along a single ideological dimension, a small number of policy domains (e.g., economic, social/cultural, etc.), or on an issue-by-issue basis. We evaluate the validity of the estimated dimensions by using them to model presidential vote choice and considering their relationship to core values and affective evaluations.

The paper's most important contributions are two-fold. From a substantive perspective, the results provide strong evidence that a low-dimensional ideological basic space structures the expanse of voters' specific policy attitudes and, in particular, their voting decisions. This is most pronounced for the politically sophisticated, but not to the exclusion of less politically sophisticated voters. This result is also consistent with work demonstrating that American voters operate within increasingly interconnected belief networks of policy attitudes, cultural orientations, and social

identities (DellaPosta, 2020). These associations tend to reinforce each other, offering citizens multiple pathways to ideological constraint since they are all situated within the same basic space.

The paper’s findings also have important methodological implications concerning the measurement of mass political attitudes. We advocate a “basic space” measurement of policy preferences that reflects the mapping of multiple issues into a lower-dimensional space of domain-specific preferences. Because the economic and social/cultural domains are so tightly intertwined in contemporary American public opinion, a unidimensional measure of ideology will be a good approximation to both latent dimensions. However, these dimension remains conceptually distinct and empirically recoverable, and future work should explore how these distinctions may be relevant for certain subsets of voters and in specific electoral contexts.

2 Theory and Background

We begin by describing how we employ a number of concepts in this paper. We refer to policy preferences as the most specific form of preferences. In the context of survey questions, it is often the case that respondents are asked to agree or disagree with a particular policy statement, or to select their most preferred option from a range of possibilities. Questions like these are asking about “policy preferences.”¹

Often, surveys include multiple policy preference questions about the same “issue.” For example, a survey might include a series of questions about abortion designed to assess the conditions under which people believe the procedure should be legal. Researchers often consider issues—and the set of policy alternatives within them—as falling within particular “domains.” The two most common domains are economic (sometimes called social welfare) and social (sometimes referred to as cultural or moral) (e.g., Layman and Carsey, 2002; Miller and Schofield, 2003; Treier and Hillygus, 2009; Layman et al., 2010; Feldman and Johnston, 2014). If there are close links between preferences across issue domains, then we will refer people as having preferences that

¹Respondents’ answers may or may not reveal their preferences, depending on a variety of factors like the quality of the question, measurement error, etc. We return to the question of measurement below.

are “ideological.”

In our analysis we investigate the dimensionality of preferences. While in theory it is possible that there are multiple dimensions within issues, our primary concern is with dimensionality *across* issues and issue domains. For example, we ask whether there are meaningful differences in the preferences people hold on different economic issues and whether there are meaningful differences in the preferences people hold in the economic and social issue domains. That is, how much and what kind of “constraint” (Converse, 1964) is evident in the preferences voters hold?

One body of research views the public as similar to political elites in that preferences track a single dimension conforming to the traditional left-right or liberal-conservative ideological continuum. For our purposes, the key finding regarding political elites is that in contemporary American politics, their preferences exist on a single dimension. For instance, allowing for additional dimensions for distinct issues or issue domains adds little if anything to our understanding of the policy positions endorsed by members of Congress (Poole and Rosenthal, 2007). Likewise, other political elites—party activists and campaign contributors, in particular—exhibit similar levels of unidimensional ideological constraint (Jennings, 1992; Layman et al., 2010; Bonica, 2018; Lup-ton, Myers and Thornton, 2015). In the mass public, a host of researchers find evidence of a similar, single underlying ideological dimension (Bafumi and Herron, 2010; Jessee, 2012; Shor and Rogowski, 2018).²

In contrast, other work develops the idea that issue and policy preferences follow from more general values and beliefs that serve to constrain preferences *within* issue domains but not *across* domains (e.g., Peffley and Hurwitz, 1985; Feldman, 1988; Goren, 2013). As Feldman and Johnston (2014, p. 339) write, “[C]itizens possess abstract beliefs which constrain specific policy preferences, but they do not necessarily see a higher-order connection between these political values.” Empirically, a host of studies report results consistent with the view that public opinion is

²Stimson (2012; 2015) offers a somewhat weaker view, arguing for “one-plus” dimensions of mass public opinion in which the two-party system serves to collapse political conflict on all but a handful of new issues into a unidimensional configuration. “While we can think of economic and cultural domains as clearly separable. . . they are far from completely distinct in the view of the American electorate. . . [T]he two dimensions are correlated, not independent” (Stimson, 2012, pp. 29-31).

best understood and represented in multidimensional terms (e.g., Layman and Carsey, 2002; Ansolabehere, Rodden and Snyder, 2008; Treier and Hillygus, 2009; Carmines, Ensley and Wagner, 2012; Klar, 2014; Lupton, Myers and Thornton, 2015).

The final perspective casts doubt on the existence of any meaningful ideological structure underlying public opinion. This view finds its modern roots in work by theorists such as Walter Lippmann and Joseph Schumpeter, both of whom questioned whether voters live up to the democratic ideal of the “omnicompetent citizen” (Bennett, 2006). Converse’s (1964) landmark essay serves as the empirical genesis and defining text of what remains the highly influential view (Achen and Bartels, 2016) that most citizens are uninterested and uninformed about politics, lack consistent views on most policy issues, and do not organize their political attitudes using higher-order schema—including the liberal-conservative ideological continuum used by political elites. In the strictest interpretation of the nonattitudes thesis, it makes little sense to discuss dimensional structure in public opinion. Mass policy preferences are rather like “scattered croutons floating in the undifferentiated cognitive soup” (Luskin, 1987, p. 860).

Of course, one can take a more qualified view of Converse’s (and subsequent) results and conclude citizens are capable of holding meaningful policy stances under certain circumstances, but that these attitudes exist in relative isolation. That is, their policy preferences (on at least some issues) are genuine but uncorrelated. In this case, public opinion could be modeled in a high dimensional policy space with each issue constituting its own disjoint dimension. Representing preferences like these in any ideological space with dimensionality lower than the number of unique issues has the potential to conflate ideologically mixed extreme preferences with moderate preferences (Broockman, 2016). Taken to its limit, this perspective could radically change how we represent policy attitudes in models of voting behavior and representation.

2.1 Cognition, Political Elites, and the Basic Space Theory

There are persuasive theoretical reasons to expect voters’ policy preferences—more specifically, the systematic component of their preferences—reduce to a low-dimensional space. The first

derives from a long line of work from psychology and behavioral economics on bounded rationality (Simon, 1955). Taking account of the complexity of the information environment relative to the limits of cognitive resources and attention, people adopt economizing heuristic strategies to manage their decision-making processes (Kahneman, 1973). Extensive work has explored the use of cues and other heuristic devices, and while the quality and effectiveness of these heuristics are debatable, it is nonetheless clear they are ubiquitous components of voters' information processing and preference formation processes (Lau and Redlawsk, 2006).

For our purposes, the key takeaway from this line of thinking is that all people (including the sophisticated, aware, and motivated) *simplify* the world in order to make sense of it.³ This perspective is empirically bolstered by multidimensional scaling results showing that human judgments across a wide set of domains can be represented in low-dimensional conceptual spaces (Gärdenfors, 2000). These include emotions, linguistics, and perceptions of colors, sounds, shapes, and facial expressions.⁴ There is also ample evidence that core human values (including political values) are organized along a small number of dimensions, though there remains disagreement over what the dimensions represent and the precise structure of the space (Rokeach, 1973; Schwartz, 1992; Inglehart, 1997; Jacoby, 2014). The low-dimensional regularity seems to reflect a fundamental truth about the nature of human cognition, as the basic pattern has been observed among children and even infants (Bornstein, Kessen and Weiskopf, 1976).

