

R. Polk Wagner+ Lee Petherbridge++

Is the Federal Circuit Succeeding?  
An Empirical Assessment of Judicial Performance

152 U. Pa. L. Rev. 1105, 1107-13, 1117-24, 1133-56 (2004)

## Introduction

In the last two decades, n1 the United States Court of Appeals for the Federal Circuit has become, by far, the most powerful and influential force in the U.S. patent system. n2 The significance of this development is impossible to overstate: even as the patent system has grown in economic importance, n3 technological complexity, n4 and public awareness, the administration of the entire enterprise increasingly depends upon the twelve active judges of the Federal Circuit. n5

[\*1108] Conferring such dominating power on the Federal Circuit has long been justified by the premise that this centralization of legal authority will yield a clearer, more coherent, more predictable legal infrastructure for the patent system. Indeed, as a response to widespread dissatisfaction due to confusion and uncertainty under the decentralized administration of the patent law, the Federal Circuit was created to play this very role. n6 And since its inception, the court - with some assistance from the Supreme Court n7 - has moved aggressively in support of its widely perceived mandate. n8

This mandate gives rise to the obvious (yet surprisingly ephemeral) question concerning the Federal Circuit's role in the patent system: is it succeeding? Has the mandate been fulfilled? Has this grand experiment in allocating judicial authority resulted in clearer, more consistent, more coherent rules surrounding patents? n9 This is a [\*1109] question to which scholars, n10 the bar, n11 and even judges n12 are now turning with increasing interest - a reconsideration of the [\*1110] institutional design of the patent system. n13 Yet the analysis of its design requires careful evaluation, and most of this literature, while often illuminating, has not been empirically grounded. n14

This Article provides important insights into this question by presenting the results of a novel empirical study of judicial performance. The findings suggest that the Federal Circuit is a court in a period of significant transition - one driven by an ongoing effort to meet the requirements of its special mandate and by important changes in court personnel. The Federal Circuit has perhaps not yet succeeded in fulfilling its mandate, though the present trajectory of its jurisprudence holds out the promise that it ultimately will do so.

Our contribution to the debate surrounding the efficacy of the patent administration system offers two features that do not presently exist in the contemporary literature. First, the analysis is systematic and empirical, synthesizing all relevant judicial pronouncements across the approximately seven-year time period of the study, rather than using scattered or individual case results. n15 Second, the study focuses squarely on the methodological approach of the Federal Circuit, [\*1111] rather than simply counting appellate results (i.e., reversal rates). n16 By looking (a) systematically and (b) at the expressed methodological approach, this study offers an unprecedented opportunity to evaluate the success of the court in its role as the arbiter of the patent law.

The study reported here analyzes the Federal Circuit's recent jurisprudence of claim construction - the interpretation of language defining a patent's scope - as a window into judicial performance. n17 Specifically, the study analyzed the court's methodological approach to claim construction in all written opinions since the April 1996 Supreme Court opinion in *Markman II* n18 using a specially developed case-coding technique that captured both general methodology and the strength of its form. The collected data was used to conduct descriptive statistical analyses, which revealed the Federal Circuit's overall methodological approaches, discernible trends over time, and the methodology of the court's judges on an individual basis.

The data reveals a sharp division within the court between two distinct methodological approaches (which we term "procedural" and "holistic," respectively), each of which leads to distinct results. n19 Specifically, we find that the Federal Circuit utilized the procedural approach in 63% of the cases and the holistic approach in the remaining 37%. During the time period of our study, the procedural approach gained favor with the court in a gradual, though statistically significant, fashion. We also find that the Federal Circuit's jurisprudence became increasingly polarized during this time, with a significant [\*1112] increase in the use of "strong" forms of each methodological approach. n20 These trends can be attributed, we believe, to increased activity among judges who typically author strong methodological opinions, as well as to the appointment of two strongly Proceduralist judges (Judges Linn and Dyk) to the court in 2000.

