

Legal Doctrine on Collegial Courts

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Appellate courts, which have the most control over legal doctrine, tend to operate through collegial (multimember) decision making. How does this collegiality affect their choice of legal doctrine? Can decisions by appellate courts be expected to result in a meaningful collegial rule? How do such collegial rules differ from the rules of individual judges? We explore these questions and show that collegiality has important implications for the structure and content of legal rules, as well as for the coherence, determinacy, and complexity of legal doctrine. We provide conditions for the occurrence of these doctrinal attributes in the output of collegial courts. Finally, we consider the connection between the problems that arise in the collegial aggregation of a set of legal rules and those previously noted in the collegial application of a single, fixed legal rule.

A lone judge deciding all cases herself could face a task overwhelming in practice, but straightforward in theory—she could simply decide all cases as she saw fit according to whatever rule she thought correct. Judges on a collegial (multimember) court, however, face further challenges that inhere in collegiality itself.

One possible challenge is the application of existing legal rules. Kornhauser and Sager noted back in 1986 that “traditional theories of adjudication are curiously incomplete,” in that they treat judging only as a solitary act, and ignore the collegial nature of most appellate courts.¹ They showed that if the judges on a collegial court are applying a single, fixed legal rule, and if they disagree over the legal subfindings in a case, then it matters how they aggregate their judgments over those subfindings under the fixed legal rule. This result was later named the Doctrinal Paradox, and it inspired a growing body of literature on collegial application of a fixed legal rule, spanning legal theory, social choice theory, and deliberative democratic theory (e.g., Chapman 1998; Kornhauser 1992a, 1992b; Kornhauser and Sager 1986, 1993, 2004; List 2003; List and Pettit 2002, 2005; Post and Salop 1992).

Appellate courts, however, do not only apply existing legal rules—they also create new rules and modify old ones. They do not hear all cases themselves, but rather issue general rules and instruct lower courts how to decide future cases. A lone appellate judge could do this by stating her own preferred rule. Appellate courts, however, tend to be collegial courts. And appellate judges can disagree far beyond whether the legal findings required by a given rule are met in a given case.² Specifically, they may disagree as to *which* of these legal findings should matter and *how much*. That is, besides the challenge of collegial rule application, they also face a potentially larger challenge, that of collegial rule creation. How can a collegial court choose a legal doctrine?

The analysis of doctrinal choice has recently emerged as a new frontier in the application of social science tools to legal theory. Work in this vein has considered the implications of ideological alignment, the role of precedent, hierarchical control, and biases towards litigants (e.g., Jacobi and Tiller 2007, Tiller and Cross 2006; see also Bueno de Mesquita and Stephenson 2002). The collegiality of doctrinal choice has received far less attention (but see Lax 2007 and Landa and Lax 2008). Indeed, because the collegial

¹Easterbrook (1982) criticized inattention to collegiality, given Arrowian social choice theory. Stearns (2000) details applications of social choice results to courts. See also Post and Salop (1992) and Caminker (1999). Vermuele notes that the legal literature on vote aggregation and political science literature on intracourt or intercourt behavior have “not penetrated far into interpretive theory . . . [which] persist[s] in treating the judiciary as a unitary actor” (2005, 553).

²The Doctrinal Paradox cannot occur if such findings do not vary across judges.

adjudication literature focuses on collegial rule *application*, the properties of collegial rule *aggregation* remained unexplored. These properties, and the issues that arise in such aggregation, are the focus of the present paper.

Our central questions concern how judges who agree as to the legal findings in a case aggregate their different preferred rules—rules that define whether and how these findings matter across possible cases. If a judge decides cases according to his or her preferred legal rule, when can judges sitting on a collegial (multi-member) court come together to create a meaningful legal doctrine? How does collegiality affect the creation of a legal doctrine? What will the “collegial rule” be? How does the method by which judges form this collegial rule affect the structure and content of legal doctrine?

Our inquiry into these questions highlights the implications of collegiality for three key aspects of legal policymaking, the *determinacy*, *coherence*, and *complexity* of legal doctrine. The challenge to determinacy is that, as we will show, there are very different senses, each quite plausible, in which legal rules might be aggregated “by majority rule.” These can yield different collegial rules and different sets of case outcomes, thus raising obvious concerns of unpredictability, inconsistency, and arbitrariness. We seek to understand under what conditions the method of aggregation will matter. What types of agreement or disagreement among the judges will ensure determinacy?

While determinacy contributes to the coherence of legal decision making in the standard sense of the term, legal coherence also requires something more. Though collegial courts are a “they,” not an “it” (to borrow a phrase from Shepsle 1992), normative theories of jurisprudence usually expect them to act as a single coherent “it.” Coherence is, of course, a multifaceted and somewhat abstract feature of decision making, including a degree of consistency *across* case decisions, along with the rationalizability of individual case decisions with reference to reasoned justifications or a principled legal philosophy (such as any of the usual “isms” : originalism, minimalism, textualism, purposivism, libertarianism, liberal egalitarianism, etc.).

Coherence is particularly important in a common law system, in that legal actors (such as lawyers, lower court judges, and law professors) often reason from patterns of case outcomes to tease out aspects and implications of the underlying legal rule or philosophy. Incoherence might endanger communication with and the management of lower courts.

As Fallon (2001) puts it, the main judicial task is implementation of general principles, by constructing comprehensible rules and tests. The ability of a collegial court to do this and speak in one, articulate voice may affect the court’s efficacy within the judicial hierarchy, and is, at bottom, a central feature of legitimacy and the rule of law (as justices themselves often acknowledge). We consider when collegial doctrine will be coherent in this sense.

Finally, doctrinal complexity evokes explicitly the structure of a legal doctrine. Recent work on the determinants of the legal doctrine has tied complexity to cases that have multiple issues and the possibility of overlapping doctrines in a given case (Jacobi and Tiller 2007). Our analysis considers the possible effects on complexity of collegiality itself.

We proceed as follows. After presenting some initial examples and highlighting our key results, we introduce our basic assumptions and our formalization of legal cases and rules. Next, we discuss collegial rules and analyze the methods by which individual rules can be aggregated into a collegial rule. The final formal section provides the results on the relationship between properties of doctrinal aggregation and the doctrinal paradox. Formal proofs are in the appendix, and supplemental formal results are contained in an online appendix available at <http://journalofpolitics.org/>.

Aggregating Rules

To foreshadow our results, we begin with examples of the phenomena we analyze:

(1) In *Roth v. U.S.*, 354 U.S. 476 (1957), the U.S. Supreme Court placed obscenity outside the protections of the First Amendment. Over the next 10 years, the justices tried to define “obscenity,” hearing over a dozen cases and issuing dozens of separate opinions (including Justice Stewart’s famous “I know it when I see it” doctrine, in *Jacobellis v. Ohio*, 378 U.S. 184 (1964)). In 1967, they gave up trying to state a formal definition, declaring it to be whatever five votes said it was (*Redrup v. New York*, 386 U.S. 767). Under this “we know it when we see it” policy (dropped six years and five new justices later), the justices themselves personally “*Redrupped*” the evidence, sorting out at least 31 subsequent cases by summary disposition. They could sort out cases by majority vote—but they were not able to articulate a workable standard for lower courts that would accomplish the same result as majority votes case by case.

Any single justice among them could issue her own preferred rule so as to tell lower court judges to “do as I would do.” Why could the justices not simply issue a rule that would amount to telling lower courts judges to “do as we would do”?

(2) Imagine a lawyer trying a case before the Supreme Court, arguing that the proper rule to apply to her type of case should consist of a specific set of legal determinations. As she runs through this list of legal factors, she is pleased that for each and every factor at least five of the nine justices nod in agreement. Even better, a justice who is usually the Court’s pivotal voter agrees as to each and every factor. Yet when the decision is handed down, she loses her case. And, even though each justice seems to reveal a preference for a simple, straightforward rule (albeit not the same rule), the Court’s majority opinion instead establishes a complex balancing test.

The opposing verdicts in two 2005 establishment clause cases handed down the same day, *Van Orden v. Perry*, 545 U.S. 677 and *McCreary County v. ACLU of Kentucky*, 545 U.S. 844, reveal the tension between counting votes and counting the justices who support legal factors. Justice Breyer’s differing votes permitted the state-sponsored display of the Ten Commandments in the former but not the latter. The pivotal distinction for him was the historical circumstances behind the displays—yet such an issue was not relevant to any majority of justices. That is, the case outcomes are consistent with majorities voting case-by-case, while the outcome in *Van Orden* stands in contrast to that indicated by majority positions on the legal factors that might compose a legal rule for applying the establishment clause.

Another example is *Kassel v. Consolidated Freightways*, 450 U.S. 420 (1998), a dormant commerce clause case analyzed by Stearns (2000). Seven justices agreed that state’s attorneys should be allowed to introduce novel evidence not considered by the Iowa legislature in support of the statute in question. Five justices wished to apply the rational basis test. This combination of factors would be necessary to sustain the statute—and it would seem that each factor did get the nod from a majority of justices. However, only three justices agreed with both factors and so the statute was struck. The problem is that different majorities agreed with each factor (in a plurality opinion signed by four justices, with a concurring bloc of two, and a dissenting bloc of three).³

³Stearns discusses a more complicated example, *Miller v. Albright*, 523 U.S. 420 (1998), where the factors that should make up the rule and legal findings are in play.

(3) Again, the Court is considering what the proper legal rule should be. This time, despite the justices’ revealing strong differences as to what the proper legal rule should be, the Court announces a relatively simple rule, which the lower courts then begin to apply—only to find the Court taking further cases undercutting the initial rule and reversing the decisions below. An example here may include the Rehnquist Court’s backtracking in *Pierce County v. Guillen*, 537 U.S. 129 (2003) from their bold limitation of Congress’s commerce power in *U.S. v. Lopez*, 514 U.S. 549 (1995) and *U.S. v. Morrison*, 529 U.S. 598 (2000) (see Berman 2004). Another example is the two-tier equal protection framework (strict scrutiny vs. the rational basis test), which Justices Marshall and Stevens each noted oversimplify the far more complex and nuanced actual pattern of decisions than these sharply delineated tiers would suggest (see Stearns 2000, 15).

These examples point to phenomena that can arise in aggregating legal doctrines on collegial courts. To see the basic structural elements of such aggregation, consider the so-called “Lemon Test” formulated by the Supreme Court in *Lemon v. Kurtzman*, 403 U.S. 602 (1971). It is a three-pronged test for a law to be constitutional under the Establishment Clause of the First Amendment: it must have a legitimate secular purpose (LT1), must not have a primary effect of advancing or inhibiting religion (LT2), and must not involve an excessive entanglement of government and religion (LT3). But suppose that justices disagree over which of these prongs (or “factors”) are necessary for constitutionality. How can a group of judges with different preferences over the inclusion of these factors in an establishment-of-religion test aggregate their preferred legal doctrines into collegial decisions?

