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From Policy Preferences to Partisan Support: A Quantitative Assessment of Political Culture in South Dakota

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Abstract

This study uses cross-county variation in support for 46 ballot measures to identify political subcultures in South Dakota and to study them. A hierarchical clustering method applied to county-level election returns allows the identification of subcultures at various levels of granularity. We choose a threshold that suggests seven subcultures as a useful summary of the data. While the allocation procedure employs only election returns as an input, the identified subcultures match observable regularities in demographics and geography. Subsequent factor analysis of election returns from the ballot measures reveals a multi-dimensional policy space. By contrast, a similar analysis of support for political candidates reveals a single partisan spectrum as a dominant feature of the data. A county's location in the revealed policy space well explains its location along this partisan spectrum. The link between policy and partisan preferences is robust to the inclusion of a wide variety of additional control measures.

Keywords: Constraint, political culture, partisanship, efficient classification

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1 Introduction

Legislative voting patterns exhibit a high degree of structure; a one-dimensional spectrum explains most of the variation in legislative votes.¹ Studies based on polling of individual voters, however, show that the members of the public generally exhibit minimal ‘constraint’ in their policy preferences; a voter’s position on one issue generally does not predict that voter’s position on another.² Why and how ideological/partisan structure in legislative politics emerges from the unstructured political preferences of the citizenry is a question of considerable importance to students of politics.³ We investigate intermediate stages of this process, identifying regularities in voters’ (aggregated, county-level) responses to specific pieces of proposed legislation (i.e. ballot measures), and corresponding levels of support for partisan candidates for political office.

The literature on political culture (Elazar 1984) provides a useful framework for organizing our thinking on these matters. This literature argues that ethnic, religious and other characteristics of locally dominant demographic groups help to shape state and/or local political institutions and outcomes. In contrast to the literature on constraint, these analyses operate under the maintained hypothesis that voting populations’ aggregated political behavior are consistent with underlying world views that are, to some degree, coherent and identifiable. A further presumption is that these world views are shaped by demographic and other criteria.

This paper introduces a new method for identifying political cultures, a hierarchical cluster analysis of election returns data. We apply this method to county-level election returns from 46 recent ballot measures in South Dakota.⁴ The method allows political subcultures to be

¹See Poole and Rosenthal (1997) among others.

²Converse (1964) introduces the concept of constraint in belief systems and provides the initial evidence that it is lacking in the political attitudes of the mass public.

³Feldman (2003, p.478), quoted in Linzer (2006), argues that unstructured political attitudes among the public are problematic for political theories of democracy. The lack of structure among voters, he argues, makes communication between elected officials and voters difficult, and undermines concepts of democratic representation.

⁴Election returns offer somewhat different information than do polling data. Ballot measures will take the force of law if enacted, responses are completely anonymous, and the outcomes follow campaigns that might shape opinions on the issues in question. One might better expect responses to reflect the considered opinions of the voters. The disadvantages of ballot measure data are 1) that they are aggregated (so we can

identified at various levels of granularity. At each level of granularity, the identified county groupings are plausibly linked to local demography, even though the classification procedure relies only on the political behavior of voters, not the demographic characteristics of the counties in which they reside. The results provide support to a key argument in the political culture literature: that local demographics drive political outcomes.⁵

The same data can be used to sketch the ideological landscape of South Dakota. Like authors investigating regularities in legislative voting behavior, we apply formal dimension-reduction techniques to our data on electoral responses. Factor analysis over the 46 referenda and initiated measures considered by South Dakota's voters over a 12-year period produces a seven-dimensional space, with only three dimensions explaining 70 percent of the overall cross-county variation in election returns. The factor analysis highlights the issues of primary division between the identified political subcultures. There appear to be consistent sources of division over related issues. These results further indicate more cohesion in electoral outcomes than the constraint literature would suggest, but still considerably less than is evident in studies of the legislative arena.⁶

In order to put the multidimensional nature of votes on the ballot measures in context we next turn to an analysis of electoral support for partisan candidates for state-wide political office. These elections include races for very different offices, with very different responsibilities (U.S. President, seats in the U.S. House and Senate, and South Dakota's Governorship). A factor analysis of county-level election returns from 1996-2006 returns a dominant single factor

not investigate regularities among individuals), 2) they may not cover as broad an area of the policy space as polls that are designed to investigate constraint. The large number of recent ballot measures faced by South Dakota voters offer a partial solution to the latter problem.

⁵The data do not allow us to distinguish between two possible reasons that demographics matter. First, it may be that demographic sub-populations have particular policy preferences, and the views of larger sub-populations dominate aggregate outcomes. Second, it may be that dominant populations affect world views of their neighbours. A claim that the first of these positions was the reason for our findings would be subject to critique based on the ecological fallacy. We are not making such claims, and we take arguments about the ecological fallacy to be tangential to our purpose. The behavior of aggregates is important in its own right, as it is aggregated voter behavior that determines political outcomes in a democratic system. In this, we concur with Snyder (1996; p. 464).

⁶Banducci (1998) reaches similar conclusions from a study of individual ballots from a single Oregon county in 1990. In her study, individual voters demonstrated a moderate degree of constraint. Three dimensions capture most of the variation in support for the eight ballot measures.

that explains more than 80 percent of the cross-county variation in support for the candidates. This is a partisan spectrum, and a robust one, a point made clear by the predictive power of county-level factor scores for outcomes in the out-of-sample state-wide elections of 2008. The tightness of these links suggest that high levels of partisan coherence emerge when voters have partisan labels available to them.⁷

Next we link our identified political subcultures to levels of partisan support for the candidates in state-wide races. We regress levels of partisan support on dummy variables representing the seven nominated subcultures. This regression reveals high levels of explanatory power. We take this as joint evidence that 1) the classification procedure has considerable merit, and 2) political subcultures as we have measured them explain a substantial portion of the variation in support for partisan candidates.

Finally, we turn to a more nuanced regression of county-level factor scores from the races for political office on the factor scores from our analysis of ballot measures. These regressions serve two purposes. First, they establish an even tighter link between counties' positions on the ballot measures and their partisan preferences in races for public office. Second, the regression coefficients offer an analytic guide to the way in which the complex ideological space suggested by patterns of support for the ballot measures is reduced to a single, dominant partisan spectrum. We find that a single factor from our analysis of the ballot measures explains more than half the cross-county variation along the partisan spectrum.⁸ Moreover, the seven factors that efficiently summarize voting on the ballot measures explain nearly all the variation in partisan preference. The relevance of these factors for partisan outcomes is robust to the inclusion of numerous control variables including partisan registration and a raft of county-level economic and demographic data.

The evidence leads us to a number of conclusions: First, when political questions are

⁷Tomz and Sniderman (2005) use polling data to show that voters exhibit more constraint when policy questions are accompanied by partisan cues. The findings here are related, but slightly different. We find high levels of structure in partisan races, and somewhat less structure on policy questions. The policy questions that voters face here contain no partisan cues, yet a moderate degree of structure emerges nonetheless.

⁸This factor separates rural, predominantly white counties from predominantly Native American counties. The most divisive issues along this axis involve the operation of the criminal justice system.

divorced from partisan affiliation, the views of the mass public appear to be considerably more complex than a simple left-right continuum would suggest. Second, the maintained hypotheses of the political culture literature are quite plausible: aggregated voting behavior is linked to the concerns of locally-dominant ethnic groups, and efficient classification methods identify subcultures that can be used to predict other political outcomes. Third, the high level of structure evident in legislative arenas is broadly reflected in votes for partisan candidates; one dominant partisan spectrum can explain county-level election returns across multiple races, offices, and candidates. Finally, political cultures identified by our procedures appear to be an important determinant of voters' preferences in partisan races.

2 Political culture

A state's or region's political culture reflects the aggregated preferences of a heterogeneous, complex electorate and is characterized by ethnic, racial, religious, economic, or broader worldview similarities (Elazar 1984). Our definition of culture follows Mead (2004, 274), who notes that culture is "widespread attitudes that shape how public institutions actually operate." Political culture, then, frames how citizens think about political institutions and the people who inhabit them (Hibbing and Theiss-Morse 1995; Welch and Peters 1980, 60-66; Joslyn 1980), the public policy decisions that are made by citizens and leaders in a state or region (Mead 2004, Erikson, Wright, and McIver 1993), and individual citizens' level of engagement with and opinions about politics in general (Fitzpatrick and Hero 1988, 150-151).