The behavior of political and intellectual elites likely facilitates the process by grouping controversies along a small number of abstract spatial dimensions. Often there is no necessary or logical connection between many policy positions. However, elites “package” them together and define “what goes with what” (Converse, 1964; Noel, 2013). To the extent there is diffusion through the mass public, the political choice space will exist along a small number of abstract spatial dimensions.⁵

³Specific to the political world, Brady (2011) argues spatial reasoning provides a natural way to think about politics since so many of the basic elements of political competition (such as cleavages, platforms, and strategic maneuvering) are presented and discussed in spatial terms.

⁴Shepard (1987) provides an overview of relevant work. See also Russell, 1980; Croft and Poole, 2008.

⁵Ample evidence indicates that citizens also use group identities and an “affective calculus” to learn about similarities and policy linkages between the components of partisan-ideological coalitions (Brady and Sniderman,

Basic space theory (Enelow and Hinich, 1982; Hinich and Munger, 1994) unifies both elite and individual-centered (or top-down/bottom-up) explanations for the existence of ideological structure in mass policy preferences. The theory posits the existence of two spaces: a complex “action space” where issues are represented by separate, orthogonal dimensions, and a predictive “basic space” that maps the action space into a low-dimensional ideological space. Bonica (2018, p. 832) calls this the “holographic interpretation” of ideology, one in which “issue preferences are understood as a higher-dimensional representation of information existing in a low-dimensional ideological space.”

The basic space theory presents ideology as a solution to a coordination problem. Democratic systems require elites to communicate their policy commitments to voters, and requires the electorate to hold parties and candidates accountable for those commitments. Political ideologies greatly reduce the information costs involved in this exchange by representing policy alternatives in a low-dimensional basic space that captures the broad, abstract goals motivating a set of specific policy positions. As Hinich and Munger (1994, p. 3) write: “[P]arties organize themselves around ideologies, not policy positions. Platforms are more than a point in an n -dimensional space; they become abstract, even ethical, statements of what is good, and why.” Consequently, parties and candidates are limited in their ability to maneuver freely in the policy space by existing ideological commitments and latent issue linkages among voters (Schickler, 2016; O’Brian, 2020). Such movement, when successful, is secular and often accompanied by intellectual or social upheaval (Carmines and Stimson, 1989; Gerring, 1998; Noel, 2013). The mappings between the two spaces are stable because elites and voters share an incentive to prevent political competition from becoming chaotic and unintelligible.

This approach provides the theoretical foundation for ideal point models to account for behavior such as congressional roll call voting using only one or two dimensions. In public opinion, the theory implies that the basic space—not the action space—defines the cognitive map citizens use to organize political information and make choices. This space should be low-dimensional

1985; Sniderman, 2017; Goggin, Henderson and Theodoridis, 2019; Orr and Huber, 2020).

and predictive of political behavior, a prediction verified in scaling analyses of feeling thermometer ratings and political perceptions over the last half-century (e.g., Rusk and Weisberg, 1972; Marcus, Tabb and Sullivan, 1974; Bakker and Poole, 2013).

The central mechanism in the basic space theory is the set of mappings between the action space (i.e., the observed survey responses) and the basic space (i.e., the latent ideological space). In reality, these mappings are unobservable “black boxes” unique to each individual (Poole, 2005; Bonica, 2018). The challenge for scaling analysis is to approximate the mapping patterns in a parsimonious manner while accounting for the most important sources of heterogeneity. Hence, despite the temptation to provide a single answer to the dimensionality question, it is more likely that the number and nature of the dimensions needed to model mass policy preferences varies. Below, we discuss two conditioning factors: by individual political sophistication and the political context or environment.⁶

First, a long line of literature rooted in Converse (1964) and expanded by Stimson (1975), Zaller (1992), Jacoby (1995), and Freeder, Lenz and Turney (2019) argues for the central importance of political sophistication in influencing the structure and effects of policy preferences. Generally, citizens with higher levels of political sophistication come closest to (although still fall short of) political elites in exhibiting horizontal, vertical, and temporal constraint in their issue attitudes. Others suggest a less consequential role for political sophistication, arguing that accounting for measurement error (Ansolabehere, Rodden and Snyder, 2008) or focusing on the structure-inducing effects of values (Goren, 2013) serves to level the playing field between low and high sophistication citizens. Still other studies sidestep the issue entirely.

In addition to the role of political sophistication, ideological context plays an important role in structuring citizens’ policy attitudes by defining issue linkages. Specifically, polarized environments in which political competition is presented in stark, clearly differentiated ideological terms between the parties promotes the level of attitudinal constraint in the mass public (Pomper, 1972; Nie, Verba and Petrocik, 1979; Layman and Carsey, 2002; Levendusky, 2009). Not only

⁶We use the terms awareness, sophistication, and knowledge interchangeably to refer to how much people know, understand, and are engaged with the political world.

is constraint bolstered by polarization in familiar terms (i.e., parties' adoption of distinct, non-centrist policy positions), but also by the bundling of visible, hotly contested policy and non-policy conflicts on the political agenda (DellaPosta, 2020).

2.2 Methodological Considerations

Complicating the dimensionality question is the tension in existing research regarding the role of measurement error. In light of the possibility an individual's response to a survey question about public policy reflects at least some random measurement error due to questionnaire design, wording, or administration, it becomes important to distinguish answers to survey questions (the indicator variables) from an individual's actual preferences (the latent variable[s]) (Achen, 1975; Erikson, 1979; Norpoth and Lodge, 1985; Ansolabehere, Rodden and Snyder, 2008). Given the dominant view of the survey response that it represents a probabilistic draw from individuals' underlying attitudinal distributions (Zaller and Feldman, 1992), basic statistical theory and the theory of errors tell us that with sufficient draws there will be asymptotical convergence on the truth. This helps to explain the widespread success of summated scales in the social sciences.

However, the proper way to aggregate stated policy preferences—answers to survey questions—into ideological scales is not obvious and may introduce other problems. For example, Broockman (2016) explains how some favored techniques—like simple averages across items or more sophisticated unfolding or item response theory (IRT) models—might erroneously categorize people toward the center of policy scales, suggesting moderate views, when in fact they hold a set of extreme views that “cancel out” when reducing high-level multidimensionality to low-level or even unidimensional scales. Moreover, researchers usually lack firm a priori theoretical footing about the number and nature of ideological dimensions encapsulated by a set of survey items. Questions concerning a particular policy domain may be over or underrepresented in a survey, and it may be ambiguous as to whether a given issue should be used to construct a domain scale.⁷

⁷For instance, environmental policy touches on both economic and cultural/postmaterialist concerns—should it be included alongside abortion and LGBTQ rights questions when estimating a social/cultural dimension of ideology? Is immigration a social issue or a racial one? These kinds of questions cannot be answered with simple

On this point, we note that the popularity of the two-parameter Bayesian IRT model (Martin and Quinn, 2002) to measure mass ideology has inadvertently stymied research into the multidimensional structure of mass policy preferences. This is not to say that Bayesian IRT methods cannot estimate multidimensional solutions (e.g., Treier and Hillygus, 2009). But, because identification is tricky and requires an increasing number of fixed constraints on the subject and/or item parameters in higher-dimensional configurations, researchers usually opt for a unidimensional result a priori. This may obscure interesting multidimensional structure in public opinion.

3 Methods and Hypotheses

We use a novel approach that simultaneously addresses both methodological problems—the presence of ideologically mixed extreme preferences and the indeterminacy of the issue mappings onto one or more latent ideological dimensions—in measuring the dimensionality of policy conflict in the mass public. Our approach also provides a method for examining the structure of public opinion that is consistent with the theory of human perception and judgment presented above. Specifically, we use multidimensional scaling (MDS) to recover the cognitive maps citizens use to organize their constellation of policy preferences. MDS procedures produce a geometric representation of observed (dis)similarities data. Observations are represented as points, and the distances between points are proportional to the observed level of dissimilarity between observations.⁸ That is, similar observations will be placed in closer proximity while dissimilar observations will be placed further apart in latent Euclidean space of given dimensionality.