Our findings also indicate that claim construction at the Federal Circuit is panel dependent. n21 That is, the data reveals that the composition of the panel that hears and decides an appeal has a statistically significant effect on the claim construction analysis. Specifically, we find that individual judges vary widely in their methodological approach to claim construction, n22 and that the distribution of the judges allows useful classification into three groups: the "Proceduralists" (i.e., those preferring procedural analyses), the "Holistics" (i.e., those preferring holistic analyses), and a middle group, the "Swing Judges." Panel participation by members of both the Proceduralist and Holistic groups is statistically related to the form of claim construction analysis. n23 In addition, the differential odds of a particular methodological approach can be calculated with 95% statistical significance for half (i.e., six) of the currently active Federal Circuit judges. n24

The totality of these results adds substantially to the contemporary analysis of the patent administration system - as well as offers unprecedented tools for the analysis of patent claims, patent disputes, and (especially) appellate proceedings at the Federal Circuit. Institutionally, the Federal Circuit appears to be a court in the midst of broad transition, especially in terms of personnel. The "new" Federal Circuit that is now emerging - a court that is more rules-based and consistent - is already having a measurable impact on patent jurisprudence.

The findings also suggest a number of policy implications for the court's efforts to meet its mandate. We recommend that the court recognize the importance of methodology and move to standardize [\*1113] the procedural methodological approach - the evidence suggests that the procedural approach is inherently more consistent than holistic analyses. Individual judges also have an important role to play in enforcement and evangelism.

In our view, whether the Federal Circuit is succeeding is a question that remains remarkably open. Little in these results would lead one to conclude that the court has been an unqualified success in bringing additional consistency, uniformity, and predictability to the patent law. But at the same time, many findings are unquestionably encouraging, suggesting that the court's effort to meet its mandate is both well underway and moving in the right direction.

This Article has four main parts. Part I sets forth the doctrinal and theoretical background of the Federal Circuit and its special mandate in the area of the patent law: an institutional framework that requires the court to develop its jurisprudence in a clear, coherent, and predictable manner. This mandate is particularly relevant in the area of claim construction, where characteristics of the analysis and policy-laden determinations by both the Supreme Court and the Federal Circuit fundamentally require jurisprudential consistency. This, in turn, suggests that claim construction is perhaps the best possible locus of inquiry into the success or failure of the court in achieving its mission.

The design of the study is set forth in detail in Part II, which describes the research methods used, including the development of the case-coding instrument, the selection of the case population, and the coding techniques.

In Part III, the results are presented, consisting of four basic inquiries. The first is the overall response of the court to the Markman II mandate, measuring the total content of the relevant jurisprudence. The second analytic section reviews trends during the period of the study and considers which factors may be driving the observed changes. A third section reports the methodological approach of individual Federal Circuit judges, describes the analytical camps or factions that exist among the judges, and ranks the judges according to consistency in methodological approach. The judge-based information is used in the fourth section to demonstrate the panel dependency in claim construction at the Federal Circuit, both in terms of the judge groups developed above and in terms of the individual judges themselves. Finally, policy implications and proposed reforms are described in Part IV....

### 1. A (Brief) Primer on Claim Construction

Patent claims are, put simply, the textual description of what a patentee "claims" as her patented invention. n39 They establish the basic boundaries of the patentee's right to exclude others from the marketplace and also determine whether the patentee receives a patent at all. As Judge Giles Rich once famously noted, in patent law, "the name of the game is the claim." n40

Claim "construction" or "interpretation," then, is the process of placing the language found in the claims into a meaningful context, [\*1118] given the circumstances. Sometimes claim language will be unexpectedly vague - for example, does the term "coupled" require a physical connection? n41 On other occasions, the language is intentionally difficult - how flat is "generally flat"? n42 In either case, the patent law's system of claim construction analysis guides the inquiry.

