

# A NEW MEASURE OF POLICY SPENDING PRIORITIES IN THE AMERICAN STATES

William G. Jacoby  
Department of Political Science  
Michigan State University  
303 South Kedzie Hall  
East Lansing, MI 48824  
[jacoby@msu.edu](mailto:jacoby@msu.edu)

Sandra K. Schneider  
Department of Political Science  
Michigan State University  
303 South Kedzie Hall  
East Lansing, MI 48824  
[sks@msu.edu](mailto:sks@msu.edu)

Many colleagues provided useful feedback on earlier versions of this paper. We particularly appreciate the excellent comments and suggestions from Robert Erikson, Richard Fording, Kim Hill, David Lowery, Andrea McAtee, and George Rabinowitz. We would also like to thank Daniel Lewis and William Myers for their assistance with the data collection. The yearly state policy priority scores obtained from the unfolding analysis, along with the data used to create the scores, the SAS macro to carry out the unfolding procedure, and all other supplemental materials are available on the authors' web sites:

<http://polisci.msu.edu/jacoby>

<http://polisci.msu.edu/schneider>

All of these materials are also available on the *Political Analysis* web site.

## **ABSTRACT**

In this paper, we develop and test a general measure of policy expenditures in the American states. Our approach is to construct a spatial proximity model of yearly state program spending. The empirical analysis reveals that state spending patterns vary along a clear and readily-interpretable unidimensional continuum which differentiates policies that provide particularized benefits to needy constituencies from policies that provide broader collective goods. Based upon standard evaluative criteria, the variable created from our model possesses some highly desirable characteristics. And, it compares favorably to other measures of state policy activity. The net result is a yearly score for each state which summarizes that state's spending across all major program areas. More generally, we believe that our variable can be interpreted as valid and reliable representational measurement of state policy priorities. In this capacity, it could occupy an important position within models of state politics.

## 1. INTRODUCTION

This paper introduces a new variable that provides representational measurement of policy expenditures in the American states over time. Specifically, we construct a geometric model in which yearly state spending on policies is represented as distances between points within a space. This approach is useful because measurement is, itself, a formal model of empirical phenomena (Jacoby 1999). In our model, the locations of the points assigned to the states constitute an empirical variable which reflects differences in state spending allocations across policies. The advantage of using a model-based approach is that models can be assessed according to an unambiguous set of evaluative standards: Parsimony, explanatory power, and substantive utility (King, Keohane, and Verba 1994). Based upon these criteria, our variable possesses some highly desirable characteristics.

Equally important, the variable generated by our model reveals a clear and readily-interpretable unidimensional structure: State government spending varies along a continuum ranging from policies that provide particularized benefits to policies that promote broader collective goods. At the very least, our geometric model provides a yearly score for each state which summarizes very accurately that state's expenditures across all major program areas. But, our variable explicitly depicts the tradeoffs that states make in allocating resources across program areas. Therefore, it can be interpreted as an empirical representation of state spending priorities. In this capacity, it could occupy an important position within models of state politics.

## 2. BACKGROUND

American state governments have developed a wide array of public policies in order to deal with the social problems, political issues, and constituent demands that confront them. Some states devote a great deal of resources to issues that are downplayed in other states. As a result, the exact package of policies differs markedly from one state to the next. This extreme heterogeneity in public policy activity is one of the most frequently-

noted characteristics of American state politics (Sharkansky and Hofferbert 1969; Hofferbert 1874; Erikson, Wright, McIver 1993; Ringquist and Garand 1999; Gray 2004). Therefore, it is important to determine whether this variability can be characterized succinctly, in a way that provides insights regarding the nature of the policy differences that exist across the states.

Our analysis is based upon the fundamental assumption that state public policies have an underlying structure which transcends specific program areas. This important idea seems to have originated in the early writings of Richard I. Hofferbert, who emphasized the existence of “common policy orientations” (Hofferbert 1966, p. 74) and “*dimensions* of policy” (Sharkansky and Hofferbert 1969, p. 867, emphasis in the original). The basic point is straightforward: State public policy is a general orientation on the part of each state government; it goes beyond the individual, specific actions that a state may undertake to address pressing social problems and issues. While there have been some dissenters over the years (e.g., Gray 1974; Sabatier and Jenkins-Smith 1993; Stone 2002), this perspective still holds a prominent position among scholars of American state politics (e.g., Garand and Hendrick 1991; Erikson, Wright, McIver 1993; Berry, Ringquist, Fording, Hanson 1998).

Hofferbert was also very influential in determining how political scientists operationalize state public policy. His work led the way in using data reduction techniques such as factor analysis to summarize many policy indicators simultaneously. Subsequent researchers have followed suit (Klingman and Lammers 1984; Wright, Erikson, McIver 1987). Although their exact results differ somewhat, these studies all demonstrate that there is a systematic, coherent framework underlying the ways that states address the broad array of pressures confronting them.

The strong points of this analytic strategy have been widely recognized (Hill, Leighley, and Hinton-Andersson 1995). But, it is also important to acknowledge that there are some potentially serious problems in the resultant policy measures. For example, the variables employed in the factor analytic studies encompass a wide range of governmental activities

(e.g., program expenditures, legislative provisions, program adoptions, tax progressivity, etc.). These indicators cover many *different* aspects of the public policy-making process, even though the underlying actors, institutions, and dynamics vary markedly between them (Kingdon 1984; Sabatier and Jenkins-Smith 1993).

Furthermore, these studies usually combine data from several time points, spanning periods from seven to fifteen years long. This is problematic because policy considerations almost certainly change over time (Ringquist and Garand 1999). Any such temporal variability is lost when the data are combined into a single summary index. For both of the preceding reasons, it is impossible to say exactly which, if any, specific aspect of the policy process is represented in the respective summary measures of state policy.

Still another problem with the factor analytic studies is that each one focuses only on a researcher-specified subset of program areas. Thus, Sharkansky and Hofferbert (1969) perform some preliminary analyses in order to isolate a subset of policy variables that produce a “clean” factor solution. Similarly, Klingman and Lammers only examine “. . . the types of policies . . . that . . . are associated with . . . a liberal position in American politics . . . (1984, page 600).” Wright, Erikson, and McIver limit their analysis to those “. . . policy variables that reflect the usual ideological distinctions between liberalism and conservatism (1987, page 985).” While these steps might produce more easily interpretable analytic results, they inevitably ignore or discard information about state spending and policymaking in a variety of other program areas.

Reliance on a selective subset of policies also introduces potential biases into the empirical results. Real-life differences in state policies may not conform to the analysts’ a priori specification about the nature of interstate variability in policymaking, and/or to their own beliefs about a general ideological dimension. If that is the case, then the preceding general policy measures run the risk of misrepresenting the ways that state governments deal with societal problems and issues.

### 3. A STRATEGY FOR MEASURING STATE POLICY SPENDING

Our objective is to create a new measure of state policy outputs which overcomes the limitations described in the previous section. We focus strictly on government spending precisely because expenditures represent an identifiable and central component of the policy process (Elling 1983; Hansen 1990; Raimondo 1996). Furthermore, the consensus of scholarly opinion clearly holds that expenditures across substantive areas provide accurate representations of governmental commitments to address various problems—in short, the states’ policy *priorities* (Garand 1985; Budge and Hofferbert 1990; Garand and Hendrick 1991; Peterson 1995; Ringquist and Garand 1999; Jacoby and Schneider 2001).

By using state expenditures, we avoid the problems engendered by mixing heterogeneous phenomena within a single variable. We will incorporate spending across a very wide range of substantive areas, covering nearly the full span of programmatic commitments by state governments. Therefore, we also avoid any problems that might arise from focusing on a more limited subset of programs or policies. And, we will look at *yearly* state expenditures, thereby making it possible to evaluate stability and change in state spending priorities over time.

#### 3.1. Data

The raw data for our analysis consist of yearly state expenditures in nine policy areas: Corrections; education; government administration; health; highways; hospitals; parks and natural resources; law enforcement; and welfare.<sup>1</sup> Note that the policy categories, themselves, are defined by the federal government. The category definitions are fairly broad, in order to facilitate comparisons across states and over time (U.S. Census Bureau 2006). The dataset currently covers the time period from 1982 through 2005. All of this spending information is obtained from *State Government Finances* (U.S. Department of Commerce 1983-2006).