MDS has been used in a wide array of fields (including psychology and psychometry, marketing, and physics) to visualize and measure the underlying structure of a dataset (Borg and Groenen, 2010). The standard example is that of a matrix of driving distances between cities. These data naturally represent the level of dissimilarity between each pair of cities, and MDS will produce a two-dimensional “map” (where the dimensions represent geographic North-South and East-West

averaging. Of course, the same indeterminacy problem exists in factor analysis and is addressed through rotation.

⁸The observed (dis)similarities are treated cardinally by metric MDS and ordinally by nonmetric MDS.

differences) that makes clear the relative proximity between all of the cities. We can also think of this process in terms of modeling the data-generating process with use of a latent geometric space, in which differences along two underlying dimensions (i.e., latitude and longitude) give rise to the observed dissimilarities between observations.

MDS methods have a long lineage in political science dating back to Weisberg and Rusk (1970), though never (to our knowledge) using policy preference data.⁹ In this paper, we use survey respondents' answers to a series of policy preference questions to generate an $n \times n$ dissimilarities matrix (called D), where n is the number of respondents. The cell entries (i.e., the dissimilarities) are the sum of squared differences between each pair of respondents over a series of q policy questions (with responses scaled to run between 0 and 1).

That is, the entries of D are calculated as:

$$d_{i,i'} = \sum_{j=1}^q (p_{ij} - p_{i'j})^2 \quad (1)$$

where p_{ij} is the stated preference of respondent i on item j and $p_{i'j}$ is the stated preference of respondent i' on item j .

By explicitly arranging and analyzing the data in terms of the degree to which respondents disagree over policy matters, we bypass the problem of extreme responses canceling each other out. Consider two respondents, one of whom provides the most liberal response on one question (a 1 on a 7-point scale) and the most conservative on the other (a 7 on a 7-point scale) while the other is the opposite, providing the most conservative response on the first (a 7) and the most liberal response (a 1) on the second. Methods that average across responses would place both individuals at the same position, in the middle of the underlying dimension as apparent "moderates." In contrast, with MDS, the entry in D will indicate maximum disagreement and the method will attempt to place maximum distance between the two respondents in latent space.

Another strength of MDS is that it is agnostic about the specific item-dimension mappings.

⁹See Poole, 2008 for a review.

Its only objective is to capture the largest sources of variance in the observed dissimilarities data. The estimation process usually proceeds by estimating configurations in $1, 2, \dots, S$ dimensions and selecting an s -dimensional solution that balances model parsimony and explanatory power.

For MDS models, fit is usually assessed in terms of *stress*: a badness-of-fit measure of which higher values correspond to ill-fitting point configurations. Overall stress provides information about the number of dimensions needed to capture how citizens disagree about policy, and we can also calculate how much each respondent contributes to overall stress. These stress-per-point values provide a measure of how well each respondent fits into the ideological space (i.e., how well their configuration of policy disagreements can be geometrically represented in an S -dimensional abstract space).

Arranging issue scale responses in this particular format offers a final advantage. By explicitly representing these data in terms of inter-respondent differences, we better capture the process of political competition. That is, opinions are not formed and held in isolation, but rather are the product of an process in which policy linkages are learned by experience: ongoing evaluations of the political world in terms of similarity and dissimilarity (Sniderman, 2017). By fitting an MDS model to citizens' patterns of disagreements, we more directly test Hinich and Munger's characterization of the basic space in capturing "[s]tructural descriptions of political differences between groups of positions. We have called these groups of positions ideologies, and have claimed that the groupings result from a similarity in the basic worldview of the adherents of those ideologies" (Hinich and Munger, 1994, p. 128).

We apply nonmetric (ordinal) MDS to analyze policy disagreement patterns between respondents in three datasets: the 2012 American National Election Study (from which we coded responses to 80 pre and post-survey issue questions), the Broockman (2016) dataset (with responses to 12 seven-point issue scales), and the **XXX** module of the 2018 Cooperative Congressional Election Study (with 58 pre and post-survey issue questions). The Broockman dataset is especially valuable to this analysis because it features a novel question format specifically designed to tap into extreme but unconstrained policy attitudes.

For each dataset, three quantities will be of most interest to us: the estimated respondent point configuration (and the degree to which it aligns with partisan, ideological, and value cleavages), the dimensionality implied by model fit (i.e., overall stress), and how well each respondent fits into the latent space (i.e., stress-per-point values). We use a technique known as property vector fitting (PVF) to project external measures (such as core values and ideological self-placements) onto the respondent configuration and assess their correspondence to the recovered dimensions (Kruskal and Wish, 1978).¹⁰ This allows us to better infer the meaning of the recovered space.

In addition to estimating MDS on the full datasets, we also estimate separate models for those with low, medium, and high levels of political sophistication; as well as simulated datasets in which responses are generated under the assumptions of normal (correlated and uncorrelated) and bimodal utility functions across the q policy items.¹¹ In order to provide a comparable null or baseline measure of fit, we also perform MDS on permuted versions of the original data. That is, for each of the three datasets, we randomly shuffle the values within each column. This provides a null hypothesis (H_0) against which to assess the fit of our model (Mair, Borg and Rusch, 2016).

Finally, we perform two series of simulations in which multidimensional scaling is applied to the policy item disagreement matrices in both datasets to estimate respondent scores on a reduced number of basic space dimensions.¹² In the first set of simulations, we vary the number of dimensions estimated from 1 to 8, using all 80 issue questions in the 2012 ANES, the 12 seven-point issue scales in the Broockman (2016) dataset, and all 58 issue questions in the 2018 CCES. In the second set of simulations, we vary both the number of items included in the disagreement matrix as well as the number of dimensions estimated.

Our concern here is how well composite information from the set of policy items—that is,

¹⁰PVF uses linear regression to estimate the normal vector of an external variable by regressing it onto the S -dimensional MDS coordinates and storing the β coefficients. The vector coordinate on the s^{th} dimension is calculated as: $\frac{\beta_s}{\sqrt{\sum_{s=1}^S \beta_s^2}}$.

¹¹Political sophistication is measured using summated scales of political knowledge items; details are provided in the appendix, pp. 4-12. Details and results for the Monte Carlo simulations are also provided in the appendix, pp. 13-16.

¹²In each of 100 trials, we draw with replacement a random set of 500 respondents using survey weights to determine the probability of selection.

estimates of respondent positions on the latent ideological dimensions—explain presidential vote choice. If voters are indeed operating in a reduced ideological space in their decision-making processes, we should find that only a small number of dimensions are needed to explain citizens' voting decisions. This set of simulations is designed to test whether it is possible to use a reduced set of items to estimate those dimensions, which would be the case if the relevant policy information contained in the responses is largely redundant.

Based on the heuristic strategies and the basic space theory discussed above, our overarching expectations are that, to the extent we find meaningful structure in citizens' policy disagreements, it should be low-dimensional and that these dimensions will be most behaviorally consequential. Put another way, we do not expect to find evidence of a well-structured high-dimensional space of political attitudes. Specifically, we test the following hypotheses in the next section:

Hypothesis 1: *Multidimensional scaling of the policy dissimilarities data will reveal patterns of low-dimensional ideological structure in public opinion.*

Hypothesis 2: *A small number of basic, ideological dimensions (≤ 3) estimated from policy preference survey responses will be sufficient to model the policy component of presidential vote choice.*

Hypothesis 3: *The basic dimensions can be created using only a partial sample of the policy questions.*

Hypothesis 4: *The basic dimensions will be correlated with politically relevant external measures such as core values, affective evaluations, and ideological self-identifications.*

Hypothesis 5: *Political sophistication will condition the relationship between the low-dimensional basic space and issue attitudes, vote choice, and external measures, such that voters with higher levels of political sophistication exhibit more low-dimensional, constrained, and behaviorally-consequential ideological structure than voters with lower levels of political sophistication.*

These hypotheses flesh out the basic space theory’s central proposition that voters operate—they hold perceptions, organize preferences, and reach choices—in an ideological basic space rather than the complex action space. Politically sophisticated voters should have a better understanding of the mappings between the two spaces and use this information to more tightly constrain their policy disagreements along ideological lines. However, the same basic, low-dimensional structure should be present across the electorate.