Approaches to measuring political culture vary, but two predominate. The first relies on Elazar's (1984, Chapter 5; 1976, 96-99) at-a-distance labelling of individual states and state political subcultures as moralistic, individualistic, or traditionalistic. Elazar's approach has engendered studies that attempt to explain cross-state variation political attitudes (Welch and Peters 1980, 66); inter-state differences in public policies (Mead 2004, 396; Wirt 1980); broad policy approaches to revenue generation, taxes, debt, and policy liberalism and innovation (Morgan and Watson 1991, 44-45); the political styles of political activists (Paddock 1997,

131); and the degree of party competition in a state (Fitzpatrick and Hero 1991, 150). The findings of these analyses suggest that Elazar's tri-cultural classification scheme—whether operationalizing the three subcultures with dummy variables or with more quantitatively rigorous approaches such as discriminant analyses of data on religious preference (Morgan and Watson 1991, 40-41)—frequently has a strong and significant predictive value in models of state political opinions and policy and electoral outcomes.

Support for Elazar's approach is mixed, however, and critiques come from two perspectives. The first, best characterized by Lowery and Sigelman (1982, 382), suggests that only weak causal arguments can be made about the relationships between each of Elazar's state subcultures and political participation or policy outcomes in a state. In multivariate models of political efficacy, governmental responsiveness, sense of civic duty, and sense of self-reliance, Lowery and Sigelman (1982, 380) find that Elazar's individualistic and moralistic subcultures differ little in substance or significance from states with traditionalistic subcultures. The implicit suggestion is that poor operationalization of Elazar's construct may be at the core of the poor performance of the moralistic, traditionalistic, and individualistic covariates in the aforementioned models (Dran et al. 1991, 29). Elazar's subcultures characterize mass publics, when, in fact, real differences across state subcultures owe to "elite cultures" (Lowery and Sigelman 1982, 383) or "cultural lag(s)" brought about by a homogenous perspective in the electorate that has failed to reach the institutions of state government.

A second critique of Elazar's work highlights the deterministic nature of the three-fold measure of political subcultures. While Sharkansky (1969) adapted Elazar's construct with an additive scale ranging from 1 (highly moralistic) to 9 (highly traditionalistic) and other scholars (Mead 2004; Fitzpatrick and Hero 1988; Wirt 1980; Peters and Welch 1980) have used Sharkansky's scale in a variety of ways, the typology and the operationalization of the scale suffer from two important flaws. First, and most importantly, Sharkansky's measure is unidimensional even though Elazar's construct suggests three separate—perhaps even orthogonal—dimensions (Johnson 1976). Second, Sharkansky's and subsequent measures

(Dran et al. 1991; Morgan and Watson 1991; Johnson 1976) presume that three categories, all carrying Elazar's labels, actually are contained in the data that is either coded or scaled underneath them. The most rigorous of these analyses by Dran et al. (1991) crafts items representing individualistic, traditionalistic, and moralistic cultures and later finds that the items factor loaded into three dimensions. These results should be unsurprising, however, because the measures are specifically constructed to find three dimensions.

The measurement approach taken by Dran et al. (1991) points to a more inductive analytic technique for measuring political culture: political geography. Because political cultures vary both between and within states (Nicholson-Crotty and Meier 2002), Elazar's state-wide labelling technique risks mischaracterizing states as being of one political culture or another. To both expose and address these concerns, Shelley and Archer (1989, 239) use factor analysis to establish regular voting patterns for a series of elections or votes that group together based on geography. Archer and Shelley (1986) and Archer and Taylor (1981) find that factor analysis can be used to identify electoral regions. These electoral regions can be captured by assessing voter behavior within defined electoral units such as counties or precincts, and by then assessing individual political subcultures within a broader unit of analysis, such as states (Kousser, Lewis, and Masket 2007; Shor, Berry and McCarty 2007; McCarty, Poole, and Rosenthal 2006; Gerber and Lewis 2004; Watrel and Foubert 2000, 206; Foubert 1996, 198). In a similar approach to ours, for example, Snyder (2005; 1996) uses a factor analysis of multiple votes over time in California to uncover regional variations in voter behavior and then maps those variations to the voting behavior of different regions' legislative representatives.

By stepping away from the assumption that states have homogenous political cultures, it becomes reasonable to examine states as comprised of potentially several political subcultures. This assumption also permits the use of single case studies (Nicholson-Crotty and Meier 2002) where the individual case—the state—is disaggregated into n-electoral units such as counties or precincts. Using appropriate analytic techniques, one then can directly (Dran et al. 1991)

assess the degree to which these individual electoral units “aggregate” into identifiable, unique political cultures within a state. As with the previously mentioned studies of political culture based on Elazar’s typology, one can use these identified political subcultures as predictive variables in models of regional voting behavior within a state. Supporting this, Foubert (2006, 218) notes that, “Through intensive [case] studies such as these, we could discern whether scalar politics in [one state] are similar to those in other states or whether they vary by region within the state.” Our focus is the latter question and it is to this task that we now turn.

2.1 Assessing South Dakota’s political (sub) cultures

For the purposes of this paper, we examine the political culture of South Dakota. South Dakota is a unique, high-leverage (Yin 1994, 40-41) case⁹ because over 12 years it presented voters with 46 ballot measures on a variety of social, economic, and government matters. For example, in 2006, South Dakota voters rendered decisions on three constitutional amendments, seven initiated measures, and one referred law. The issues covered in this wide cut of initiative and referenda voting included an all-out abortion ban, medical marijuana, judicial accountability, and more pedestrian changes to the state’s Constitution intended to tighten and clarify language (Anderson et al. 2008). Initiatives and referenda in particular are pervasive because South Dakota has a relatively low threshold for such measures reaching the ballot (5% of the electorate or approximately 16,700 voters). These initiatives and referenda—because of their diversity, scope, and volume, and because they are a separate vote stream from candidate votes—provide a novel opportunity to assess political subcultures within a state.

South Dakota’s political culture also provides a unique case because voters in the state have a deep ideological conflict between a kind of prairie populism or agrarian conservatism that favors limited government but that recognizes the value of federal government involvement in the state’s largest industry, agriculture (Lauck, Miller, and Hogan 2004, 158). For example, in the 1987 Supreme Court case *South Dakota v. Dole, Secretary of Transportation*, the state

⁹Not excepting the findings of Young and Sigelman (2008, 350), who suggest that North and South Dakota export the highest proportion of individuals who later are elected to Congress in other states.

held fast against the federal government mandate to adopt a minimum drinking age. While resisting federal government mandates, the state today ranks 7th among the American states in federal tax dollars received and 10th in the proportion of federal tax dollars it receives per dollar that South Dakota taxpayers pay to the Treasury.¹⁰ Such a political environment suggests a rich opportunity to deconstruct a deeply conflicted political culture that alternately is conservative, progressive, and pragmatic.

Past analyses of South Dakota's political culture offer a strong validity check against subsequent analyses such as ours. The approaches taken to analyzing South Dakota's political culture, however, are uneven, with some being entirely ad hoc and others, more formal. Consistent with the ad hoc approach, Elazar (1980, 277) notes that South Dakota is a "moralistic dominant, strong individualist strain" state with a foundation that from statehood pitted progressive and conservative blocs against one another (ibid 269-270). Later analyses have deconstructed this simple rendering of South Dakota's aggregated political culture, finding subcultures arrayed by temporal, cultural, and ethnic settlement patterns (Shortridge 1988, 207, 211-213; Ostergren 1983, 53, 62-72), population density (Clem 1995, 148-149); socioeconomic realities (Shortridge 1988, 214, 218), and geography more generally (Fouberg 2006; Lauck et al. 2004, 173-174; McLaird 1989, 456; Shortridge 1988, 210). Using analytic approaches as varied as a priori regional models (Fouberg 1996, 190) and factor analysis (Watrell and Fouberg 2000; Fouberg 1996), scholars have documented two (McLaird 1989); three (Clem 1995; Hogan 1995, 1991); four (Fouberg 2006, 215; Lauck et al. 2004; Watrell and Fouberg 2000, 205), and even five regional political cultures or clusters (Fouberg 1996, 198-199) in South Dakota.¹¹ The most rigorous of these analyses rely on voting patterns associated with single ballot issues such as gaming (Fouberg 1996) or multi-year analyses that focus on presidential elections (Watrell and Fouberg 2000).

¹⁰See <http://www.nemw.org/fundsrnk.htm>. Accessed 15 April 2009.

¹¹The regional cultures respectively break down as follows: two (East and West of the Missouri River); three (East and West River and Indian Country, alternately, Black Hills, Great Plains, and Agricultural Interior); four (Liberal, Increasingly Liberal, Increasingly Conservative, and Conservative); and five (religious settlement patterns and variations across Indian Country).