Our analysis seeks to explain the states’ *relative* priorities across the different policy areas. We are not interested in examining *how much* states spend on different programs. Instead, this analysis focuses on how states divide up their yearly pools of available resources. For

this reason, the policy-specific spending values within each state for each year are expressed as proportions of the total policy expenditures for that state across all nine categories for that year. In other words, the nine data values that are actually employed in the analysis will sum to 1.00 for each state in each year. This provides a yearly measure of variability in policy allocations across the states while still effectively controlling for such features as state size, overall spending levels, costs of living, inflation, and the like.<sup>2</sup>

### 3.2. The Spatial Proximity Model

Our analysis will construct a specific geometric representation, called a “spatial proximity model,” of the state spending data. The basic idea behind this model is very simple. For each year, the fifty states and the nine policy areas are shown as two sets of points located along a common continuum. The relative positions of the points are determined by the empirical expenditure values: State  $i$ ’s spending on policy  $j$  is inversely proportional to the distance between the point representing  $i$  and the point representing  $j$ : As spending increases, this distance gets smaller and vice versa. Thus, state points will tend to be located close to the points representing policies for which their relative spending levels are high and far from the points representing policies where their relative spending levels are low.<sup>3</sup>

The spatial proximity model of yearly state policy spending can be represented as follows:

$$c - x_{ijt} = |s_{it} - p_j| + e_{ijt} \tag{1a}$$

On the left-hand side of equation (1a),  $x_{ijt}$  is state  $i$ ’s relative expenditure on policy  $j$  in year  $t$  and  $c$  is a constant, greater than or equal to the maximum  $x_{ijt}$ . On the right-hand side,  $s_{it}$  is the coordinate for the point representing state  $i$  in year  $t$ ,  $p_j$  is the coordinate for the point representing policy  $j$ , and  $e_{ijt}$  is an error term. Subtracting the  $x_{ijt}$ ’s from  $c$  “reflects” them so that higher spending levels correspond to lower data values, and vice versa. In the present case, it is natural to set  $c = 1$ , since the input data are proportions of yearly state spending and they accordingly sum to one within every state for every year. Also note that

the first term on the right-hand side of equation (1a) is simply the Euclidean distance, in unidimensional space, between  $s_{it}$  and  $p_j$ . Thus, equation (1a) can be re-expressed more succinctly, as follows:

$$x_{ijt}^* = d_{ijt} + e_{ijt} \tag{1b}$$

In equation (1b),  $x_{ijt}^*$  is the reflected value for state  $i$ 's spending on policy  $j$  in year  $t$ , and  $d_{ijt}$  is the distance between the point representing state  $i$  in year  $t$  and the point representing policy  $j$ .

The analytic objective is to find point coordinates for the states and policies such that the distances between the two sets of points approximate the reflected spending values as closely as possible, for all fifty states, nine policies, and 24 years. That is, find  $s_{it}$ 's and  $p_j$ 's such that  $x_{ijt}^* \approx d_{ijt}$  for  $i = 1, 2, \dots, 50$ ,  $j = 1, 2, \dots, 9$ , and  $t = 1982, 1983, \dots, 2005$ . If this can be accomplished, then the relative positions of the points may provide useful insights about substantive similarities and differences across the policies and also across the states. For example, policies that receive similar proportional allocations in state budgets will be represented by points that fall close to each other along the dimension. Policies that exhibit contrasting spending patterns— high relative expenditures in one policy area coincide with small expenditures in another— will be shown as widely-separated points. In the same manner, states with similar spending profiles (i.e., they allocate similar percentages of their funds to the respective policy areas) will have points that are located close to each other along the dimension while states with markedly different spending priorities will show larger distances between their points.

In carrying out the analysis, we will hold the policy points at fixed locations across the 1982-2005 period. This is equivalent to assuming that the substantive meanings of the respective policy areas remain constant over time.<sup>4</sup> On the other hand, the state points will be located separately for each year. To the extent that any movements occur over time in

the positions of the state points, they should conform to temporal changes in state spending patterns.

### 3.3. Advantages of the Spatial Proximity Model

The model we are proposing overcomes all of the previously-described limitations associated with the other measures of state policy activity. The spatial proximity model: (1) represents a single component of the policy process— spending— rather than a broad combination of different indicators; (2) provides yearly measurements for the states, rather than a single score for each state which extends across a longer time period; and (3) covers the full range of substantive policy areas, rather than an arbitrarily-selected subset. Building upon the latter point, it is also important to emphasize that the relative positions of the state and policy points are estimated from the data; they are *not* based upon any a priori assumptions about the substantive nature of an underlying dimension. This means that the final model should provide a very accurate representation of the variability which actually exists in state spending patterns.

The point locations in the spatial proximity model are estimated empirically, so the *meaning* of the dimension along which they are placed cannot be specified in advance of the analysis. Instead, the dimension is interpreted by looking for recognizable patterns in the relative positions of the policy and state points. Admittedly, this introduces a degree of subjectivity into the definition of our state policy variable. But, the analysis will show how the states really do vary in their spending allocations across program areas. And, we believe that this ultimately will prove to be more productive than simply determining the degree to which state policy activity conforms to some pre-specified criterion, such as a liberal-conservative continuum (which is, itself, highly amenable to subjective interpretation).

The spatial proximity model has still another advantage over the more commonly-used factor analytic approach. Factor analysis models linear correlations between columns (or rows) of a data matrix as angles between vectors. If the data contain nonrandom patterns which are also nonlinear in form, then a factor analysis will almost certainly produce “extra”

factors in order to account for the nonlinearities. This is not necessarily the case with the spatial proximity model, which represents entries in the data matrix as distances between points. These distances can readily incorporate a variety of nonlinear data patterns. Thus, the spatial proximity model produces lower-dimensioned— and hence, more parsimonious— depictions of the spending data than does the factor analytic model. This contrast between proximity and factor representations of empirical data has long been recognized in the literature on scaling methods and dimensional analysis (e.g., Coombs 1964; Weisberg 1974; Jacoby 1991; Van Schuur and Kiers 1994). We argue that the parsimony of the spatial proximity model provides an important advantage over other measures of state policy outputs which have appeared in the previous research literature.<sup>5</sup>

#### 4. OPERATIONALIZING THE SPATIAL PROXIMITY MODEL

The spatial proximity model contains two sets of parameters: A set of 1,200 points representing the states in each year (designated  $s_{it}$ , with  $i$  ranging from 1 to 50 and  $t$  ranging from 1982 to 2005) and another set of nine points representing the policy areas (designated  $p_1, p_2, \dots, p_9$ ). Many specific procedures— usually called “unfolding techniques”— have been developed to estimate the parameters of the spatial proximity model (e.g., Cox and Cox 2001; Borg and Groenen 2005). Our analysis uses a metric, least-squares unfolding method developed by Keith Poole (1984). The overall approach is called “unfolding” because, according to the geometry of the model, a state’s profile of (reflected) spending values can be obtained by “folding” the unidimensional continuum at the location of the state’s point (Coombs 1964).

The scaling task is the opposite of this process: We begin with the folded versions of the dimension (i.e., the reflected input data values) and seek to “unfold” them simultaneously across all states, in order to estimate the dimension itself (i.e., the relative positions of the state and policy points). The method is “metric” because it assumes that the input data are measured at the interval level or higher (many unfolding techniques only assume ordinal or even nominal measurement levels). The method is “least-squares” because its immediate

analytic objective is to find the set of state and policy point locations such that the squared errors between distances and data values are minimized. That is, for  $i = 1$  to 50,  $j = 1$  to 9, and  $t = 1982$  to 2005, find:

$$d_{ijt} = |s_{it} - p_j| \quad (2)$$

Such that the squared discrepancies, or errors, between distances and data values are minimized:

$$\text{Minimize } \sum e_{ijt}^2 = \sum_{i=1}^{50} \sum_{j=1}^9 \sum_{t=1982}^{2005} (d_{ijt} - x_{ijt}^*)^2 \quad (3)$$

Alternatively, the procedure seeks to maximize the correlation between the interpoint distances and the reflected program expenditures.

Readers are referred to Poole’s original article (Poole 1984) for theoretical background and technical development on this least-squares, metric unfolding technique. The scaling strategy is quite simple, although the notation and computations can be a bit cumbersome. The remainder of this section contains a brief, largely informal, description of the methodology.