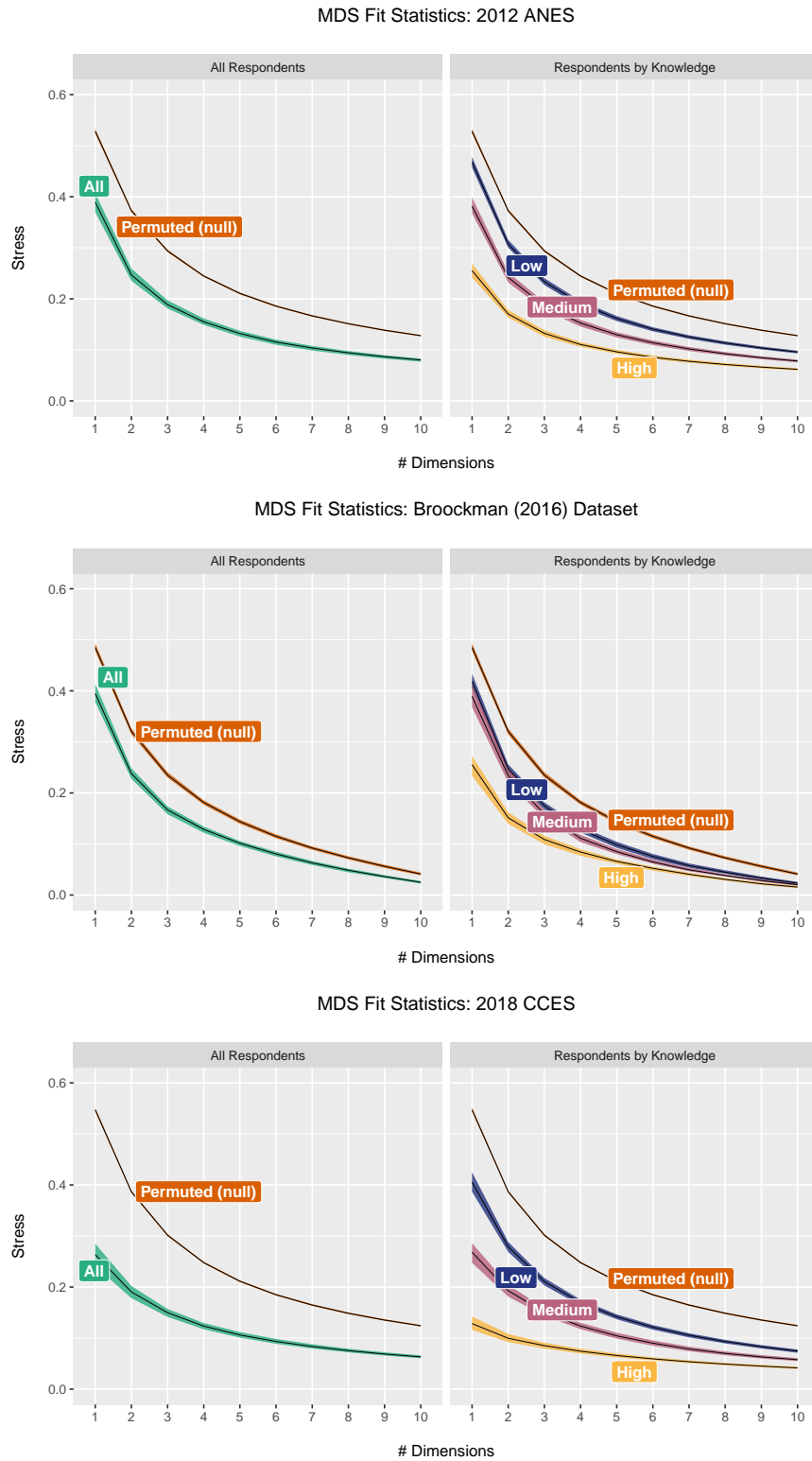
4 Results

We begin by examining the fit statistics (the stress values) for each of the estimated nonmetric MDS configurations in the three datasets. These values are displayed in the scree plots in Figure 1. Of course, stress monotonically decreases as we increase the dimensionality of the estimated configurations. The quantities of greatest interest to us are the location of the “elbow” (the point at which the inclusion of additional dimension provides only marginal improvement in model fit) and the difference in stress values between the actual and randomly permuted data.

What is immediately striking from Figure 1 are the similar patterns in model fit across datasets. In each survey, the MDS configurations of the observed policy disagreement data (both overall and subsetted by level of political knowledge) have smaller stress values than those estimated from the randomly permuted versions of the same data. In other words, MDS provides a statistically significant improvement in fit over the null hypothesis that policy disagreements among citizens exhibit no latent structure. We also find a steady gradation in stress values among voters based on political knowledge, with low knowledge respondents possessing the highest stress configurations followed by medium and then high knowledge respondents.¹³ In all three cases, the elbow occurs at either two or three dimensions, though it is sharpest among respondents with high levels of political sophistication respondents and becomes flatter as we move to medium

¹³In the appendix (pp. 13-16), we show results from our Monte Carlo experiments that generate issue responses under different assumptions about voter utility functions and degree of correlation between issues. The MDS fit statistics for the three observed datasets are most in line with data simulated under the assumption that respondents possess utility functions that are normally distributed and correlated across issues.

Figure 1: Scree plots from nonmetric multidimensional scaling (MDS) of the policy disagreement matrices. Shaded regions show 95% bootstrapped confidence intervals.



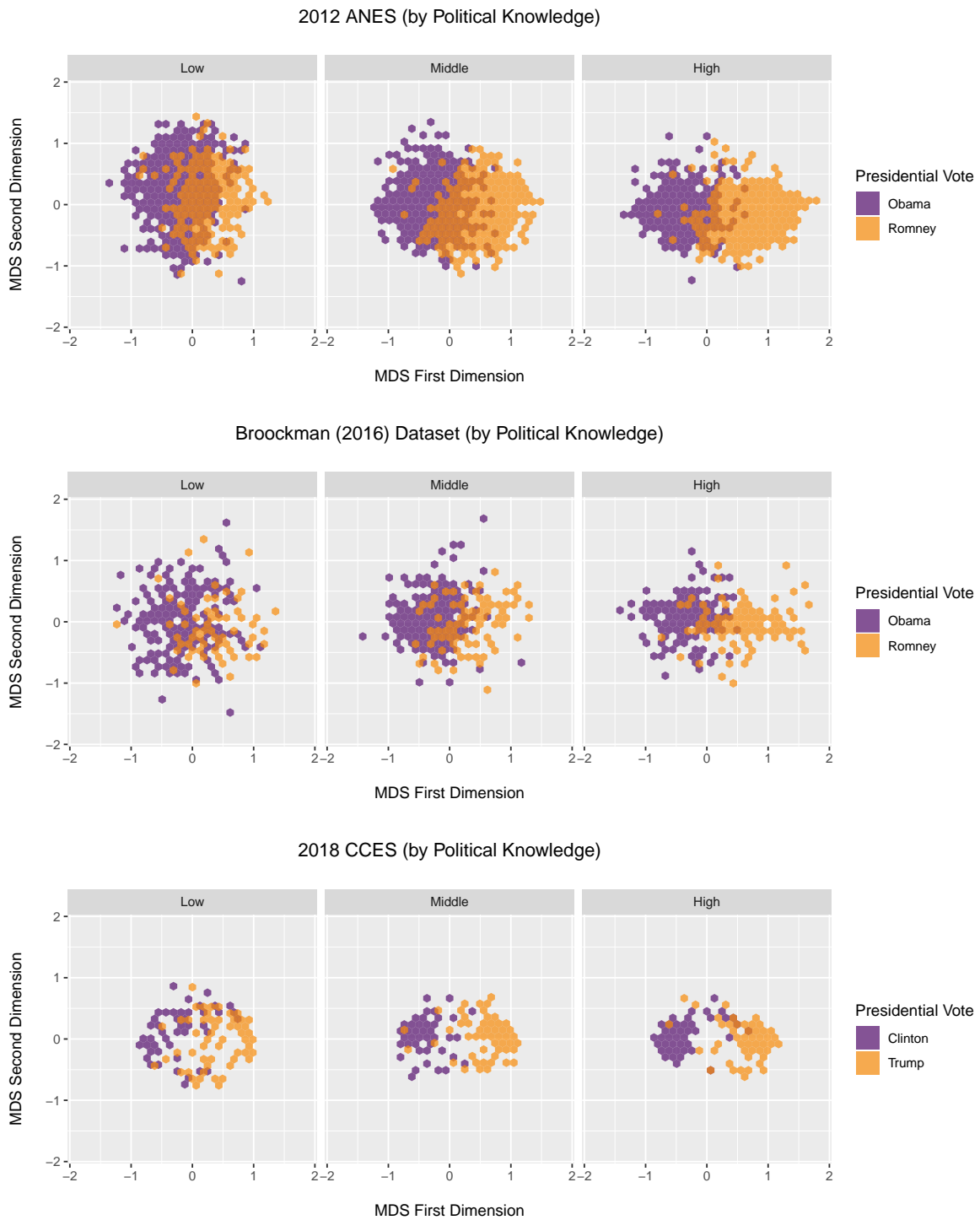
and then low sophistication respondents. Hence, the observed patterns reveal we can characterize voters' policy disagreements as being organized in low (no more than three-) dimensional space. High sophistication respondents' policy differences exhibit the most structure, but even low sophistication respondents show a significant difference from the permuted data (i.e., the null).