Further, South Dakota provides a useful laboratory for both documenting political culture and using those measures to understand electoral politics that one might naturally assume occur on a simple left-right or Liberal-Conservative continuum. Analyses only of voting behavior in South Dakota’s state legislative and gubernatorial races might presume that the state’s voters are strong conservatives who overwhelmingly favor Republican candidates. For example, in the 58 elections between 1901 and 2008, South Dakotans have seated 55 Republican majorities in the House and 50 in the Senate. Similarly, since statehood in 1889, South Dakotans have elected only four Democrats and one Populist to serve as governor. Even with these overwhelming trends in state politics, however, South Dakota’s Washington delegation has been checkboarded with party balancing: of the 25 US House members and 21 US Senators serving South Dakota since 1913, nine (9) and seven (7), respectively, were Democrats.

In sum, what may seem to be a simple Liberal-Conservative character to South Dakota’s—or any state’s—political culture may unwittingly mask political subculture heterogeneity. Such variation in South Dakota’s political subcultures may have explanatory value for understanding candidate voting patterns around the state. Supporting this notion, Fouberg (2006, 216) notes that defining voters only by party identification or labels such as “soccer mom” or a “female voter” may do a particular disservice to the more granular politics underneath each of these labels. Rigorous analyses of initiative and referendum voting by voters may, however, provide such granularity and offer insights into the political subcultures and voting pattern regularities of a particular state.

3 Identifying political subcultures with heirarchical clustering

Any effort to assign regions or people to particular political subcultures involves some loss of information. Classification schemes implicitly suggest a false homogeneity within subcultures. They also discard information about similarities between members of different subcultures. Understanding the nature and the degree of differences across subcultures requires subsequent

analysis.

While the inherent problems with classification remain in our analysis, we at least attempt to mitigate another weakness in much of the existing literature: the absence of replicability. Impressionistic approaches to classification like Elazar's impose subjective and often implicit weights on different types of data. We rely on a specific set of input data and an established, precise algorithm for classification. Impressionistic approaches are also unclear about the metric for choosing the number of identified subcultures. The procedure we propose directly associates the number of subcultures with a dissimilarity threshold defined by a Euclidean distance measure. The analysis also retains information about the links between subcultures, and these are presented in a figure. The figure provides the reader with sufficient information to identify subcultures at various levels of granularity.

The primary input data are normalized election returns on 46 ballot measures from 1996-2008. Ballot measures are an excellent input for exercises such as these, for they provide an explicit indicator of policy differences. Analyses of culture such as Elazar use information about voters' characteristics (ethnicity, religious affiliation, etc.) as an input. It will be clear from the results of our analysis that such factors are indeed indicative of differences in political behavior. Nonetheless, we demonstrate that revealed policy preferences alone are sufficient for a meaningful classification with considerable predictive power in other contexts.

We adopt hierarchical clustering as our classification method. This technique provides a formal method of classification into subcultures. The technique retains information on the links between subcultures.¹² We choose seven subcultures as a useful summary of the data, but we also provide the reader with sufficient information for assignment into a larger or smaller number of groups.

The dendrogram in Figure 1 illustrates the outcome of the hierarchical clustering

¹²The procedure requires two further analytical choices: a distance measure for summarizing the degree of dissimilarity between any two counties' election outcomes, and the choice of a specific algorithm. We use Stata's default measure of Euclidian distances, and the 'complete linkage' algorithm. A description of both the Euclidian distance and the complete linkage algorithm can be found in most multivariate statistics textbooks, including Mardia, et al. (1979, 360-393). Both are described in further detail in the appendix.

procedures. A vertical line stretches upward from each county or cluster. Horizontal lines linking the vertical lines indicate the distance at which two sub-clusters join.¹³ Once two counties/clusters are linked, the algorithm treats them as a higher-order cluster.¹⁴ The value of the complete linkage algorithm is that it tends to minimize overlap between the clusters, a point that will be evident in Figure 3.

Figure 1 allows an assignment of political cultures at various levels of granularity. Beginning at the top of the figure, the first division separates the seven counties with at least 55 percent Native American residents from South Dakota's remaining 59 counties.¹⁵ At a substantially lower level of dissimilarity, these 59 counties subdivide into two groups: one group of rural counties (mostly in central and NW South Dakota) and a second group of counties with generally larger population densities. Moving further down the figure, we observe each of these three clusters sub-divide again. Amongst low-population-density counties, Douglas County's voting behavior emerges as sufficiently different from that of the other rural counties to form its own cluster. The group of higher density counties subdivides into three; first a group of six geographically contiguous western counties splits away from the rest, followed by a division between the seven highest-density eastern counties and those with more moderate population densities. The group of seven counties with the largest shares of Native Americans at the right of the figure subdivides as well, with the three counties with the largest Native American majorities separating from those with smaller majorities.¹⁶

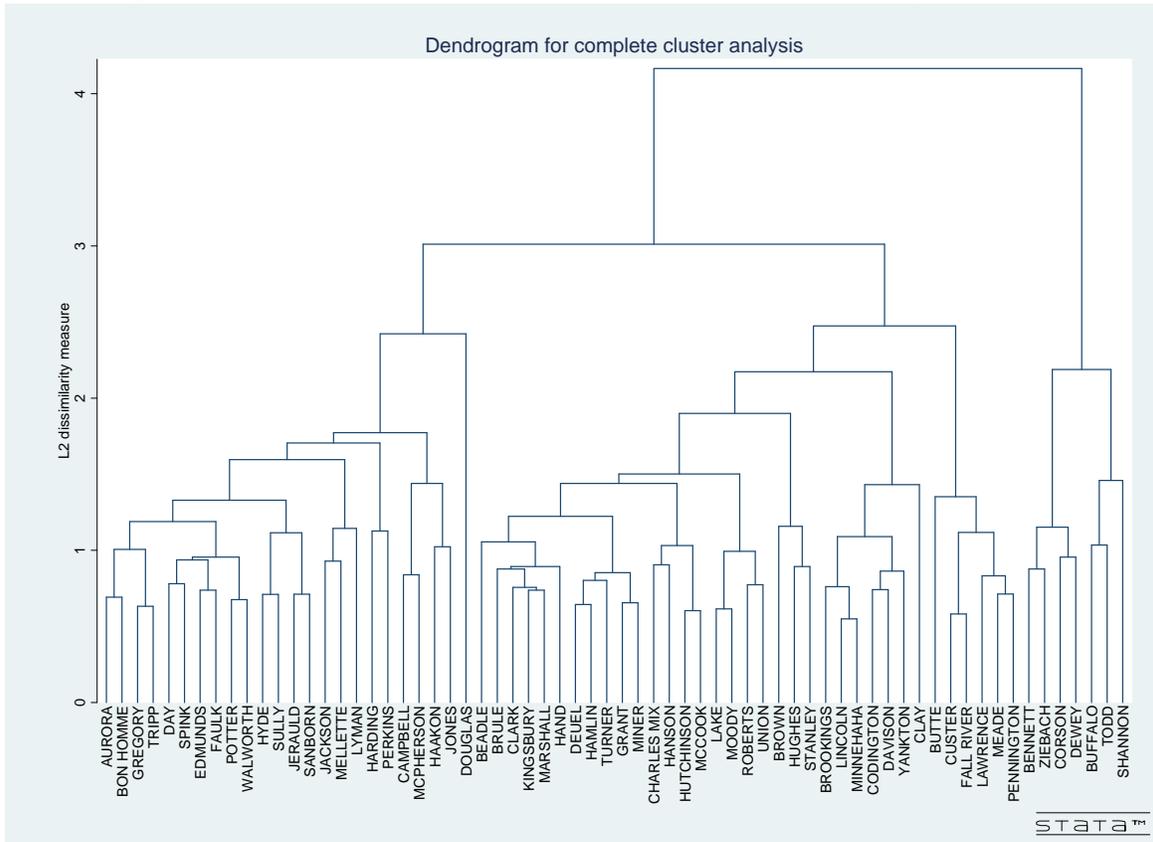
¹³This distance is the maximum Euclidian distance between members of each cluster.

¹⁴So, for example, the figure indicates that, across all 46 ballot measures, Lincoln and Minnehaha counties have the most similar election outcomes. These two counties form the initial cluster, and are treated as a single cluster for all subsequent analysis. Brookings County votes more similarly to this cluster than to any other cluster, so it joins this cluster at a slightly greater distance. At somewhat greater distances, this cluster merges with other high population density counties in eastern South Dakota.

¹⁵The proportion of Native Americans in each county is taken from US Census estimates from 2005.

¹⁶In the three counties at the far right of the figure, the Native American share of the population is greater than 0.75 (2005 census data). The Native American share in each of the other four counties lies between 0.55 and 0.75.

Figure 1: Hierarchical cluster over votes on ballot measures, 1996-2008



Results from the application of the complete linkage algorithm to normalized county-level election returns over 46 ballot measures. The dissimilarity measure is Euclidean distance. Subcultures identified at a dissimilarity threshold of two.

