

Locating Supreme Court Opinions in Doctrine Space

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We develop a scaling model to estimate U.S. Supreme Court opinion locations and justice ideal points along a common spatial dimension using data derived from the citations between opinions. Citations from new opinions to precedent opinions usually apply and endorse the doctrine of the precedent opinion; however, sometimes they implicitly or explicitly dispute the precedent opinion. We collect original datasets classifying citations from search and seizure and freedom of religion opinions written between 1953 and 2006 into these different types and develop a model relating the similarity of the doctrine embodied in the citing and cited opinions to the relative probability of these different types of citations. The resulting spatial estimates of opinion location are used to evaluate theories of Supreme Court bargaining and opinion writing. We find empirical support for theoretical models that predict the majority opinion will fall at the ideal point of the median member of the majority coalition. Given the centrality of theories of judicial policymaking to various substantive problems in political science, the method of scaling opinions developed in this article can facilitate a range of future research.

One of the most significant limitations in the study of judicial behavior and the development of judge-made law is the unavailability of fine-grained measures of what policies judges create when they decide cases. Scholars have learned much of what is known about judicial decision making based on crude dichotomous measures of case outcomes: liberal versus conservative. Such dichotomous measures describe the Court's *judgment*. In part because judicial decisions are themselves dichotomous—guilty/innocent, affirm/reverse, admit/exclude evidence—a focus on dichotomous case outcomes is often useful. When continuous measures of judicial outputs have been needed, scholars have often simply grouped individual case outcomes into aggregate measures—e.g., percent of cases decided liberally in a given term. However, there is much more to a judicial opinion than just the case disposition, and aggregated dichotomous judgments of the court depend as much on the Court's docket as on the policy it is enacting.

Supreme Court decisions are often most important because of the qualitative changes in law that they effect, rather than because of the decision they provide on the case facing the Court. That is, decisions consist of both a judgment and a *reasoning* for that judgment, or *ratio decidendi*. As Tiller and Cross note, “The case outcome is obviously important for the immediate parties to the action but carries no particular significance for others. The language of the opinion at least purports to establish the rules to govern future cases, but political science researchers have generally disregarded the significance of this language” (2006, 523). Indeed, most contemporary theories of judicial politics are about opinions and the policies they advance, not judgments. In this vein, a notable recent trend in the empirical study of the law has been an effort by scholars to quantitatively measure the content of Supreme Court opinions. This development represents an important movement towards bridging the gap between legal scholarship and political science of the courts.

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This article aims to bring us a step closer to that goal. We seek to estimate the legal position taken by a given opinion. One way that court opinions reveal their content is by which precedents they cite positively (affirming the argument of the older opinion) and which they cite negatively (disputing the argument of the previous opinion). We develop a scaling model which estimates the location of opinions by assuming that the probability of positively citing another opinion is a decreasing function of the policy distance between the two opinions. Using original data on which precedents are cited positively or negatively by each opinion, we estimate locations in a single-dimensional space for each search and seizure and freedom of religion opinion authored by the Warren, Burger, and Rehnquist Courts (1953–2004). These estimates allow fine-grained, systematic analysis of the doctrinal content of Supreme Court opinions. Our method can be used to study a variety of substantive problems, including, but not limited to, intracourt bargaining, the judicial hierarchy, the effect of separation-of-powers mechanisms on judicial policymaking, and the consequences of Supreme Court nominations. After developing our measurement method and presenting the results of our estimation, we present an initial, though admittedly limited, application of our estimates to theories of intracourt bargaining.

In the second section, we provide an overview of the various substantive problems in the study of judicial politics that make predictions or assumptions about opinion locations. While the goal of our article is to introduce a general method for measuring opinion location, we focus on theories of bargaining on the Court as the application of greatest interest because of the centrality of these theories to the study of judicial politics. Next, we present an argument for measuring doctrinal content by referencing the precedents cited by a case and how they are cited. We describe a model of the citation process and the estimator resulting from that data-generating process. Using original data sets collected on citations in freedom of religion and search and seizure cases, we then discuss the opinion locations derived from the estimation. The estimates appear to capture the substantive variation in legal policy in which we are interested. We then present an empirical test of three major theories of intracourt bargaining that dominate the literature: median voter, author monopoly, and majority coalition median. We find remarkably strong evidence that the ideal point of the median justice in the majority coalition most powerfully predicts majority opinion location. Finally, we propose future extensions of the model and data described in this article.

Measures of Opinion Location Substantive Problems and Judicial Policymaking

At its core, the political science of courts is about the study of systematic patterns in the choices judges make. Sometimes scholars are interested in the votes judges cast—did a judge vote in a liberal or conservative direction—but much of the theoretical interest in the study of courts is about the *policy* choices embedded in judicial opinions. One of the most active areas of research in the field of judicial politics concerns intracourt bargaining and opinion writing. This line of inquiry is concerned with how the institutional structure of the Court affects the types of policies on which the justices will agree and what will be the content of an opinion. That is, given justices have preferred legal doctrines or policies in some k -dimensional policy space—i.e., ideal points—where will the Court’s opinion be located in that policy space? Indeed, this question has been at the center of judicial politics research for some time, and scholars have developed theoretical models ranging from “soft” rational choice (Epstein and Knight 1998) to “hard” formal-theoretic models. These models come in various shapes and sizes and make divergent predictions about where the Court will locate policy as a consequence of intracourt bargaining and coalition formation. Some models predict that the median justice will control policy or that the opinion author will have a degree of monopoly power (Hammond, Bonneau, and Sheehan 2005; Schwartz 1992). Other models predict that the median member of the particular coalition of justices in the majority will control opinions (Carrubba et al. 2007; Spriggs and Hansford 2002; Westerland 2003); and yet others predict more complicated bargaining leading to possibly indeterminate policy location (Lax and Cameron 2007).

Intracourt bargaining, however, is not the only substantive problem for which measurement of judicial policy outputs has direct implications. While often informed by research on intracourt bargaining, scholars studying Supreme Court nominations (Krehbiel 2007; Moraski and Shipan 1999; Rohde and Shepsle 2007), judicial hierarchy and strategic auditing (Cameron, Segal, and Songer 2000; Clark 2009), and separation-of-powers models (Eskridge 1991; Ferejohn and Shipan 1990) usually implicate judicial policy output. Most often, these studies adopt the median justice model, which predicts that all policies will be located at the median justice’s ideal point. Indeed, its widespread adoption in applied work led Martin, Quinn, and Epstein to observe that the median justice model “now figures prominently and crucially in a wide

array of research on the Court, from studies of the nomination and confirmation of Justices to their interactions with Congress and, of course, to the Court's resolution of disputes. Where disagreement exists, however, is over how to identify the median justice" (2005, 1278–79). Far less research has been focused on assessing *whether* the median justice model is an empirically supported assumption. With a direct measure of opinion content, research on these myriad problems can make use of an additional source of information about judicial performance.

Measuring Judicial Policy

Scholars sensitive to the nature and significance of judicial policymaking note that Supreme Court opinions are important precisely because of the doctrine—or law—that they make. After all, the Court does not just announce the result of its vote; rather, it offers an opinion—often more than one—with reasoning, justification, and principles of law. It is this part of the Court's decision—the reasoning, justification, and principles of law—that is binding on lower courts and other institutions. In fact, it is this part of a Supreme Court decision in which political scientists are usually—at least implicitly—interested.

Two approaches to measuring judicial policy output have dominated the extant literature. The first approach has been to use dichotomous measures of the Court's judgment as approximations for opinion content (see, for example, Hansford and Spriggs 2006). However, using dichotomous measures of the Court's judgment to approximate opinion location can be criticized on a number of grounds; indeed, Hansford and Spriggs conclude their innovative study of doctrinal development and the interpretation of precedent with a call for better measures of doctrinal content (2006, 133). Some scholars have begun to investigate evidence of apparent systematic bias in the dichotomous measures currently used to measure judicial decision making (see, for example, Harvey 2007). For example, the Spaeth “liberal”/“conservative” coding of Supreme Court decisions is based on the identity of the winning litigant in a lawsuit. The coding rules, however, ignore the possibility that while a traditional “underdog” (to use Spaeth's words) may win a case, the policy announced by the Court may in fact be very conservative. To the extent that political scientists are interested in the Court's policies—not whether they rule against a particular litigant—the judgment may be misleading. When these dichotomous measures of Supreme Court decision making are aggregated to higher levels (such as year, term of Court, or natural court), and used to test (uniformly) microlevel theories of judicial decision making, they can

seldom adjudicate convincingly between the variety of alternative theoretical models that have been developed by scholars. Finally, we also note that in order for a “liberal” decision at one point in time to be substantively comparable with a “liberal” decision at another point in time, one must make an implicit assumption that the distribution of cases—their locations in a case space, for example—is somewhat stable across time. Even setting aside these limitations, dichotomous measures of opinion content simply cannot capture the substantive implications of Supreme Court opinions. Political science theories of judicial decision making generate predictions about the location of judicial policy in some substantive dimension, rather than about the binary judgment of the Court. Indeed, recent developments in judicial politics evince a growing interest in “taking law seriously” (Friedman 2006), which involves critiques of simple dichotomous measures of nuanced judicial policy (McGuire et al. 2009). For example, McGuire and Vanberg (2005) have sought to measure the content of Supreme Court decisions and legal documents using technological developments in computer science that allow for machine reading of texts to code the content of judicial opinions.