The recovered low-dimensional point configurations appear to be good fits to the policy disagreement data, but to what extent do the estimated dimensions reflect ideological and partisan divisions? That is, do voters organize their policy differences in the same space as they make other political choices? Figure 2 suggests they do. For each survey, it shows the estimated two-dimensional MDS configurations of respondents divided by level of political sophistication and colored by presidential vote choice. Across levels of political sophistication, we see the first dimension separates Obama/Romney (in the 2012 ANES and 2016 Broockman data) and Clinton/Trump (in the 2018 CCES data) voters most acutely and that these divisions are sharpest among politically sophisticated respondents. The second dimension appears to offer minimal explanatory power in terms of vote choice for any knowledge group.

To further assess the meaning of the estimated MDS configurations of voter positions, we use property vector fitting (PVF) to analyze the mapping of several external political variables. These items were not used to construct the policy disagreement matrices, but PVF allows us to project them into the same space via linear regression (details provided in Section 3). Hence, we can assess not only the *orientation* of the external measures but also their *fit* in the space via R^2 values (i.e., how well voters' MDS scores predict their responses to other survey items). The direction simply indicates whether the measure is positive or negatively related to MDS scores (for instance, thermometers ratings of left and right-wing stimuli will presumably have different signs).

Specifically, we use PVF to project three types of responses—those to core value questions and feeling thermometer ratings (from the 2012 ANES) and overall and domain-specific ideological self-placements (from the 2018 CCES)—into their respective two-dimensional MDS configura-

Figure 2: Respondent coordinates from nonmetric multidimensional scaling (MDS) of policy disagreement matrices.



tions in Figure 3. If the recovered ideological scores reflect underlying and meaningful attitudes (rather than simply serving as useful summary measures of overall policy dispositions), they should exhibit a strong association with value structures, affective evaluations, and ideological self-identifications. Indeed, core values—as universal and central components of human behavior—serve as a crucial “bottom-up” constraining mechanism in the basic space theory, and provide a further test of the veracity of our theoretical framework.¹⁴ As before, we subset respondents into three political knowledge levels to illustrate the conditioning role of political sophistication. The results in Figure 3 demonstrate that the forces structuring citizens’ policy disagreements are closely connected to particular value, affective, and ideological dispositions. Moreover, these relationships are strongest among respondents with higher levels of political knowledge. The results also provide evidence the second dimension is not simply fitting noise in the data, but rather taps into distinctions between clusters of substantively similar political controversies and tradeoffs.

Moral traditionalism and economic egalitarianism have similar projections in the MDS space for all three knowledge groups, but exhibit a poor fit among low knowledge respondents (R^2 values of 0.12 and 0.16, respectively) and a much stronger fit among high knowledge respondents (R^2 values of 0.64 and 0.63).¹⁵ The gap between the moral traditionalism and egalitarianism vectors in Figure 3 indicates these two value batteries are tapping into distinct (though correlated) sources of citizens’ policy disagreements. A 90° right angle indicates complete orthogonality, with angles closer to 0° denoting a stronger positive relationship between the concept mappings.¹⁶ In this case, the angle between the moral traditionalism and egalitarianism vectors is 27° for low knowledge respondents, 54° for middle knowledge respondents, and 61° for high knowledge respondents.

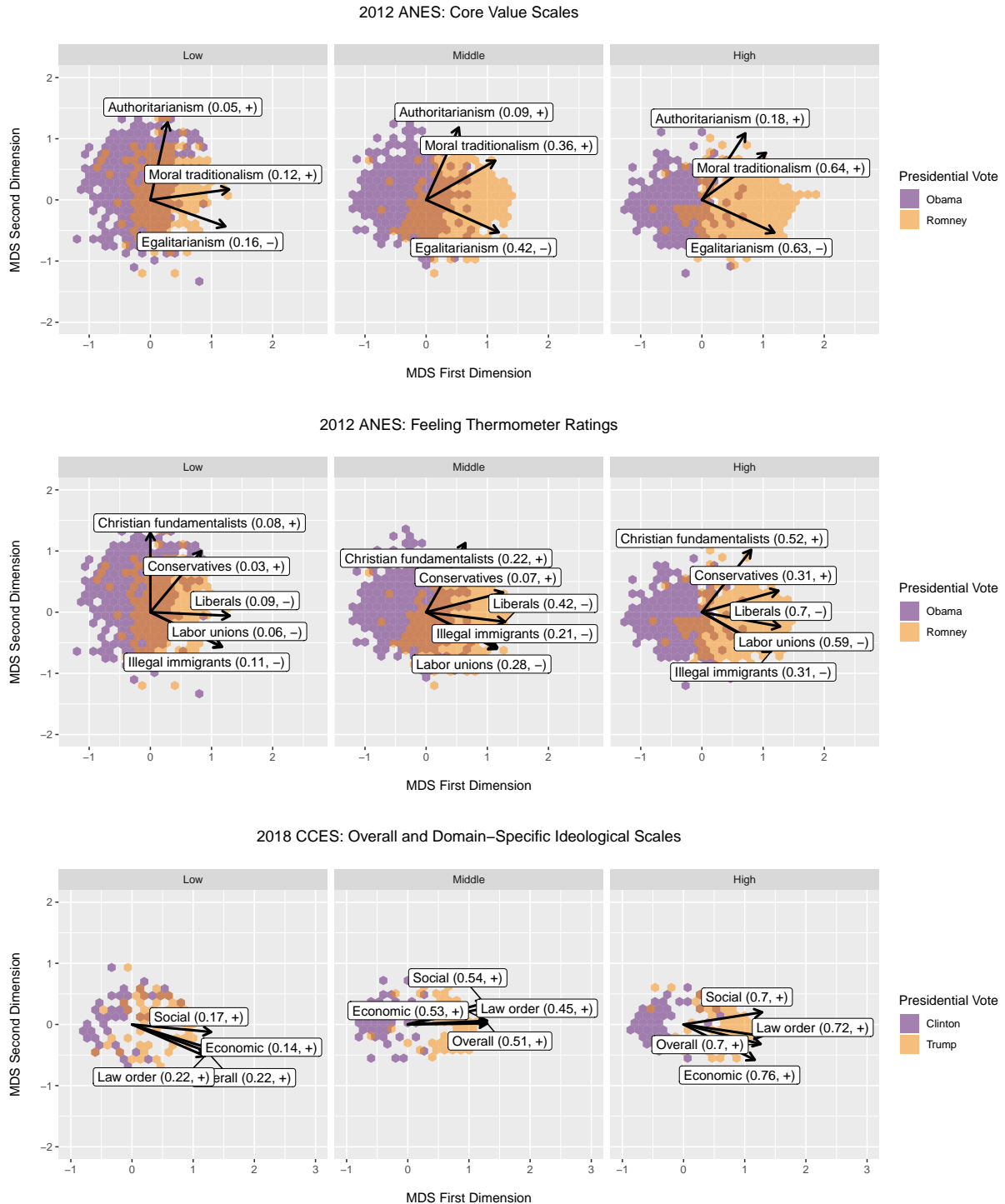
It is important to note this does not mean moral traditionalism and economic egalitarianism are less intertwined among sophisticated voters—indeed, the correlation between the two value indices increases (from 0.14 to 0.32 to 0.60) as we move from the low to high political knowledge