It is important to note that claim construction is undertaken by a variety of public and private actors. For example, the PTO necessarily interprets claim language when evaluating the patentability of an invention. n43 Private parties are constantly interpreting patent claim language as well, either as an evaluation of potential infringement risk, the determination of the value of a licensing agreement, or as part of an investment decision. But the really important claim interpretations are those conducted by the courts, usually during infringement proceedings. n44

From an institutional design perspective, important features of the current claim construction scheme are:

1. Claim language is determined solely by judges, typically well in advance of trial during what are (tellingly) known as Markman hearings. n45

2. A district court's claim construction is reviewed de novo on appeal to the Federal Circuit. No formal deference is given to the district court or, for that matter, the PTO. n46 At this point, [\*1119] the Federal Circuit has never accepted any interlocutory appeals on issues of claim construction. n47

From an operational perspective, the patent law contains a wide variety of "canons of construction" that purport to guide the analysis. n48 As has been noted by the court itself, however, many, if not all, of these canons are contradictory and not especially useful. n49 Indeed, it is the efforts to resolve the tension between a pair of these canons - (a) that claims are to be interpreted in light of the specification and prosecution history and (b) that claims may not be modified beyond their actual language by reference to the specification or prosecution history - that creates the split in authority that forms the basis of this study.

Though the precise magnitude of its role is a matter of considerable debate, n50 it is clear that claim construction plays a major - and perhaps the major - role in patent infringement litigation. And with the gradual decline in favor of the doctrine of equivalents - a judicial doctrine allowing patentees to exclude others from making, using, and selling subject matter beyond the scope of, but "equivalent" to, their claims n51 - there is reason to expect that the importance of claim interpretation will only increase.

[\*1120] Thus armed with some general background information about patent claim construction, we can turn now to the details of the institutional arrangements and their implications.

## 2. Markman and the Express Mandate

It has been almost seven years since the Supreme Court's decision in *Markman II* set into place the basic structural design of the claim construction process. Holding that the Seventh Amendment's guarantee of a jury trial did not apply to the interpretation of the patent document, the Court made quite clear that the question was "exclusively within the province of the court." n52 More important than the holding, however, was the reasoning. Justice Souter, writing for a unanimous Court, framed the issue in traditional (and traditionally narrow) Seventh Amendment terms: whether the right to a trial by jury existed under the English common law in the late eighteenth century. n53 The Court noted that while patent infringement actions were unquestionably tried to juries during the relevant time period, the historical record was far less clear regarding the locus of decision-making on interpretation. The Court's historical analysis was - as one might imagine - substantially complicated on this point because patent claims (at least as we understand them now) did not exist until the early 1800s, n54 did not receive formal legal recognition until 1836, n55 and were not required of all patentees until 1870. n56 Thus, the court turned to the body of the patent document itself - the specification n57 - as a contemporaneous analogue. Surveying what it described as the "mere smattering" of relevant cases, n58 the Court concluded that there was no evidence that eighteenth-century juries had interpreted patent documents and found it telling that "as soon as the English [courts] did begin to describe the construction of patent documents" in the early 1800s, they indicated that the judge was the interpreter, not the jury. n59 [\*1121] Thus, the Court rejected the argument that the Seventh Amendment guaranteed the role of the jury in claim construction. n60

Significantly, *Markman II* here turns from description to prescription. That is, having found no constitutional reason to task the jury with claim construction, the Court - after noting that long-standing precedent (at least weakly and to some extent) supported an exclusive judicial role n61 - ultimately rested its decision on purely "functional considerations." n62 These factors took two

forms. The first was the Court's expectation that judges - by virtue of their special skills and experience, as well as the "highly technical" nature of patent claim construction and the "special doctrines" developed by the courts for their interpretation<sup>n63</sup> - were simply more likely to be better at the task than "jurors unburdened by training in exegesis."<sup>n64</sup> Second, the allocation of interpretive authority to judges was, the Court suggested, likely to promote the goals of intrajurisdictional certainty and uniformity.<sup>n65</sup> Whether the Court got it "right" when it analyzed these factors is obviously a matter of some debate, which has been widely [\*1122] discussed and debated in the literature.<sup>n66</sup> However, from the perspective of institutional design, the importance of the Court's discussion is not the detailed analysis as much as the underlying assumptions (and, indeed, requirements) concerning the framework of the claim construction process. As an initial point, the Court was fairly explicit about its criteria for measuring the goodness of competing systems: correctness,<sup>n67</sup> uniformity,<sup>n68</sup> and certainty.<sup>n69</sup> Second, and perhaps more significantly, both functional factors identified by the Court share a unifying underlying principle: the existence of specific legal rules guiding the interpretation of patent claims. For example, in suggesting that judges were likely to be better at construing claims, the Court cited "special doctrines" relating to construction embedded in the law.<sup>n70</sup> Further, *stare decisis* - the strong judicial convention of adherence to existing judicial precedent - anchored the Court's argument that judicial decision making in this context would enhance uniformity and certainty.<sup>n71</sup> Thus, in both cases, *Markman II*'s functionalist approach was largely based on the theory that allocating the interpretive task to judges would extend and enhance the development of legal rules guiding the construction of patent claims.