A second approach has been applied specifically to theories of intracourt bargaining. This approach involves assessing patterns in concurrences and voting to determine which theory of bargaining is most consistent with the observed patterns. Without measures of opinion location, these studies have attempted to infer opinion location, beginning most notably with Westerland (2003), though more recent work has relied on this insight to develop measures of opinion location that are based on each of the various theories of voting. The valuable insight here is that by referencing a given theory of intracourt bargaining, one can develop opinion location estimates and use them to assess the predictive power of competing theories of opinion writing. While myriad studies have adopted this approach and made their own notable contributions, three studies bear mentioning.

Hammond, Bonneau, and Sheehan (2007) assume that a status quo exists at the midpoint between the marginal justice in a given case and the next justice (in an ideological order). With this assumption in hand, the authors compare patterns in which justices join the majority, assuming they are choosing between the latent status quo and the opinion written at either the bench median's ideal point or the opinion author's ideal point. They then compare the fit of those two models and find the opinion author model outperforms the bench median model. Carrubba et al. (2007) attempt to identify the location of an opinion by examining patterns of concurrences. These authors develop a formal-theoretic model which

yields predictions about where an opinion should be located. They then examine which justices voting with the majority on the case disposition join the majority opinion and which justices concur with the result. Assuming that a justice's decision to concur is a function of the ideological distance between the opinion location and the justice's ideal point (as well as a cost of concurring), the authors provide evidence that justices are more likely to concur with the majority opinion as they move away from the median of the majority coalition. Lax and Rader (2008) adopt a similar approach by examining patterns in "vote fluidity." They consider the propensity for a justice in the minority to change her conference vote and vote with the majority after the opinion has been written. Assessing various models of bargaining and their predictions for where an opinion will be located, Lax and Rader adopt an assumption that a justice will join the opinion that is closest to her ideal point. They find support for the "strategic bargaining" model of Lax and Cameron (2007).

Our approach does not supplant these existing approaches, but rather complements them. One feature of the previous approaches is that they require making assumptions about judicial behavior in the bargaining process. Our method for estimating opinion location rests on an alternative set of assumptions—assumptions about the opinion-writing process rather than the judicial voting process. Without measures of opinions themselves, previous studies can only assess whether voting and concurring behavior is consistent with inferred opinion location, *given the relevant assumptions about the bargaining process*. These assumptions are necessary because none of these studies can directly observe or measure the location of an opinion; they can only indirectly infer it from patterns of judicial voting.¹ By contrast, the method we propose allows for such comparisons *given assumptions about the use of citations to explain the legal content of an opinion*. What is more, the use of assumed opinion locations derived from an adopted theory of intracourt bargaining does not lend itself well to the exploration of how, if at all, each of the existing theories fails to capture systematic variation in opinion location. With a measure of opinion location that is not reliant at all on any theory of intracourt bargaining, we will have at our disposal a useful tool for theory building and exploration.

¹But if the adopted model of the voting process is incorrect, then the resulting analysis will be as well. While the assumed models of the bargaining process are all plausible, the appropriate model for the Supreme Court is hardly a settled theoretical question.

Measuring Opinion Location with Precedents

We propose an alternative approach to measuring the legal content of Supreme Court opinions. A central feature of legal argumentation is the use of precedent to justify a decision. In fact, it is the use of precedent to establish doctrine that defines a legal opinion and is often the subject of interest to almost everyone—save, perhaps, the particular litigants in a case. Specifically, we look to the precedents cited by the opinion.² The intuition is simple. When the Court makes a decision, it must decide on a legal standard to apply. The Court generally regards the precedents cited in an opinion as crucial to establishing that standard. Even casual inspection of intracourt memoranda demonstrates that the justices argue over which precedents should be cited and often think that citing certain precedents will have particular legal implications that they may or may not want to invoke in the opinion. Assuming that precedents have legal implications that a given opinion author (or coalition) may or may not want to invoke, the question is whether we can deduce the legal implications of an opinion by considering which precedents are cited. For example, if one opinion affirmatively cites precedents from group A, while another opinion affirmatively cites only precedents from group B, and yet a third opinion draws on precedents from both groups A and B, then we might identify the third opinion as being "between" the first two in a "doctrine space."

Citations provide a useful source of information about an opinion's doctrinal location. The method of common law argumentation is one in which the rule or standard applied in a given case is justified by its association with existing precedents. An opinion author can most fully explain her reasoning and clearly communicate the legal principle contained in the opinion by referencing positively those precedents that are similar and referencing those precedents whose principles are dissimilar. By citing the appropriate precedents, an opinion can most fully illuminate the standard to be applied and justify its reasoning (Bueno de Mesquita and Stephenson

²Our work differs from previous scholarship on patterns of citation (Fowler and Jeon 2008; Fowler et al. 2007). Those studies examine patterns of citations among all cases to establish which cases are most central to the law. As is appropriate for that goal, the authors employ all cases across all substantive areas of the law and consider simply the fact of citation. We examine the substantive use of citations within a single issue area because we are interested in the decision to locate doctrine at a particular point in an ideological dimension and how that location may be inferred from the position in the network of citations that an opinion is given.

2002; Kornhauser 1989; Rehnquist 1986; Shapiro 1972). Moreover, to the extent an opinion, its meaning, and its content are the function of intracourt bargaining, the pattern of citations within that opinion may reflect the compromises made among the judges (Choi and Gulati 2008). To implement this idea, we develop an original Bayesian model of opinion citations that rests on two key assumptions—(a) each opinion has a fixed location along a single dimension,³ and (b) the probability of a doctrine-affirming or “positive” citation as opposed to a doctrine-disputing or “negative” citation from one opinion to another is decreasing in the distance between the two opinions.

Locating Opinions Using Citation Data

As with any data analysis, estimating the location of Supreme Court opinions requires making assumptions about the data-generating process. We have adopted a particular set of assumptions for the present analysis and examined small variations in some of them. The first part of this section describes those assumptions and why we believe they are the best ones given the constraints of the data. The second part of this section describes various ways those assumptions could be wrong, the consequences for our estimates, and solutions that might be developed in further research.

Two general classes of models that might be appropriate for opinion citations are *directional* or *proximity* models. Directional models assume that an opinion is more likely to cite a precedent if the precedent has the same ideological polarity as the opinion. In the context of freedom of religion opinions, precedents upholding governmental support for a religion would be more likely to draw on precedents that also upheld governmental support for religion. Proximity models, by contrast, assume that the probability of a positive citation from an opinion to a precedent decreases as the doctrine between the two opinions diverges. Here, an opinion may cite a precedent that resulted in a different directional outcome that nevertheless had similar doctrinal content. Thus, in a proximity model, the data-generating process that leads to a positive citation is one where the law and doctrine

drive citations, whereas in a directional model, citations are primarily oriented towards the case disposition.

We believe the proximity model most accurately captures the data-generating process. Given the choice between two precedents with identical doctrine and differing directional outcomes, we believe that a justice in this situation would cite both precedents positively. It is not uncommon for an opinion author to write something to the effect, “Case X established rule A. The facts of the case in X led us to uphold the government’s regulation. However, the facts in the instant case are sufficiently different, and rule A requires us to invalidate the government’s regulation.” Such citations are coded as positive citations and make sense only under a proximity model, not a directional model. Additionally, the proximity model more naturally follows the recent move in judicial politics towards conceptualizing of the judicial decision space as a “case space.” A case space is a k -dimensional space in which cases are located. A legal rule is then conceptualized as a k -dimensional surface that divided all points into dichotomous outcomes (e.g., guilty vs. innocent, liable vs. not liable). Thus, in contrast to spatial models of legislative voting where policies are points, in a case space rules (policies) are surfaces (Lax 2007). The case space interpretation of the proximity model is that justices use precedents to try to clearly locate the appropriate legal rule, with more similar precedents (cutting surfaces) more likely to be positively cited.

The model we adopt is different from the ideal point estimators used to scale legislative votes (Clinton, Jackman, and Rivers 2004; Martin and Quinn 2002; Poole and Rosenthal 1997) in two ways. First, those models are based on data linking legislators to roll-call votes: units of different types. In our problem, the data link new opinions to older opinions: units of the same type. Second, ideal point estimators are based on a “cutpoint” model: individuals on one side of a cutpoint are expected to make one choice while individuals on the other side make the other choice.⁴ In our problem, the proximity perspective implies “midpoint” model: precedent opinions close to the citing opinion (the midpoint) will be positively cited while those further away on both sides will be negatively cited. A similar kind of scaling model has been employed to scale interest group ratings of legislators (Poole and Rosenthal 1984); however, that problem involves units of one type (interest groups) rating their distance to units of a different type (legislators).

³As we describe below, we limit our analysis to purely substantive citations, rather than procedural citations. By not treating the procedural aspects of an opinion, we allow ourselves to focus on a component of the opinion content that is more plausibly contained in a single dimension.

⁴The cutpoint is induced by choices over binary alternatives under certain types of preferences for proximate policies.