¹⁴We create standard indices of moral traditionalism (4 items, $\alpha = 0.70$), egalitarianism (6 items, Cronbach’s $\alpha = 0.78$), and authoritarianism (4 items, $\alpha = 0.61$) for the core value scales. The domain-specific ideological self-placements were developed in Klar (2014). Additional details and question wording provided in the appendix, pp. 4-12.

¹⁵Authoritarian dispositions map poorly into the MDS configuration across knowledge groups.

¹⁶Angles greater than 90° indicate a negative relationship.

Figure 3: Property vector mappings of external core values, group feeling thermometer ratings, and alternate ideological measures onto nonmetric multidimensional scaling (MDS) configurations (by political knowledge). R^2 values and vector directions in parentheses.



tertiles. Rather, sophisticated voters appear to have more meaningful multidimensional political attitude structures, ones which draw from two distinct (but correlated) value dispositions. That is, the mappings between the value and policy-based spaces are both stronger and somewhat more elaborate for politically knowledgeable voters, even though these spaces remain low-dimensional.

The middle and bottom panels of Figure 3 show the projections of the group feeling thermometer ratings (from the 2012 ANES) and the ideological self-placement scales (from the 2018 CCES). We again find extremely weak relationships among respondents in the lowest tertile of political knowledge, with no R^2 value exceeding 0.22. However, the fit of the external measures onto policy-based configurations improves substantially once we move to moderately and highly politically sophisticated voters.

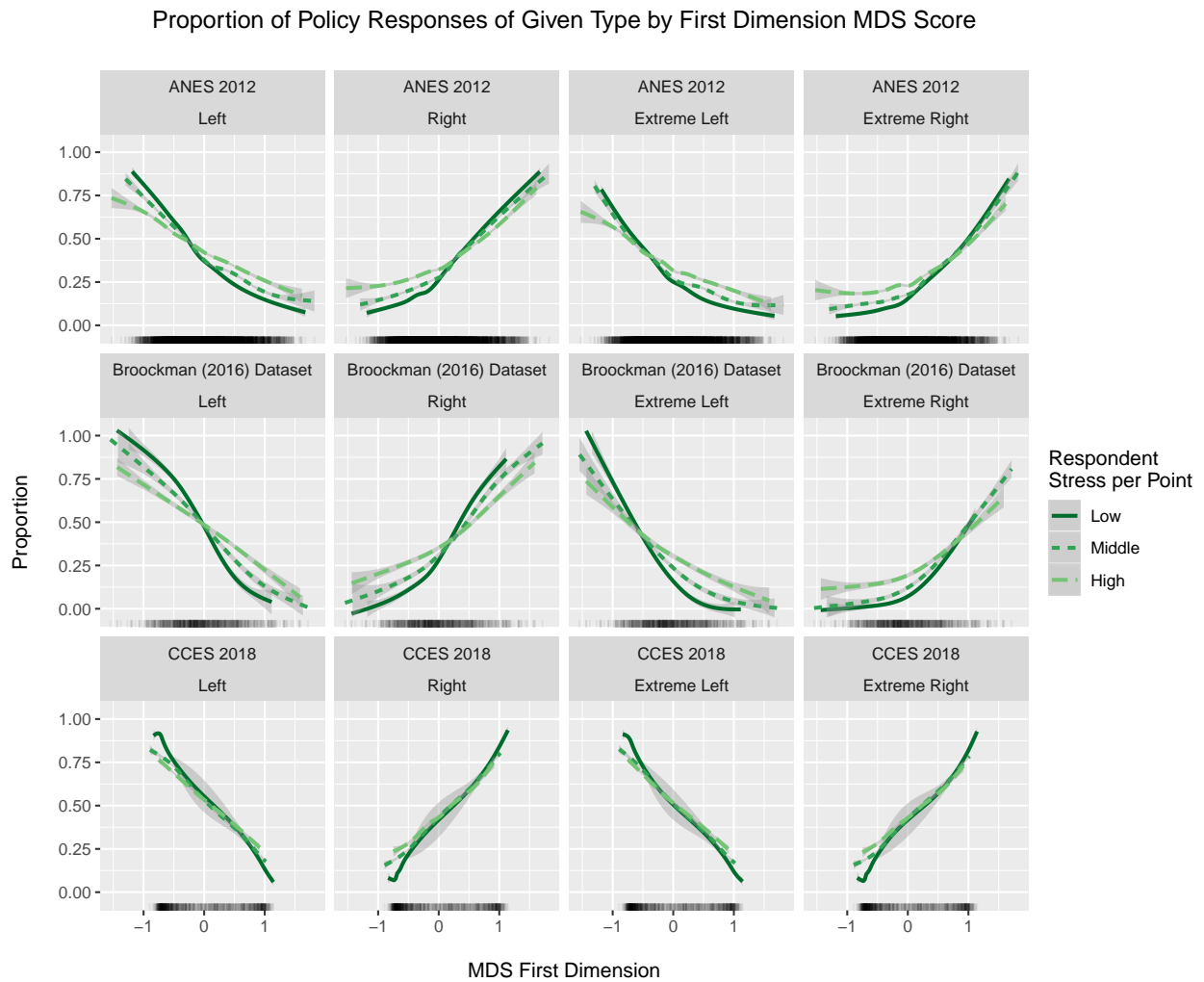
We also find that the substantively similar stimuli (e.g., moral traditionalism, thermometer ratings of Christian fundamentalists, and social ideology self-placements) have similar projections in the policy disagreement space. Accordingly, we also find similar gaps between the mappings of economic and social stimuli such as Christian fundamentalists/labor unions in the 2012 ANES and social/economic ideological self-placements in the 2018 CCES.¹⁷ We interpret these patterns as validating that our MDS-based approach is recovering meaningful and consistent attitudinal dimensions underlying citizens' patterns of policy disagreements.

As another test of the ideological content of the estimated MDS scores, we calculate the proportion of each respondent's policy choices that are left or right wing (as well as extreme left or extreme right, defined as the choices at the endpoints of the issue scales). We then use semi-parametric smoothers to plot the relationship between the first dimension MDS scores and the estimated proportions of responses of each ideological type in Figure 4. We split respondents into three tertiles based on their stress-per-point (SPP) scores that represent each respondent's contribution to the total stress of the MDS configuration. Hence, low SPP values indicate that

¹⁷It is worth noting the difference in how affective evaluations of "conservatives" and "liberals" map onto the space. This, in part, captures the phenomenon of "conflicted conservatives": voters who are symbolically but not operationally conservative (Ellis and Stimson, 2012). That is, attitudes about conservatism as a symbol map into the northeast quadrant of the MDS configuration, while attitudes about specific social welfare programs tend to map into the southeast quadrant. Hence, conflicted conservatives are concentrated among respondents with positive second dimension scores.

a respondent's observed pattern of policy disagreements is a better fit to the estimated low-dimensional space, while a high SPP indicates it is difficult to position the respondent.