The judges could simply decide each case one by one, without announcing a general rule—but arguably the main task of appellate court judges is to aggregate their doctrinal preferences into a single decision rule announce in their opinion, to be applied by lower courts and followed by other actors. What rule could they issue? One presumptive interpretation is that they append a rule that simply captures what would happen if they voted case by case. Alternatively, they could append a rule that captures their preferences over each factor in turn (LT1, then LT2, and so on). Or, they could pick a rule by an explicit vote over all possible general rules (formed by various combinations of LT1 through LT3). Each of these options will indeed each yield a single composite rule, but will they yield the same rule, matching collective decision making case by case?

The problem is that the various rule possibilities suggested above turn out to have systematic differences. They may have sharply different substantive content and different implications for case outcomes. The choice among them presents substantial complications that are of considerable political importance. Specifically, the court's task may be more complex and less feasible than may have been previously recognized. The forms that collegial doctrines take may be due specifically to collegiality, which can directly or indirectly—through judges' attempts to manage it—affect complexity and alter the structure of the legal policies we observe.

One of our conclusions, intimated in the various examples above, is *an impossibility result*: “collegial” legal rules are different than individual legal rules, in that it might not be possible to form the same type of rule for a court as a whole as any individual judge might have. That is, to the extent that individual rules are each representative of coherent legal philosophies, it may not be possible to construct a similarly principled collegial doctrine, at least not one that is representative of the court in a majoritarian sense. Collegial courts thus face problems even beyond majoritarian cycling (see Easterbrook 1982). Moreover, the legal rule that can “rationalize” the pattern of case-by-case decisions by a collegial court often needs to be structurally different from and potentially more complex than the preferred legal rules of the judges on the court (though collegiality can sometimes smooth out complexity, making rules perhaps less nuanced). And, even when the court can construct a coherent legal rule that captures the court's preferences case by case—even a rule that would be chosen by the majority over any other rule head to head—it may still be inconsistent with the rule constructed from separate majority decisions on the elements comprising it that rule.

These findings mean that a collegial court can face a choice between adopting a rule that does not comport structurally and/or substantively with the preferred rules of individual judges; abandoning the pursuit of a single explicit rule (and issuing either overly narrow rulings or a multiplicity of opinions); and adopting a rule that does not match how the collegial court wishes lower courts to handle particular cases. (We set aside issues of compliance, but rather focus on what problems can arise even if lower courts are faithful agents.) We analyze the conditions that determine when the court cannot avoid having to make such a choice. We show, further, that there exists a fundamental connection between some of the features that characterize the context of doctrinal

aggregation and those that characterize the aggregation of judgments under a fixed rule, particularly the structure of the Doctrinal Paradox. Indeed, we provide necessary and sufficient conditions for a generalized version of this paradox that operates on the level of doctrinal aggregation, as opposed to rule application.

Modeling Cases and Rules

The aim of our model is to characterize some of the key substantive features of the correspondence between collegial court output and the preferred rules of the individual judges, under alternative modes of collective decision making. Since our focus is the aggregation of rules, we isolate the issues involved by holding case findings as fixed and objective. The judges do not disagree as to whether a given case meets the requirements of a given legal test (which would only make collegial doctrine formation an even harder task). Rather, they differ as to what the elements of the test *should* be.

Cases and Decisions

The two key conceptual elements in our model are cases and rules. Suppose there are k potential legal dimensions, or “factors,” in a given issue area. A *case* is described in terms of these factors, which may be thought of as a particular mix of both purely objective facts and intermediate legal conclusions. Formally, a case can be represented by a list of values, indexed from 1 through k , $c = (c_1, c_2, \dots, c_i, \dots, c_k)$, indicating whether each of these k factors is present or absent in this case. Let each value c_i be 0 or 1, with the natural interpretation that $c_i = 1$ means that factor i is present in the case and $c_i = 0$ that factor i is absent.⁴ For example, when there are two possible factors (i.e., $k = 2$), one can identify four distinct possible cases: (0, 0), (0, 1), (1, 0), and (1, 1), with the first factor being present in only the third and fourth cases, and the second factor only in the second and fourth cases.

Rules

At the most general level, a *legal rule* ρ is a way of assigning an outcome (decision) to each possible case, either “yes” (Y) or “no” (N), $\rho : c \rightarrow \{Y, N\}$. Because different rules can assign different outcomes to a given case, the outcome of a case will depend both on the specifics of that case and on the rule

⁴With some abuse of language, we refer to c_i s as “case factors.”

being applied. Let the set of decisions under the application of rule ρ to all possible cases be the *decision set* of that rule. Below, we say that a rule ρ *yields* those outcomes. So far, these definitions are compatible with any kind of structure connecting a description of cases with outcomes.

The analytical structure that we impose on the legal rules in this paper invokes two key elements: *rule factors* and the *rule threshold*. Let the *list of rule factors* that are considered (potentially) relevant to a decision be represented by $r = (r_1, r_2, \dots, r_i, \dots, r_k)$. We assume that each r_i is either 0 or 1, with the interpretation that $r_i = 1$ means that factor i is relevant under the rule in question, and $r_i = 0$ means that it is irrelevant. Consider, for example, a potential fourth Lemon Test prong: the law must not affect one religion more than others (LT4). The original Lemon Test would deem this prong irrelevant and so, explicitly reflecting its irrelevance, the test could be represented as $(1, 1, 1, 0)$.

A legal rule must also specify the logical relationship between these factors. For example, are all of them necessary to reach a Y ? Are all of them individually sufficient? Are the factors treated symmetrically? Or is there a more complex weighing of the factors?⁵ A key type of rule is a base rule: *base rules* are rules that (1) identify which factors are relevant and (2) dictate a rule threshold $\tau \in [0, k]$ setting the minimum number of factors needed for the decision Y rather than N .⁶

We say that a case factor c_i *contributes* to meeting the threshold τ if and only if both $c_i = 1$ (factor i exists in this case) and $r_i = 1$ (that factor is relevant under this given rule). For example, the Lemon Test threshold is three—all three factors must be found for constitutionality; further, because the Lemon Test treats LT4 as irrelevant, the existence of the corresponding case factor would not contribute to the case outcome.

Base rules can be compactly represented by a pair of the list of relevant rule factors r and the threshold τ , $(r; \tau)$ (such that the case outcome is Y if and only if $r \cdot c \geq \tau$). Our running example, the Lemon Test, is representable as a base rule $((1, 1, 1), 3)$. If we wished to explicitly reject the potential fourth prong to the test, we would add a dimension and have the rule $((1, 1, 1, 0), 3)$. Other examples of possible base rules

⁵A rule might also be defined by establishing the exceptions to a default outcome. That is, we can assert which cases should get a Y or establish a straightforward rule of N subject to exceptions. Mathematically, these will be equivalent.

⁶Our “factors” differ from the “causes of action” in Kornhauser (1992b). The equivalent of a cause of action in our framework would be any sufficient set of factors for a finding of “yes” given a particular rule.

for $k = 3$ that a judge might prefer are $((1, 1, 0), 2)$, $((1, 1, 0), 1)$, and $((0, 0, 1), 1)$. The first judge thinks “secular purpose” and “no primary religious effect” are both necessary; the second judge thinks either is sufficient; and the third thinks “nonentanglement” is necessary and sufficient.

The case $(1, 1, 0)$ will be decided as Y under rule $((1, 0, 1), 1)$ —the first case factor both exists and is relevant, and this is sufficient under threshold $\tau = 1$. The second factor exists in this case but is irrelevant; the third factor is not present in this case but would be relevant if it were. However, the decision in the case $(1, 1, 0)$ would be N under the rules $((1, 0, 1), 2)$ or $((0, 0, 1), 1)$. Under the former rule, only one existing factor is relevant and two are required; under the latter rule, only one relevant factor is required, but neither of the factors that exist in this case is relevant. The case $(1, 0, 1)$ would receive decision Y under any of these rules.

Base rules include two prominent subcategories of rules. Suppose there are m relevant factors in the rule. At one extreme is the strict or conjunctive rule, one that requires each and every relevant factor to exist to get a Y ($\tau = m$). The Lemon Test is just such a test, in which all prongs are necessary. Seemingly at the other extreme is a weak or disjunctive test, where the presence of any one relevant factor is sufficient ($\tau = 1$). Logically, however, these are structurally equivalent: one could define a parallel Lemon Test as a strictly disjunctive test which yields a N under the condition that any one of its prongs is missing.⁷ We call any purely conjunctive or purely disjunctive test a *simple rule*, in that it takes the simplest and surely most common structure for a logical rule.

A somewhat more complicated form of base rule is the *intermediate rule*, in which meeting the threshold requires more than one factor but less than all m factors ($1 < \tau < m$).⁸

⁷An interesting example of *both* conjunctive and disjunctive rules is the circuit split (as of 2006) on the qualifications for favorable treatment under the tax code and the relationship between the “economic gains” and “business purpose” prongs. The 4th Circuit said either prong was sufficient (*Rice’s Toyota World v. Comm.*, 752 F.2d 89 (4th Cir. 1985)); the 11th said both were necessary (*Winn-Dixie Stores v. Comm.*, 254 F.3d 1313 (11th Cir. 2001)).

⁸Simple rules resemble bright line rules, while intermediate rules can look more like standards. Indeed, intermediate rules include all sorts of balancing tests, reasonableness tests, standards, and the like—any test wherein some overall weight or threshold must be reached and factors are treated symmetrically. Otherwise, such tests are complex tests, in which different factors have different contributions to reaching the threshold. There is also an analogy to one-dimensional spatial models, in which the questions is whether a case is past a certain line aggregating the effect of all case facts (e.g., Lax and Cameron 2007).

Suppose, hypothetically, that the Lemon Test held that any two of its three prongs were sufficient. In effect, then, instead of positing Y if and only if (LT1 and LT2 and LT3), that rule would be described as positing Y if and only if ((LT1 and LT2) or (LT2 and LT3) or (LT1 and LT3)). Despite this complication, such a rule can still be represented as a base rule—requiring a threshold for symmetric factors, ((1, 1, 1), 2).