A Common Space Estimator for Justices and Opinions

Let there be K opinions, and let \mathbf{Z} be the $K \times K$ matrix where $Z_{kk'}$ equals 1 if the opinion in row k cites the opinion in column k' positively and 0 if it cites the opinion in column k' negatively. We make three crucial substantive assumptions. First, we assume that each opinion (both citing and cited) has a fixed location in a unidimensional space.⁵ Second, we assume that the probability of a positive citation is monotonically decreasing in the distance between the citing opinion and the cited opinion. We use a quadratic loss function in a probit link to describe the latent propensity to cite a precedent positively rather than negatively. Third, we assume that missing data—temporally possible citations that are not made in an opinion—are missing at random (see below for caveats). Where Φ is the standard normal cumulative distribution function and x_k is the location of opinion k , the probability of a positive citation from case k to case k' is thus:

$$\Pr(Z_{kk'} = 1 \mid x_k, x_{k'}, \kappa, \lambda) = \Phi(\kappa - \lambda(x_k - x_{k'})^2) \quad (1)$$

We use a prior to identify the range of the opinion locations, $x_k \sim N(0, 1)$. The probit scaled probability of a positive citation for two cases with identical positions is thus given by the estimate of κ , which we give a diffuse uniform prior $\kappa \sim U(-10, 10)$. The rate with which increasing discrepancies in position reduce the probability of citation is captured by λ , which has a strictly positive prior $\lambda \sim U(0, 10)$. The edges of these uniform priors were chosen to be large enough to approximate an improper uniform prior (i.e., a uniform prior with infinite bounds).

To facilitate theory testing, we integrate this citation model with existing techniques for locating justices based on their votes to form an estimator that locates both justices and opinions on a common scale. Our estimates of the justices' ideal points come from applying the standard Bayesian ideal point estimator (Clinton, Jackman, and Rivers 2004; Jackman 2001) to justices' votes with respect to case disposition. Rather than using the widely applied Martin-Quinn scores—based on a dynamic version of the same ideal point estimator—we estimate the equivalent of their constant ideal point model using only votes cast in the cases that generated our citation data.⁶

⁵We acknowledge this assumption may not be entirely innocuous. However, considerable evidence suggests that American policy questions can generally be studied in a single dimension (Martin and Quinn 2002; Poole and Rosenthal 1997). Moreover, that we apply our estimator to only cases within a single policy area further suggests our assumption is reasonable.

⁶Recent scholarship has argued that some justices' ideal points may change over time (Epstein et al. 2007). We assume a constant

Estimating both justice ideal points and opinion locations simultaneously facilitates appropriate estimates of uncertainty when evaluating the theoretical models that make predictions about their joint distribution. Where \mathbf{Y} is a matrix of votes by justice i on case j , x_i is justice i 's ideal point, and α_j and β_j are parameters characterizing the cutpoint and discrimination factor for case j ,

$$\Pr(Y_{ij} = 1 \mid x_i, \alpha_j, \beta_j) = \Phi(\alpha_j - \beta_j x_i) \quad (2)$$

Following standard practice, the case parameters α_j and β_j are given diffuse normal priors $N(0, 5^2)$. We do not link the case parameters to the estimated opinion locations in any case, since we want to avoid assuming any particular theory of how justices vote on case disposition as a function of opinion locations. Since all extant bargaining theories predict opinions in the same range of positions as the ideal points, the justice ideal points are given the same prior distribution as the opinion locations $x_i \sim N(0, 1)$.

While much can be learned by estimating the opinion locations and justice ideal points separately as described above, having positions for opinions and for justices on the same scale is especially valuable. However, in order to place both opinions and justices in a common space, we need an assumption to tie the justices to the opinion space. We choose to assume that some opinions fall at certain points in the judicial ideology space, thereby tethering the two spaces. Imposing this assumption with respect to majority opinions is problematic because we aim to test theories related to the location of these opinions. Concurring opinions are also less than ideal as a bridge between the two spaces, as they are often written to complement or contrast with the majority opinion. While dissenting opinions may have some of those strategic elements, we believe they are less strategic than majority or concurring opinions. Thus, in order to place justices and opinions on a common scale, we assume that dissenting opinions are located at their authors' ideal points. Empirically, we find support for this assumption. We have estimated the location of opinions without linking them to the justices' ideal points and compared them both to our estimates of their authors' ideal points based on our subsets of cases and to the Martin and Quinn (2002) estimates of their authors' ideal points. We find that the strongest relationships between opinion location and author's ideal point are for dissenting opinions, with weaker relationships for

ideal point model for two primary reasons. First, the small number of cases studied here makes identifying changes in individual justices' ideal points difficult, if not impossible. Second, because we are examining only a single issue area—freedom of religion jurisprudence—we do not believe there will be much variation in any individual justice's ideal point.

majority opinions and the weakest for concurring opinions.⁷ Finally, we show below that relaxing this assumption does not significantly change the relative positions of opinions except for a few that are very imprecisely estimated due to a small number of citations.⁸

Limitations of the Model Specification. There are a number of ways that the assumptions we have adopted might be incorrect. There are at least four plausible features of the true data-generating process relating citation data to opinion location that we leave unmodeled. These mechanisms could lead to problems with the opinion locations recovered by our estimator, but to fully address them requires analysis of a considerably more complicated opinion location estimator and additional sources of data. As such, these possible model violations are important to keep in mind both in evaluating the results of our analysis and in contemplating future research using citation data.

First, some opinions may be narrower or broader than others in their application of precedent. By modeling κ and λ as constant parameters across all opinions, we have assumed that all opinions are equally likely to positively cite an opinion a given distance away. We adopt this assumption to limit the number of parameters estimated, but it is possible there are meaningful variations across opinions. Unfortunately, given the limited number of citations per opinion, it is simply not possible to get meaningful estimates of opinion-specific κ or λ .⁹ To the extent that we are wrong about this assumption, we will underestimate or overestimate the uncertainty in the opinion locations. The estimated locations of very narrow or very broad opinions may be biased for opinions near

⁷We note that we obtain similar results when we constrain only solo-authored dissenting opinions to be at their authors' ideal points. However, there are very few solo-authored dissents, and the restriction provides a weaker link between the two spaces. Most dissents, while not solo-authored, do seem to reflect the preferences of their author and do not seem to be the product of bargaining among the group of authors concurring in the opinion. For example, dissenting opinions are usually written in the first person, and other justices who agree with the opinion are said to "concur" in the opinion (rather than to join).

⁸One would prefer to have direct empirical evidence that dissenting opinions are closer to their authors' ideal points than are majority opinions. However, given that no research to date has been able to estimate opinions in a common space with justice ideal points, such evidence is not available. Our assumption is the most plausible assumption which identifies the relative positions of justices and opinions given our data.

⁹We have tried hierarchical models for these parameters, yielding essentially the same results as reported in the article. The negligible information in the data about variation in these parameters means that the priors governing shrinkage determine the results of the hierarchical analysis.

the edge of the space, and the direction of the biases will vary.

Second, the doctrine embodied by an opinion in doctrine space may change over time. For example, an opinion may be liberal at the time it is written, but over time it is interpreted and modified into an effectively conservative precedent. The way in which precedents and their doctrinal implications change over time is certainly of interest and consequence. Assuming a model where opinion locations are static is a reasonable approximation of the most likely dynamic processes, but future research might examine whether precedents change over time in a significant way.¹⁰

Third, the citation data-generating process may not be entirely driven by doctrinal concerns. We have assumed that the direction of a precedent judgment is far less important to how it will be cited than the arguments that the precedent makes about doctrine. If opinions cite precedent because they match the disposition of the current case as well as because they make similar doctrinal arguments, the appropriate model is a mixture of a proximity and a directional model. Such a model is difficult to identify (Lewis and King 1999) and interpret, so we adopt the pure proximity model here. To the extent that directional citation is present in the data, it will induce an artificial separation between estimated opinion locations arguing for "liberal" versus "conservative" dispositions. However, since such separation is to be expected even if the pure proximity model is correct, simply observing the estimates cannot tell us how much directionally motivated citation is inducing bias.

Fourth, we have not modeled the selection process by which opinions are either cited or left unmentioned, assuming that failures to cite are missing at random (MAR). We are implicitly assuming that the decision to cite does not depend on spatial proximity; however, this might be incorrect (Hansford and Spriggs 2006, chap. 6). To the extent that spatial distance rather than other features motivates selection, bias in the estimates would result. A variety of nonspatial features of opinions—e.g., time elapsed, quality, breadth—might influence citation

¹⁰A recent notable study has attempted to explain how legal doctrine changes over time through the interpretation of precedent (Hansford and Spriggs 2006). While their goal is an important one, ours is different. We are interested in measuring where particular opinions are located. Current doctrine consists of part or all of many opinions. Thus "doctrine" might change through interpretation even as the doctrinal location of a precedent stays fixed. In this sense, we see our goal in this article as complementary, rather than inapposite, to theirs. They are interested in legal rules and their development over time; we are interested in the content of a particular opinion at a particular point in time—i.e., when it is written.

propensity and allow identification of a more elaborate selection model that predicts both citation and whether the citation is positive or negative. Some recent scholarship has examined the legal centrality of Supreme Court opinions (Fowler and Jeon 2008; Fowler et al. 2007) using the fact of citation rather than the content of the citation. While that scholarship does not necessarily identify the sources or determinants of frequent citations to precedents, it does demonstrate that some precedents are cited far more often than others, suggesting nonspatial valence characteristics or other selection criteria.