Figure 4: Ideological direction and extremity of respondents' policy preferences by first dimension MDS scores. Stress per point (SPP) values indicate each respondent's contribution to the total stress of the configuration from low (indicating a good fit) to high (indicating a poor fit).



Our theory predicts there will be monotonically increasing (decreasing) relationships between the first dimension MDS scores and the proportion of right/extreme right (left/extreme left) responses. This pattern should be strongest among low stress respondents (whose patterns of policy disagreements are a better fit to an ideological basic space) than high stress respondents. This is precisely what Figure 4 shows. In all three datasets, those at the left and rightmost

edges of the first dimension have the highest proportions of left/extreme left and right/extreme right policy responses. Especially among low SPP respondents, the expected proportion of left (right) responses is close to 1 for those with the lowest (highest) first dimension MDS scores. Further, the expected proportion of extreme left/right responses quickly drops moving away from the corresponding ideological pole. Respondents with low and, to a lesser extent, middle SPP scores who are placed in the center of the space are what we think they are: moderates. There is very little evidence that many of these respondents hold a mix of ideologically competing extreme positions. The expected proportion of extreme responses (both left and right) by respondents in the center of the space is indeed higher among those with high SPP values, suggesting that SPP values can serve as a filter for these kinds of voters.¹⁸

As a final test of our theoretical expectations, we next perform two sets of tests using non-metric MDS to extract latent ideological dimensions and use the MDS scores as predictor variables in standard models of presidential vote choice. Above, we found an ideological space of two or less dimensions proved sufficient to model the basic structure of most citizens' policy disagreements. In these tests, we consider the possibility that higher dimensions are nonetheless meaningful drivers of individual voting behavior.

First, we use nonmetric MDS to estimate 1-8 dimensions on policy disagreement matrices constructed from bootstrapped samples of 500 respondents. We then include the MDS scores (alongside standard demographic controls; though omitting party identification) to model presidential vote choice, and use the AUC value as our measure of model fit. Here, we are interested to find the point at which additional dimensions provide only marginal improvement in voting behavior model fit. The second test uses this same design, but also varies the number of policy items. That is, we randomly select a subset of issues from the full set of issue questions to estimate the MDS dimensions.¹⁹ If all or most of the issues are tapping into the same ideological basic space, then only a fraction should be needed to explain the policy-based component of vote

¹⁸The correlations between SPP and political knowledge are -0.36 in the 2012 ANES, -0.23 in the 2016 Brookman data, and -0.52 in the 2018 CCES. We expect negative correlations since stress is a *badness* of fit measure.

¹⁹We limit the second test to the 2012 ANES because it has the largest number of items from which to sample.

Figure 5: Presidential vote model fit by dimensionality of nonmetric multidimensional scaling (MDS) configuration from policy items. Shaded regions show 95% bootstrapped confidence intervals. Baseline AUC values for controls-only models are: 0.80, 0.70, and 0.77 for the ANES, Brockman, and CCES datasets, respectively.

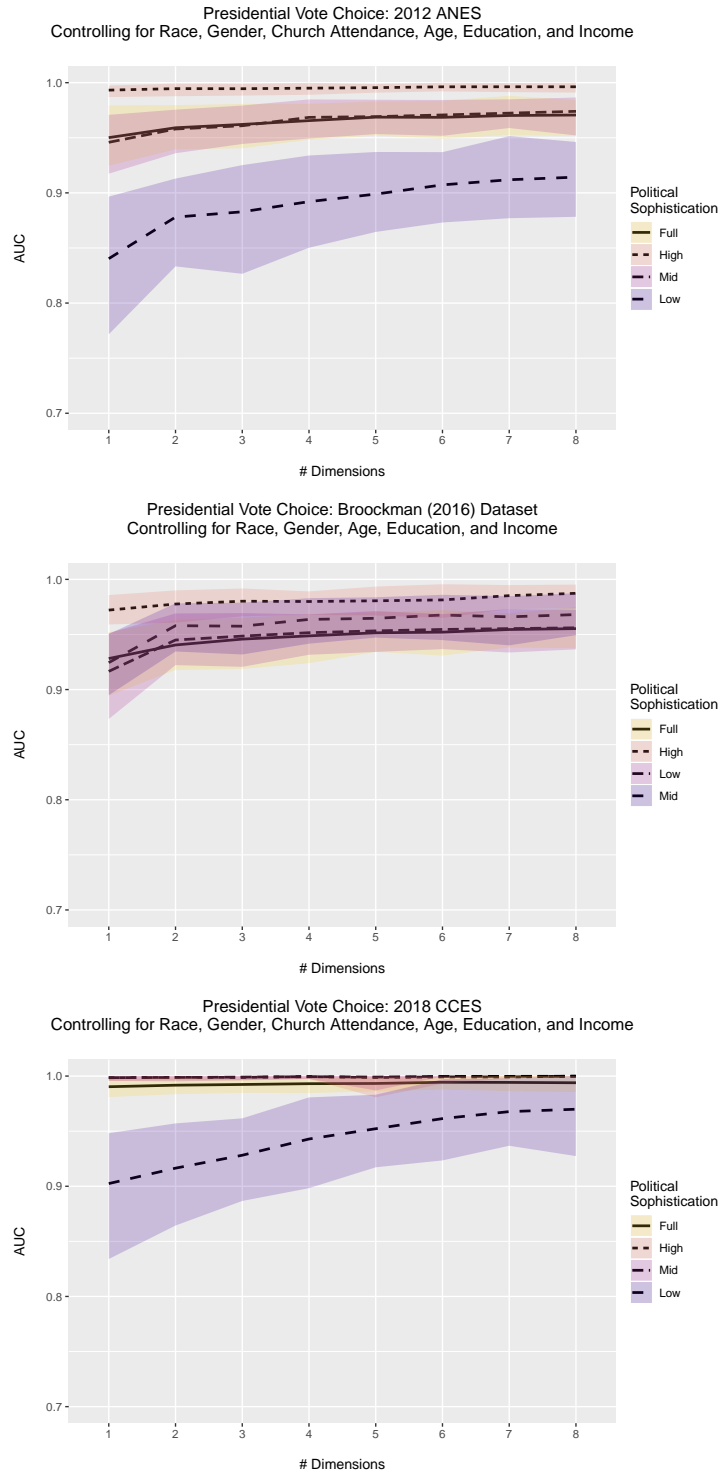
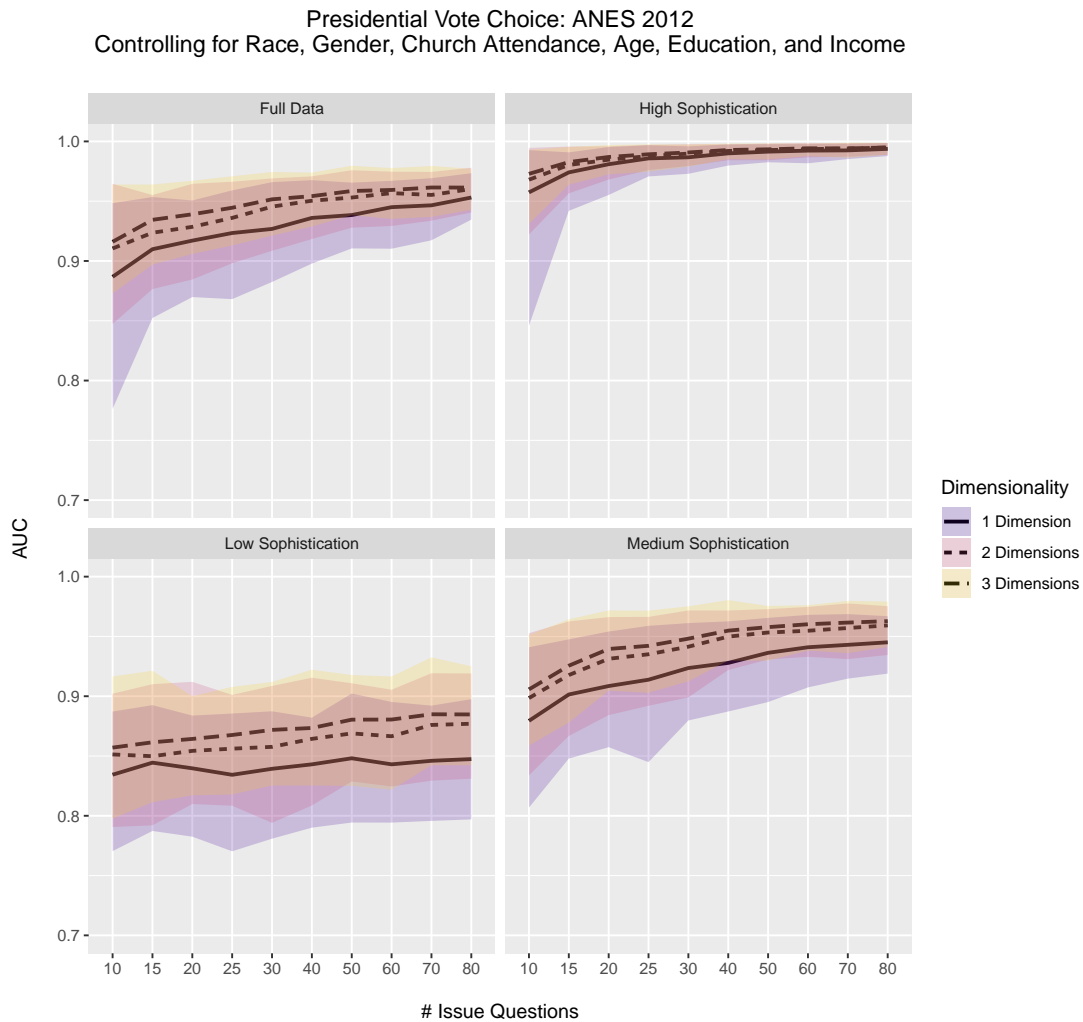