An example of an intermediate rule in action is the Winston test (*Winston v. Mediafare Entm't Corp.*, 777 F.2d 78 (2d Cir. 1986) for precontractual liability, handed down by the Court of Appeals for the 2nd Circuit. A subsequent 2nd Circuit decision, *Ciaramella v. Reader's Digest*, 131 F.3d 320 (1997), provides the following instructive restatement and an elaboration of the test:⁹

This court has articulated four factors to guide the inquiry regarding whether parties intended to be bound... (1) whether there has been an express reservation of the right not to be bound in the absence of a signed writing; (2) whether there has been partial performance of the contract; (3) whether all of the terms of the alleged contract have been agreed upon; and (4) whether the agreement at issue is the type of contract that is usually committed to writing. No single factor is decisive, but each provides significant guidance.

The court goes on to cite *Winston* itself as a case wherein the agreement was found not binding on appeal because “three of the four factors indicated that the parties had not intended to be bound in the absence of a signed agreement.” In other words, one relevant factor was insufficient, and not all relevant factors are necessary, making this an intermediate rule. Another example of an intermediate test is that for differentiating a partner from an employee (*Fenwick v. Unemployment Comp. Comm.*, 133 NJL 295, 1945).

Finally, base rules can be distinguished from *complex rules*, which establish more complicated, asymmetric relationships between factors, and so cannot be represented by a pair of factor list and threshold. The disposition such a rule yields not only on how many factors are present but also on which they are. For example, a complex rule might take the logical form $A \wedge (B \vee C)$, so that the effects of C depend on which of the other two is present.

An interesting example is a recent Minnesota case, *Lennartson v. Anoka-Hennepin*, 662 N.W.2d 125 (2003). The Anoka County District Court cast the test for evaluating when a lawyer should be disqualified (in a private sector case in which the lawyer's firm has hired a lawyer who previously represented the adverse party in the same matter) as a purely conjunctive test, with three factors to be satisfied for allowing representation (if information is unlikely to be significant, the erection of an ethical wall, and notice). The Court of Appeals reversed and remanded, declaring the proper test to be a mixture of disjunctive and conjunctive tests (requiring insignificance or both an ethical wall and notice), or, in our parlance, a complex rule. The Minnesota Supreme Court reversed again, in favor of the original simple base rule. Another example of a complex rule is the “total takings” rule of *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992), declaring a governmental regulation a compensable taking if (1) it destroys all economically viable use and either (2) the restriction could not also have been imposed under the common law of nuisance or (3) the restriction could not also have been imposed through the application of some legal principle related to the title of the property.

Our primary analytical focus in this paper is on the properties of the collective aggregation of judges' individual rules. We thus largely focus on individual rules that are base rules (simple or intermediate), so as to ask, *inter alia*, whether sets of case outcomes that represent the court's collegial decisions can be rationalized (induced) by a rule of the same structure and degree of complexity—that is, whether the collegial rule will take the same form as the individual rules.¹⁰ This allows us to isolate collegiality as a potential source of doctrinal complexity (if the individual rules were themselves complex, it would hardly be

⁹Another post-*Winston* case, *Teachers Ins. & Annuity Assn. v. Tribune Co.*, 670 F. Supp. 491 (SD NY 1987), further elaborates on the relevant test.

¹⁰Complex rules can always be recoded as base rules by redefining the case space, thus suggesting that our restriction of individual rules to base rules is mathematically innocuous insofar as the interesting questions concern marginal effects, holding fixed the level of individual-rule complexity. But such transformations may make the transformed-rule space substantively uninterpretable (when transforming a number of rules into base rules in a compatible space requires a radical transformation, such as making the number of factors correspond to the number of judges on the court, with each judge's individual rule now effectively understood as a single factor) adversely affecting the communication of doctrine to lower courts and other legal actors. Collegial rules that have the structure of “*Redrup* everything” will also seem illegitimate. Thus, from a substantive standpoint, such transformations are not a plausible response to the challenges of complexity that we identify.

surprising that the collective rule were).¹¹ It also allows us to show that inherent properties of base rules are of particular substantive significance, tying them directly to the necessary and sufficient conditions we establish for the appearance of a generalized version of the Doctrinal Paradox.

We will speak of a judge’s preferred rule, yet for our purposes it is immaterial whether the judge prefers a rule that, in turn, yields her preferred set of case outcomes, or rather prefers a set of case outcomes that are then captured by her preferred rule. That is, it is immaterial whether her most primitive preferences are over outcomes or over rules. It is also immaterial for the formal analyses whether such preferences are derived from a higher legal philosophy or from the crudest of ideological motives—either way, judges must express their preferences in terms of which cases should win and which cases should lose. To say that a judge has an underlying preferred rule is, in the end, to say that, whatever that judge’s preferences over the outcomes, they treat cases with some minimal degree of consistency captured by the structure of the associated rule.

Outcome Sets

We begin by describing sets of case outcomes. Call the set of all possible cases C . The *outcome set* associated with C specifies the outcome, Y or N , for each possible case. The following example shows that not all outcome sets can be induced by a base rule.

Example 1. *An outcome set:*

case:	(1,1,1)	(1,1,0)	(1,0,1)	(0,1,1)	(1,0,0)	(0,1,0)	(0,0,1)	(0,0,0)
outcome:	Y	Y	Y	Y	Y	N	N	N

It can be easily seen that there exists no simple or intermediate rule that yields this set of case outcomes. Any rule with the threshold $\tau \geq 2$ fails for $c = (1, 0, 0)$. To see that every rule with $\tau = 1$ fails as well, note that if the second rule factor, r_2 , is 1, then the outcome in $(0, 1, 0)$ cannot be N ; similarly, if the third rule factor, r_3 , is 1, then the outcome in $(0, 0, 1)$ cannot be N either. This leaves the rule $((1, 0, 0); 1)$, which in the case $(0, 1, 1)$ yields N ,

¹¹The online appendix contains a computational analysis of aggregating complex rules showing that our argument that collegiality provides an explanation for doctrinal complexity is robust.

contradicting the outcome Y in that case provided in the table.

The property of being induced by a base rule is connected to another important property of outcome sets captured in the following definition: an outcome set is *monotonic* if, whenever a given case has outcome Y , any case with all the factors of the first case and at least one additional factor also has outcome Y .

Example 1 clearly satisfies this property, but a combination of cases and outcomes that is identical to it except for yielding N in any of the first three cases, $(1, 1, 1)$, $(1, 1, 0)$, or $(1, 0, 1)$ would not, since it would require assigning Y to the case $(1, 0, 0)$.

Monotonicity of outcome sets ensures that the factual dimensions are not “coded” perversely (i.e., such that, holding constant a legal rule, a case that more clearly fits a “liberal” outcome is less likely to be decided that way than a case that fits that outcome less clearly). It may be thought of as an important aspect of the coherence of judicial decision making more generally. This intuition is borne out by the following result:

Proposition 1 *An outcome set can be induced by a base rule only if it is monotonic.*

Thus, showing that an outcome set is coherent insofar as it can be induced by a base rule itself means that that set satisfies another sense of coherence as well (viz., coherence as monotonicity). However, this result cannot be strengthened to “if and only if”: not all monotonic outcome sets can be induced by a base rule. As noted above, the outcome set in Example 1 is monotonic but cannot be induced by a base rule.

Having set up a framework for thinking about rules and cases at the level of the individual judge, we can now extend these concepts to analyze collegiality.

Collegiality

In all that follows, we assume that the court consists of n (odd) judges, $J = \{j^1, \dots, j^j, \dots, j^n\}$, who are making decisions either in cases or on rules that are then faithfully applied by lower courts. Let $\rho = (\rho^1, \dots, \rho^j, \dots, \rho^n)$ be a profile (list) of the judges’ most-preferred rules, one rule $\rho^j = (r^j; \tau^j)$ for each judge j . Judicial preferences, whether over case outcomes or the elements of rules, are aggregated by simple majority rule.

Collegial Decisions

Given a set of judges and rules, a useful benchmark is provided by majority votes over case decisions (each vote as induced by the judge’s preferred legal rule), leading to two definitions. The *collegial decision* in case c is the decision preferred by the majority of judges given the judges’ rule profile ρ . The *collegial decision set* is the outcome set formed by collegial decisions for each case $c \in C$.

This collegial decision set will be “rational” in the following sense:

Proposition 2 *The collegial decision set is monotonic.*

Thus, aggregating by majority rule the preferred case decisions induced by judges’ preferred base rules necessarily satisfies one important aspect of coherence. An implication of this proposition is that in analyzing the properties of collegial decisions, we are effectively restricting our attention to outcome sets that must already satisfy monotonicity. To the extent that we are interested in ascertaining which collegial decision sets can be induced by a (simple or intermediate) base rule, Propositions 1 and 2 establish that collegial rules satisfy a preliminary but nontrivial necessary condition.

Given the benchmark represented by the collegial decision set, we next ask whether and how a collegial court can achieve this outcome set short of voting case by case in all cases.

Collegial Rules

We begin with the following definitions. A legal rule ρ is the *implicit collegial rule* (ICR) of the collegial decision set if ρ ’s decision set is equal to the collegial decision set. A *base ICR* is a rule $(r;\tau)$ such that its decision set is equal to the collegial decision set. A collegial decision set is *inducible by a base ICR* if a base ICR exists for that decision set.

The outcomes induced by the ICR match the majority-preferred outcome in each case (as determined by each judge’s individual rule). The following two examples provide an instructive illustration. Unless noted otherwise, in all examples, the left-most column contains the ordered lists $r^1, r^2,$ and r^3 of rule factors for most preferred rules of each of the three judges; the second column contains the thresholds for each of those rules, and the rest of the columns identify decisions under each of these rules for the cases specified in the top row. The bottom row

identifies the collegial decision in each case by majority vote.

Example 2.

	r^j	τ^j	(1,1,1)	(1,1,0)	(1,0,1)	(0,1,1)	(1,0,0)	(0,1,0)	(0,0,1)	(0,0,0)
$r^1 =$	2	Y	Y	N	N	N	N	N	N	N
(1,1,0)										
$r^2 =$	2	Y	N	Y	N	N	N	N	N	N
(1,0,1)										
$r^3 =$	2	Y	N	N	Y	N	N	N	N	N
(0,1,1)										
collegial		Y	N	N	N	N	N	N	N	N
decision										

The collegial decision set is inducible by a base ICR $((1, 1, 1);3)$, which is structurally equivalent to the Lemon Test. Note an interesting implication of this example: while each of the three judges preferred a two-prong simple conjunctive rule, the implicit collegial rule—though it is also simple (and thus base)—is a more demanding three-prong test. Here, collegiality has the effect of ratcheting up the demands of the effective decision rule.

Moreover, the ICR is not the rule of any of the judges in this example. For this set of judges to hand down a rule to match their desired outcomes, they would have to declare a rule that not one judge among them would actually believe to be the correct legal rule. As we argue below, this fact raises the issue of the extent to which collegial decision making on the courts can be said to produce results that are “representative” of the court.