Data

To estimate the content of Supreme Court opinions, we assemble two original datasets of citations covering the Warren, Burger, and Rehnquist Courts. The first includes all search and seizure cases; the second includes all freedom of religion cases. We chose these two issue areas for several reasons. First, these two issue areas are among those with the most cases decided and opinions written in recent decades. Second, both are substantive areas of the Court's jurisprudence that has been the subject of considerable scholarly attention; as a consequence, there exists theory and empirical evidence that can be brought to bear on the analysis of our estimates of opinion content. Finally, civil liberties is an area of law that is known to map onto ideological dimensions very well (Epstein and Mershon 1996; Segal and Cover 1989). Therefore, subsequent investigation of the determinants of opinion location can take advantage of well-documented evidence of correlation between ideology and judicial decision making. To compile a list of opinions, we used the Spaeth database to identify all cases that were about search and seizure (ISSUE = 16, 17, or 18) or freedom of religion (ISSUE = 455, 461, or 462). The justices' votes in these cases constitute the voting data used to estimate ideal points on the relevant dimension.

Compiling data on citations and their polarity requires extensive manual coding. While the Shepard's citation index provides a complete list of citations in majority opinions, many of the codes given to citations are ambiguous in their polarity. For example, the categories distinguished, explained, and dissenting are all ambiguous in their substantive implications for the polarity of a citation. An "explained" citation is defined by Shepard's as a citation "interpreting [the] case in a significant way"; a distinguishing citation is defined by Shepard's as a citation noting the "case is different from the [citing] case in significant aspects." Both of these citations could be positive or negative in polarity and are often

very clearly negative or positive citations. To overcome the limitations imposed by the Shepard's citation codings, we read each opinion and compiled a list of cited precedents, ignoring purely procedural citations and citations to opinions from other courts. To code citations, we adopted a relatively permissive definition of a positive citation. Citations coded in a strictly positive or negative way by Shepard's are coded in our analysis as positive and negative, respectively. The more neutral citations, including distinguishing, explained, and dissenting, are coded according to the citing author's purpose. Most often, these neutral citations are coded as positive in our data, though a nonnegligible portion of them are coded as negative citations. They are only coded as negative when it is particularly apparent that the opinion author disagrees with the thrust of a precedent's reasoning and is avoiding explicitly rejecting the precedent. Such citations are usually the product of one opinion's reliance on a precedent, while a competing opinion seeks to reject the precedent. Thus, unless an opinion challenges a precedent or rejects its reasoning, a citation is coded as positive. The implication here is that if an opinion author is willing to cite a precedent, the precedent must be sufficiently compatible with the citing opinion reasoning. While we admittedly lose some of the objectivity inherent in the Shepard's coding system, we believe this trade-off is warranted by the considerable additional information we gain from substantively examining the neutral citations.

For search and seizure cases, our data collection yielded a total of 851 opinions in 294 cases: 294 majority opinions, 168 concurring opinions, 259 dissenting opinions, and 45 concurring and dissenting opinions. Among the freedom of religion cases, we identified a total of 217 opinions in 78 cases: 78 majority opinions, 60 concurring, 72 dissenting, and 7 concurring and dissenting. We code all citations in each of the opinions in our dataset—not just citations to other opinions in our dataset. The number of opinions per case varies from 1 to 6, with averages of 2.5 (search and seizure) and 2.8 (freedom of religion).¹¹ Fifty-one search and seizure majority opinions were written per curiam; two freedom of religion majority opinions were per curiam. For each of these opinions, all citations to precedent were coded as either positive or negative. Positive citations include instances of reliance on a standard or logic that was followed or developed in a precedent, or analogizing from the facts of the instant case to the facts of the precedent. Negative citations include distinguishing a precedent from the instant

¹¹ Among the search and seizure cases, six cases had six opinions and 15 cases had five opinions. Among the freedom of religion cases, one case had six opinions and six cases had five opinions.

case, declining to follow a precedent, or contrasting the current case with the precedent. Among the search and seizure cases, the average number of citations per opinion is 14.6 (13.5 s.d.), with a minimum of 1 and a maximum of 92. Among the freedom of religion cases, the average number of citations per opinion is 15.9 (11.9 s.d.), with a minimum of 1 and a maximum of 50.

Estimates

We apply our estimator to the two sets of cases separately.¹² We simulated the posterior distribution of the model by Markov Chain Monte Carlo. Our mean posterior estimates are based on 100,000 iteration simulations (thinned by 10) implemented in JAGS (we discard a 2,000 iteration burn-in period). The web appendix to this article includes the JAGS model code, and a complete replication archive for all the analysis in this article is available. The posterior correlation of the model parameters is low, which aids convergence and mixing (Gelman et al. 2004; Gill 2008). Trace plots for individual parameters suggest that the model converges quickly. We describe our estimates from each of the two sets of cases in turn.

Opinion Estimates. The posterior means for the incidental parameters from the citation model applied to the search and seizure cases are $\hat{\kappa} = 1.02(0.02)$ and $\hat{\lambda} = 0.34(0.02)$. The estimate of κ implies that a new opinion will positively cite a precedent at the same doctrinal location with probability 0.85. The estimate of λ implies that opinions at distances of 1, 2, and 3 units in the space will positively cite with probabilities of 0.75, 0.37, and 0.02, respectively. Since the mean posterior estimates of the opinion locations vary from -2.7 to 2.4 , the predicted probability of positive citation varies over most of the range between 0 and 1. Our estimates of the justices' ideal points based on the search and seizure cases are highly correlated with the Martin and Quinn (2002) estimates based on all cases ($\rho = 0.72$, $\rho = 0.73$ excluding the Martin-Quinn outlier Douglas). In the web appendix to this article, we provide (1) a table of the estimated opinion locations along with information about opinion author, opinion type, citation counts, and other descriptive information, and (2) a table of each justice's estimated ideal point, his or her tenure on the court, and other descriptive statistics.

The two panels in Figure 1 show the distribution of estimated majority opinion locations. First, we see very

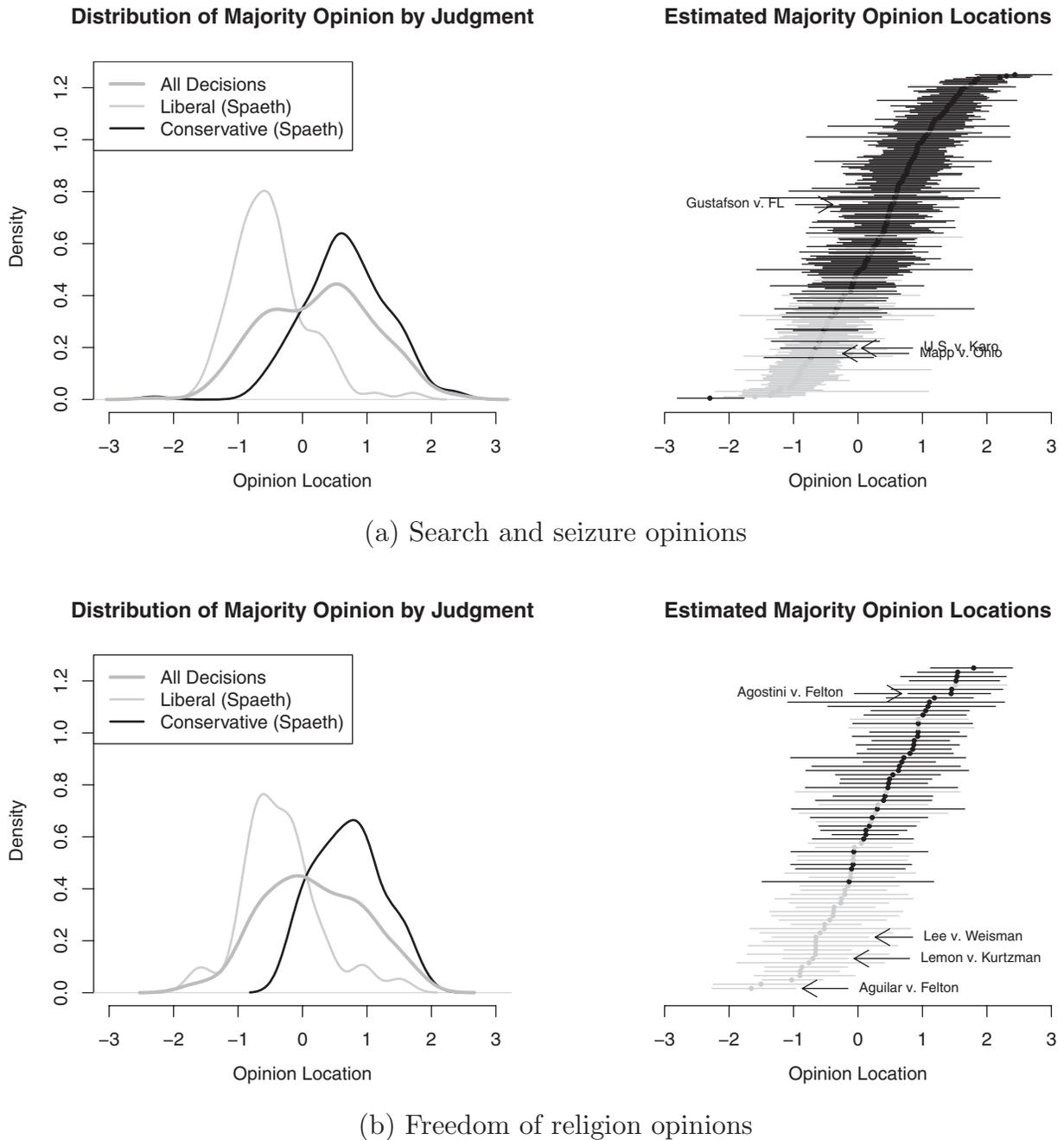
clearly in the left-hand panel that the distribution of opinion locations is bimodal. Indeed, we see that the overall bimodal distribution is in fact a function of two distinct unimodal distributions, one corresponding to each of the dichotomous measures of judgment polarity. While the coding based on case disposition captures much of the variation in the location of majority opinions, there are several advantages to our measure. First, and most important, our measure is a measure of *opinion location*, rather than a measure of *judgment*. To the extent that theories of bargaining are about opinions and only indirectly about judgments, these measures provide a more direct estimate of the quantity of interest for scholars seeking to test those theories. Second, while there is a high correlation between our measures and the Spaeth measures of the Court's judgment, our measures actually allow tests of the influence of specific actors on the bench. That is, within the class of decisions considered "liberal" or "conservative" by Spaeth, our estimates provide the only direct method for assessing variation in the spatial location of opinions. Finally, our estimates allow us to place opinions on an ideological dimension that is not dependent on the Court's judgment. This can be important in instances where the Court's judgment may belie the actual legal and doctrinal implications of a decision—cases where the winning litigant is a misleading proxy for the doctrine of the majority opinion. Indeed, one can see in Figure 1 that there is considerable overlap between the distribution of opinions for each of the "conservative" and "liberal" judgments. Below, we provide some discussion of a few exemplar opinions to demonstrate the ways in which our measures capture the substantive nuance of opinions that is missed when we study only judgments.