Figure 6: Presidential vote model fit by number of policy items used in nonmetric multidimensional scaling (MDS) configuration. Shaded regions show 95% bootstrapped confidence intervals. Baseline AUC value for controls-only model is 0.80.



choice.

The results are displayed in Figures 5-6. Both show a consistent pattern: a single ideological dimension is nearly sufficient to explain the voting behavior of low and medium sophistication respondents and entirely sufficient to explain the voting behavior of high sophistication respondents. In no case do more than two or three dimensions meaningfully improve model fit.²⁰ This of course does not mean we should expect the inclusion of one or two ideological dimensions

²⁰We do find a gradual increase in AUC values offered by estimating higher dimensional MDS configuration among low sophistication respondents in the 2012 ANES and 2018 CCES, though this improvement is marginal and not statistically significant at conventional levels.

will perfectly predict vote choice—policy considerations are, after all, tangential for many voters. Rather, our emphasis is on the finding that *additional* ideological dimensions that extend the basic space are not capturing variance meaningfully related to voting behavior.

Figure 6 provides further validation for this argument. Here, we find that using only ten random issue questions is usually adequate to estimate behaviorally consequential ideological dimensions. The inclusion of additional issues provides the most dramatic improvement in fit among medium sophistication respondents (low sophistication respondents do not see an increase because policy attitudes never provide a large improvement in fit over the baseline, while high sophistication respondents' choices are virtually perfectly predicted with the inclusion of any policy information). However, even for moderately knowledgeable voters, the increase is not substantial. Two-dimensional MDS configurations modestly outperform one-dimensional configurations, while the improvement provided by a third dimension is marginal. There is a faint indication the difference in fit between the one and two-dimensional models increases alongside the number of issue questions selected (presumably, as the samples capture a more diverse set of policy attitudes). But, as in Figure 5, we find scant evidence for exotic policy influences on vote choice.

5 Discussion

When voters can expertly judge every detail of every stand taken and relate it directly to their own views of the good society, they are interested only in issues, not in philosophies. . . Uncertainty alters this whole situation by removing the voters' perfect competence at relating every party decision to their own ideologies. Voters do not know in great detail what the decisions of the government are, and they cannot find out except at a significant cost. . . Under these conditions, many a voter finds party ideologies useful because they remove the necessity of his relating every issue to his own philosophy.

Downs, 1957, p. 98

Downs' seminal work stands like a monolith in studies of policy voting, but one of its key insights about the role of issues in voters' political universes has nonetheless gone underappreciated. His spatial model makes clear we should not expect citizens to vote on the basis on

exhaustive, issue-by-issue comparisons. Indeed, as confirmed by countless empirical studies of public opinion since, we should not even expect voters to hold coherent attitudes on most issues. Rather, the central mechanism of the Downsian model is an ideological dimension that binds parties to abstract societal goals. This is the space citizens use to understand politics and evaluate parties and candidates. The basic space theory expanded and formalized this understanding of how citizens engage in policy voting. The theory permits multiple (though limited) ideological dimensions beyond an economic left-right continuum and detailing the influence of political elites in creating mappings between the policy and ideological spaces. These linkages are defined and reinforced by political competition in a path dependent process: “the product of the accumulated experience citizens have with the political system” (Hinich and Munger, 1994, p. 165). The basic space theory is consistent with accumulated work from behavioral economics and cognitive science that emphasize humans’ proclivity to store and process information using heuristic strategies and spatially organized cognitive structures.

In this paper, we have tested the basic space theory with a novel approach based on multidimensional scaling (MDS). Our methodology specifically considers the way citizens structure their disagreements about policy matters, and in doing so addresses the important critique of the now-standard dimensional analyses of policy preferences raised by Broockman (2016) concerning voters who hold ideologically conflicting, extreme views. This allows us to consider the fault lines of public opinion in a different light.

Two influential approaches to the dimensionality question—one that rejects the existence of widespread ideological structure in mass policy preferences, and the other that conceives of such preferences as positions in high-dimensional space—provide unrealistic models of how voters navigate the political world. To the extent there is structure to be found in citizens’ policy disagreements, it consists of a small number of intertwined ideological dimensions. The inclusion of more than three latent dimensions provides only trivial improvements in fit.²¹ Even though the MDS procedure is entirely agnostic about the source(s) of the underlying disagreements across

²¹The results also suggest that individuals of type Broockman (2016) theorizes are not much evident in the data.

issues, we nonetheless recover a clear left-right ideological dimension.

For most of the electorate, a basic ideological space is behaviorally predictive and sufficient to capture the systematic component of their policy attitudes. This is especially true among citizens with moderate and high levels of political sophistication. To clarify, we do not mean to suggest voters' policy attitudes exhibit perfect or even high levels of ideological constraint, but rather we simply fail to find patterns that would seriously invalidate the use of aggregate policy scales. From a methodological perspective, this implies scales and indices are useful measurement tools for the vast majority of citizens. Scaling-based ideological estimates—whether from factor analysis, IRT models, or simple summated scales—are successful because they combine insights from measurement theory as well as the basic space theory to derive estimates of voter positions in a simplified cognitive space. This basic space consists of a small number of correlated dimensions and it—rather than the complex action space defined by the full universe of policy conflicts—structures citizens' issue attitudes, drives the policy component of voting behavior, and reflects citizens' basic value and affective dispositions.

Looking forward, there are some important avenues for future research. For one, methods such as individual differences scaling²² could be used to examine differences in the relative importance of the entangled ideological dimensions among subgroups of voters. Additionally, Broockman's (2016) argument that standard scaling procedures may conflate moderation in locations with mixed-extreme views does not only apply to the mass public. Given the use of these models for locating a host of actors—including members of Congress, Supreme Court justices, the President, and political parties and candidates—a key extension of the work we have done here would be to employ MDS to analyze these and other politicians. Because MDS allows “ideology” to be observed without imposing any assumptions that make it more or less likely, it is an extremely valuable method for assessing if a host of political institutions and actors are organized in the way we have come to think they are.

²²Also referred to as weighted or three-way multidimensional scaling (Borg and Groenen, 2010, pp. 449-494).

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