And yet the logic of *Markman II* clearly encompasses a prescriptive aspect as well. If the Court assigned claim construction to judges on the theory that doing so would result in the continued use and development of legal rules, then it follows that such legal rules (and their development) are not simply hortatory, but are instead a mandatory aspect of the institutional arrangements surrounding claim construction. In essence, the *Markman II* decision granted the judges the [\*1123] power to construe patent claims, but this grant was clearly conditioned on the use and development of legal-doctrinal "rules and tools" to provide clarity and uniformity in the treatment of interpretive issues.<sup>n72</sup> Absent a uniform legal framework, the basic premise of the Court's functionalist analysis is absent.

Significantly, the Federal Circuit has, to no small extent, amplified the effect of the Supreme Court's prescription in *Markman II*. In *Cybor Corp. v. FAS Technologies, Inc.*,<sup>n73</sup> an en banc court responded to the challenge. While the *Cybor* majority opinion, joined by nine judges, has been described as "unfortunate"<sup>n74</sup> and involving "strained reasoning" in the "manufacture [of] legal fictions,"<sup>n75</sup> relatively few commentators have fully considered the logical framework underlying *Cybor*. This is understandable in part because the majority opinion focused almost entirely upon the question of whether claim construction is an inquiry of "fact" or "law" and, more particularly, upon whether *Markman II* stated a view on the matter.<sup>n76</sup> It is easy to criticize this form of analysis; even the Supreme Court in *Markman II* noted that divining the fact/law distinction is considerably less satisfactory than an analysis grounded in historical analogues and functional considerations.<sup>n77</sup> By declaring the interpretation of patent claims as "purely legal," the *Cybor* majority reasoned that no deference was due a district court's claim construction and that appellate review was to be conducted *de novo*.<sup>n78</sup> Unfortunately, the *Cybor* majority did not base its argument on institutional design considerations, the instrumentally appropriate [\*1124] location of this decision-making authority.<sup>n79</sup> Rather, as Professor Duffy has aptly noted, the opinion can really only be viewed as implicitly reinforcing the Federal Circuit as the superlative administrative player in the claim con-

struction process. n80 Thus, the Federal Circuit has not merely embraced the special mandate underlying the Markman II decision - it has reinforced it....

### "Bottom Up" Measurement Design

Ultimately, the opinions themselves inspired the design of this study's measurement criteria. A reading of a broad sample of the relevant dataset revealed a distinction between claim construction methodologies on the basis of the hierarchical status given to the sources of meaning of claim terms. Throughout the relevant time period, the Federal Circuit observably struggled with the tension inherent in two generally accepted (and conventionally cited) "canons" of claim construction: (1) that claim language is read in light of the specification of which it is a part; and (2) that the meaning of claim language may not be altered by importing or reading-in changes from outside the claims. Taken together, these canons recognize that the claim construction exercise is necessarily a contextual one, and they also attempt to preserve the function of the claim as the ultimate statement of patent scope. And yet the canons' inherent tension cannot be easily set aside: at what point does an appropriately contextual analysis spill over into impermissible importation of meaning into the claims? It is the resolution of this tension - which fundamentally exists in all disputes about the meaning of claim language n108 - that provides the measurement criteria by which the Federal Circuit's methodological approach may be evaluated.

Two distinct approaches to resolving this tension were identified and defined. One line of reasoning, designated procedural, reveals a fairly formal process for analyzing the meaning of disputed claim terms, one that principally traverses according to a hierarchy of status among the various sources of meaning. The procedural approach starts with a general presumption in favor of the ordinarily understood meaning of claim language, typically drawn from a relevant - often technical - dictionary, reference works, or common usage. It then follows a predetermined path of analysis, wherein any suggested alteration from the ordinary meaning must be accompanied by [\*1134] significant proof that such an alteration is required under the circumstances.