#### 4.1. The Conditional Global Minimum Criterion

Let us consider a strategy for estimating the positions of one point set (representing either the states or the policies) conditional upon fixed locations of the other point set (policy or state points, respectively). For this discussion, assume that we are estimating policy points, with fixed state points. Imagine that each state point,  $s_{it}$  has attached to it nine different vectors— one for each policy in that year. The length of each such vector (say, for the  $j^{th}$  policy) is equal to the state’s (reflected) spending value for that policy during that year,  $x_{ijt}^*$ . Since we are considering a unidimensional model, each of these vectors can only point in one of two directions— to the left or the right of the state point to which it is attached. In either case, the terminal point of each vector,  $t_{ijt}$ , can be calculated as one of the following:

$$t_{ijt} = s_{it} - x_{ijt}^* \quad (4a)$$

$$t_{ijt} = s_{it} + x_{ijt}^* \quad (4b)$$

Condition (4a) is used when state  $i$ 's vector for policy  $j$  points to the left of the state point, and condition (4b) is used when the vector points toward the right. The sum of squared errors for any given policy,  $j$  can be calculated as:

$$\sum e_j^2 = \sum_{i=1}^{50} \sum_{t=1982}^{2005} (x_{ijt}^* - d_{ijt})^2 = \sum_{i=1}^{50} \sum_{t=1982}^{2005} (x_{ijt}^* - |s_{it} - p_j|)^2 \quad (5)$$

On the right-hand side of equation (5), the  $x_{ijt}^*$  are the reflected data values and the  $s_{it}$  are fixed by construction. Therefore, only the  $p_j$  values can be manipulated.

For any given policy, this sum of squared errors is minimized when the states' vectors are all pointed in the correct direction (i.e., directly toward the location of policy  $j$ , rather than away from it) and the policy location is estimated as the centroid of the vector terminal points. That is:

$$p_j = \frac{\sum_{i=1}^{50} \sum_{t=1982}^{2005} t_{ijt}}{50 \times 24} \quad (6)$$

This estimate of the policy point location is called the *conditional global minimum* (CGM). It is a “minimum” in the sense that it is the  $p_j$  value which produces the smallest possible value of  $\sum e_j^2$ . It is “conditional” because the result only holds when the state points, the  $s_{it}$ 's, are held fixed at their current locations. But, within this constraint, it is a “global” minimum: No other value of  $p_j$  will produce a smaller squared error (Poole 1984).

## 4.2. A Scaling Procedure Based Upon CGM

The preceding result leads to a particularly simple and exhaustive, but computationally-intensive, search procedure for finding the optimal policy location, relative to the currently-fixed state points. The states comprise 1,200 (i.e., the 50 states in each of 24 years) different locations along the dimension, and their points therefore divide the dimension into 1,201 distinct intervals. Start by tentatively placing the policy point to the left of the leftmost state point; in this case, all 1,200 vectors will point to the left, and the  $t_{ijt}$  values would be calculated according to equation (4a). Use equation (6) to estimate the tentative policy location (designate this  $\hat{p}_j$ , with the carat indicating that it is only a tentative point location

at this stage of the estimation process), and also calculate the variance associated with this tentative position, as follows:

$$var(\hat{p}_j) = \frac{\sum_{i=1}^{1200} (t_{ijt} - \hat{p}_j)^2}{1,200} \quad (7)$$

Next, “move” the policy point to the second interval along the dimension (i.e., between the first and second state point locations). Note that, in doing so, one vector reverses direction—the one that originates from the leftmost state point (that is, the  $s_{it}$  with the smallest coordinate value along the continuum). For the latter state,  $t_{ijt}$  is calculated using equation (4b); the remaining 1,199 states still use (4a). Calculate a new value for  $\hat{p}_j$  and also a new value for  $var(\hat{p}_j)$ . If this latter variance is smaller than the first one, then there is less error associated with the second, tentative policy point location. Therefore, the policy point should be moved to this new centroid.

This process continues, “moving” the policy point into each successive interval between adjacent pairs of state points. Upon each such movement, one more state uses equation (4b) to calculate its  $t_{ijt}$  value. After the policy point has been tried in each of the 1,201 intervals (i.e., it is moved all the way to the right of the rightmost state point), the final policy point location estimate,  $p_j$ , is the centroid value ( $\hat{p}_j$ ) that was associated with the smallest value of  $var(\hat{p}_j)$ . Again, this is a global minimum for the amount of error associated with the position of  $p_j$ , conditional upon the current, fixed set of state points (Poole 1984). Hence,  $p_j$  is referred to as the “CGM estimate” of the policy point location.

The “point moving” procedure is repeated for each of the nine policies in order to obtain the least squares estimate of the point location for each one. Then, the two point sets (policies and states) are interchanged and the search procedure is repeated. In other words, the vectors are now conceived as originating from the policy points and terminating at the various state points. The policy points are held fixed at their current locations,  $p_1, p_2, \dots, p_j, \dots, p_9$ , and each of the 1,200 state points are tried in each of the 10 resultant intervals

along the dimension. As before, each state’s estimated point location is set to the centroid of vector termini that is associated with the smallest  $var(\hat{s}_{it})$  value.

A single iteration of the CGM procedure consists of two complete sets of point movements. The first time through, one set of point locations must be specified by the researcher. Here, this is accomplished by simply locating the state points at uniformly-distributed random positions along the dimension and estimating the policy positions accordingly. The state points will be moved during the course of the unfolding procedure, so these initial estimated locations are not taken very seriously (and, tests indicate that the initial locations have little, if any, discernible impact on the final scaling solution). The CGM procedure is completed whenever the total sum of squared errors (calculated across all subjects and stimuli) converges to a value that does not change across iterations.

Extensive Monte Carlo testing and several applications to real-world data indicate that Poole’s unfolding technique works very well. The scaling algorithm based upon the CGM criterion converges to a solution very quickly and it provides highly accurate estimates of the point locations. An easy-to-use SAS/IML macro program for performing this type of least-squares metric unfolding is available from the authors and an R function is in preparation.

## 5. EMPIRICAL RESULTS

Models are abstract depictions of real-world phenomena. As such, it is inappropriate to say that any model is “correct” or “incorrect.” Instead, a model’s adequacy is assessed on the basis of three criteria: (1) Parsimony or the degree to which the model simplifies the representation of the original information; (2) explanatory power or the accuracy with which the model represents the original data; and (3) analytic utility or the degree to which the model parameters are substantively interpretable. By these criteria, the spatial proximity model provides an excellent representation of the yearly state spending data.

### 5.1. Parsimony

Models are useful analytic tools because they provide simple depictions of complex phenomena (Kaplan 1964). The parsimonious nature of the spatial proximity model relative to

the original spending data can be established very easily. With 50 states and nine policy areas across 24 years, the raw data contain 10,800 distinct values. The complete results from the unfolding analysis comprise only 1,209 elements— the coordinates for 50 state points in each of 24 years, and the coordinates for nine policy points.

The point locations can be used to reproduce the original data values: The distance from point  $s_{it}$  to point  $p_j$  should be inversely proportional to the amount that state  $i$  spends on policy  $j$  during year  $t$ , except for error. In this manner, the spatial proximity model retains all of the information from the original dataset. But, it achieves an 88% reduction in the number of values that are required to represent this information. This is clearly a much more parsimonious depiction of state government spending patterns over time than the raw expenditure figures themselves.

## 5.2. Explanatory Power

Since models are abstract constructions, it is important to assess their fidelity to the data that they are intended to represent. If the estimated parameters are consistent with the original empirical observations, then the model has explanatory power (Putt and Springer 1989). In the present context, we need to determine the accuracy with which the distances between the unfolded state and policy points depict the input (reflected) spending values.

The spatial proximity model expresses the reflected state expenditures in the respective policy areas as a linear function of the interpoint distances along the unfolded dimension. Therefore, the amount of consistency between the two can be assessed using their correlation. By this standard, the model provides an excellent representation of the 1982-2005 state spending data:  $r_{d_{ijt}, x_{ijt}^*} = 0.972$ . This extremely strong linear relationship establishes that the spatial proximity model does provide a nearly veridical representation of yearly state policy expenditures.

## 5.3. Substantive Interpretation

So far, we have established the quality of the spatial proximity model according to relatively abstract standards— parsimony and explanatory power. However, a model is only

*useful* to the extent that its parameters are substantively interpretable; in other words the degree to which the model provides insights into the real-world phenomena it represents (Gupta 2001). Therefore, we need to examine the unfolded results to determine what they can tell us about patterns of state policy spending.

Once again, the output from the unfolding analysis consists of two point sets arrayed along a common dimension. We will defer discussion of the specific point coordinate values until we consider the measurement characteristics of the unfolded continuum, below. For now, we can derive our general substantive interpretation of the dimension using the relative positions of the points.

As it happens, the unfolded results place the state points in a rather narrow “clump” near the center of the continuum. The policy points are divided into two groups, located at opposite ends of the dimension. In order to provide adequate visual resolution of the variability within the respective point sets, we will present separate figures showing the point locations for states and policies, respectively.