The following example shows that collegiality can also change the kind of rule required to represent the collegial decision set, in that the aggregation of simple rules can require an intermediate ICR, here $((1, 1, 1), 2)$. (Proposition 9 in the online appendix shows a necessary condition for the ICR to be an intermediate rule.)

Example 3.

	r^j	τ^j	(1,1,1)	(1,1,0)	(1,0,1)	(0,1,1)	(1,0,0)	(0,1,0)	(0,0,1)	(0,0,0)
$r^1 =$	1	Y	Y	N	Y	N	Y	N	N	N
(0, 1, 0)										
$r^2 =$	1	Y	Y	Y	N	Y	N	N	N	N
(1, 0, 0)										
$r^3 =$	1	Y	N	Y	Y	N	N	Y	N	N
(0, 0, 1)										
collegial		Y	Y	Y	Y	N	N	N	N	N
decision										

Since the ICR in this example is an intermediate rule, if the collegial court wants to issue a simple rule, it must issue one that does not represent what the

court itself would do in at least some cases. Although, in this example, the effect of collegiality is to make the Court’s rule more complex, it can also have the opposite effect:

Example 4.

Suppose each judge thinks a different one of the three factors is sufficient, with the remaining pair jointly sufficient (e.g., Judge 1 requires either the first factor OR both of the second and third, Judge 2 the second factor OR both the first and the third, and Judge 3 the third factor OR both the first and the second). Each judge has a complex rule, but the collegial outcome set is induced by the intermediate base rule ((1,1,1),2):

case:	(1,1,1)	(1,1,0)	(1,0,1)	(0,1,1)	(1,0,0)	(0,1,0)	(0,0,1)	(0,0,0)
outcome:	Y	Y	Y	Y	N	N	N	N

The next example provides support for another conclusion that is central for our analysis: the aggregation of base rules may not be possible with either a simple rule *or* an intermediate rule, but may instead require a complex rule:

Example 5.

r^j	τ^j	(1,1,1)	(1,1,0)	(1,0,1)	(0,1,1)	(1,0,0)	(0,1,0)	(0,0,1)	(0,0,0)
$r^1 =$	1	Y	Y	Y	Y	Y	Y	N	N
	(1, 1, 0)								
$r^2 =$	1	Y	Y	Y	N	Y	N	N	N
	(1, 0, 0)								
$r^3 =$	1	Y	Y	Y	Y	Y	N	Y	N
	(1, 0, 1)								
collegial		Y	Y	Y	Y	Y	N	N	N
decision									

Note that the collegial decision set in this example is identical to the outcome set in Example 1. The discussion of that example, then, establishes that this collegial decision set is not inducible by any base rule. This gives rise to the following result:

Proposition 3 *Even when the collegial decision set is the result of the aggregation of individually preferred decisions induced by a set of base rules, it may not be inducible by any base rule itself.*

The rule that induces the collegial decision set in Example 5 would be a complex rule that treat factors asymmetrically, mixing conjunction and disjunction: either the first or both the second- and third-case factors are necessary and sufficient for the outcome Y. Note that this increase in the complexity of the collegial rule is structural—it goes beyond an increase in the number of prongs (as in Example 2), and moves

beyond a shift from simple rule to intermediate rule (as in Example 3). This means that if the collegial court wishes to impose a base rule, it must choose one that does not represent what the collegial court itself would decide in at least some subset of cases.

The nonexistence of a base ICR in Example 5 and its existence in Examples 2 and 3 naturally raise the question about the conditions that could account for this variation. One such condition is on the number of dimensions. It is immediate to see that all two-factor monotonic decisions sets are inducible by a base rule. The ICR will be ((1, 1), 2), ((1, 0), 1), or ((0, 1), 1). Because, by Proposition 2, collegial decision sets associated with judges described by base rules are always monotonic, collegial courts will always yield decisions that are inducible by a base rule if there are no more than two case factors of relevance. Are there conditions that apply to “larger” case spaces, those with three or more potentially relevant factors?

In what follows, we consider two criteria for comparing rules, each providing such conditions. One criterion compares rules by the direct patterns of their decisions, asking whether a given rule “includes” all the Y outcomes of another rule: rule ρ^j *decision-dominates* rule ρ^d if, whenever ρ^d yields the outcome Y, so does ρ^j . Example 5 provides an illustration of this property, in that the first and third rules each decision-dominate the second, but not each other. Lemma 1 provides a necessary and sufficient condition for decision-dominance in terms of the relationship between rule factors and thresholds (see the proof of Proposition 6 or the online appendix).

Because decision-dominance is a transitive relation, it may be possible to order a number of rules in relation to this condition. Say that a rule profile can be *ordered by decision dominance* if for all pairs of rules (ρ^j and ρ^k), either ρ^j decision-dominates ρ^k , or ρ^k decision-dominates ρ^j , or both. Thus, for example, it can be easily seen that the rule ((1, 1, 0); 1) strictly decision-dominates ((1, 1, 1); 2), which in turn strictly decision-dominates ((1, 1, 1); 3), and so the rule profile consisting of these three rules can be (completely) ordered by decision-dominance. As our next result shows, rule profiles that can be ordered in this fashion have an important property:

Proposition 4 *The collegial decision set is inducible by a base rule if the profile of base legal rules ρ can be ordered by decision-dominance. The median rule in that ordering is the base ICR.*

As Example 2 shows, however, the ordering by decision-dominance is only a sufficient and not

a necessary condition for the collegial decision set to have a base ICR. Moreover, the proof of Proposition 4 shows that an even weaker condition than an orderable rule profile is sufficient. That condition only requires that there exist one rule that decision-dominates half the remaining rules and is in turn decision-dominated by all other rules. A rule which “splits” the remaining rules will again be the base ICR.

Apart from decision-dominance, legal rules may also be compared to each other by their *permissiveness*. This property is determined by how “easy” it is for a given rule to reach a finding of Y . Unlike decision dominance, permissiveness is based solely on a comparison of thresholds and not on rule factors. A legal rule ρ^j is *more permissive* (*less permissive*) than a legal rule ρ^d if and only if it has a smaller (larger) threshold. Legal rules ρ^j and ρ^d are *equally permissive* if they have equal thresholds.

Because there is a certain trade-off between a value of the threshold and the number of factors that the rule considers relevant (again see Lemma 1 in the proof of Proposition 6 or the online appendix), the notion of rule permissiveness may be somewhat difficult to interpret. It does, however, have an intuitive interpretation, holding constant factor values. In such a circumstance, rule permissiveness may be thought of as a determinant of how “liberal” or “conservative” a rule might be. For example, in the Lemon Test, where a finding of Y (constitutionality) is conservative, a lower threshold (a more permissive rule) means a more conservative rule. Were a Y outcome instead the liberal outcome, a higher threshold (lower permissiveness) would mean a more conservative rule.

The concept of permissiveness allows us to state our last result in this section, which identifies a necessary property of base ICRs:

Proposition 5 *Rule ρ^d is the base ICR only if it is no more permissive than a majority of the judges’ rules.*

Thus, though one might have expected a trade-off between the values of rule factors and of the rule threshold in a given comparison between rules, the existence of a base ICR turns out to require a constraint that can be stated specifically and solely in terms of the comparison of rule thresholds. This result has a clear directionality, further underscored by Example 2—the base ICR can be strictly less permissive than the median threshold, and, indeed, than any of the individual rules. However, by Proposition 5, it is constrained to not be too permissive—no more permissive than the majority of judges.

Though the above analysis identifies some of the issues that arise with respect to the properties of the

ICR, such a rule is but one of a number of ways in which doctrinal aggregation may be pursued. We next consider another prominent possibility.

Collegial Factor Rules

An important way of aggregating judgments that has received considerable normative attention in the debates on epistemic voting inspired by the discovery of the Doctrinal Paradox is premise-by-premise voting within a single case (see, e.g., Pettit 2001). In our context of rule aggregation, the analogue is voting separately on the elements comprising the rules. Formally, we can define the following doctrinal aggregation method: the *collegial factor rule* (CFR) is the rule formed by separate majority votes over each factor dimension combined with the median threshold.¹²

Consider again Example 5 above. If the judges have the preferred rules given in that example, then the CFR is $((1, 0, 0), 1)$. Because the CFR is, by construction, a base rule, the decision set induced by the CFR is inducible by a base rule. However, the implications of using a rule constructed in such a manner are far from certain. Note, in the same example, that the decision set induced by the CFR differs from the collegial decision set. This means that voting over the rule factors individually to construct a legal rule may yield a different result with respect to a given case than the result of voting in that case directly.

In fact, Example 5 shows something even more troubling: there exists a judge $j = 2$ who is a median judge with respect to every aspect of the rule—i.e., every rule factor and the rule threshold—and thus, j ’s preferred rule is the CFR. Despite this, judge j can still end up in the minority with respect to some cases (here, in the case $c = (0, 1, 1)$). This is the problem captured in our second introductory anecdote: the lawyer with case $(0, 1, 1)$ and arguing for rule $(1, 0, 0)$ will get judge 2’s vote factor-by-factor along with a majority of judges factor-by-factor, but if they decide this case by majority vote, she will lose.

Given the nonexistence of a base ICR in Example 5, it is natural to ask whether and how the two phenomena are linked. To begin with, does the coherence of

¹²Given that there may be more than two alternatives for the threshold, the determination of the collective threshold can give rise to incentives that are more complicated than for any (dichotomous) rule factor. We set aside full exploration of this, but note that the median threshold is a focal choice, in particular given the focus of the judicial literature on the swing or median judge. Determining the threshold by plurality would only change some of details of the results that follow—it would not resolve the tensions we study.

collegial decision making associated with the existence of a base ICR prevent the kind of incoherence suggested by the gap between the collegial decision set and the decision set induced by the CFR?

Consider Example 2 above, in which the collegial decision set does have a corresponding base ICR $((1, 1, 1), 3)$. However, the CFR in that example is $((1, 1, 1), 2)$, which produces different judgments in cases $(1, 1, 0)$, $(1, 0, 1)$, and $(0, 1, 1)$. (Note that neither the ICR nor the CFR matches the individual rules of any of the judges on the court.) Thus, *the existence of a base ICR does not imply that the collegial decision set is inducible by the CFR*. That is, the ICR need not be identical to the CFR. (The relationship between them will be crucial in our analysis below of the Generalized Doctrinal Paradox.)