The estimated incidental parameters from the citation model applied to the freedom of religion cases are very similar to those from the search and seizure cases: $\hat{\kappa} = 1.07(0.04)$ and $\hat{\lambda} = 0.36(0.04)$.¹³ As in the search and seizure cases, we find an overall bimodal distribution of opinion locations. Also as before, the Spaeth coding of case judgment captures a great deal of the variation between liberal and conservative decisions, the

¹²There are not enough precedents commonly cited across these two sets of cases to link the two dimensions.

¹³The estimate of κ implies that a new opinion will positively cite a precedent at the same doctrinal location with probability 0.86. The estimate of λ implies that opinions at distances of 1, 2, and 3 units in the space will positively cite with probabilities of 0.75, 0.35, and 0.01, respectively. The mean posterior estimates of opinion location range from -2.5 to 2.1 ; as above, our estimates of κ and λ mean that the predicted probability of positive citation varies over most of the range between 0 and 1. Also as with search and seizure, our estimates of the justices' ideal points based on the freedom of religion cases are highly correlated with the Martin and Quinn (2002) estimates based on all cases ($\rho = 0.72$, $\rho = 0.87$ excluding the Martin-Quinn outlier Douglas).

FIGURE 1 Estimated Locations of (a) Search and Seizure and (b) Freedom of Religion Majority Opinions, 1953–2004

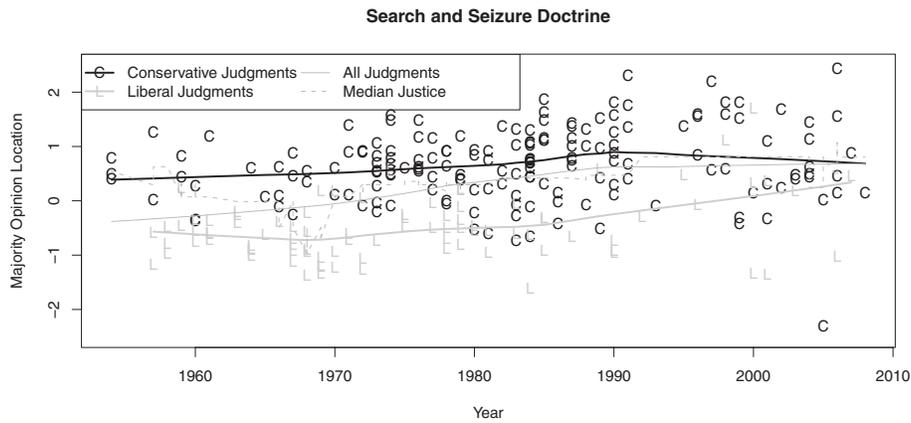


Note: Left-hand panel shows distribution of all majority opinions (in black) and distribution of opinions divided by judgment (as coded by Spaeth); right-hand panel shows estimated location of opinions and 95% high-density intervals.

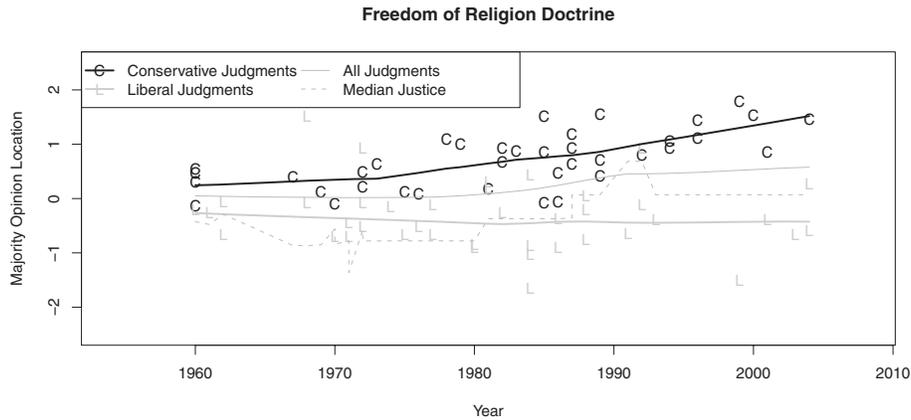
dichotomous measure clearly masks both important variation *within* liberal or conservative decisions and instances in which a liberal judgment may be associated with a relatively conservative opinion, or vice versa.

Temporal Patterns. Next, we briefly note the distribution of opinion locations over time. Figure 2 shows each majority opinion written by the Supreme Court between 1953 and 2004 in the search and seizure and freedom of religion cases. The top panel shows search

FIGURE 2 Estimated Opinion Locations Across Time and the Location of the Median Justice in Search and Seizure and Freedom of Religion Cases



(a) Search and seizure opinions



(b) Freedom of religion opinions

Note: Majority opinions only shown.

and seizure cases; the bottom, freedom of religion. The x-axis shows the year an opinion was handed down, and the y-axis shows its location in doctrine space; the solid lines show lowess smoothers for majority opinions coded as “liberal” (blue) and “conservative” (red) by Spaeth. The black solid line shows all opinions; the dotted line shows the location of the median justice in the common space. A striking pattern emerges in both sets of opinions. First, notice that the overall trend in majority opinions does roughly track with the location of the median justice. As the median justice has become more conservative since 1970, the average majority opinion location also becomes more conservative. However, this trend captures little of the variation in opinion locations. Notice that few opinions are located near the average opinion location. Rather, there appear to be two distinct sets of opinions—those leading to conservative judgments and those leading

to liberal judgments. This finding suggests that considering the average location of a Court’s opinions may be misleading, as few observations are actually “average.”¹⁴ Indeed, this is precisely what one might infer from the left-hand panels of Figure 1.

Further, there is a second trend in the data that is made clear by this figure. The distance between “conservative” opinions and “liberal” opinions has grown recently in freedom of religion while shrinking in search and seizure cases. In freedom of religion, the majority opinions leading to liberal judgments in 2004 have locations in doctrine space comparable to liberal judgment opinions in 1960. Opinions leading to conservative judgments in

¹⁴Given that there is the possibility of some artificial separation in the estimates if some citations are motivated by direction of judgment rather than proximity of doctrine, this separation may or may not indicate that the Court’s doctrine is inconsistent.

2004 are much further to the right—i.e., higher values—than their counterparts in 1960. However, in search and seizure the liberal judgments have become less liberal in doctrine over time, almost converging to the same average doctrine as conservative judgments. Indeed, this pattern comports with model perceptions of contemporary search and seizure doctrine. As the development of legal doctrine and the systematic measurement of judicial policy become subjects of greater scholarly interest among political scientists of the courts, these estimates will be useful for identifying where and when doctrinal change takes place.

Validity and Sensitivity

Our Measures Capture Important Substantive Opinion Content. Before proceeding to a preliminary substantive application of our estimates of opinion location, we present first some substantive description of a few exemplar opinions to demonstrate the validity of our measures as indices of the doctrinal content of opinions. (Below, we also provide results from three sensitivity analyses.) The measures we have developed are useful precisely because they allow a more fine-grained analysis of the Court's policy output. Rather than divide all decisions into rough dichotomous categories, corresponding to the Court's judgment (which litigant wins), our measures place *opinions* along a continuum. This approach provides both a measure that is more fine-grained and more directly connected to the substantive component of judicial decision making about which scholars are usually interested—the content of their opinions.