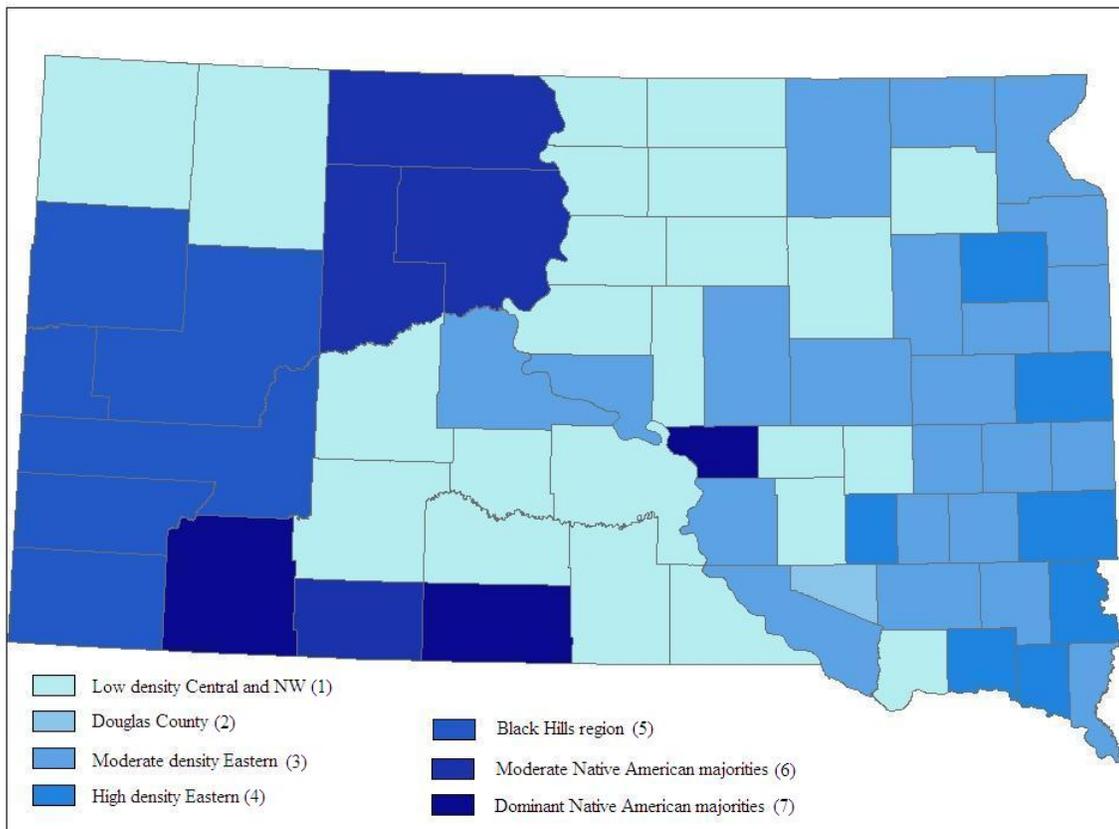
For the purposes of later analysis, we enumerate the identified subcultures at this point, with a dissimilarity threshold (a Euclidean distance of two in the clustering procedure) determining the number of cultures. Moving from left to right across the figure, the subcultures are numbered as follows:

1. Low population density counties in central and NW South Dakota,
2. Douglas County,
3. Moderate population density counties in eastern SD,
4. High population density counties in eastern SD,

5. The Black Hills region of western SD,
6. Counties with moderate Native American majorities,
7. Counties with dominant Native American majorities.

The geographic relationships between the enumerated cultures are evident in Figure 2. Lower-numbered cultures have lighter coloration and higher numbered cultures darker coloration, with the numerical value attached to each culture included in the figure's key.

Figure 2: Political subcultures in South Dakota



Much of the existing literature on political culture uses demographic information as an analytical input. The classification procedure employed here relies only on voting behavior,

but the strong links with demographic phenomena emerge nonetheless.¹⁷ In this, the results are consistent with much of the earlier work on political culture in South Dakota. Our hierarchical cluster analysis offers a method for identifying the most quantitatively important sources of these demographic divisions, and comparing these against alternative sources of division, such as geography.

The primary division amongst the political cultures, according to the procedure, separates seven predominantly Native American counties from the rest of the state. This is consistent with earlier work on the political culture of South Dakota, though we offer additional refinement. Watrel and Fouberg (2000) and Fouberg (1996) identify a single political subculture called “Indian Country.” At high levels of our dissimilarity measure, it is indeed adequate to group these counties together, but our work suggests a further refinement linked quite tightly to the degree to which Native American populations dominate the local demographics. We find that Indian Country political subcultures—rather than being distinguishable only by geography or tribal affiliation as one might expect—can be distinguished by differences in political behavior across initiatives and referenda we consider. These differences appear to be related, in the first instance, to the share of Native Americans in the local population.¹⁸

A secondary source of demographic division appears to be population density. Outside of Indian Country, the primary subdivision separates high- and low-population counties. This

¹⁷One interesting counterpart to our work is that of Lieske (2010) who employs demographic data as inputs, and identifies 11 cultures in the United States. Lieske’s classification of South Dakota counties is reasonably similar to ours, even though we use political outcomes and he uses demographic data. We note that Lieske’s Germanic and Nordic subcultures appear not to vote differently over the ballot measures; population density appears to be more relevant than this particular cultural distinction. Lieske also identifies several more counties as ‘Native American’ than we do. Our procedures reveal important differences amongst counties that Lieske labels as Native American.

¹⁸One likely explanation for these apparent differences in behavior would be the demographic mix. Subsequent factor analysis will reveal that the counties with the highest Native American shares (cluster 7) typically lie further from the rest of the state (and, in particular, from rural white counties) than do the counties in cluster 6. Since rural whites account for most of the non-native populations in Indian Country, it is not surprising that counties with larger shares of non-native voters would appear more similar to rural, predominantly white counties than counties that have quite small shares of the population that are not Native American. This composition argument, however, is subject to the ecological fallacy, so we raise it only as a possibility.

mapping is similar to existing definitions of political subcultures in South Dakota that find that the state may be simply divided, as Fouberg (2006, 215; 1996) notes, into higher and lower densely populated counties in the state.¹⁹ Within the group of higher-density counties subsequent divisions are linked to a combination of geography and population density. These findings are also consistent with the broader political culture literature, as well as the existing literature on South Dakota.²⁰

The emergence of Douglas County as a distinct political subculture is, as far as we are aware, a finding unique to our work. Douglas County distinguishes itself demographically from the rest of the state through its unusual religious profile. While all but five counties in South Dakota had pluralities of Lutheran or Catholic adherents in 2000, adherents of Reformed churches constituted a majority of Douglas County residents. No other county in South Dakota had as much as $\frac{1}{4}$ of its population attend Reformed churches.²¹ Subsequent analysis will illustrate that this particular religious profile is broadly consistent with the manner in which Douglas County voters distinguish themselves from voters in the rest of the state.

While the focus of our attention is these seven identified subcultures, it is nonetheless useful to note that broader patterns, including an interaction of demography with geography, are visible amongst even narrowly defined county groups. As Watrel and Fouberg (2000, 206) suggest, political subcultures may be largely geographically contiguous and, where such cross-county political subcultures are not contiguous, the political behavior(s) of counties appear to at least be related to ethnic and religious similarities and economic and political experiences (ibid., 208). For example, initiative and referendum voters in sparsely populated

¹⁹Fouberg suggests more simply that, owing to the growth of the Sioux Falls MSA, South Dakota's political regions may be roughly divided into two: Sioux Falls and the rest of the state. The dendrogram suggests, however, that the more useful division may be counties with higher densities of populations—most of which have at least one large town or city—and counties that are sparsely populated throughout.

²⁰Clem (2002), for example, focuses on population density as a determinant of political culture.

²¹Douglas County ranked 2nd nationally (behind Sioux County, Iowa) in congregants per capita in the Christian Reformed Church of North America, 2nd nationally (behind Sioux County, Iowa again) in congregants per capita in the Reformed Church in America, and 1st nationally in adherents per capita in Netherlands Reformed Congregations. Data from Jones, et al (2002), with county rankings taken from <http://ext.nazarene.org/rcms/stamet.html>

areas of the south central region of the state—including Bon Homme, Gregory, Aurora, and Tripp—are located in the left-most portion of the dendrogram. These counties, according to Ostergren (1983, 62-72), share a plurality or majority German, Eastern European, and Russian ancestry. Similarly, the counties most closely related to those at the left-most portion of the dendrogram and similarly sparsely populated—the contiguous county region including Spink, Faulk, Edmunds, Potter, and Day counties—each have plurality or majority German or Russian ancestry. These results suggest that our analysis, at least in sparsely populated areas in the state, is detecting differences in political subcultures that largely may be driven by historical ethnic and religious settlement patterns.