In fact, as the following example shows, the implication does not follow even when there exists a complete and strict decision-dominance ordering, which is sufficient but not necessary for the existence of a base ICR:

Example 6.

	r^j	τ^j	(1,1,1)	(1,1,0)	(1,0,1)	(0,1,1)	(1,0,0)	(0,1,0)	(0,0,1)	(0,0,0)
$r^1 =$	1	Y	Y	Y	Y	Y	Y	Y	Y	N
	(1, 1, 1)									
$r^2 =$	1	Y	Y	Y	Y	Y	N	Y	Y	N
	(1, 0, 1)									
$r^3 =$	2	Y	Y	Y	Y	N	N	N	N	N
	(1, 1, 1)									
collegial		Y	Y	Y	Y	Y	N	Y	Y	N
decision										

Note first that ρ^1 decision-dominates ρ^2 and ρ^3 ; ρ^2 decision-dominates ρ^3 . Thus, there exists a complete strict decision-dominance ordering of the profile of rules ρ . The collegial decision set has a base ICR $\rho^2 = ((1, 0, 1), 1)$. But the CFR is $((1, 1, 1), 1)$, which yields a decision Y in the case $(0, 1, 0)$ in contrast to the decision N by ρ^2 .

Both of these examples reveal the potential indeterminacy of doctrine on collegial courts. However, given a decision-dominance ordering, one additional condition, invoking rule permissiveness as defined above, is sufficient to prevent this from occurring:

Proposition 6 *Suppose that legal rules in profile ρ can be ordered by decision-dominance and are equally permissive. Then, (a) a rule ρ^j is a CFR if and only if it is a base ICR, and (b) both the CFR and the ICR coincide with the preferred rule of the median judge in the decision-dominance ordering.*

Thus, although the existence of a base ICR does not, generally, imply that it matches the CFR, these rules

are identical under the particular conditions we invoked above.¹³

The Collegial Rule Choice

The next part of our formal analysis explores judges' voting directly over rules. Our predictive concept for the outcomes of rule choice is the *majority core* in rule choice—the set of rules that would not be defeated under majority rule by any possible rule in a pair-wise comparison by the members of the court. To say something meaningful about the content of the majority core in rule choice, we need to introduce judges' utility functions. There are many possible choices for what those functions should look like. Though the choice among these will have effects for the conditions under which the majority core may be expected to be nonempty, our primary focus in this section is not on the characterization of those conditions (that is, no doubt, an important issue in and of itself, but one that lies outside the scope and the aim of the present paper), but on the properties of the majority core prediction, when that prediction can be made. Thus, in the remainder of this subsection, we assume what is possibly the simplest form of the utility function that generates a nonempty core under the conditions on rule profiles introduced above. This function treats the cases symmetrically, giving a judge the same positive payoff in all case outcome in which she “wins” (the case outcome matches her preferred decision), and the same negative or zero value in all cases in which she “loses.” In other words, it simply counts case victories.

Our next result shows that a sufficient condition for the existence of a base ICR ensures that that rule is in the majority core in rule choice:

Proposition 7 *Suppose that legal rules in profile ρ can be ordered by decision-dominance. Then the ICR must be in the majority core of rule choice, while the CFR need not be.*

Because the CFR may differ from the ICR even if the rule profile can be ordered by decision-dominance (Example 6), and because the ICR is in the majority core of rule choice when the rule profile can be ordered by decision-dominance (Proposition 7), it follows that under the same dominance condition

¹³Since Kornhauser and Sager focus on a fixed legal rule, they assume equal permissiveness. This assumption has been standard, if implicit, in subsequent analysis of judgment aggregation. The conjunction of Proposition 5 and Example 5 indicates the precise bite of this assumption in inducing the coincidence of the ICR with the CFR.

the CFR may differ from the majority core rule. Put differently, *even when a base ICR exists and would be chosen by the majority rule on the court when compared to any other legal rule, it may be inconsistent with the rule constructed from separate majority decisions on the elements composing it.* This reveals a key problem in doctrinal aggregation and raises questions of indeterminacy. However, when we also require that all judges' rules be equally permissive, the CFR must be in the majority core:

Corollary 1 *Suppose that legal rules in profile ρ can be ordered by decision-dominance and are equally permissive. Then the CFR coincides with the ICR and is in the majority core.*

The Generalized Doctrinal Paradox

The final part of our formal analysis concerns the relationship between the framework of doctrinal aggregation and the analytical structure of Kornhauser and Sager's Doctrinal Paradox. The essence of the Doctrinal Paradox is the possible disparity between the outcomes of using majority votes (1) over individual factor decisions which are then aggregated to yield an input into a legal rule or (2) over the preferred judgments of each judge, each individually applying that legal rule. The following example (Kornhauser and Sager 1986, 115) provides an illustration. Suppose that a criminal appeals her conviction on two grounds (considerations A and B, respectively), either of which would be sufficient and at least one of which would be necessary to reverse the conviction. (That is, the underlying rule used by the judges is $((1, 1), 1)$.) The court is to decide by majority rule, and the individual judges comprising it arrive at the following evaluations of the relevant issues:

Example 7.

	Consideration A	Consideration B	Outcome
Judge 1	Present	Absent	Reverse
Judge 2	Absent	Present	Reverse
Judge 3	Absent	Absent	Affirm
Outcome	Absent	Absent	Affirm/Reverse

Judges 1 and 2 each think the case as a whole warrants reversal, and so by majority vote among judges the conviction should be reversed. On the other hand, judges 2 and 3 think consideration A does not warrant a reversal (is absent in the case), and judges 1 and 3 think consideration B does not

warrant a reversal (is absent in the case). Therefore, applying majority rule to each consideration separately, the court would find that no individual consideration warrants a reversal and so the conviction should be affirmed. Thus, aggregating individual votes on the outcome resulting from judges' applying the rule to their own sets of individual findings yields the opposite result from voting on preliminary legal findings one at a time and then applying the rule to the resulting set of findings.

As is clear from this example, the setting for the Doctrinal Paradox is the aggregation of differing subjudgments on the elements of the case, holding constant the legal rule that maps these subjudgments into the overall decision on the case. Our model of rule aggregation points to a related aggregation paradox where case facts and legal findings as to those facts are held constant, but the *doctrinal* factors—the mapping from legal findings to a legal decision—differ across the judges. Consider the following example, which, unlike our other examples, focuses on a single, specific case, (0, 1, 1), shown in the top row.

Example 8.

r^j	τ^j	0	1	1	decision judge by judge
$r^1 = (1, 1, 0)$	1	0	1	0	Y
$r^2 = (0, 0, 1)$	1	0	0	1	Y
$r^3 = (1, 0, 0)$	1	0	0	0	N
decision case factor by case factor		0	0	0	N\Y

All three judges agree only the second-and third-case factors exist, but they disagree as to their relevance (shown by the third through fifth columns). There are then two choices. They could aggregate subjudgments judge by judge, as shown in the last column, with two Ys and one N yielding a collegial decision of Y. Or, they can aggregate case factor by case factor, yielding the bottom row with the vector (0, 0, 0) of factor judgments, leading to a decision of N under the collegial factor rule $((1, 0, 0), 1)$, and so contradicting judge-by-judge aggregation.

This example has an analytical structure closely related to that of the Doctrinal Paradox, as can be seen in the following definition of an analytical object that subsumes both of the above examples. For each judge j and for each case c , let $f^{j,c}$ be a vector of case findings—these are case-specific values that in our model correspond to case factors of the case c , (c_1, c_2, \dots, c_k) , and in the Kornhauser-Sager example above correspond to the vectors of “present” and “absent.”

Let R and F^c be the aggregate vectors of rule factors and case findings, respectively (by majority votes over each), and T be the aggregate rule threshold (the median threshold). Note that, consistent with our assumptions above, $F^c = f^{j^c}$ for all j in our model (our judges agree as to the case findings), while $R = r^j$ for all j in Kornhauser and Sager's analysis (their judges agree as to the rule). Say that a rule profile ρ manifests a Generalized Doctrinal Paradox if there exists a case c such that either $R \cdot F^c \geq T$ but the collegial decision in the case is N or $R \cdot F^c < T$ but the collegial decision in the case is Y —that is, if factor-by-factor aggregation differs from judge-by-judge aggregation.¹⁴

The following result characterizes the analytical connection between the subtleties of judgement aggregation in our model of doctrinal aggregation and the Generalized Doctrinal Paradox:

Proposition 8 *Let all judges agree as to which case factors are present (that is, $\forall j \in J, \forall c \in C: F^c = f^{j^c}$). Then, given a rule profile ρ , (a) If a base ICR does not exist, then ρ manifests the Generalized Doctrinal Paradox; (b) If a base ICR exists but is not equivalent to the CFR, then ρ manifests the Generalized Doctrinal Paradox, and the cases where these rules conflict are the very cases that give rise to the Generalized Doctrinal Paradox; (c) If a base ICR exists and is equivalent to the CFR, ρ will not manifest the Generalized Doctrinal Paradox.*

Part (a) of Proposition 8 shows, then, that the non-existence of a base ICR is sufficient to guarantee that ρ will manifest the Generalized Doctrinal Paradox. Part (b) of Proposition 8 implies that decision-dominance (which, by Proposition 4 is sufficient to guarantee the existence of a base ICR) is not sufficient to prevent the Generalized Doctrinal Paradox. Nor is

¹⁴In Kornhauser and Sager's formulation, the Doctrinal Paradox may be thought of as a property of a particular implicit rule-case assessment pairing. One can construct many pairings of rules and cases that could give rise to a given instance of DP. Because we want to identify general properties of rule profiles for which the inconsistency at the core of this paradox may or may not exist (Prop. 8 and Cor. 2), it is desirable to define a paradox that is a feature of a rule profile rather than of a particular implicit rule-case pairing. Consequently, and unlike Kornhauser and Sager, our framework permits that inconsistency to emerge "endogenously"—from the cross-product of a rule profile and the universe of cases—and due to collegiality acting on another level of judicial product entirely, at the level of rule construction. In this context, the object of analysis becomes a rule profile rather than an outcome of a suppressed and nonunique rule profile/case assessment pairing. Because this is a different mathematical object from the Doctrinal Paradox, we cannot adopt Kornhauser and Sager's formulation of the paradox. We refer to a Generalized Doctrinal Paradox because we define it as a property of general rule profiles in relation to the universe of cases—a more general object than the basic Doctrinal Paradox.

decision dominance necessary to prevent the Generalized Doctrinal Paradox. The profile $((1, 1, 0), 1); ((1, 0, 1), 1); ((0, 1, 1), 1)$ cannot be decision-dominance ordered, but has base ICR $((1, 1, 1), 1)$, which is also the CFR for this profile. It follows immediately that ρ does not manifest the Generalized Doctrinal Paradox.