The alternative methodology, designated holistic, adopts a distinctly more free-form approach, seeking the correct meaning according to the particular circumstances presented, rather than following the formal steps and hierarchy of information sources seen in the procedural method. The holistic approach is significantly more relaxed than the procedural method in moving away from the abstracted "ordinary meaning" of a term in favor of a more localized understanding. n109

An example of the court's expression of the procedural approach is *Johnson Worldwide Associates v. Zebco Corp.*: n110

We begin, as with all claim interpretation analyses, with the language of the claims. The general rule is, of course, that terms in the claim are to be given their ordinary and accustomed meaning. General descriptive terms will ordinarily be given their full meaning; modifiers will not [\*1135] be added to broad terms standing alone. In short, a court must presume that the terms in the claim mean what they say, and, unless otherwise compelled, give full effect to the ordinary and accustomed meaning of claim terms.

In order to overcome this heavy presumption in favor of the ordinary meaning of claim language, ... there must be a textual reference in the actual language of the claim with which to associate a proffered claim construction.

Our case law demonstrates two situations where a sufficient reason exists to require the entry of a definition of a claim term other than its ordinary and accustomed meaning. The first arises if the patentee has chosen to be his or her own lexicographer by clearly setting forth an explicit definition for a claim term. The second is where the term or terms chosen by the patentee so deprive the claim of clarity that there is no means by which the scope of the claim may be ascertained from the language used. In these two circumstances, a term or terms used in the claim invites - or indeed, requires - reference to intrinsic, or in some cases, extrinsic, evidence to determine the scope of the claim language. n111

By contrast, consider the discussion of methodology in *Wang Laboratories, Inc. v. America Online, Inc.*: n112

The parties agreed before the district court that the term "frame" can in general usage be applied to bit-mapped display systems as well as to character-based systems; experts for both sides so testified. The disagreement was as to whether the term "frame" in the '669 claims embraced this general usage, or whether the term would be understood by persons of skill in this field as limited to the character-based systems described in the '669 patent. The district court started its analysis with the specification....

The only system that is described and enabled in the '669 specification and drawings uses a character-based protocol. The specification mentions non-character-based protocols, [but] ... the district court viewed the references to bit-mapped protocols as acknowledgments of the state of the art, and not as an enlargement of the invention described in the patent. We agree, and conclude that the references to other known protocols do not describe them as included in the applicant's invention, and that the specification would not be so understood by a person skilled in the field of the invention...

Wang states that the character-based protocol is simply a "preferred embodiment," and that the embodiment described in the specification does not set the boundaries of the claims ... Although precedent offers assorted quotations in support of differing conclusions concerning the scope of the specification, these cases must be viewed in the factual context in which they arose. Whether an invention is fairly claimed more broadly than the "preferred embodiment" in the specification is a question specific to the content of the specification, the context in which the embodiment is described, the prosecution history, and if appropriate the prior art, for claims should be construed, when feasible, to sustain their validity. The usage "preferred" does not of itself broaden the claims beyond their support in the specification. The only embodiment described in the '669 patent specification is the character-based protocol, and the claims were correctly interpreted as limited thereto. n113

It is this contrast between the procedural and the holistic methodological approaches that forms the basis of our measurement criteria....

### III. Study Results

Analysis of the collected data is split into three general categories. The first looks at the observed methodological approach evinced by the court as a whole during the period of the study. The second evaluates whether there are any discernible trends over time. The third considers the observed methodological approach of the individual judges on the Federal Circuit to determine whether opinion authorship or panel membership is related to expressed methodology.

#### A. Overall Results n151

Table 2 describes the overall frequency distribution of the Federal Circuit's claim construction methodologies since *Markman II*, where the methodological approach is expressed in binomial form - that is, where the strong/intermediate/weak categories are collapsed.