To see that these measure capture the substance of judicial opinions, we consider a few exemplar opinions. Consider first *United States v. Karo*, 468 U.S. 705 (1984), which is coded as a conservative judgment by Spaeth because the Court upheld a governmental search. In that case, the Drug Enforcement Agency learned that the defendant was going to buy 50 gallons of ether from a government informant. The DEA replaced one of the containers of ether with its own container, which contained a tracking device (with the informant's consent). The government agents saw the defendant pick up the container, followed him to his house, and then tracked the container with the electronic "beeper" to two other houses until it was ultimately placed in a locker at a commercial storage facility. Using this information, the DEA obtained a search warrant. They executed the warrant and arrested the defendants. The lower courts granted a motion to suppress the evidence, holding that the warrant was invalid because the DEA needed a warrant to

place a beeper in the container in the first place. The Supreme Court reversed that decision, holding the evidence from the search admissible. However, in doing so, the Supreme Court announced strict limitations on when and how the government may use electronic tracking devices. The Court rejected a number of the government's claims and refused to allow warrantless installation of electronic tracking devices. Writing for the majority, Justice White noted,

We cannot accept the Government's contention that it should be completely free from the constraints of the Fourth Amendment to determine by means of an electronic device, without a warrant and without probable cause or reasonable suspicion, whether a particular article—or a person, for that matter—is in an individual's home at a particular time. Indiscriminate monitoring of property that has been withdrawn from public view would present far too serious a threat to privacy interests in the home to escape entirely some sort of Fourth Amendment oversight. 468 U.S. 705, 716 (1984)

He went on to observe, "We also reject the Government's contention that it should be able to monitor beepers in private residences without a warrant if there is the requisite justification in the facts for believing that a crime is being or will be committed and that monitoring the beeper wherever it goes is likely to produce evidence of criminal activity" (468 U.S. 705, 717 (1984)). However, the Court did hold that in this particular case, the search was valid because the electronic device did not reveal any information about the contents of the locker to be searched, and the warrant would have been issued even without the electronic device. Thus, the Court announced a rule that ought to be considered "liberal" because it substantially constrains the government's power. In our data, *Karo* is one of the most liberal opinions from among those coded as "conservative" by Spaeth.

Another notable example is *United States v. Place*, 462 U.S. 696 (1983). In this case, law enforcement officers observed the defendant acting suspiciously in the Miami airport when he purchased a ticket to fly to New York. The officers approached the defendant, who then consented to a search of his checked baggage. However, because his flight was about to depart, the officers decided not to search the baggage; they did notice a discrepancy between the addresses on the two pieces of luggage. The officers notified the DEA in New York. When he arrived in New York, the defendant was approached by DEA agents but refused to consent to a search. The agents took the suitcase

to another airport, where a drug-sniffing dog tested the luggage. The officers then obtained a search warrant and found cocaine in the bag. This process took over 90 minutes. The defendant pleaded guilty when the trial court denied his motion to suppress the evidence. The Court of Appeals, however, reversed the case and declared the evidence inadmissible. The Supreme Court affirmed the Court of Appeals. Thus, this decision is coded as “liberal” by Spaeth because the Supreme Court overturns a conviction. However, in the opinion, the Supreme Court allowed very extensive warrantless search powers to the government. Writing for the majority, Justice O’Connor declared,

The context of a particular law enforcement practice, of course, may affect the determination whether a brief intrusion on Fourth Amendment interests on less than probable cause is essential to effective criminal investigation. Because of the inherently transient nature of drug courier activity at airports, allowing police to make brief investigative stops of persons at airports on reasonable suspicion of drug-trafficking substantially enhances the likelihood that police will be able to prevent the flow of narcotics into distribution channels. 462 U.S. 696, 704 (1983)

Justice O’Connor went on to write that “a ‘canine sniff’ by a well-trained narcotics detection dog, however, does not require opening the luggage” (462 U.S. 696, 707 (1984)). That is, a search by a drug-sniffing dog does not constitute a search and does not require a warrant. This is a very “conservative,” or government-friendly, rule. The Supreme Court only invalidated the search because they decided it took too long to effectuate. While the outcome is “liberal” in the sense that the defendant won, the rule announced in the opinion is a conservative rule. This opinion has one of the most conservative estimates from among those coded as “liberal” by Spaeth.

We find similar evidence of the measures’ validity in the freedom of religion cases. For example, the most negative estimated opinion location among those coded by Spaeth as “conservative” is Justice Blackmun’s majority opinion in *Jones v. Wolf*, 443 U.S. 595 (1979). That case involved a dispute about the ownership of church property after a local church split from its hierarchical church organization. The Court declared that the state courts may adopt a “neutral principles of law” analysis in evaluating the claims to the church property, rather than deferring to the church’s religious authority. To the extent that lower locations in doctrine space indicate a stricter church-state divide, or a “nonentanglement” doctrine,

this opinion clearly belongs at the left end of the scale. That is, the Court’s ruling in this case is specifically concerned with avoiding state entanglement with religion by divorcing the church’s “religious authority” from the contract law employed by the courts. However, even under this liberal rule, the court determined that the conservative plaintiff should prevail given the facts of the particular case.

By contrast, the most positive estimate of an opinion coded by Spaeth as “liberal” is Justice Scalia’s concurring opinion in *Lamb’s Chapel v. School District*, 508 U.S. 384 (1993). That case raised a question about whether a public school may constitutionally refuse a church’s request to use the school’s facilities to show a series of religious-oriented films on family values and child rearing. The Court held that the school may not constitutionally refuse such a request, grounding its decision in the *Lemon* test.¹⁵ Justice Scalia, joined by Justice Thomas, concurred in the judgment but rejected the *Lemon* test. While he does not give much rationale for his judgment, his opinion levels a strong attack on the *Lemon* test and argues for its rejection. Scalia’s opinion, then, belongs at the right end of the doctrine space dimension because it argues for fewer barriers to governmental support for religious organizations. Thus, we see in these two examples that the doctrine space estimates of the opinions give a much richer measure of the policy embedded in a particular opinion than is possible using dichotomous coding of the Court’s judgment. The Spaeth codes identify the winning litigant, but the doctrine space estimates provide a measure of the content of an opinion and its policy implications.

In sum, the opinion locations we derive from our model yield intuitively plausible estimates of judicial policy. They are highly correlated with directional codes of an opinion’s judgment (Spaeth 2008), and where they appear to be inconsistent with the directional code, a qualitative examination of the opinion’s content suggests that the directional code is itself misleading.

Model Robustness and Sensitivity to Specification. To demonstrate the robustness of our results to particular modeling choices, we present the results of three sensitivity analyses we have performed. First, we use our posterior parameter estimates to replicate the citation data (Gelman et al., 2004). To the extent our model fits the data well, it should be able to predict a pattern of citations that resembles the true dataset. On the smaller freedom of religion data, we predict 74% of citations correctly, compared with

¹⁵The *Lemon* test is a standard doctrine, developed in *Lemon v. Kurtzman*, 403 U.S. 602 (1971), in the area of First Amendment law, which has been consistently attacked by conservative legal scholars and jurists.

66% from a null model that assumes a constant probability of positive citation equal to the sample average.¹⁶ With more data to work with in the larger search and seizure data, the predictive payoff versus the null model is larger: we predict 66% of the citations correctly, compared with 54% under the null model. Thus, our model fits the data fairly well; given our data we can predict with some accuracy how each precedent will be cited by an opinion at any given location in doctrine space.

Second, we evaluated the empirical implications of our assumption that dissenting opinions are sincere representations of their authors' ideal points by running the model with and without that assumption. The relative ideal points of justices are essentially unchanged when we impose the common space constraint. A small subset of opinions are inverted in relative order by imposing additional structure. This inversion occurs because some cases and subsets of cases are poorly connected by citations to the majority of cases that remain unchanged in relative location across the constrained and unconstrained estimations. Thus, while the sincere dissent assumption is not necessary for applying our method of scaling citations, it helps identify some segments of the case law that are poorly connected through citations as well as unifying ideal points and opinions in a common space.

Third, we consider the possibility that a strategic process underlies the decision to cite particular precedents. In order to (at least partially) address this problem, we code "implicit citations" from opinions to precedents. For example, suppose opinion 1 cites precedents *a* and *b*, but not *c*. Now suppose the dissenting opinion in that case cites precedents *a* and *b* and cites *c*, by noting something to the effect of "the majority disregards precedent *c*, which undermines its argument." In this case, we code the majority as "implicitly" citing precedent *c* negatively. This coding rule mitigates some concerns about selection bias, since such bias would result if there was a strong relationship between fact of citation and polarity of citation (selection to be cited depending on the error term in the citation equation). By coding implicit citations, the set of cases cited by a majority opinion and the dissent in the same case become more similar.¹⁷ We reestimate

¹⁶Seventy-eight percent of the citations in the sample are positive. Of course, one could assume a null model that all citations are positive, which would predict 78% of citations correctly (equivalent to having a positive κ with a large magnitude relative to λ in our model). However, the posterior probability that that model is correct is 0, because negative citations are observed. In the search and seizure data, 65% of the citations in our sample are positive.

¹⁷While the risk of selection bias is reduced, coding reliability may also be reduced due to the difficulty of finding all such implicit citations.

opinion and justice locations including implicit citations; both the majority opinion locations and the justice ideal points are nearly identical across each of the two estimations across both sets of cases. These additional data primarily serve to increase the precision of the estimated location of majority opinions.