Overall, our analysis has revealed meaningful demographic and geographic divisions that emerge from a procedure that considers only political behavior over a robust sample of initiative and referendum votes. The results suggest important similarities with past work, but diverge in ways that show that our procedure offers more detail than extant studies of the state’s political culture. While geographic or ethnic similarities may provide a useful basis for considering or grouping political subcultures within a state, our analysis suggests important advantages to the use of behavioral measures. Our results do suggest that ethnicity, religious homogeneity or population density drives political behavior, but these forces also interact with geography in ways that are not immediately obvious. In total, our approach suggests that the rich initiative and referendum data we bring to bear here may provide sufficient nuance to better identify and understand political subcultures.

4 Factor analysis

While clustering is useful for subdividing political cultures, the process loses three types of information that are useful for subsequent analysis. First, clustering discards a substantial amount of information about the proximity of members of different clusters. Second, the assignment of counties to clusters suggests a false homogeneity within the cluster; the information on within-cluster variation in behavior is lost. Finally, the procedure discards

information on the types of issues over which the clusters separate. We adopt factor analysis as a secondary tool that addresses these shortcomings.

A large and influential literature has used techniques from multivariate statistics to locate political actors in implicit ideological space. Most commonly, these studies apply multivariate scaling techniques to up or down votes in legislative arena.²² Snyder (1996) applies factor analysis to election outcomes for ballot measures to locate Californian legislative districts on an implicit space. We apply a closely related technique to election returns from ballot measures for South Dakota counties.

Snyder (2005) provides the analytical framework that justifies an exercise like ours. The underlying assumptions are as follows:

1. each ballot measure can be described by two points (Yea and Nay) in multidimensional space;
2. all voters have Euclidean preferences;
3. voters vote for their most preferred alternative;
4. the distribution of the voters' ideal points is multivariate normal.

Snyder explains that there is some room to relax these assumptions, but we take assumptions 1-4 as relevant for our exercise.²³ Under these assumptions, the factor analysis over the inverse normal of the percentage of voters supporting each measure will be consistent with the underlying distribution of voter preferences assumed above.

We employ a factor analysis over county-level z-scores for all state-wide ballot measures during the period 1996-2008, using absolute voter turnout in 2000 as an analytic weight.²⁴

²²Poole and Rosenthal (1985, 1991, 1997), among others, investigate voting behavior in the U.S. Congress. Authors applying these techniques to state legislative votes include Aldrich and Batista (2002), Gerber and Lewis (2004), McCarty, Poole and Rosenthal (2006), and Kousser, Lewis and Masket (2007) and Shor, Berry and McCarty (2007).

²³In a multi-election analysis like Snyder's (1996), and ours, a further maintained assumption is that the underlying preferences of the voters are consistent over time. To the degree that variations in turnout are non-random, this is potentially problematic for a strict interpretation of the aggregation conditions.

²⁴Snyder (1996) uses legislative districts as his unit of observation; these have similar population levels by

The results of this analysis appear in Table 1. While the one-dimensional cohesion typically observed in studies of legislative behavior is absent, the factor analysis is nonetheless successful in substantially reducing the dimensionality of the problem. Election returns from the 46 ballot measures collapse into a 7-dimensional space. The first three dimensions alone explain more than 70 percent of the cross-county variance in initiative and referendum results over 12 years of voting in South Dakota.²⁵

Table 1: Factor analysis of ballot measures

Factor	Eigen value	Share of variance explained
1	15.528	0.338
2	11.125	0.242
3	5.872	0.128
4	2.920	0.064
5	1.924	0.042
6	1.206	0.026
7	1.008	0.022

Note: Principal components factor analysis over 46 ballot measures from 1996-2008. Year 2000 turnout used as analytic weights.

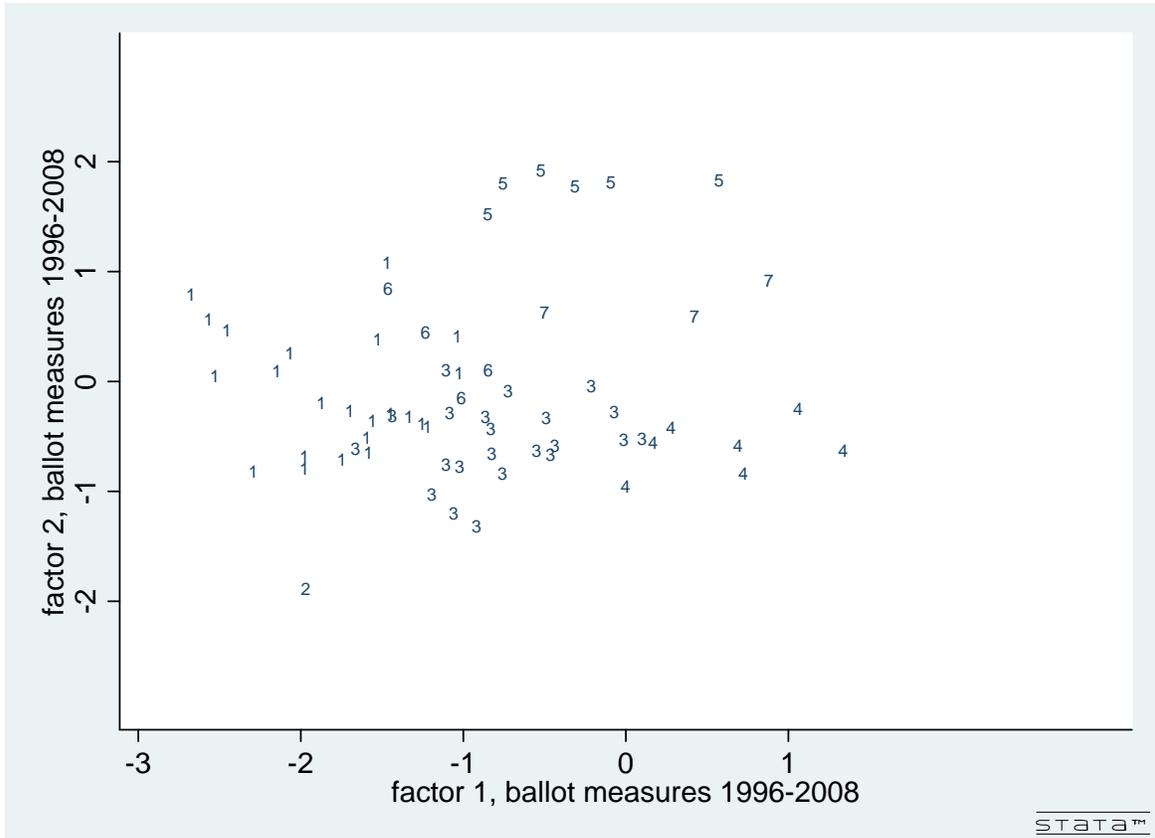
Figure 3 maps counties into two-dimensional factor space, using the first two dimensions identified in Table 1 as the axes. While all the issues contribute something to the separation of counties along factor 1, correlation between counties' factor 1 scores and the election returns from individual ballot measures suggests that separation along this dimension is most strongly associated with proposed changes in institutional structures such as reorganizing local government units, allowing local school boards to invest in the stock market, extending time for gubernatorial review of legislation, fixing the length of legislative sessions, amending the operation of the legislature, etc. Voters in high-population-density counties (groups 4

design. In our case, the political subdivisions (counties) differ substantially in both population and turnout. We correct for this problem by weighting larger counties more heavily in the analysis. Weighting according to total turnout in a presidential election year seems an appropriate way to account for variation in the sizes of counties' politically active electorates.

²⁵We are not primarily interested in explaining the factors, so we forgo the varimax rotation that Snyder (1996) uses to facilitate interpretation. We wish to keep the information about the degree of variance explained by each factor, so that the ranking of factors will have empirical content for what follows. We shall attempt a brief assessment of the revealed factors nonetheless, for there is still a substantial amount of information in the unrotated factors, and interpretation of the unrotated factors is not overly difficult.

and 5) and heavily Native American counties (group 7) are generally the most favourably disposed toward such proposed changes, while counties populated largely by rural whites (groups 1 and 2) are most opposed to such changes.

Figure 3: County positions along factors 1 and 2



County locations in a 2-dimensional space defined by factor analysis over the ballot measures. County positions are determined by factor scores. Counties are labelled by identified political cultures (as indicated in section III).