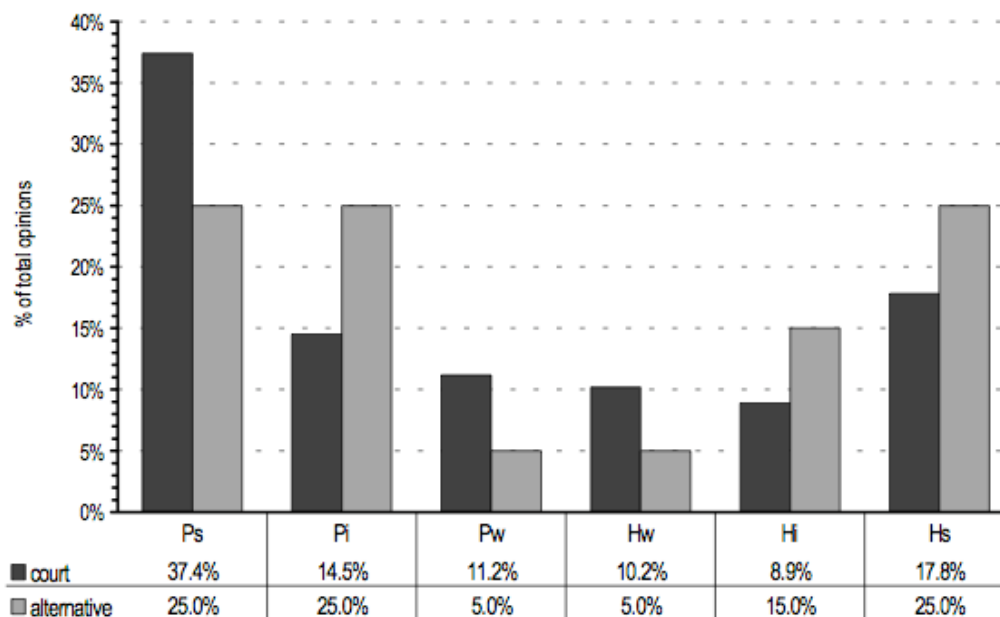
**Table 2: Frequency of Methodologies (binomial, n=393)**

	procedural	holistic
n	248	145
%	63.1%	36.9%

Table 2 suggests that the procedural methodology is predominant, though perhaps not overwhelmingly. n152

[\*1149] Figure 2 breaks out the categorical details, with the score for each methodological approach indicated as a percentage of the observations (court: n=393, alternative: n=20) and as a numeric total. Figure 2 includes the profile of the alternative opinions for comparison purposes.



**Figure 2: Frequency Distribution of Methodologies (Categorical)**

The strong form of the procedural methodology was observed more than twice as often as any other methodological approach, followed by the strong form of holistic, and then the intermediate form of procedural. The general shape of the histogram (ordered according to the taxonomy noted in Figure 1) suggests that the court's methodological approach tends to be somewhat polar, favoring stronger expressions of methodology.

#### B. Methodological Trends over Time

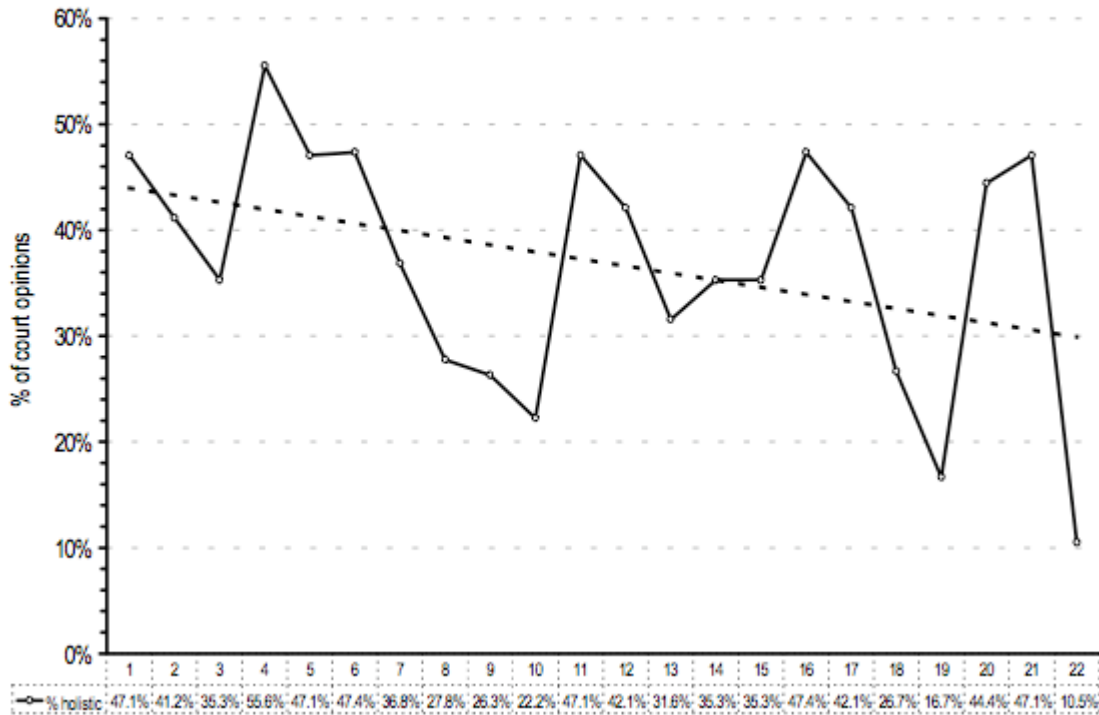
The time period for this study spanned about six-and-a-half years, from April 1996 to November 2002. Accordingly, it was possible to evaluate the court's methodological approach over time and to consider whether any trends might be discernible.