These sensitivity analyses suggest that several of our most consequential modeling assumptions are reasonable. The model explains a significant fraction of the variation in the data, our common space assumption is largely consistent with the patterns already in the data, and strategic selection of citations does not appear to be severely biasing our estimates. We now proceed to apply our opinion location estimates to a substantive problem in the field of judicial politics, reporting results from analysis using the sincere dissent assumption to form a common space and the implicit citations to minimize the risk of selection bias.

Opinion Content and Theories of Bargaining

Our estimates of opinion locations in doctrine space have many potential applications. However, as we noted above, the most direct—and most central, in our view—application of these data is to the empirical assessment of theories of bargaining on the Supreme Court. Because of the centrality of these theories to almost all other scholarship concerning the Court, we believe providing a direct test of the competing theories' predictions is an important contribution. First, we provide a more detailed discussion of the predictions from each of the classes of models described earlier. Second, we bring our new estimates to bear on those predictions. Third, we provide some discussion of the models and their empirical support.

Theoretical Predictions

Median justice models assert that—as such models do in the context of elections or legislative voting—because the median is pivotal in any vote, all opinions will be located at the median justice's preferred policy (Hammond et al. 2005). Thus, controlling for the median justice, neither the opinion author, nor the division of the Court, nor the minority's preferences should affect the location of an opinion. Author monopoly models, by contrast, assert that the opinion author should have some degree of influence over the opinion location. In one variant, the author has complete monopoly, while in another, the author is

“constrained” by the need to keep the median justice from defecting to the minority (Hammond et al. 2005; Schwartz 1992). A third variant on this general logic is the strategic bargaining model (Lax and Cameron 2007), which predicts that the particular location of an opinion should be affected by the median justice, the opinion author, and the preferences of the most extreme member of the minority. In this model, opinion authors seek to deter the median from defecting and joining an opinion written by the minority.¹⁸ A final model is the “median of the majority coalition” model. This model, which has its roots in empirical work (Spriggs and Hansford 2002; Westerland 2003) but has recently been formalized as well (Carrubba et al. 2007), predicts that the median member of the majority coalition will control the location of opinions. Thus, once controlling for the median member of the majority coalition—or the particular composition of a coalition of justices—neither the opinion author nor the median justice should have an effect on the location of an opinion. Here, we provide an initial, though admittedly limited, empirical analysis of these three main theories of intracourt bargaining using our original measurement strategy.

Bringing Data to the Theories

Three of these models—the median justice, strong author, and coalition median models—predict that majority opinions will be located at the ideal point of the relevant controlling justice. Our estimates of opinion locations in a common space with justice ideal points allow us to present the first comparison of estimated opinion locations (independent of voting patterns) to justice ideal points. With our estimates, we can simply compare opinion locations with the ideal point of the justice that should be determining the opinion location under each theory. Figure 3 does just this. The top row shows the correlations using search and seizure opinions; the bottom row shows correlations using freedom of religion opinions. In the left-hand panels, we see the estimated location of each majority opinion against the estimated ideal point of the median justice. In the middle panels, we see the estimated opinion location against the estimated ideal point of the opinion author. Finally, in the right-hand panels, we see the estimated opinion location against the estimated ideal point of the

median member of the majority coalition. Each of these three theories predicts that all opinions should fall on the diagonal line—i.e., that the opinions should be located exactly at the relevant justice’s ideal point.

To assess which theoretical model is most powerful at predicting the location of the opinion, we must take into account the measurement uncertainty in our estimates of both the opinion location *and* the justices’ ideal points. In Table 1, we present linear models for estimated opinion location as a function of various theoretically relevant estimated ideal points, using the posterior variance of the estimates to identify a model that takes into account measurement uncertainty.¹⁹ Similarly, in Figure 3, we provide a visual sense of the uncertainty in opinion locations and ideal points by plotting 95% posterior probability ellipses for a subset of the opinions.²⁰

Consider first the median justice model. In Table 1 and in the left-hand panels in Figure 3, it is clear that the median justice has some predictive power, but explains little of the variation in location of the majority opinions. The median justice’s estimated ideal point has only slightly more explanatory power with respect to the estimated opinion location than simply predicting every opinion will be located at the mean opinion location. Among the search and seizure cases, 36% of the majority opinions are statistically distinguishable from the median justice’s ideal point at the 95% level. Among the freedom of religion cases, 20% of majority opinions are statistically distinguishable from the median justice’s ideal point. Were the model correct, and all error due to estimation, we would expect no more than 5% of such opinions to be statistically distinguishable from the median.

Consider next the relationship between the opinion author and the opinion location. We see in the middle panels in Figure 3 that the location of the opinion author is generally a poor predictor of the estimated opinion location. Among the search and seizure cases, 54% of the estimated opinion locations are statistically distinguishable from the opinion author’s ideal point; among the freedom of religion cases, 28% of the opinions are statistically distinguishable from their author’s ideal point. Moreover, as the figures make clear, some of the estimated opinion locations are very far from the diagonal line.

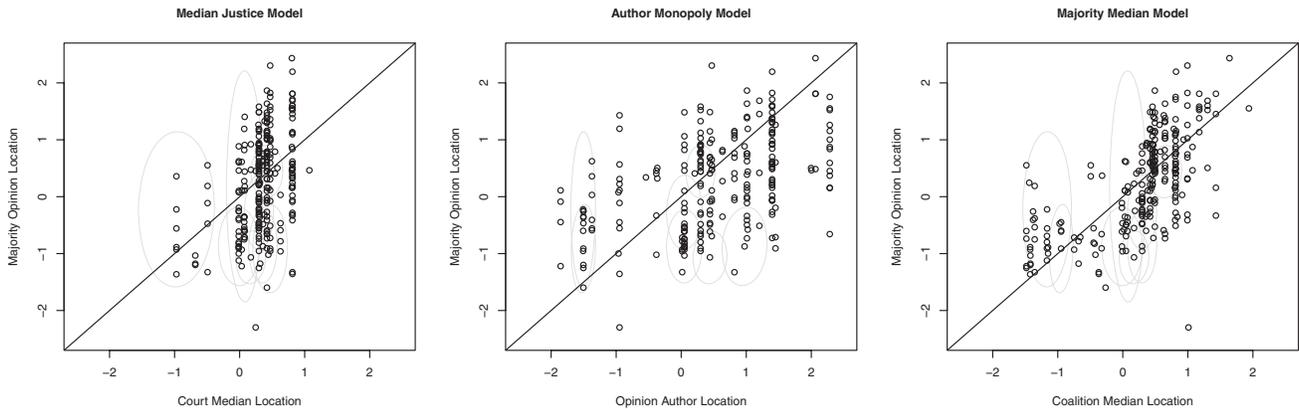
Finally, consider the relationship between the majority coalition median’s ideal point and the estimated

¹⁸Opinions in this model, however, have characteristics on two dimensions—policy and quality. Particular configurations of preferences lead to complicated strategic interactions in which authors balance divergence between the opinion location and the median’s preferences with (costly) opinion quality against expectations about competing “offers” from the minority.

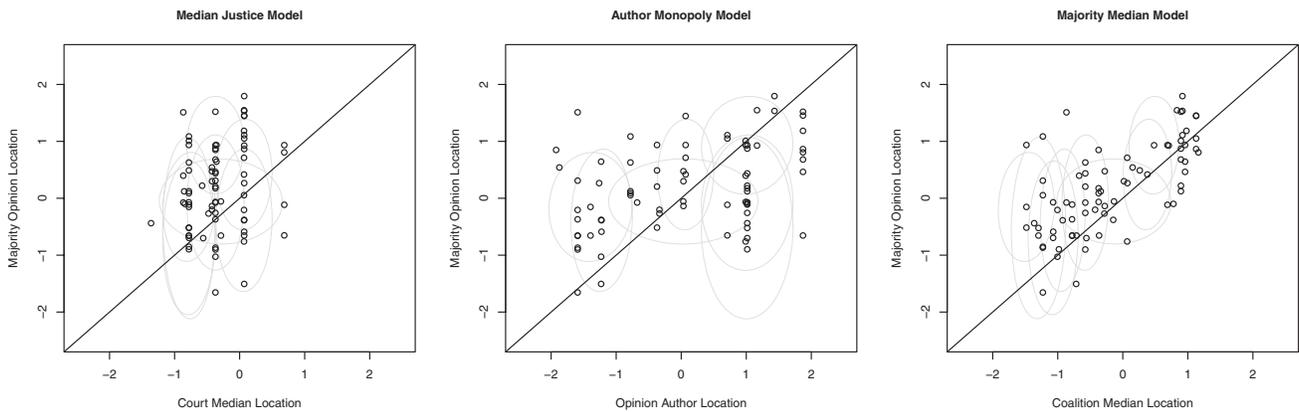
¹⁹We constructed a linear model in which we can account for uncertainty on both the left- and right-hand sides of the model. Our estimation, however, returns results essentially identical to those from a standard OLS model.

²⁰Showing ellipses for all points makes the figure unintelligible; however, we show ellipses for the same opinions in all three panels to facilitate comparisons.