Although decision dominance is, therefore, neither necessary nor sufficient to prevent the Generalized Doctrinal Paradox, one implication of Proposition 6 is that the combination of decision-dominance and equal permissiveness of legal rules is indeed sufficient for that purpose. As Proposition 6 (b) shows, when those two conditions obtain, the CFR and the base ICR coincide with the preferred rule of the median judge in the decision-dominance ordering. Indeed, we can state the following necessary and sufficient condition directly in terms of the identity of the median judge:

Corollary 2 *Suppose a rule profile ρ that can be ordered by decision-dominance. Then ρ does not manifest the Generalized Doctrinal Paradox if and only if the factor-by-factor median judge is also a median judge in the decision-dominance ordering of ρ .*

Thus, when the factor-by-factor median judge is not the median judge in the decision-dominance ordering of ρ , ρ manifests the Generalized Doctrinal Paradox (because the CFR does not equal the ICR). Indeed, it is noteworthy that the cases that give rise to the paradox may occur both when the factor-by-factor median judge loses in the majority rule aggregation of overall judgments (as in case (0, 1, 1) in Example 8) and when there exists a median judge in the decision-dominance ordered profile (and desired case outcomes) who loses in the factor-by-factor aggregation (as in case (0, 1, 0) in Example 6).

In effect, this shows that no matter how we define a median judge, by the outcomes of cases or by the individual doctrinal requirements, the existence thereof does not prevent the Generalized Doctrinal Paradox. Consistency and predictability are still at risk either way.

Discussion

In an influential essay, Judge Easterbrook (1982, 815) argued that, while it may be reasonable to expect an individual judge's preferred rule to be one that corresponds to a minimally principled legal philosophy, social choice-theoretic problems of collective cycling over rules (exemplified by Condorcet's Paradox) imply that it is inappropriate to criticize a

collegial court for the lack of coherence, so defined.¹⁵ Our analysis offers what may be seen as a complementary view that does not rely on the existence of preference cycles or on the court's failures to check them.

One aspect of this view is the Generalized Doctrinal Paradox, which extends Kornhauser and Sager's key finding from the domain of rule application to the domain of doctrinal aggregation. Another aspect derives from our results on the base-rule rationalizability of collegial decision sets, the lack of which is shown to be a necessary condition for the existence of the Generalized Doctrinal Paradox, but which also gives rise to a somewhat distinct set of concerns. Suppose that each individual judge's rule reflects a consistent jurisprudence of some sort.¹⁶ The aggregation of individual judges' judgments may result in an object—either a rule or a set of case decisions that may be explainable by some rule—that is structurally distinct from the individual judges' rules and their case implications. Though some set of philosophical principles may indeed be found to support this amalgamated product, there is no reason to believe that such set must exist; at the very least, the judges may have to go outside their collective set of such principles to find it, and the resulting rule loses the presumption of principled justification that we might associate with the opinions of judges taken as individuals.¹⁷ Because

¹⁵Recent comprehensive development of the social choice theory on political domains is presented in Austen-Smith and Banks (1998). Following Arrow's theorem, this theory has focused on the existence of acyclical preference aggregation rules satisfying varying lists of normative axioms. A closely related to it, and relatively recent, literature on judgment aggregation deals with the possibility of rational aggregation of judgments subject to similar sets of axioms—e.g., List 2003; List and Pettit 2002). Although our model of doctrinal aggregation also analyzes aggregation of judgments and so may be thought to belong to this latter literature as well, it differs from it its focus on (1) a particular structure of individual judgments that corresponds to the relationship between judges' individually preferred rules and preferred case dispositions, and (2) a somewhat different set of properties of aggregation that have special relevance for legal policymaking.

¹⁶Of course, if the individual rules themselves are not principled or coherent in some other sense, then collegial incoherence is not surprising nor normatively worrisome. And, when individual judge's rules instead exhibit particularistic biases, collegiality can also have positive effects: when such biases are not supported by majority vote, the resulting collegial rule can be more faithful to neutral principles than any one rule. Collegiality can thus make it harder to indulge ad hoc or unprincipled departures from neutral principles. See the online appendix for an example. Covering this in depth is beyond the scope of this paper, though the formal apparatus we present could possibly be used to analyze the properties of aggregating such biases.

¹⁷Kornhauser and Sager are correctly skeptical about inferring "from the fact that each judge's rule is legitimately derivable from a small set of general, consistent, and unitary premises that the court's amalgamated rule is similarly derivable" (1986, 111).

opinions are rarely if ever complete and unequivocal descriptions that can be enforced or implemented without interpretation by legal agents downstream, the absence of a clear and consistent connection to a background legal philosophy may make it more difficult to predict what the collegial high Court will do, undermine consistency of judgments across lower courts, reduce persuasive power (Ferejohn and Pasquino 2002), and, consequently, reduce judicial legitimacy.

Note that the problems of aggregation we have demonstrated exist no matter how principled the judges are and given the most optimistic assumptions about their motives. This conclusion is troublesome, given that much legal scholarship seeks to attack or defend the output of collegial courts in terms of jurisprudential consistency. Given the collegial nature of higher courts, the normative account of law as "integrity" advanced by Dworkin (1986) may simply be outside of logical possibility.¹⁸

The framework and results of this paper also allow us to address some of the key issues involved in the differing versions of *stare decisis*—dependent on whether subsequent judges are or should be bound by the reasons provided by their predecessors, the rules stated by them, or the case outcomes they handed down (see Kornhauser 1992a). First, note that if rules are derived from previous case outcomes, then, barring changes on the court, the result will be the collegial decision set. As we show above, this set may or may not be supportable by a single implicit base rule. Alternatively, we might consider the precedent set by the determination of the proper role of a single legal factor. In this fashion, the precedent-respecting court may be seen as constructing a rule by decisions on rule factors. This way of proceeding would lead to the collegial factor rule, which, as we show above, may systematically differ from the implicit collegial rule, even when the latter may be in the majority core of rule choice.

Our results in relation to these focal modes of *stare decisis* raise concerns about the compatibility of *stare decisis* and a "coherence" or "integrity" account of legal adjudication. A rule might be considered effective and stable only if it is supportable upon majoritarian appellate review. When the implicit collegial rule is announced by the court, then we

¹⁸Problems in rule aggregation parallel the problems noted by Vermuele (2005). Interpretive theories often commit fallacies of division—they improperly generalize from arguments that a particular interpretive approach is best for the court as a whole to a conclusion that individual judges should adopt that approach, ignoring collegiality.

know for a fact that settlement is final and the law settled. If not, then we might expect appeals that will undercut the collegial court's announced rule.

Even if the collegial court consistently uses one particular aggregation method rather than others, the concerns that we associate with (in-)determinacy are still present. When there exist disagreements between the collegial factor rule, the implicit collegial rule, and the majority core rule, these disagreements can be implicitly revealed by dissenting and concurrent opinions. This would suggest to lower courts or other actors that they can push to find the "right" case, one that could get a majority vote on the high court inconsistent with the court's previous stated opinion. In effect, it sends a signal that there may be "wobble room" in the decision, that other cases may yield a winning combination of factors. To what extent this is desirable turns on whether we associate greater value with encouraging the development of the law or with avoiding giving the encouragement to other actors to push the "doctrinal envelope" (think, desegregation cases). The justices might indeed agree up front how to aggregate their rules when writing an opinion, but one may reasonably doubt their commitment to sticking with that opinion in a future case for which there are five or more votes to rule otherwise. Finally, the divergence between implicit collegial rule, the collegial factor rule, and the majority core may be thought to create a sense that courts' decisions as a whole (across various issues) are substantively arbitrary rather than reasoned and "necessary." The general consequence is to further undermine the persuasive power and the perceived legitimacy of the court.

Second-order preferences over rules

Consistent with much of the political science literature on the courts, we assumed in the preceding that judges' preferences over legal rules are induced entirely by substantive concerns associated with particular cases. However, the recognition of effects of collegiality that we analyze in this paper may also lead judges to develop second-order preferences over the content and structure of rules that would directly reflect valuing coherence. If judges are concerned with coherence, especially in the opinions bearing their names, they might prefer to announce simpler (base) rules in a given case (consider the strict scrutiny/rational basis simplification discussed in the introduction) and then later take up further cases to promulgate other rules that would, on their own, call for a different disposition in the initial case.

Proceeding in this way, the court might develop a complex doctrine, one not necessarily coherent taken as a whole (takings law seems to be a favorite target for such accusations). In this sense, our results should not be taken to imply that complexity comes *only* in the form of explicitly complex rules. Rather, it can arise in the form of what would amount to a complex—and possibly incoherent—doctrine spanning different rulings.

The pressures we note herein might therefore not be manifested in observable opinion outputs—after all, we do not get to observe the individual rules preferred by the judges in isolation without the pressures of collegiality—but rather play a role behind the scenes in how law is produced, given the "costs" of collegiality. Judges have at their disposal a range of coping mechanisms for dealing with the various pressures and problems that we identify in this paper. None of these mechanisms is "free"—each comes at its own cost, or trade-off. One can think of these mechanisms as belonging to a spectrum defined by how strongly the judges feel about the particular substantive or ideological concern represented by a given case relative to the value they place on coherence and other collective goods. At one end of that spectrum are direct concessions, accommodations, and bargaining between coalition members who are concerned with the collective good of the collegial output but disagree over its precise content.¹⁹ At the other end are concurrences (both regular concurrences, written along with joining the majority opinion, and special concurrences, which only add a vote for the majority outcome), which may indicate judges' relative unwillingness to compromise on a majority opinion/collegial rule and their relative readiness to give it up for the sake of issuing relatively unconstrained individual pronouncements (and a judgment of the Court). This could force lower courts to attempt to count votes behind different sections of the opinions and behind different arguments or rule factors, which could lead again to the implicit collegial rule "de facto" if not "de jure."²⁰

Between these ends of the spectrum lie several legal practices that have been the focus of recent attention in legal theory. One such practice is intentional vagueness in the court opinion and postponement of a

¹⁹E.g., Epstein and Knight (1998) show that the justices bargain over opinion content. Our framework suggests how one might think about the substantive elements of such bargaining.

²⁰For other takes on coalition building, see, e.g., Lax (2007) and Jacobi (2007).

clear statement of the general rule behind it (see Staton and Vanberg 2008). A closely related practice, also giving up on a determinate rule, is the endorsement of an indeterminate standard (Fallon 2001, Jacobi and Tiller 2007, Kaplow 1992, Posner 1997, Schauer 1991, Sullivan 1992). Still another relevant and somewhat more distinct practice is the narrow casting of appellate case decisions, which, Sunstein (1995) argues, is a desirable feature of decision making in a morally pluralist society, in which “completely theorized agreement” on the principled support for a legal doctrine may be difficult, if not impossible, to obtain. Of course, the justices could just avoid deciding at all. (As Stearns 2000 argues, doctrines such as standing and justiciability may enable the justices to duck troublesome cases, thereby avoiding cycling over rules, public incoherence, and manipulation by outside agents.) Each of these mechanisms may serve to stabilize law and policy. One of the implications of our arguments is that their relative prevalence may be associated with particular properties of collegial adjudication and the presence of features of disagreement among the members of the court that underlie the phenomena we analyze above.