Ultimately, we will be more interested in the state points than in the policy points. But, the positions of the state points are determined *relative* to the policies. So, we must begin by examining the policy points, to see whether their locations vary in a substantively interpretable manner. If they do, then the differences across the policies should make it a straightforward process to interpret the differences in the state point locations

Figure 1 shows a dotplot of the point coordinates for the nine policies. Substantive interpretation usually proceeds by considering the relative positions of the points to see if here is any systematic pattern in their placement across the dimension. Here, that task is facilitated by the fact that the policy points fall neatly into two strongly contrasting subsets.

The three points located near the left side of the dimension represent health care, hospitals, and welfare. These are all policies that provide specific services and benefits to the neediest strata within the respective state populations. In contrast, the points located near the right side of the dimension represent law enforcement, parks and natural resources, cor-

rections, government administration, highways, and education. These are all policy areas that either have generic regulatory purposes or ostensibly benefit the entire society rather than particular segments of the population. We will refer to these two subsets of policies using terms that are becoming increasingly prevalent in the political science literature (Baron and Ferejohn 1989; Huber and Stephens 2001; Jacoby and Schneider 2001; Kousser 2005; Volden and Wiseman 2007): We will call the first group “particularized benefits” and we will label the second subset of policies “collective goods.”<sup>6</sup>

Although they are not shown in Figure 1, the state points all fall within the central region of the dimension, in between the two subsets of policy points. This is an important finding, in itself. The geometry of this relative positioning requires that state points which fall closer to one group of policy points *must* lie farther from the other group of policy points. In substantive terms, this implies that states which spend more on particularized benefits invariably spend less on collective goods, and vice versa. Thus, the unfolding results provide an important insight regarding tradeoff patterns in state policy expenditures.

More generally, the two policy subsets anchor the opposing poles of the unfolded unidimensional space. This stark contrast, in turn, provides the basic definition of the dimension underlying variability in state policy spending patterns. In each year, every state is associated with a “profile” of spending amounts devoted to the nine policy areas. The differences in the respective states’ profiles are summarized in the varying locations of the state points (the  $s_{it}$ ’s). Our empirical analysis reveals that, across the entire 1982-2005 period, these state spending profiles are arrayed along a continuum ranging from those that provide greater support for particularized benefits, to those that allocate more money to collective goods. Therefore, it is appropriate to characterize state spending priorities (as manifested in the relative amounts of resources allocated to different program areas) as a unidimensional phenomenon which varies from greater emphasis on particularized benefits to greater emphasis on collective goods.<sup>7</sup>

Turning to the states, Figure 2 shows a dotplot summarizing their positions along the unfolded continuum. Recall that the state point locations are estimated on a yearly basis. The plotted points in Figure 2 represent the mean coordinate for each state from 1982 through 2005, and the horizontal bars extend to each state's maximum and minimum coordinate values across that time period. This figure shows the same dimension that contains the policy points and was illustrated in Figure 1.<sup>8</sup> Therefore, points near the left side of the graph (i.e., those with smaller coordinate values) represent states that spend more on the policies that we call particularized benefits, while points near the right side (i.e., with larger coordinate values) correspond to states that spend more on collective goods.

One obvious feature in Figure 2 is the existence of nontrivial variability in the point locations for all of the states. This shows that policy priorities do change over time. For some states, the size of the movement (shown as the length of the horizontal bar in the figure) is quite large. This is true for New Hampshire, Tennessee, Arizona, and New Mexico. The spending priorities in these states swing back and forth between collective goods and particularized benefits. In other states (e.g., Montana, Kansas, New Jersey, and Ohio) the horizontal bars in Figure 2 are quite short. In such cases, states maintain the same general "mix" of policy expenditures from one year to the next. The vast majority of the states fall in between these two extremes. They show some degree of change in their spending patterns, but not enough to signal a major refocusing of their policy priorities over time.

Moving on to the central tendencies of the state locations (i.e., the points plotted within each row of Figure 2), the relative positions of the mean state points suggest that our interpretation of the dimension as a contrast between particularized benefits and collective goods has a high degree of face validity. Consider the states that fall near the left end of the unfolded continuum (or near the lower extreme of the vertical axis in Figure 2). These include virtually all of the states that are commonly identified as innovators or leaders in their policy activities, such as New York, Massachusetts, and California (e.g., DiIulio and Nathan 1994). The latter states tend to be progressive and highly active in orientation, aggressively

taking positive steps to deal with social problems as they arise. This is manifested directly in their willingness to spend relatively large amounts of money in order to provide benefits for needy groups within their respective populations.

In contrast, the states near the right side of the dimension (shown near the upper end of the vertical axis in Figure 2) are usually noted for being more cautious in their orientations toward government involvement in social and economic issues. States such as Wyoming, Idaho, and Utah are less likely to take action in the first place, and when they do so, their steps tend to be relatively narrow and limited in nature (Erikson, Wright, McIver 1993; Ringquist and Garand 1999). Instead, they devote most of their resources toward maintaining infrastructure, providing broadly-based services, and ensuring orderly societal conditions—in other words, collective goods.

The states in the center of the dimension exhibit two characteristics. First, some allocate their resources to a broad mixture of policy objectives. For example, Missouri, Florida, and Nebraska do not manifest consistently active or inactive stances in the ways that they address societal concerns (Gray 1973; Erikson, Wright, McIver 1993). Instead, their spending is more evenly divided across policies that entail particularized benefits and collective goods. Second, several of the centrally-positioned states are policy innovators, but only within limited substantive areas. For example, Oregon and Hawaii have taken important proactive steps in the field of health care (Neubauer 1992). However, they do not allocate large amounts of resources to other particularized benefits. A similar situation occurs for Wisconsin, which was the first state to experiment with “welfare reform” (Mead 2004). On the other hand, Minnesota is well-known as a state willing to experiment with education (Wong 2004) and prison reform (Lewis and Maruna 1999), even though it does not spend proportionately large amounts on other collective goods policies. The common characteristic among all of these states is that they are not especially active (at least in terms of spending allocations) across either of the full subset of policy areas at the opposing ends of the unfolded continuum (Hovey and Hovey 2007). Therefore, it seems very reasonable that they are located in

central positions between the other states that are more consistent in their attentiveness toward either particularized benefits or collective goods.

In summary, the point locations in the spatial proximity model (or, more precisely, the distances between them) depict the spending information in a far more compact form than the original data values. And, the distances between particular state and policy points can be used to reproduce the individual spending values almost perfectly. The differences in the policy point coordinates conform to a substantively reasonable contrast between the content of the various program areas. And, the distribution of the state points corresponds to acknowledged distinctions among state policy environments. Thus, the spatial proximity model definitely meets the criteria of parsimony, explanatory power, and substantive interpretability.

## **6. THE SPATIAL PROXIMITY MODEL AS MEASUREMENT**

The content of the spatial proximity model is intrinsically interesting because it reveals a clearcut pattern in which state spending varies between two contrasting subsets of policy areas, particularized benefits and collective goods. The model also has important practical implications: The unfolded state points can be used as an empirical measure of variability in state policy spending along this substantively-defined dimension.

### **6.1. Validity and Reliability**

Empirical variables are usually judged by their validity and reliability. We believe the substantive interpretability of our model attests to the face validity of the point locations as a measure of state spending. But, we can go farther than this. Validity is the degree to which a variable actually captures the phenomenon it is intended to measure. With many social scientific concepts, validity assessment is problematic because the phenomenon being measured is unobservable (Adcock and Collier 2001). However, that is not the case here. The spatial proximity model is not estimating a latent trait; rather it merely summarizes a set of empirically observable values (i.e., the yearly state policy expenditures). If validity

is construed in a fairly narrow way, as the degree to which the unfolded point locations accurately summarize the states' yearly spending profiles across the full set of nine policies, then it can be assessed directly.<sup>9</sup> We do so by examining the structural relationship between the spending data and the parameter estimates for the spatial proximity model (Bollen 1989).

When the reflected spending proportions (i.e., the  $x_{ijt}^*$ 's calculated from the raw input data) are regressed on the interpoint distances (i.e., the  $d_{ijt}$ 's produced by the unfolding analysis), the OLS estimates are as follows:

$$x_{ijt}^* = 0.00 + 1.00 d_{ijt} + e_{ijt} \quad (8)$$

The values of the intercept and slope are zero and one, respectively. This shows that here is, on average, a one-to-one correspondence between interpoint distances and (reflected) proportionate spending allocations in the nine policy areas. That is, the mean error (or discrepancy between interpoint distance and spending) will be zero. There is no bias, or systematic tendency for the interpoint distances to over- or under-estimate the actual (reflected) proportionate spending values. By definition, this establishes that the unfolded state points comprise a valid measure of variability in state policy spending (Zeller and Carmines 1980; Hand 2004).