Factor 2 (measured along the y-axis) generally acts to separate western and eastern counties. The ballot measures with election returns most correlated with factor 2 scores address issues of particular interest to the western portion of the state - the use of proceeds of the sale of the state cement plant (located in the state's west), betting limits in the western town of Deadwood - as well as taxes on wealth (a proposed limit on property tax assessments and a proposed elimination of an inheritance tax). Western counties are generally more

supportive of reductions/caps in such taxes than are eastern counties, which is reflected here by the fact that Western counties tend to be located nearer the top of Figure 3.

Even though the factor analysis suggests that the first two dimensions only capture 58 percent of the overall variation in voting behavior, one can see the clusters emerging in Figure 3. This indicates that the two procedures summarize the voting behavior in a broadly similar way. The procedures use the same information (z-scores from the ballot measures as an input), but treat the data in very different ways. As noted above, various types of information are lost in the clustering, but the visible evidence here suggests that the procedure is quite good at producing coherent groupings.

Factors 3 and 4 also act to separate the clusters in meaningful and intuitive ways. Factor 3 separates Native American majority counties from the rest of the state. The primary issues associated with differentiation along factor 3 are oversight of the judiciary and the rights of the accused. Relative to the rest of the state counties with large numbers of Native American people (subcultures 6 and 7) are more supportive of restrictions on the judiciary and protections for dependents. At the opposite end of this spectrum lies Douglas County (subculture 2). Factor 4 further differentiates Douglas County from the rest of the state. Proposed bans on abortion and the short-selling of stock (both heavily backed by Douglas County voters) are the measures with election returns most correlated with Factor 4 scores.²⁶

A key premise of the political culture literature is that interactions between demography and geography affect voters' approaches to political questions. The factor analysis helps elucidate this point. Along factor 1, one can observe rural, primarily white counties offering more resistance to institutional changes than are voters either in Native American counties or counties with higher population densities. Given the history of the state, one might expect that such institutions emerged to serve the interests/needs of rural white voters, so it is not surprising to see greater resistance to such changes in counties that with large majorities of

²⁶While the factor analysis indicated that factors 5-7 also captured meaningful variation in cross-county election returns, this residual variation appears largely to be within-cluster variation, rather than cross-cluster variation. We omit further discussion of these factors, as they are quantitatively less important.

rural white voters. Along factor 2, regional issues, as well as approaches to taxing wealth, separate eastern and western voters. Factor 3 separates Native American counties from rural white counties, with issues surrounding the operation of the court system and the rights of the accused serving as a primary point of differentiation.

Douglas County separates from the rest of the state along several dimensions, especially the second, third and fourth. The county's voting behavior is consistent with a sort of Calvinist social conservatism that is consistent with its Reformed church religious tradition. Closer analysis suggests that the county tends to be an outlier along several dimensions, including a) support for state action to enforce a traditional sense of moral order, b) a tendency to favour retention of existing institutional structures, c) resistance to most efforts to reduce government revenues, as well as an enthusiasm for so-called "sin" taxes, and d) opposition to financial speculation/gambling, even when such opposition conflicts with government funding needs. Points (c) and (d) at least do not immediately suggest that Douglas County would offer unusually high levels of support for Republican candidates, as it does. Idiosyncrasies such as these help to motivate our exploration of the link between political attitudes and partisan preferences in the next section.

5 Support for political candidates

The previous section demonstrates that there are meaningful distinctions amongst the counties in their responses to a wide-ranging set of ballot measures, and that these responses allow the counties to be grouped into meaningful political subcultures. We now turn to the question of whether our classification is informative about the distribution of support for candidates for elective office. We demonstrate that the classification is highly predictive of relative levels of partisan support. We also show that the multidimensionality of the implicit ideological space is substantially reduced in elections for political candidates, and we parameterize this reduction in complexity with regression analysis.

The primary data input for this section is the election returns from all prominent races

for state-wide office from 1996-2008. We split the data, conducting a joint analysis of the 1996-2006 elections to explore commonalities across races and election years. We then use the election returns from the 2008 races for U.S. President, Senator and at-large Congressperson as an external validity check.

5.1 Factor analysis of votes for candidates (1996-2006)

Using the same procedures as were applied to the ballot measures, we conduct a factor analysis of county-wide variation in the support for candidates for 17 state-wide races for elective office in the period 1996-2006.²⁷ As with the ballot measures, we apply Snyder’s method, calculating z-scores of county electoral returns by normalizing the proportion of votes that go to the winning candidate, and then conducting factor analysis over the z-scores. The results of this analysis appear in Table 2.

Table 2: Factor analysis among state-wide elections for office, 1996-2006.

Factor	Eigen value	Share of variance explained
1	13.83	0.814
2	1.12	0.070

Note: Principal components factor analysis. Year 2000 turnout used as analytic weights.

The results in Table 2 suggest that a one-dimensional spectrum is quite useful for describing cross-county divisions in support for political candidates. More than 80 percent of the cross-county variation observed across all races is observed by this single factor. A reasonable description of this dominant factor is as a partisan spectrum. A county’s location along Factor 1 well explains the distribution of its two-party vote across two-major party candidates in any given state-wide election of political candidates. The (much less important) second factor appears to capture residual variation in counties’ tendency to support incumbents.²⁸

²⁷We include Gubernatorial, Presidential, and Senate races, as well as races from South Dakota’s at-large Congressional seat. Public Utilities Commissioners are also elected in state-wide elections, but we exclude these on the grounds that these candidates have very little name recognition.

²⁸In 12 of the 13 races involving incumbents, factor 2 scores were positively correlated with the incumbent’s vote share. The exception is the 1996 U.S. Senate race, in which a sitting, at-large Congressman defeated an

We next turn to an external validity check, and to evidence that the first dimension factor scores associated with the analysis in Table 2 reveal counties' partisan preference. We regress the winning candidate's share of the two-party vote in 2008 in each election on the factor scores (weighting this time by county-level turnout in 2008). We first regress on a single factor, then on two factors jointly. In our third specification we include the share of each counties' voters that are registered with each of the two major parties. The results appear in Table 3.

Table 3: Regression analysis of 2008 returns on factor scores from past elections

	McCain, R (US President)			Johnson, D (US Senate)			Herseth-Sandlin, D (US Congress – at large)		
Factor 1 (candidates)	0.085 ^a (0.005)	0.085 ^a (0.005)	0.067 ^a (0.007)	-0.067 ^a (0.005)	-0.068 ^a (0.002)	-0.067 ^a (0.007)	-0.064 ^a (0.009)	-0.066 ^a (0.003)	-0.075 ^a (0.007)
Factor 2 (candidates)		0.001 (0.004)	-0.004 (0.003)		0.019 ^a (0.002)	0.016 ^a (0.003)		0.028 ^a (0.003)	0.026 ^a (0.003)
Republican share of registered voters (2008)			0.465 ^a (0.082)			0.178 ^b (0.077)			0.187 ^b (0.086)
Democratic share (2008)			0.255 ^a (0.087)			0.188 ^b (0.082)			0.078 (0.09)
Constant	0.545 ^a (0.006)	0.545 ^a (0.006)	0.233 ^a (0.063)	0.623 ^a (0.005)	0.625 ^a (0.004)	0.471 ^a (0.059)	0.674 ^a (0.008)	0.676 ^a (0.004)	0.560 ^a (0.066)
R ²	0.915	0.915	0.944	0.855	0.917	0.925	0.771	0.903	0.911

All regressions have 66 observations. Counties' total voter turnout in 2008 used as analytic weights.

^a indicates significance at less than the 1% level. ^b indicates statistical significance at less than the 5% level.

In all regressions, the two dimensions extracted from past levels of support for partisan candidates explain nearly all of the variation in votes for the candidates in 2008, as measured by R^2 . Coefficient estimates indicate the response of the named candidate's share of the vote to a single standard deviation increase in the factor scores.²⁹ Along factor 1, for example, incumbent Senator. The incumbent/challenger distinction is not likely to be especially relevant in such a setting.

²⁹By construction, all of the factor scores have distributions with mean 0 and standard deviation 1 when

each standard deviation change in the county factor score raises the vote for John McCain by 8.5 percentage points. Vote shares for the two other winning candidates, both Democrats, are negatively related to factor 1 scores. Factor 1 scores hold up as statistically and quantitatively significant regressors, even after the partisan affiliation of counties' registered voters has been taken in to account.³⁰

The main lesson of these regressions is that there are quantitatively important, durable regularities in counties' election returns in state-wide races for public office. The dominant, single spectrum has a strongly partisan flavor, and remains quite informative as a predictor of election outcomes, even after partisan registration is taken into account.