Conclusion

Our results demonstrate that case dispositions and the development of legal doctrine can be affected by (a) substantive and formal relationships between judges’ preferred legal rules and (b) how and whether these judges can come together to state an official court rule. Judges may legitimately hold different legal philosophies or ideologies and thus legitimately prioritize distinct legal rules (particularly as to constitutional law), but divisions within the collegial court can produce paradoxical correlations between individual rules and collegial behavior, raising normative concerns as to the stability and rationality of the law.

Judges on a collegial court can create a collegial rule that will capture the effects of their individual votes—but this collegial rule may be quite different from any of their individual rules, may be more (or even less) complex than any of their individual rules, may include nonmajoritarian treatments of the factors that compose a legal rule, may be sensitive to how they come together to construct their collegial rule, and may not be a meaningful legal doctrine according to standard normative or philosophical criteria. Further, when we observe an explicit collegial

rule handed down by a collegial court, depending on how that rule is chosen, there may be cases that would be decided differently by the collegial court itself (by majority vote) than under the announced rule. We have identified some of the conditions under which such disparities occur. Because explicit legal rules can be articulated through various methods, and because these methods may, under the conditions we indicated, yield different rules, the clarity and finality of the collegial doctrine (vis-à-vis enterprising lower courts and future litigants) are inherently in jeopardy.

These complexities of collegial decision making have fundamental implications for legal theory, some of which we highlighted above. Our analysis of these complexities also points to a research agenda on the positive study of doctrinal choice and judicial decision making: How do the complexities we identify motivate judges’ choices? What trade-offs between various normative criteria for legal doctrines are more or less desirable? What institutional choices can implement those trade-offs? These questions would begin where the present analysis leaves off.

Acknowledgement

We thank Chris Berry, Ethan Bueno de Mesquita, David Epstein, John Ferejohn, Barry Friedman, Jake Gersen, Sandy Gordon, Cathy Hafer, John Kastellec, Lewis Kornhauser, Sarah Lawsky, Kelly Rader, and seminar participants at the Harris School of Public Policy at the University of Chicago.

Appendix

We begin by introducing the following useful notation. Let $\theta : C \rightarrow \{Y, N\}$, and let the outcome set for C be $\Theta(C) = \{(c, \theta(c)) : c \in C\}$. Let $\hat{\Theta}(C)$ be the set of all possible outcome sets associated with C , $\Theta(C) \in \hat{\Theta}(C)$. Let $\phi(c; \rho) \in \{Y, N\}$ be the decision in the case c under the rule ρ , and let the set of such decisions $\Phi(C, \rho)$ be the decision set of the rule ρ , $\Phi(C, \rho) = \{(c, \phi(c; \rho)) : c \in C\}$. Note that $\Phi(C, \rho) \in \hat{\Theta}(C)$. The decision set of the base rule $(r; \tau)$, $\Phi(C, (r, \tau))$, is $\{(c, \phi(c; (r, \tau))) : c \in C\}$ where $\phi(c; r, \tau) = \{Y \text{ if } r \cdot c \geq \tau \text{ and } N \text{ else}\}$. Finally, let $\phi_m(c, \rho)$ be the collegial decision, and $\Phi_m(C, \rho)$ be the collegial decision set.

Proof of Proposition 1. Suppose not. Then, there exists a rule (r, τ) and cases c^1 and c^2 s.t. for

some j , $c_i^1 \geq c_i^2$ for all $i \neq j$ and $c_j^1 > c_j^2$, and $\phi(c^1, (r, \tau)) = N$ but $\phi(c^2, (r, \tau)) = Y$. Hence, $r \cdot c^2 \geq \tau$ and $r \cdot c^1 < \tau$. Then, $r \cdot c^2 > r \cdot c^1$, and hence, $r \cdot (c^2 - c^1) > 0$, i.e., $\sum_{i=1}^k r_i(c_i^2 - c_i^1) > 0$. But $(c_i^2 - c_i^1) \leq 0$ for all $i \neq j$ and $(c_j^2 - c_j^1) < 0$ —a contradiction. \square

Proof of Proposition 2. Fix a profile ρ . Suppose the claim of the proposition is false. Then there exist $c^1, c^2 \in C$, s.t. $\phi_m(c^1, \rho) = Y, c_i^2 \geq c_i^1$ for all $i = 1, \dots, k$, and $\phi_m(c^2, \rho) = N$. Given $\phi_m(c^1, \rho) = Y$, it follows that there exists a $J' \subseteq J$ s.t. $|J'| \geq \frac{|J|+1}{2}$ and $\forall j \in J', \phi(c^1, \rho^j) = Y$. Similarly, given $\phi_m(c^2, \rho) = N$, it follows that there exists a $J'' \subseteq J$ s.t. $|J''| \geq \frac{|J|+1}{2}$ and $\forall k \in J'', \phi(c^2, \rho^k) = N$. Given that majority rules are proper (see e.g., Austen-Smith and Banks 1998, Chap. 3), it follows that there exists a judge j s.t. $j \in J'$ and $j \in J''$, or, equivalently, that there exists a base rule ρ^j , s.t. $\phi(c^1, \rho^j) = Y$ and $\phi(c^2, \rho^j) = N$. This means, then, that there exists $\rho^j = (r, \tau)$ s.t. $c^1 \cdot r \geq \tau$ and $c^2 \cdot r < \tau$, but that contradicts the supposition that $c_i^2 \geq c_i^1$ for all $i = 1, \dots, k$. \square

Proof of Proposition 4. We prove a stronger result than stated in the text (that is, under a weaker sufficient condition): The collegial decision set $\Phi_m(C, \rho)$ is inducible by a base rule if the profile of legal rules ρ can be ordered so that for all $j < \frac{n+1}{2}$ in that ordering, $\rho^{\frac{n+1}{2}}$ is decision-dominated by ρ^j and for all $j > \frac{n+1}{2}$, $\rho^{\frac{n+1}{2}}$ decision-dominates ρ^j ; if the latter condition holds, then the implicit collegial rule is $\rho^* = \rho^{\frac{n+1}{2}}$. To see that this result holds, take the median rule, $\rho^{\frac{n+1}{2}}$. If $\phi\left(c, \rho^{\frac{n+1}{2}}\right) = Y$, then all $\phi\left(c, \rho^{j < \frac{n+1}{2}}\right) = Y$ and thus $\phi_m(c, \rho) = Y$. If $\phi\left(c, \rho^{\frac{n+1}{2}}\right) = N$, then all $\phi\left(c, \rho^{j > \frac{n+1}{2}}\right) = N$ and thus $\phi_m(c, \rho) = N$. Thus, $\Phi_m(C, \rho) = \Phi\left(C, \rho^{\frac{n+1}{2}}\right)$ and so has a base rule. \square

Proof of Proposition 5. Let the base ICR be $\hat{\rho} = (\hat{r}, \hat{\tau})$. Reorder the dimensions such that $\hat{r}_i \geq \hat{r}_{i+1}$. Reorder the profile ρ such that $\tau^j \leq \tau^{j+1}$ and so that the median threshold is $\tau^m = \tau^{\frac{j+1}{2}}$. Proceed by contradiction. Assume that $\hat{\tau} < \tau^m$. Consider first the possibility that the base ICR has an outcome set with at least one Y . Note that $\hat{r}_{\hat{\tau}} = 1$ (else the ICR would have a rank smaller than its threshold and could never induce a Y). Construct c such that $c_i = 1$ if and only if $i \leq \hat{\tau}$. $\hat{r} \cdot c = \hat{\tau}$ and so $\phi(c, \hat{\rho}) = Y$. For all $i \geq m$, $\hat{r}_i \cdot c \leq \hat{\tau} < \tau_m \leq \tau_i$ and

so for all $i \geq m$, $\phi(c, \rho_i) = N$. Thus, $\phi(c, \hat{\rho}) = N$ —a contradiction. Consider next the possibility that the ICR has an outcome set consisting solely of N outcomes. Then, its threshold must be $k + 1$, which must be higher than all judges' rules. \square

Proof of Proposition 6. (a) Let $\rho = (\rho^1, \dots, \rho^n)$ be ordered by decision-dominance with ρ^1 decision-dominating ρ^2 , etc. If $\rho^j \neq \rho^{j+1}$ and ρ^j decision-dominates ρ^{j+1} , it must be that there exists $c \in C$ s.t. $\phi(c, \rho^j) = Y$ and $\phi(c, \rho^{j+1}) = N$. Because $\tau^j = \tau^{j+1}$ this can only occur when $r^j \cdot c > r^{j+1} \cdot c$. Lemma 1 (proof in online appendix) establishes that rule ρ^j decision-dominates rule ρ^d if and only if $\tau^d - \tau^j \geq \sum_i r_i^d(1 - r_i^j)$. Given Lemma 1, because ρ^j decision-dominates ρ^{j+1} and $\tau^{j+1} - \tau^j = 0$, $\sum_i r_i^d(1 - r_i^j) = 0$. Thus, $r^j \geq r^{j+1}$. If $\rho^j = \rho^{j+1}$, then $r^j = r^{j+1}$; thus, for all $j = (1, \dots, n)$, $r^j \geq r^{j+1}$. Thus, if $r_i^{\frac{n+1}{2}} = 1$, then all $\rho_i^{j < \frac{n+1}{2}} = 1$, and if $\rho_i^{\frac{n+1}{2}} = 0$, then all $\rho_i^{j > \frac{n+1}{2}} = 0$. Thus, the CFR is equal to $\rho_i^{\frac{n+1}{2}}$, which, by Proposition 4, is a base ICR. (b) Follows directly from Proposition 4 and Part (a). \square