The reliability of the measure is provided by the  $R^2$  for equation (8). The reasoning is as follows: Reliability is defined as the proportion of a measure's variance that corresponds to variance in the phenomenon being measured (e.g., Hand 2004). This proportion is also equal to the squared correlation between the measure and the phenomenon (Bollen 1989). In the present context, the "measure" is the set of  $d_{ijt}$ 's calculated from the point locations, and the "phenomenon" being measured is the set of  $x_{ijt}^*$ 's. And, the squared correlation between these two is the  $R^2$  for equation (8), which is equal to 0.944.<sup>10</sup> The  $d_{ijt}$ 's and the  $x_{ijt}^*$ 's share 94.4% of their variance, leaving only 5.6% of the variance in the point locations

(or the spending allocations) as error. Clearly, the state points constitute a highly valid and extremely reliable measure of interstate differences in policy spending.<sup>11</sup>

## 6.2. Representational Measurement and Interpretation of State Scores

It is important to emphasize that the unfolded state points constitute *representational* measurement of state policy spending. In other words, there is a two-way correspondence (called a “homeomorphism” in the formal measurement literature) between the property of the objects being measured and the distribution of points along the measurement scale (Suppes and Zinnes 1963; Coombs, Dawes, Tversky 1970; Hand 2004). In the present context, this means that variations between state spending patterns determine the relative locations of the state points along the unfolded dimension. At the same time, differences in the state point locations can be used to reproduce the arrays of policy expenditures for the respective states.

It is this ability to move from the empirical observations to the measurement model, and from the model back to the observations which distinguishes representational measurement from the “index” or “pragmatic” measures which are far more common in the social sciences (Dawes 1972; Hand 2004). Index measures are usually created by combining information from several sources to generate a summary which has predictive power relative to other measured variables. While index measures are definitely useful for assessing empirical relationships, they involve inherent ambiguities about the precise phenomenon being measured. The homeomorphism of representational measures avoids this problem.

The immediate practical benefit conveyed by representational measurement is a very precise and unambiguous interpretation of the state scores. The scale scores are unique up to a linear transformation. This means that the origin of, and the measurement units along, the unfolded continuum can be changed arbitrarily without affecting the *relative* distances between the various points. And this, in turn, implies that the unfolded continuum provides interval-level measurement of the states’ propensities to devote financial resources toward either particularized benefits or collective goods (Jacoby 1991, 1999).

Here, we set the measurement units along the dimension to be the same as those in the original data values—proportional spending. And, since the location of the origin is arbitrary, we simply set it equal to the mean state coordinate. The preceding steps enable a straightforward and easy interpretation of the state scores: If the scale score in year  $t$  for state  $A$  is, say, .03 units larger than the score for state  $B$ , it means that state  $A$  devoted three percent more of its total spending toward collective goods than did state  $B$  (or, alternatively,  $B$  allocated three percent more of its total spending toward particularized benefits than did state  $A$ ). Such comparisons can be made across states and/or years.<sup>12</sup>

At the same time, a positive scale score for year  $t$  means that the specific state devoted a higher proportion of its total spending than the average state (across the 1982-2005 time period) to collective goods policies during that year; a negative scale score implies that a higher-than-average proportion of spending was allocated to particularized benefits. Such detailed statements about the precise meaning of the scale scores are only possible because the unfolded dimension provides representational measurement of the differences across the states.

### **6.3. The Distribution of State Policy Priorities**

The discussion in the preceding section established that the unfolded state scores can be interpreted as the relative priorities that states assign to spending on policies representing collective goods versus policies representing particularized benefits. Figure 3 shows a histogram of these spending priority scores for all states across the entire 1982-2005 time period. The distribution is unimodal, but somewhat skewed in the negative direction. This means that there is a sizable number of states with proportionate spending slightly more oriented toward collective goods than the average (i.e., with small positive scale scores). The relatively “heavy” upper side of the distribution is counterbalanced by a longer lower tail, which shows that a few states devoted quite a bit more of their total resources toward particularized benefits.

The scale scores range from -0.230 to 0.199, showing that there is about a 43% difference in the maximum proportions of spending allocated to particularized benefits and collective goods during this time period. However, such extreme differences are relatively unusual. The interquartile range for the distribution is 0.100; this indicates that half of the yearly state scores vary within an interval of ten percentage points.

One of the strong aspects of our variable, compared to other measures of state policy activity, is its yearly nature (Berry, Ringquist, Fording, Hanson 1998). This enables an assessment of temporal change in policy priorities. Figure 4 shows boxplots of the state score distributions, by year. There is a clear pattern that is immediately apparent in the display: The central tendencies of the yearly distributions shift systematically over time. During the early and mid-1980's, the median state scores are all positive, indicating greater priority on collective goods policies. This changes sharply during the late 1980's and early 1990's. The distribution medians shift to the left, indicating rapid increases in the proportionate allocations toward particularized benefits. During the late 1990's there is a slight counter-movement. But, state policy priorities during the first few years of the twenty-first century are definitely oriented in the direction of particularized benefits over collective goods to a much greater extent than they were during the 1980's.

Figure 4 also shows a second obvious feature: The whiskers extending from all of the boxes indicate that there is substantial variation across the states within each year. Regardless of the central tendency at a given time point, states continue to exhibit sizable differences in their proportionate spending on particularized benefits and collective goods. Unraveling the sources and consequences of this cross-sectional and temporal variability in policy priorities is an obvious direction for future research using the unfolded state scores.<sup>13</sup>

## **7. COMPARISON TO OTHER STATE POLICY VARIABLES**

It is imperative that we compare the unfolded state scale scores to other well-known measures of public policy in the American states. This is useful not only for establishing the convergent validity of our program spending scale, but also for explicating the similarities

and differences among the various measures. For this purpose, we have selected four variables: Walker’s policy innovation scores (1969); Sharkansky and Hofferbert’s “welfare-education” factor (1969); Klingman and Lammer’s “general policy liberalism factor” (1984); and Wright, Erikson, and McIver’s “grand index (of) composite policy liberalism” (1987). These four measures of state policy activity appear very frequently in the research literature. But, they all use different data from the relative spending information that is employed in our unfolding analysis. Therefore, we believe that these variables provide excellent standards of comparison for our results.

Each of the other variables assigns only a single score to each state. In contrast, our unfolded scale provides 24 scores for each state, one for each year from 1982 to 2005. We believe the yearly nature of our measure is one of its major advantages over the alternatives. However, for purposes of comparison, we want to combine the time-series information in order to obtain a single set of state scores. So, we simply use the mean point location (calculated across the 24-year period) for each state.

Let us begin with the comparison to Walker’s innovation scores. Figure 5A shows the scatterplot between the latter variable (vertical axis) and our unfolded state scores (horizontal axis). The graph also contains a nonparametric loess curve to summarize the functional form of the bivariate structure. The relationship between the two variables is far from deterministic, as signaled by the dispersion in the point cloud. This is not at all unreasonable, given that Walker was measuring an ostensibly different concept with data collected more than twenty years earlier than those employed in the present analysis.

Nevertheless, the relationship between innovativeness and our spending scale is negative, monotonic, and nearly linear. The correlation between the two is quite strong at -0.695. This suggests that these two variables may be tapping a common phenomenon.<sup>14</sup> Walker’s scores are based upon sequential *state* adoptions: “The larger the innovation score, . . . the faster the state has been, on the average, in responding to new ideas or policies” (Walker 1969: 883).

But, Figure 5A shows that this also corresponds to systematic, sequential adoptions of particular types of *policies*. Specifically, innovative states (i.e., those with large values on Walker’s measure) also spend more on particularized benefits for various groups, relative to the collective goods required for maintaining socioeconomic infrastructure (i.e., they have low scores on the unfolded scale). In this way, our measure of policy spending helps clarify the substantive implications of policy innovativeness within the states.

Sharkansky and Hofferbert’s welfare-education factor and the variables created by Klingman and Lammers and by Wright, Erikson, and McIver are all very similar to each other. So, we will examine them together. Panels B, C, and D of Figure 5 show the scatterplots of these variables against the unfolded state spending scale. The correlations are  $-0.283$ ,  $-0.486$ , and  $-0.492$ , respectively. It is important to emphasize that Sharkansky and Hofferbert, Klingman and Lammers, and Wright, Erikson, and McIver all provide broad summaries of overall state policy outputs. Thus, their variables simply do not measure the same thing as our unfolded scale. Furthermore, Sharkansky and Hofferbert employ data from two decades prior to the earliest spending figures that are used as input to our unfolding analysis. Both of these features undoubtedly help to generate the relatively weak to moderate relationships revealed in the scatterplots.