5.2 Political culture and partisan preference

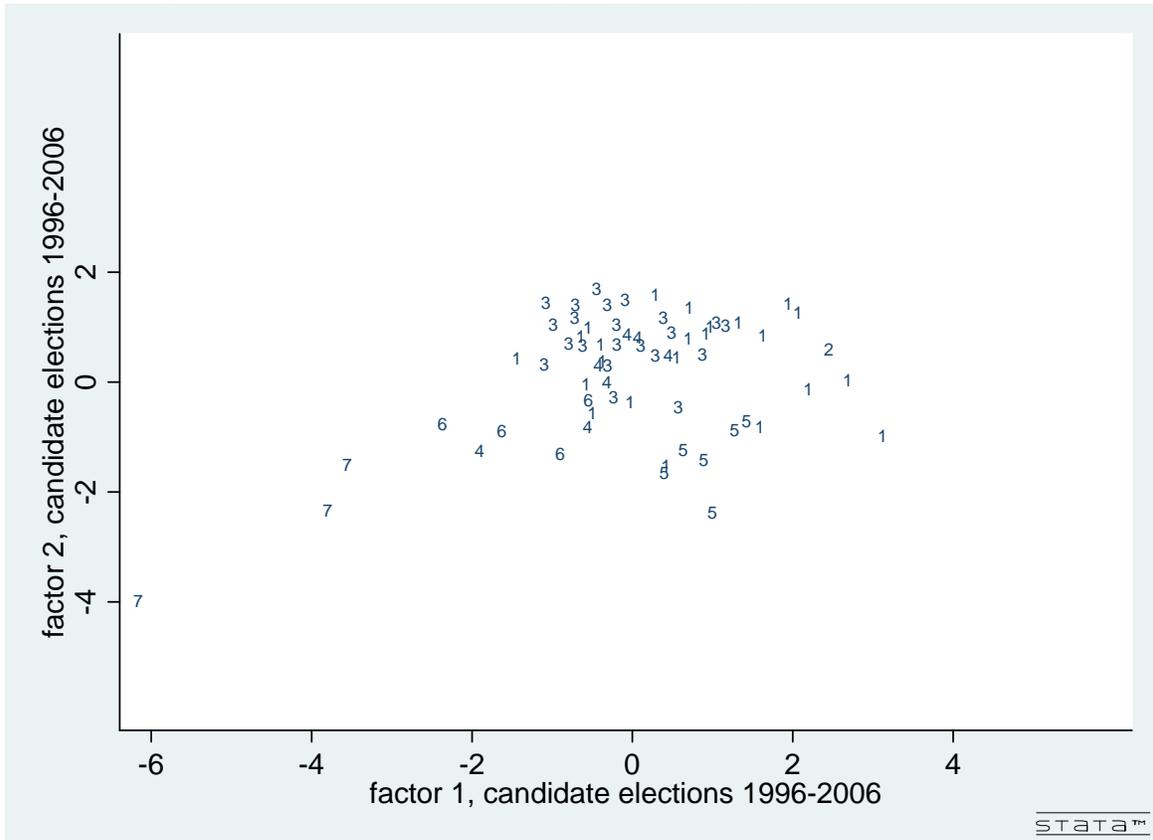
As the foundation literature suggests and as we expected, the simplicity of the variation in races for candidates belies the fair degree of complexity observed in votes over the ballot measures. An interesting question, therefore, is how the complexity in revealed policy preferences (the ballot measures) translates into support for partisan candidates. We address this question in two ways. First, we link counties' revealed partisan preferences to the political subcultures, and show that a county's membership in our nominated subcultures is quite informative about observed levels of support for political candidates/parties in that county. Second, we show that the factor scores taken from the analysis of ballot measures are even better predictors of outcomes in races for elective office.

Figure 4 maps counties onto the two-dimensional space generated by factor analysis of the support for state-wide candidates. Counties are labelled with the indicative numbers assigned earlier. There is a substantial amount of clustering of counties amongst the particular political subcultures identified above. This coherence suggests important regularities in political

2000 analytic weights are applied. Since we use 2008 turnout in this specification, the properties of the factor score distribution are not quite this clean.

³⁰As in many recent state-wide elections, the 2008 election returned majority support for candidates of different parties. This indicates that ticket-splitting was an important feature of South Dakota voters' behavior. We conducted an assessment of ticket splitting behavior, but were unable to identify strong regularities in counties' tendency to return (aggregate) evidence of ticket-splitting.

Figure 4: Distribution of county support for political candidates.



County locations in a 2-dimensional space defined by factor analysis over races for political office. County positions are determined by factor scores. Counties labelled by identified political cultures (as indicated in section III).

behavior. Counties that vote similarly on ballot measures appear to prefer similar candidates. To the degree that locations in the two-dimensional space can be summarized as partisan preference (x-axis, movement to the right indicates increasing support for Republicans) and support for incumbents (y-axis, movement up the page indicates increasing support for incumbents), it is possible to link the subcultures to important regularities in support for political candidates.

The distribution of counties in Figure 4 reflects cross-county divisions over political candidates. These are quite plausibly related to similar divisions over the ballot measures. Factor 1 from the analysis of votes featuring partisan candidates reveals divisions between

the heavily Native American counties (groups 6 and 7) and the rest of the state. The (year-2000-turnout-weighted) correlation between this factor and Factor 3 from the ballot measure analysis is 0.76. Factor 2 seems to separate eastern and western parts of the state, with the eastern portion of the state more supportive of incumbents. This division recalls factor 2 from the ballot measures, in which western and eastern counties divided over the taxation of wealth, among other things. The turnout-weighted correlation between these two factors is -0.75.

We provide further evidence that the identified political subcultures are useful for predicting support for political candidates. Table 4 reports the results of regressions of partisan preference indicators on a vector of fixed effects representing the political subcultures. Our interest is not in particular parameter estimates, though it is clear from the results in Table 4 that there are strong regularities in each of the subcultures' partisan preferences. Our focus instead is on the R^2 measures, which are consistently high. The classification of counties into political subcultures appears to be quite predictive of levels of support for partisan candidates. Fixed effects alone can explain more than 60 percent of the cross-county variation in support for candidates, both in general, and in the specific context of the 2008 elections. This is joint evidence that the clustering procedure has identified counties with similar political cultures, and that the identified subcultures are informative predictors of support for partisan candidates.

Despite the success of the classification procedure in the regression results in Table 4, we note that there is a substantial loss of information in any such procedure. Within-subculture variation is lost, as well as links between subcultures. Factor analysis of the ballot measures is better able to reflect the diversity of counties' responses to the ballot measures. Factor scores also help to highlight the types of issues that particular divisions represent. We now turn our attention to an assessment of how such divisions map onto support for political candidates.

We regress factor scores along the partisan spectrum on the factor scores that emerge from

Table 4: Regressions of candidate support on subculture fixed effects

	Factor 1 score, candidates	McCain vote share	Johnson vote share	Herseth-Sandlin vote share
Constant	0.411 (0.264)	0.609 ^a (0.023)	0.617 ^a (0.02)	0.676 ^a (0.016)
Subculture 2	2.042 ^a (0.263)	0.145 ^a (0.023)	-0.100 ^a (0.02)	-0.153 ^a (0.016)
Subculture 3	-0.636 (0.321)	-0.07 (0.03)	0.039 (0.026)	0.03 (0.022)
Subculture 4	-0.706 ^b (0.286)	-0.100 ^a (0.027)	0.021 (0.023)	0.025 (0.02)
Subculture 5	0.508 (0.275)	0.012 (0.026)	-0.077 ^a (0.02)	-0.105 ^a (0.018)
Subculture 6	-1.851 ^a (0.512)	-0.215 ^a (0.045)	0.136 ^a (0.043)	0.100b (0.042)
Subculture 7	-5.393 ^a (0.857)	-0.450 ^a (0.044)	0.281 ^a (0.039)	0.228 ^a (0.035)
R^2	0.624	0.632	0.622	0.693

All regressions have 66 observations. Counties' total voter turnout in 2000 used as analytic weights for column 1. 2008 turnout used in columns 2-4. ^a indicates significance at less than the 1% level. ^b indicates statistical significance at less than the 5% level.

the ballot measures. These results are reported in Table 5. We first run regressions with each of the ballot measure factor scores entering separately as independent variables. We report the results of the first 3 of these regressions.³¹ Factor 3 has the most salience for predicting counties' location along the partisan spectrum. 57 percent of the cross-county variation in partisan preference can be explained by a county's location along Factor 3.³² Factors 1 and 2, which are more relevant than Factor 3 for explaining support for the ballot measures, are of considerably less importance to counties' location along the partisan spectrum.