Proof of Proposition 7. Let $\rho = (\rho^1, \dots, \rho^n)$ be ordered by decision-dominance with ρ^1 decision-dominating ρ^2 , etc. By Proposition 4, $\Phi(\rho, C)$ has the base ICR $\rho^{\frac{n+1}{2}}$. By definition of the majority core, if $\rho^{\frac{n+1}{2}}$ is not in the majority core, then there exists $\hat{\rho}$ s.t. for some $J' \subseteq J$, $|J'| \geq \frac{n+1}{2}$ and for all $j \in J'$, j prefers rule $\hat{\rho}$ to rule $\rho^{\frac{n+1}{2}}$. In order for $j < \frac{n+1}{2}$ to prefer $\hat{\rho}$ to rule $\rho^{\frac{n+1}{2}}$, $\hat{\rho}$ must decision-dominate $\rho^{\frac{n+1}{2}}$. But any such $\hat{\rho}$ must be worse than $\rho^{\frac{n+1}{2}}$ for all $j \geq \frac{n+1}{2}$. Similarly, in order for $j > \frac{n+1}{2}$ to prefer $\hat{\rho}$ to rule $\rho^{\frac{n+1}{2}}$, $\rho^{\frac{n+1}{2}}$ must decision-dominate $\hat{\rho}$. Any such $\hat{\rho}$ must be worse than $\rho^{\frac{n+1}{2}}$ for all $j \leq \frac{n+1}{2}$. Thus, no $\hat{\rho}$ as defined above exists. Therefore, $\rho^{\frac{n+1}{2}}$ is in the majority core. \square

Proof of Proposition 8. (a) Suppose that a base ICR does not exist. It must, then, be true that there exists no base legal rule that yields $\Phi_m(C, \rho)$. Let $\bar{\rho}(\rho)$ be the CFR. $\bar{\rho}(\rho)$ always exists and is a base rule. It follows that the (complex) legal rule $\hat{\rho}$ such that $\Phi(C, \hat{\rho}) = \Phi_m(C, \rho)$ is not equivalent to $\bar{\rho}(\rho)$, that is, $\Phi(C, \hat{\rho}) \neq \Phi(C, \bar{\rho}(\rho))$. Therefore, there must exist at least one case $c^1 \in C$ such that $\phi(c^1, \hat{\rho}) \neq \phi(c^1, \bar{\rho}(\rho))$. It follows that ρ must manifest the Generalized Doctrinal Paradox. (b) Example 5 shows that Part

(b) of this Proposition is not vacuous. Suppose that ρ^j is the base ICR given $\Phi_m(C, \rho)$ and that $\Phi(C, \rho^j) \neq \Phi(C, \bar{\rho}(\rho))$. It follows that there exists $\tilde{C} \subseteq C$ such that for all $c^i \in \tilde{C}$, $\phi(c^i, \rho^j) \neq \phi(c^i, \bar{\rho}(\rho))$ and for all $c^k \in C \setminus \tilde{C}$ (the set $C \setminus \tilde{C}$ possibly empty), $\phi(c^k, \rho^j) = \phi(c^k, \bar{\rho}(\rho))$. Because ρ^j is the base ICR, it follows that for all and only $c^i \in \tilde{C}$, the (overall judgment) majority decisions differ from the corresponding decisions induced by $\bar{\rho}(\rho)$ —that is ρ must manifest the Generalized Doctrinal Paradox, and $c^i \in \tilde{C}$ are all and only cases in C that give rise to it. (c) The contradiction of this would require the same rule to produce a different set of case outcomes, which is obviously impossible. \square

Manuscript submitted 26 November 2007

Manuscript accepted for publication 13 September 2008

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Web Appendix

The following establishes a necessary and sufficient condition for decision-dominance:

Lemma 1. *Rule ρ^j decision-dominates rule ρ^d if and only if $\tau^d - \tau^j \geq \sum_i r_i^d(1 - r_i^j)$.*

Proof of Lemma 1. The latter term counts the number of “1”s that exist in ρ^d but not in

ρ^j . *Sufficiency.* Suppose otherwise. $\tau^d - \tau^j \geq \sum_i r_i^d(1 - r_i^j)$ but ρ^j does not

decision-dominate ρ^d . Then there exists c such that $\phi(c, \rho^d) = Y$ and $\phi(c, \rho^j) = N$.

$r^d \cdot c \geq \tau^d$ and $r^j \cdot c < \tau^j$ so $r^d \cdot c + \tau^j > r^j \cdot c + \tau^d$ and $r^d \cdot c - r^j \cdot c > \tau^d - \tau^j$. Thus,

$r^d \cdot c - r^j \cdot c > \sum_i r_i^d(1 - r_i^j) \geq (r^d - r^j) \cdot c$ —a contradiction. *Necessity.* Suppose otherwise.

Then, ρ^j decision-dominates ρ^d and $\tau^d - \tau^j < \sum_i r_i^d(1 - r_i^j)$. For all $c \in C$, if $\phi(c, \rho^d) = Y$

then $\phi(c, \rho^j) = Y$. Let $w = \sum_i r_i^d(1 - r_i^j)$. Then $\tau^j > \tau^d - w$ by supposition. Re-order the

rule factors such that all factors i s.t. $r_i^d = 1$ and $r_i^j = 0$ precede all factors i s.t. $r_i^d = 1$ and

$r_i^j = 1$, and these precede all factors i s.t. $r_i^d = 0$. Index the re-ordered factors by $i' =$

$(1', \dots, k')$. (See Figure 1 below for an example.) Now, construct c as follows: let $c_{i'} = 1$ if

and only if $i' \leq \tau^d$. Then, $r^d \cdot c = \tau^d$ and $\phi(c, \rho^d) = Y$. Because ρ^j decision-dominates ρ^d ,

$\phi(c, \rho^j) = Y$. Thus, $r^j \cdot c \geq \tau^j > \tau^d - w$. Given c , either $r^j \cdot c = 0 < \tau^j$ which is a

contradiction or $r^j \cdot c = r^d \cdot c - w = \tau^d - w < \tau^j$ which would also be a contradiction. \square

Figure 1: Example of rule factor re-ordering for Proof of Lemma 1.

ρ^d	N	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N	N	N	
ρ^j	Y	N	Y	Y	N	Y	Y	N	N	N	Y	Y	Y	N	Y	Y
i	1	2	3	4	5	6	7	8	5	8	3	7	1	2	4	6
i'									1	2	3	4	5	6	7	8

The following result identifies a necessary condition for the ICR to be intermediate:

Proposition 9. *The ICR is an intermediate rule only if there exists no rule factor such that a majority on the court believes that factor is necessary for Y .*

Proof of Proposition 9. Let (r^*, τ^*) be an intermediate implicit collegial rule and let m be the number of factors that (r^*, τ^*) recognizes as relevant (i.e., factors i such that $r_i = 1$).

Then, it has to be that $\tau^* < m$. If so, then at least some possible cases must get Y .

Suppose, following the condition in the proposition, that, without the loss of generality, r is such that there are $\frac{n+1}{2}$ judges for whom $r_1 = 1$ and the preferred outcome is N if $c_1 = 0$.

Then there is a case c^* s.t. for all $i \neq 1$, $c_i^* = 1$ and $c_1 = 0$ in which the collegial outcome is N . What base implicit collegial rule would be consistent with such an outcome? First, it has to be that $r_1^* = 1$, else, by properness, we must have Y in c^* . But if (r^*, τ^*) is intermediate, then $\tau^* < m$, in which case, by properness, we should have reached an outcome Y in c^* . Hence (r^*, τ^*) cannot have been an intermediate rule. \square

An example in which collegiality increases coherence (We thank an anonymous reviewer for this example): Consider three judges (J1, J2, and J3) and four factors (C1, C2, C3, and C4). Suppose that a coherent (libertarian) legal philosophy would require a Y outcome if and only if $C1=1$, with the other three factors irrelevant. C2, C3, and C4 therefore represent “incoherent” individualistic biases. For example, the Y/N decision might be “Is the enforcement of this libel law unconstitutional,” C1 might be “Does the enforcement of the law in this case suppress political speech?,” while C2, C3, and C4 are, respectively, “Was the enforcement target someone other than a communist?”; “Was the enforcement target someone other than a pornographer?”; and “Was the enforcement target someone other than a white supremacist?” Suppose the three individual judge rules are such that each requires C1 along with one of the biased factors (C2, C3, and C4 respectively). In this example, the individual preferred rules are “incoherent” in that they all contain ad hoc exceptions to a general “libertarian” principal that suppression of political speech is unlawful. But the collective rule is coherent, at least in this sense, because while there is majority support for the general principle (Y if $C1=1$), there is not majority support for any of the particularistic exceptions.

Additional material on complexity:

Consider the case space with four factors. Complex rules can be represented as sets of base rules each of which is a sufficient condition for a given case outcome. For example, a rule ρ which requires the presence of the 1st or of both 2nd and 3rd factors for Y in a 3-factor case space could be represented equivalently as $\rho = \{((1, 0, 0); 1), ((0, 1, 1); 2)$. Define a rule's *complexity score* to be the cardinality of the smallest set of base rules that is necessary for the equivalent representation. Thus, base rules will have the complexity score of 1, while the rule ρ above will have the complexity score of 2.

To get a systematic sense of how likely we are to see collegiality increasing rather than decreasing complexity, we conducted a computational analysis in Mathematica. The smallest possible case space that allows us to consider the direction of marginal changes in complexity starting with a panel with complex individual rules has 4 case factors, and yields the highest possible complexity score of 4 (a 3-factor case space yields the highest possible complexity score of 2, and so prevents us from considering a possibility of an increase in complexity for a panel with already complex rules). The universe of possible judicial panels in the 4-factor case space is extremely large, and characterizing what happens in that universe without sampling is essentially impossible. To deal with this problem, our program draws random samples from the set of all possible three-judge panels with individual rule complexity score of 2 (there are 29,260 of those), computes the collegial outcome set, and then identifies the lowest complexity score rule that can induce such a set. The program is available from the authors upon request.

The analysis of collegial rule complexity of a random sample of 300 3-judge panels produces the following complexity breakdown:

ICR complexity score	number of instances out of 300
1	32
2	120
3	145
4	3

The following is a typical example of a marginal increase in complexity:

Example 9. Consider a 4-factor case space and the following panel of judges:

$$\rho^1 = \{((1, 0, 0, 0); 1), ((0, 1, 1, 1); 3),$$

$$\rho^2 = \{((0, 1, 0, 0); 1), ((1, 0, 1, 0); 2),$$

$$\rho^3 = \{((0, 0, 0, 1); 1), ((0, 1, 1, 0); 2).$$

Each judge's rule has a complexity score of 2. A majority of judges will vote *Y* on the following list of cases (and will vote *N* on all others): $(1, 1, 1, 1)$, $(0, 1, 1, 1)$, $(1, 1, 1, 0)$, $(1, 0, 1, 1)$, $(1, 1, 0, 0)$, $(1, 0, 1, 0)$, $(1, 0, 0, 1)$, $(0, 1, 0, 1)$. This collegial outcome set yields the following complex implicit collegial rule:

$$\{((1, 1, 1, 0); 2), ((1, 0, 0, 1); 2), ((0, 1, 0, 1); 2)\},$$

which has a complexity score of 3.