Because opinions are not issued by the Federal Circuit at a uniform rate, utilizing calendar-related criteria to separate the series of opinions resulted in widely varying groups of opinions. To offset this problem, the dataset was separated into twenty-two bins in chronological order, with each bin representing approximately two to four [\*1150] months during the period of the study. Each bin contains eighteen or nineteen opinions. n153

##### 1. Overall Trends

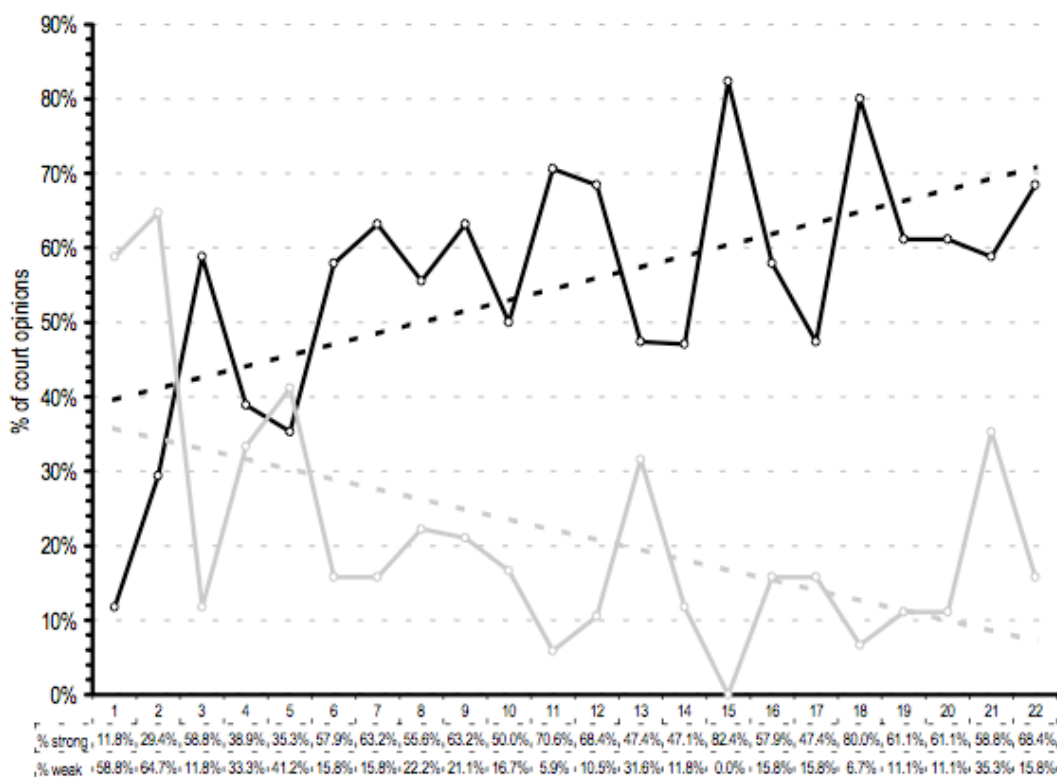
Figure 3 shows the methodology (binomial categorization) over time, expressed in terms of the percentage of holistic observations.