But, there is a more immediate reason for the low correlations: The functional relationships are simply not linear. The shapes of the nonparametric loess curves in the three scatterplots are very revealing. In each case there is a negative and fairly steep slope in the left side of the plotting region. But, on the right side, the curve becomes nearly flat and even reverses direction slightly in one graph (Figure 5B). This shows that the Sharkansky and Hofferbert, Klingman and Lammers, and Wright, Erikson, McIver measures do distinguish among states that place their highest priorities on particularized benefits (i.e., those with smaller values on the unfolded spending priorities scale). However, these variables do not differentiate at all among those states that place greater emphasis on collective goods (i.e., those with larger values on the unfolded scale).

This latter feature is perfectly understandable. For one thing, welfare is the main defining characteristic of the Sharkansky-Hofferbert factor, and it is also the largest of the particularized-benefit policies on our policy spending scale. At the same time, Klingman and Lammers and Wright, Erikson, and McIver both explicitly measure policy *liberalism*. Therefore, they emphasize programs that provide public assistance to needy groups. And, these are precisely the kinds of policies that comprise our set of particularized benefits.

Our state spending variable is distinct from, but related to, other prominent measures of state policy activity. And, there are reasonable explanations for the differences that exist across these variables. Accordingly, we believe that the results presented in this section attest to the convergent validity of our measure. Moreover, the precise functional forms of the relationships illustrated in the four panels of Figure 5 are revealing in themselves: They are very useful for interpreting and providing more specific meaning to concepts like state innovativeness and policy liberalism. This, in turn, demonstrates the analytic utility of the unfolded spending priorities scale.

## 8. CONCLUSIONS

In this paper, we have developed and tested a variable that measures yearly state policy spending priorities. The unfolding analysis reveals a clear separation between two subsets of policies, which we have labeled particularized benefits and collective goods, respectively. We believe that this is a fundamental distinction in the ways that states allocate resources toward the achievement of different sociopolitical objectives: Increasing the proportion of a state's expenditures that is devoted to particularized benefits invariably reduces the proportion which is devoted to collective goods, and vice versa.

The clarity of this bifurcated structure is so pronounced that— subject to a reasonably small margin of error— knowing a state's spending in one policy area allows us to determine its spending in all other major policy areas, as well. It is this latter characteristic which makes the unfolded state points such a powerful empirical variable. Again, each state's entire yearly array of proportionate policy expenditures is captured in a single numeric value: That

state's point coordinate along the unfolded dimension. And, the resultant variable can be interpreted directly as the states' relative spending priorities for collective goods versus particularized benefits.

Our variable is a compelling measure of state spending priorities precisely because of its empirical foundation. That is, the two policy clusters (i.e., collective goods and particularized benefits), along with the states' varying positions in between these groupings are *not* based upon any prior ideas about how policies and states should be laid out along an ideological (or any other sort of) dimension. Instead, they are obtained strictly by optimizing the correspondence between reflected proportionate spending values and the distances between state points and policy points along the scale continuum. Therefore, we can be reasonably certain that the scale scores really do provide an accurate depiction of the ways that states differ in their expenditure profiles.

Fortuitously, our empirical results are nicely consistent with a theoretical distinction that has appeared with increasing frequency in the recent political science literature: A number of other analysts also have argued that the most prominent dimension of variability among public policies is that between particularized benefits and collective goods (Baron and Ferejohn 1989; Huber and Stephens 2001; Kousser 2005; Volden and Wiseman 2007). This convergence of interpretations from different sources, based upon markedly different research designs and empirical evidence, attests to the theoretical importance of the dimension that is represented by our spatial proximity model of state spending.

We regard the unfolded scale as a *general* representation of the relative emphasis that state governments assign to different policy areas. In this respect, our variable is similar in spirit (although different in method) to several other measures developed recently in the political science literature. These include Poole's (2004) NOMINATE and OC scores for members of Congress, Martin and Quinn's (2000) ideal points for Supreme Court Justices, Stimson's (1999) public mood variable for national-level public opinion, Erikson, Wright, and McIver's (1993) survey-based measures of state public opinion, and Berry, Ringquist,

Fording, and Hansen's (1998) measures of state ideology.<sup>15</sup> In every case, the objective is to discern a broad dimension of variability underlying a set of politically-relevant objects. Likewise, our variable measures differences in the degree to which the American states allocate resources (and, thereby, reveal their priorities) across two broad policy areas, particularized benefits and collective goods.

The spatial proximity model developed in this study is very different from the factor analyses and linear composites that often have been used to create general indicators of state policy in the research literature. But, we regard our work as an extension, rather than a refutation or contradiction, of these earlier efforts. Previous research was aimed primarily at summarizing the information contained in a large set of policy indicators. But, data reduction never occurs "in a vacuum;" instead, it always involves fitting a model (Coombs 1964; Weisberg 1972; 1974; Jacoby 1991). When one recognizes this basic and inescapable fact, it leads easily to a consideration of alternative geometric structures— such as our spatial proximity model— for representing systematic variability within the relevant data.

In conclusion, our unfolded scale of state policy spending priorities has a number of advantageous features that should make it a useful analytic tool. First, the scale provides representational measurement. Differences in state scale scores can be interpreted directly as differences in proportionate spending allocations to policies that promote collective goods, rather than to policies that provide particularized. There is no analogous straightforward interpretation of the factor scores, principal components, or linear composites that have been used in the previous literature. Second, the spatial proximity model is based upon one specific element of the policy process— program expenditures— rather than a general amalgam of heterogeneous policy indicators. This makes it easier to specify exactly which part of the policy process is being modeled and captured in the empirical variable than is the case with the other composite measures which seem to treat policy as a set of undifferentiated components. Third, the unfolded scale provides a nearly perfect representation of the spending data. It explains a higher proportion of the variance in a larger number of program areas

than any of the other policy variables that have been employed in political research on the American states. Fourth, the unfolded scores for the states are calculated on a yearly basis, thereby enabling analyses over time. This is just not the case with any of the other summary measures of policy outputs. Finally, expenditure allocations represent a relatively central step in the broader policy process. Therefore, our new variable facilitates investigation of both the sources and the consequences of state spending priorities. For all of these reasons, we hope the unfolded scale of policy spending developed in this paper will stimulate and enable future research efforts in the field of state politics.

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## NOTES

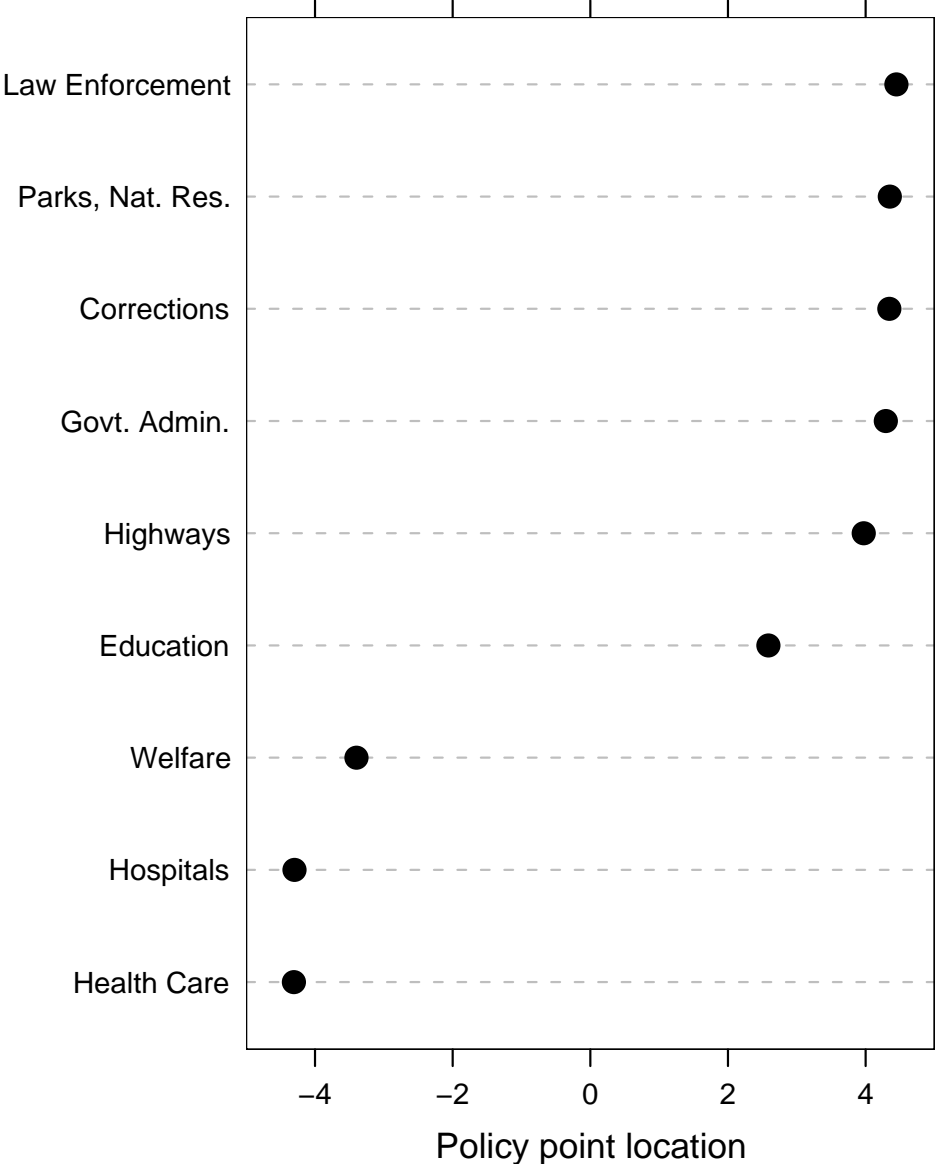
1. The original data from federal government actually employ ten policy categories because they separate “Natural Resources” from “Parks and Recreation.” However, both of these categories only take up tiny proportions of spending in all of the states and they are highly correlated with each other. Therefore, we combine these two areas into the single category of “Parks and Natural Resources” for purposes of our analysis.
2. We replicated our analysis, using both per capita spending figures and spending as a proportion of GSP. These replications produced results that are virtually identical to those we report here. A separate report, discussing the analyses based upon the alternative versions of the state spending figures, is available from the authors.
3. In the traditional nomenclature for such models, the points representing states would be designated “ideal points” and the points representing policies would be called “stimulus points.” This term comes from Coombs (1964) and it reflects his seminal work in using the spatial proximity model to represent individual-level preferential choice behavior. While the term “ideal point” has been used recently to describe measures of decision-making by various political actors (e.g., members of Congress, Supreme Court Justices, etc.), it makes little sense in the context of the American states. For that reason, we will simply refer to “state points” and “policy points,” rather than “ideal points” and “stimulus points.”
4. This is not a troublesome assumption. The federal government uses a single definition for each policy category across the entire 1982-2005 time period covered by our analysis. We did replicate the unfolding analysis, allowing the policy points (as well as the state points) to move over time. However, the goodness-of-fit showed virtually no improvement over our model, in which the policy points are held constant. Furthermore, the substantive interpretation of the unfolding results would be nearly identical, regardless whether or not the policy points are allowed to vary over time. For all of these reasons, we prefer to retain the simpler model, in which states can vary over time, but policy categories cannot.