We assess the effects of policy preferences on partisan preferences jointly in subsequent regressions, including all seven factor scores (from the analysis of the ballot measures) as right hand side variables. The factors scores jointly explain 84 percent of the variation in the partisan preference variable. In the fifth column of Table 5, we add county-level Democratic and Republican registration as additional control variables. While these are somewhat correlated with the factor scores, the factor scores nonetheless remain an important source of independent information in these regressions. An empirical test that the factor scores are jointly irrelevant is firmly rejected. In column six we include a host of additional control variables, exploiting the wide variety of information available on economic and demographic characteristics at the county level.³³ Despite the wide variety of additional variables, the factor scores remain an important source of explained variation in the support for candidates. An F-test of irrelevance is soundly rejected once again. The results in Table 5 confirm that political culture, as observed in our assessment of the ballot measures, remains a significant feature of the political landscape, and helps to determine support for partisan candidates.³⁴

³¹Of factors 4-7, only factor 7 had a coefficient that was statistically significant. The R^2 for that regression was only 0.07, indicating relatively low explanatory power.

³²Recall that a county's location along Factor 3 is most closely associated with votes related to oversight of the judiciary and the rights of the accused.

³³The full table of results including all demographic variables is available on request.

³⁴We also ran the same specifications for each of the three 2008 races that were discussed above. The results were broadly consistent in terms of the signs and relative magnitudes of the coefficients.

Table 5: Dependence of partisan preferences on factor scores from ballot measures

	First dimension factor score, election of candidates 1996-2006					
Ballot measures (Factor 1)	-0.263 ^b (0.107)			-0.263 ^a (0.059)	-0.204 ^a (0.068)	-0.561 ^a (0.188)
Ballot measures (Factor 2)		0.321 ^a (0.106)		0.321 ^a (0.036)	0.164 ^a (0.035)	-0.072 (0.182)
Ballot measures (Factor 3)			0.755 ^a (0.076)	0.755 ^a (0.06)	0.411 ^a (0.097)	0.353 ^a (0.108)
Ballot measures (Factor 4)				0 (0.046)	0.077 ^b (0.03)	0.033 (0.046)
Ballot measures (Factor 5)				0.044 (0.066)	0.012 (0.044)	0.019 (0.044)
Ballot measures (Factor 6)				-0.134 ^a (0.044)	-0.04 (0.044)	-0.038 (0.043)
Ballot measures (Factor 7)				-0.283 ^a (0.049)	-0.167 ^a (0.038)	-0.106 (0.073)
Republican share of registered voters (2006)					1.859 (1.451)	-0.986 (1.481)
Democratic share of registered voters (2006)					-3.564 ^b (1.559)	-6.220 ^a (1.768)
Constant	0.000 (0.157)	0.000 (0.103)	0.000 (0.12)	0.000 (0.05)	0.42 (1.236)	-2.979 (2.414)
Control variables	None	None	None	None	None	All demographic and economic controls
R^2	0.069	0.103	0.570	0.842	0.926	0.975
p-value, test that coefficients on factor scores are jointly zero	0.016	0.004	0.000	0.000	0.000	0.000

All regressions have 66 observations. Counties' total voter turnout in 2000 used as analytic weights. Robust standard errors employed. ^a indicates significance at less than the 1% level. ^a indicates statistical significance at less than the 5% level. Control variables include measures of per capita income, population density and growth, age, racial and gender composition, religious affiliation, educational attainment, government spending at the federal, state and local levels, types of economic activity, partisan affiliation, and geographic dummy variables.

6 Conclusion

Evidence from polling data suggests that voters exhibit minimal constraint in their policy preferences. This is in sharp contrast to the behavior of legislators, whose votes can often be usefully mapped onto a single ideological spectrum. In an effort to help understand how this gap is bridged, we look for evidence of coherence in aggregated election returns. The political culture literature is a useful framework for understanding our work.

A potential weakness in the existing political culture literature is that the classification methods are often imprecise, and the types of information used as inputs are variable and/or unclear. For example, data on political behavior/attitudes are often considered jointly with other inputs such as demographics or historical circumstance. Our procedure applies a particular numerical algorithm for identifying clusters, and we restrict our input data to political behavior. Specifically, we use county vote shares from 46 state-wide ballot measures in South Dakota as the sole input. The clusters that emerge from this procedure reveal clear demographic divisions, even though the demographics are not employed as an input. Our procedure thus allows a better guide to which demographic data are most important, and to the ways in which demographic divisions manifest themselves in different political behavior.

In order to better identify these divisions, we conduct a factor analysis over levels of support for the ballot measures. Four sets of issues appear important for dividing South Dakota's political subcultures. First, a series of proposed administrative changes to the operation of state and local governments divides rural white counties from high density counties and counties with large Native American populations. Second, regional issues and proposed limits on wealth taxes separate the western and eastern parts of the state. Third, oversight of the judicial branch and the rights of the accused divide Native American voters from the rest of the state. Finally, proposed bans on abortion and short selling of stock further separate Douglas County from the rest of the state.

The apparent complexity of political attitudes that is evident in responses to the ballot measures largely disappears when the voters turn their attention to races for political office.

A single factor explains more than 80 percent of the cross-county variation in two-party vote shares in the races for political office. In the main, the identified political subcultures retain their coherence in partisan elections, but some of the underlying divisions over policy appear to be suppressed.

This last point raises some subsequent questions that lie beyond the scope of our paper. We identify persistent policy divisions that appear not to have much salience in decisions over races for political office. The divisions between heavily Native American counties and the rest of the state (and in particular, rural, majority-white counties) are important for explaining votes on the ballot measures, and remain critical to the partisan races. Other divisions identified in the ballot measures (between western and eastern South Dakota, and between high- and low-population majority-white counties) appear substantially less useful in explaining variation in partisan support. Given the wide mix of personalities and political responsibilities in recent Gubernatorial, Congressional and Presidential elections, one might have expected the partisan races to capture a bit more of the complexity evident in divisions over the ballot measures.

The contributions of this paper are methodological and descriptive. We add to the existing literature on political subculture by proposing a transparent numerical algorithm for classification. We propose ballot measures as an extremely useful input for such procedures. In the case of South Dakota's recent electoral history, which contains many ballot measures that cover a wide swathe of the policy space, the subcultures identified by our procedure map well onto observable demographic and geographic characteristics of South Dakota counties. The classification is also quite informative for explaining variation in county-level support for political candidates.

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Appendix A: Hierarchical clustering using Euclidean distance and the complete linkage algorithm

In this section we provide a more detailed description of the classification method we use to assign counties to political subcultures. Conceptually one can characterize the dissimilarity of voting behavior across counties with a distance measure that summarizes the gap between the two counties' election outcomes across all the ballot measures. Such a distance measure provides a continuous measure of the dissimilarity between each of the county pairs (66 counties implies 2145 county pairs for which the distance measure is calculated). The hierarchical clustering procedure employed in this paper is one of several nested grouping algorithms that group counties that are "close" to one another in terms of a given distance measure. We describe the groups or clusters that emerge from this process as political subcultures.

Before describing our specific clustering algorithm, we first note a transformation of the data that we conduct in order to be consistent with Snyder (2005) and the factor analysis that we conduct in a subsequent section of the paper. We take as our initial data the proportion of voters voting 'yea' (out of the total voting 'yea' or 'nay' on a given measure). Following Snyder, we apply an inverse normal distribution function to this proportion, converting the proportion of votes in favour of a proposition into a z-score that takes the value of zero at $p = 50$ percent.

There are $66 \times 46 = 3036$ scores characterizing the level of support for each measure in each county. We transform these into measures of Euclidean distance between each pair of counties. The Euclidean distance measure is calculated as

$$d_{ij} = \sum_m (z_i^m - z_j^m)^2,$$

where z is the z-score associated with each election outcome, i and j are county subscripts, and m indexes the ballot measures. Alternative measures of distance can be used in such applications, but we view the simple Euclidean distance as a straightforward and transparent metric.

There are a number of algorithms for using inputs such as the d_{ij} pairs to generate clusters. We choose the 'complete linkage' (or 'furthest neighbor') algorithm. Relative to other algorithms, the complete linkage algorithm tends to produce compact clusters, which we view as an important property for this particular exercise. The algorithm sorts the bilateral distance measures, and the two counties/clusters with the minimum value of d_{ij} are put into

a larger cluster. The distance between the new cluster and the remaining counties/clusters are calculated as the maximum of the bilateral d_{ij} measures between the members of the cluster and the counties outside the cluster. The distances are sorted once more, and the closest pair of counties/clusters are joined together into yet another higher-order cluster. This process continues until all of the counties have been grouped into a single cluster.

The dendrogram in Figure 1 illustrates the outcome of the clustering procedures. A vertical line stretches upward from each county or cluster. When the algorithm finds that a pair of counties/clusters is the minimum distance pair, the figure contains a horizontal line linking the pair of counties/clusters. The horizontal line is at a height that represents the Euclidean distance between the pair when the cluster is formed. A property of the complete linkage algorithm is that all the bilateral distances between counties within the cluster are no greater than the distance measure at which the cluster is formed.