FIGURE 3 Estimated Location of (a) Search and Seizure Opinions and (b) Freedom of Religion Opinions Relative to Bench Median, Opinion Author, and Majority Coalition Median



(a) Search and seizure opinions



(b) Freedom of religion opinions

Note: Diagonal line shows $y = x$; each theory predicts that all opinions should fall on the respective diagonal line; ellipses show posterior 95% density regions for a subset of opinions (there is uncertainty in both the location of the relevant justice and the location of the opinion).

location of the majority opinion. We see in Table 1 and in the right-hand panels in Figure 3 that the coalition median is by far the strongest predictor of opinion location. Among the search and seizure cases, 30% of the majority opinions have estimated locations that are statistically distinguishable from the coalition median’s ideal point. Among the freedom of religion cases, only 18% of the opinions are statistically distinguishable from the coalition median. In the linear model of opinion location as a function of coalition median, the residual error is substantially lower than under the other two models, though the coefficient on the majority median’s ideal point falls short of the theoretically predicted value of 1.

These results represent evidence in support of the coalition median model, at least relative to the median justice and author monopoly models. This finding is reinforced when we run regressions including the median of the court’s ideal point, the author’s ideal point, and the median of the majority’s ideal point to assess whether—net of the strong apparent influence of the coalition median—these other factors influence judicial bargaining. The coefficients on coalition median remain the same as in the bivariate model and remain highly statistically significant. In contrast, not only is the effect of the median justice’s location reduced, in both sets of cases it is somewhat *negative*. Net of coalition median, the median of the court does not predict opinion location or

TABLE 1 Coefficient Table (Standard Errors in Parentheses) for Linear Models of Estimated Opinion Location on Three Actors' Estimated Ideal Points

	Search and Seizure			Freedom of Religion				
Median Justice	0.91 (0.16)			-0.38 (0.17)	0.32 (0.23)			-0.19 (0.17)
Opinion Author		0.41 (0.05)		0.23 (0.05)		0.27 (0.07)		0.04 (0.07)
Coalition Median			0.79 (0.07)	0.76 (0.08)			0.65 (0.08)	0.65 (0.11)
Intercept	-0.03 (0.08)	0.06 (0.06)	0.05 (0.05)	0.06 (0.06)	0.29 (0.12)	0.16 (0.09)	0.28 (0.07)	0.22 (0.09)
Residual Error (σ)	0.73 (0.04)	0.69 (0.04)	0.59 (0.04)	0.55 (0.03)	0.68 (0.08)	0.61 (0.08)	0.40 (0.07)	0.40 (0.08)
N	240	240	240	240	76	76	76	76

Note: Posterior error in estimates treated as measurement error; per curiam opinions discarded; residual errors for the null model (intercept only) are 0.80 (search and seizure) and 0.70 (freedom of religion).

predicts the opinion location in the *wrong* direction. This is not to say that the median justice is irrelevant. To the extent that the median justice of the court predicts the opinions of the court, it is due to the median's effect on the distribution of majority coalitions that will form on a court with a particular median. However, taken in conjunction with the data shown in Figure 3, this result does suggest that the median justice model is inadequate for explaining variation in Court opinions. The effect of the opinion author's ideal point also drops when the median of the coalition is included, with essentially no correlation in the freedom of religion data but a modest and statistically significant coefficient in the search and seizure data. It appears that some of the deviation from the coalition median in search and seizure opinions can be explained by the opinion author's ideal point.

Thus, we find that the median of the majority coalition model has by far the most predictive power of the three models we have considered. That the same pattern emerges in two sets of cases, scaled independently, provides substantial evidence against the median justice model and in favor of the median-of-the-majority coalition model. Moreover, varying the assumptions related to implicit citations or the common space has little effect on these findings. The median-of-the-majority-coalition model strongly outperforms the bench median and opinion author models as a predictor of opinion location. While the median of the court has some explanatory power alone, it appears to be entirely due to the fact that the median of the court (weakly) predicts the median of the majority. We do not find in our data much evidence

to support either of the alternative models, even net of the coalition median's predictive power. In the search and seizure data, we find some evidence of author influence, but the particular pattern that emerges is different from the standard author influence model (Hammond, Bonnaeu, and Sheehan 2005). Specifically, we find that the author and the *coalition* median, rather than the author and the *bench* median, together influence the opinion location. This pattern is consistent with Carrubba et al. (2007), whose theoretical model identifies conditions under which the opinion author can exert influence on the opinion. It is important to note, though, that we find this relationship only in the search and seizure cases and not in the freedom of religion cases.²¹

It is also crucial to note that our analysis here is preliminary in nature and cannot account for nonideological opinion qualities or multidimensional ideological influences. There is considerable evidence that policy can usually be reduced to a single dimension (Poole and Rosenthal 1997) and that such an assumption applies well to judicial decision making (Martin and Quinn 2002). Indeed, the standard practice in the judicial politics literature has been to model judicial ideology in a single dimension. Nevertheless, recent scholarship has made

²¹If we estimate a regression with opinion location on the left-hand side and opinion author and coalition median on the right-hand side for the freedom of religion and search and seizure cases, the estimated coefficients are, respectively, $\hat{\beta} = 0.21(0.05)$ and $\hat{\beta} = 0.05(0.07)$ for the opinion author; and $\hat{\beta} = 0.65(0.07)$ and $\hat{\beta} = 0.60(0.10)$ for the coalition median. The residual errors (σ) are 0.56 and 0.41, respectively.

considerable progress in understanding the effects of hyper-dimensional bargaining (Lax 2007; Lax and Cameron 2007), and our analysis is not well equipped to evaluate those theories' predictions. Our findings are conditional on the modeling assumptions we have made, and results may not be robust to modifying the citation model beyond those sensitivity analyses that we have been able to perform. We hope that our analysis initiates further empirical research using citation data and other sources of information about judicial opinions—with respect to their ideological and nonideological dimensions. We also hope our research facilitates refinement of existing theoretical perspectives on the process of judicial bargaining and opinion writing. Finally, this analysis should serve as a caution to empirical scholars who must make assumptions about judicial policymaking. Much of the empirical work today assumes a median justice model of Supreme Court decision making (Martin, Quinn, and Epstein 2005)—and, specifically, policy location—but our analysis suggests that such an assumption may be erroneous.

Conclusion

We develop a method for estimating opinion location that relies on two key assumptions. First, each opinion has a fixed location in a one-dimensional policy space. Second, the probability that one opinion cites another positively is a decreasing function of the distance between the two opinions in that underlying dimension. A third assumption—that dissenting opinions are located at their authors' ideal points—is not necessary for estimating opinion locations but does allow us to place justices and opinions on a common space.

A broad array of substantive areas of research in the judicial politics literature involve questions and implications for opinion content and location. Theories of judicial hierarchy (Cameron, Segal, and Songer 2000; Clark 2009), as well as the separation of powers (Ferejohn and Shipan 1990; Marks 1989) all make predictions about policy decisions that are necessarily continuous. However, the current state of empirical work requires that those predictions be tested either (a) using crude, discrete measures or (b) by aggregating data and using macrolevel observations to test microlevel theories. The dichotomous liberal/conservative distinction is certainly too crude and perhaps also misleading. The estimates derived from our method can be a useful empirical tool for scholars studying any of these substantive problems.

Perhaps most notably, though, theories of judicial bargaining and opinion writing usually make predictions about the location of an opinion, while scholars have been limited in their empirical analyses by the unavailability of systematic measures of opinion location. The measures we have developed can be used to assess empirical support for the predictions derived from various models of judicial bargaining and opinion writing. Our analysis indicates that strong median voter models, which predict that all opinions will be located at the median justice's preferred policy, are insufficient to explain variation in freedom of religion opinions. We find surprisingly strong evidence in favor of models that predict a majority opinion near the majority coalition median. Thus, in the context of theories of bargaining, hierarchy, and interinstitutional interactions, the estimates developed in this article represent an important step towards better bringing data to bear on theoretical models of judicial decision making.

Finally, we note two caveats. First, the conclusions drawn here about the empirical support for the various models of judicial bargaining are limited to the context of the universe of cases in our study. While our analysis provides strong and promising results, future research should go beyond these two substantive areas of law in order to make broader claims about the doctrine space and its ability to assess the performance of competing theories of judicial bargaining. Nothing in our estimation strategy is unique to the specific substantive areas of the law we have studied. Moreover, by examining more nuanced and broader areas of the law, future research may be better positioned to explore the multidimensionality of doctrine space. The clearest limit to broader application is the tediousness of manually coding citations, though future work could rely on the Shepard's citation service alone, discarding information from ambiguous Shepard's codes. Second, our estimates are estimates of opinion location in a single dimension using a particular model of the citation data-generating process. We have suggested several ways that our assumptions about the relationship between citations and opinion doctrine might be wrong, which we hope will direct further research aiming to fully employ the richness of citation data. Our goal in this article was to suggest a way to use this data to measure the policies embedded in each opinion, which we believe are reflected in citation patterns. However, judicial policy may involve components that are different from precedent and jurisprudence, and we recognize this limitation. For our purposes, though, the one-dimensional model is a reasonable starting place, given the broad evidence suggesting that policy can largely be modeled on a single dimension (e.g., Martin and Quinn 2002). The

data and analyses presented here are a step forward in the larger project of measuring doctrine and describing judicial policymaking, but there is much work still to be done.

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