5. A separate report, explaining this limitation of the factor analysis model, and its relevance to the state spending data, is available from the authors.
6. It is important to emphasize that the terms, “particularized benefits” and “collective goods,” are merely descriptive labels. These terms are convenient to use in the discussion of our unfolded scale because they eliminate the need to refer to the specific policies that fall at each end of the continuum. We do recognize that all public policies can be viewed as collective goods. Similarly, all policies provide some particularized benefits, regardless of their overt objectives. Nevertheless, we believe the contrast between particularized benefits and collective goods does provide a reasonable verbalization of the differing objectives usually articulated for the two distinct subsets of policies revealed in the unfolding analysis.
7. A separate report, discussing alternative substantive interpretations of the unfolded dimension, is available from the authors.
8. Note, however, that the *scale* of the illustration differs across the two figures. In Figure 1, the unfolded dimension is shown from -4.307 to 4.352 (i.e., the range of the policy points). Figure 2 focuses only on the interval from -0.230 to 0.199, the range of the yearly state points.
9. This relatively strict definition of validity is drawn from the measurement theory literature (e.g., Hand 2004, p. 129). However, many researchers employ a broader definition, in which validity is regarded as the “scientific utility” of an empirical variable (e.g., Nunnally and Bernstein 1994, p. 83). It is important to emphasize that we are using the former, rather than the latter, definition in the present context.
10. Of course, this is also the square of the correlation between the unfolded distances and the reflected proportionate spending values, presented earlier.
11. We examined the stability of the unfolding solution using a jackknife resampling procedure (de Leeuw and Meulman 1986). The results show that the relative positions of the state points are tightly constrained in the sense that they do not change very much, regardless of

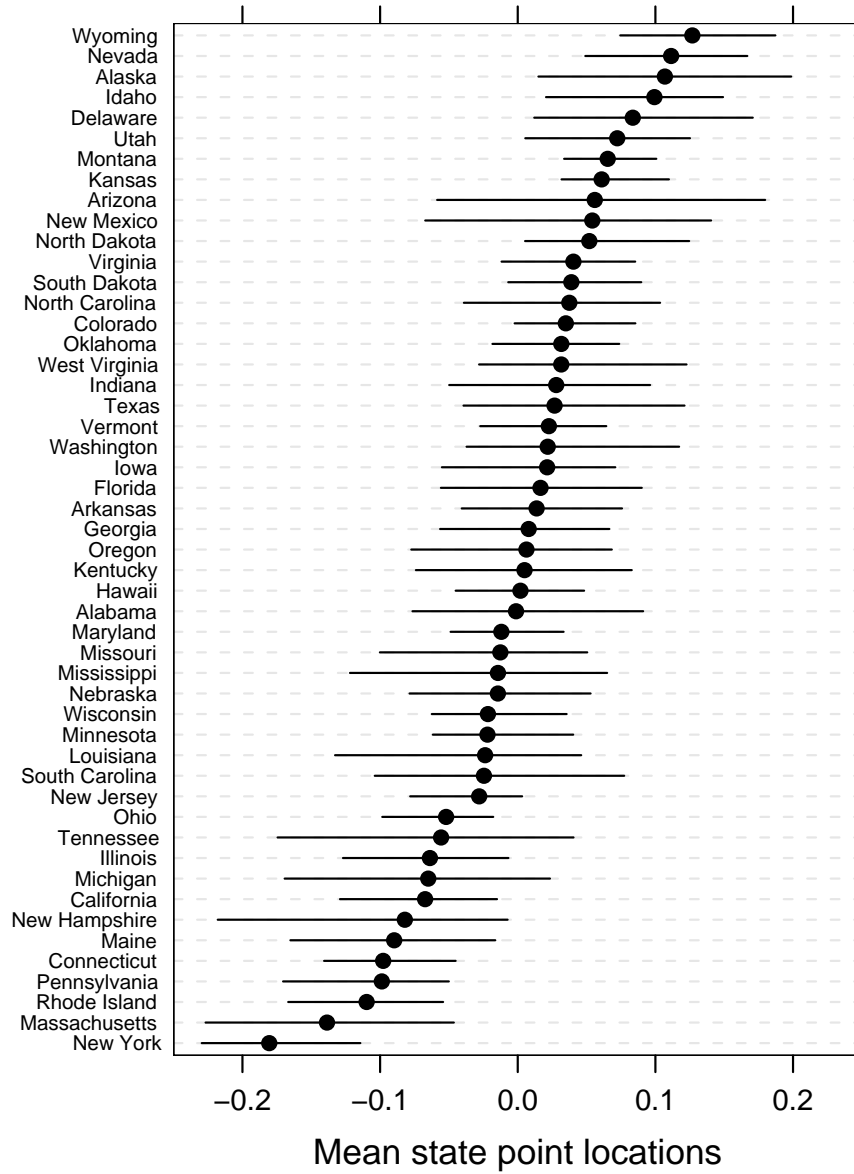
small perturbations in the data. A separate report on the stability analysis is available from the authors.

12. Given that our variable's values are interpreted in terms of proportions, one could ask why we need to invoke the spatial proximity model and perform the unfolding analysis in the first place. Why not simply use the proportion of spending devoted to the policies that fall within one or the other of our two categories, particularized benefits or collective goods? The answer is that the distinction between particularized benefits and collective goods is, itself, due to the contrasting policy point locations at the opposite ends of the unfolded scale. In other words, the contents of the two policy subsets are revealed through the unfolding analysis. Without the latter, we would have no way of knowing which spending figures should go into the numerator of the proportion.
13. A separate report examining the relationship between the state policy priorities variable and several other measures of theory-relevant state and national characteristics is available from the authors.
14. The signs of the correlations between the unfolded state scores and the other measures of state policy are not meaningful in substantive terms. Since the unfolded scale is only determined up to a linear transformation, the state scores could be reflected without any loss or distortion of information. In that case, larger state scores would indicate greater proportions of spending on particularized benefits. With a reflected set of state scores, the signs of the correlations would change, but the absolute values would remain the same.
15. In fact, Poole's NOMINATE procedure is also based upon a spatial proximity model, in which congressional roll call votes are represented as distances between members of Congress' ideal points and the contrasting alternatives on which the members are voting. Thus, NOMINATE is actually an unfolding procedure for dichotomous data (Poole 2004).

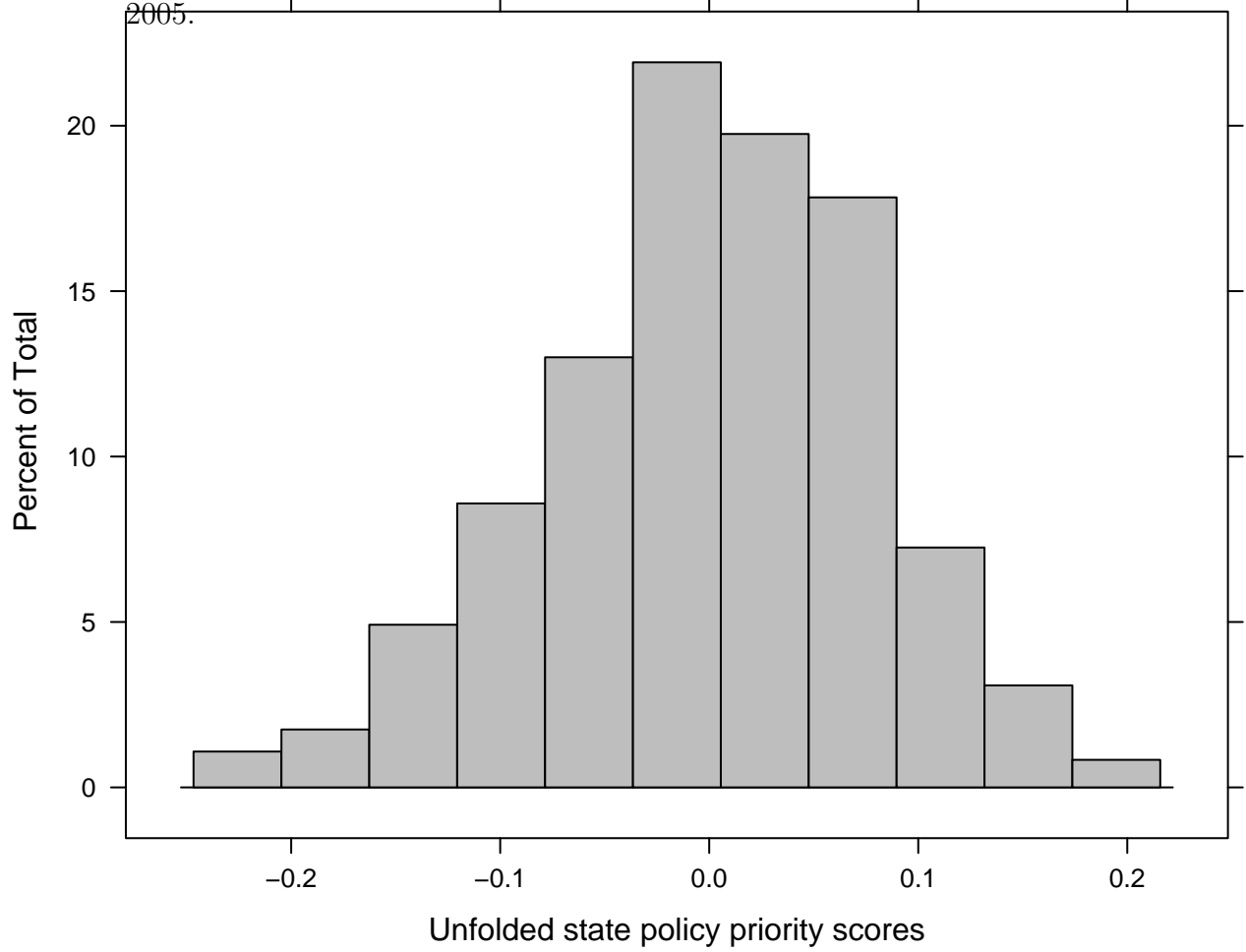
**Figure 1:** Dot plot showing point coordinates for policy areas obtained from unfolding analysis of state spending data, 1982-2005.



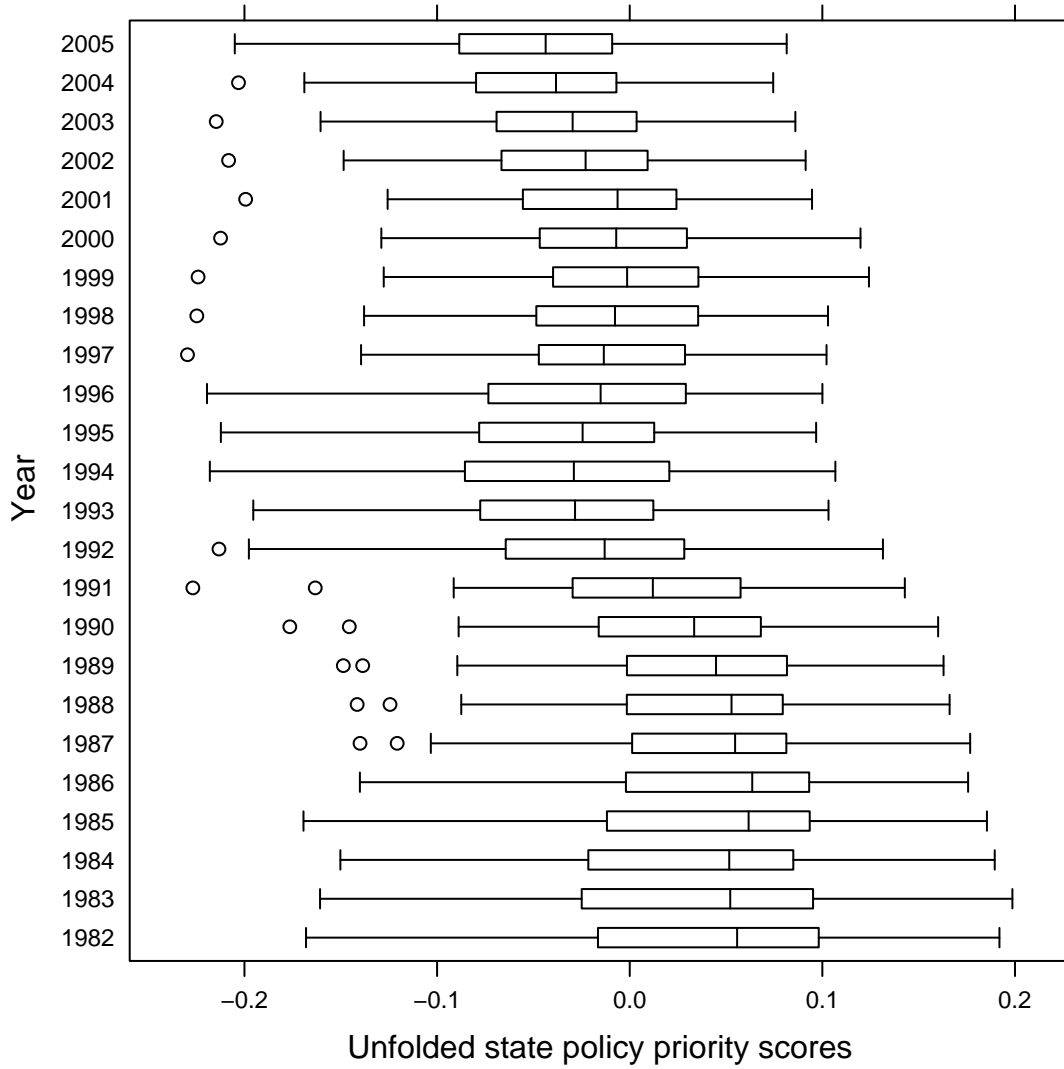
**Figure 2:** Dot plot showing the mean point coordinate for each state. Means are calculated from the yearly unfolded state coordinates across the twenty-four year time span (1982-2005). Horizontal bars extend to the maximum and minimum point coordinates for each state during that time period.



**Figure 3:** Histogram showing the distribution of unfolded state policy priority scores, 1982-2005.



**Figure 4:** Boxplot showing the yearly distributions of unfolded state policy priority scores, 1982-2005.



**Figure 5:** Scatterplots showing mean state spending priority scores versus other measures of state policy. Mean state spending priority scores are from the unfolding analysis of the 1982-2005 spending data; mean values are calculated for each state across the 24-year time span of the dataset. The policy innovation index is obtained from Walker (1969); the welfare-education factor is from Sharkansky and Hofferbert (1969); the general policy liberalism factor is from Klingman and Lammers (1984); and, the composite policy liberalism index is from Wright, Erikson, and McIver (1987).