**Figure 3: Methodology over Time (Binomial)**



The downward-sloping trend line superimposed on the graph indicates that the frequency of the holistic methodological approach (when categorized in binomial form) tended to decrease during the period of the study. n154

In an effort to produce a clearer picture of the real trends at the Federal Circuit, Figure 4 digs somewhat deeper into the data by [\*1151] depicting the frequency trends of both strong and weak methodological approaches (irrespective of whether such approaches were procedural or holistic) during the period of the study.

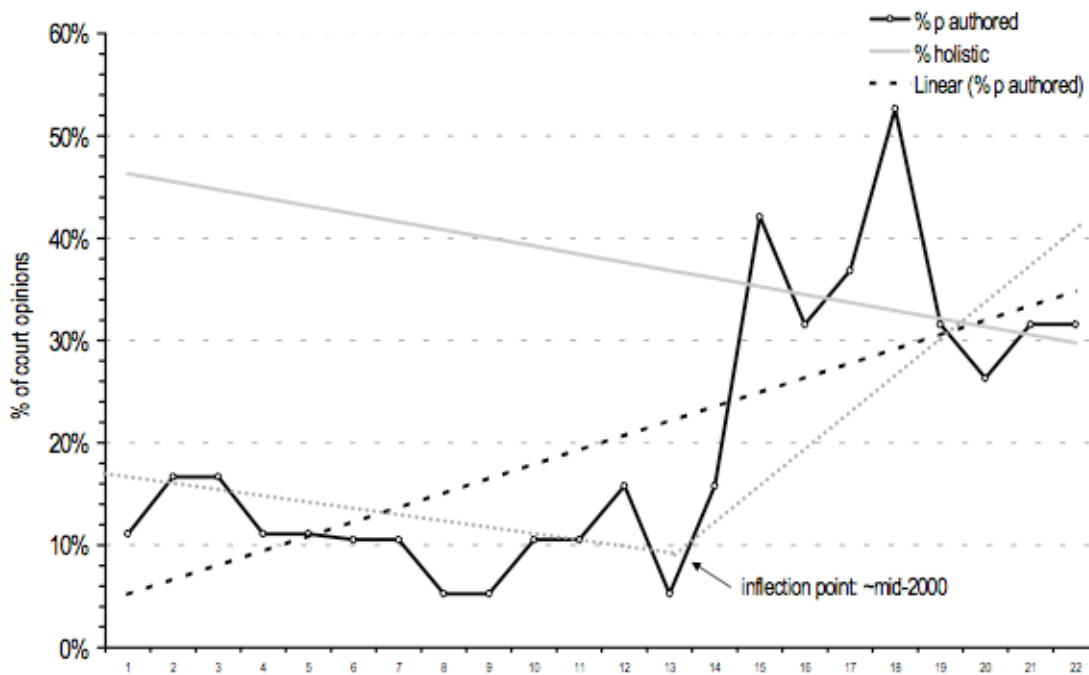
**Figure 4: Proportion of Strong/Weak Approaches over Time**

Again, trend lines were superimposed on the graph. n155 The striking result here is the marked increase in the "extremism" of the Federal Circuit during the period of the study: moving from near parity between strong and weak forms of methodological approach in early periods to a jurisprudence increasingly characterized by strong forms of analysis. Note that one byproduct of this increasing extremism is likely to be an increasing reversal rate over time because lower courts may be unable to determine the proper approach and/or the Federal Circuit may become less forgiving of alternative methodologies. This observation is supported by Chu's results showing an increasing rate of claim construction changes over time. n156

[\*1152]

## 2. Authorship Activity Patterns

The significant rise in methodological extremism revealed by Figure 4 suggested further analysis of the data. Using the statistical profiles developed for each judge, n157 the trends in Figures 3 and 4 were deconstructed by analyzing changes in Federal Circuit judicial activity. First, two groups of judges were identified according to their statistical profile as Proceduralists (i.e., those most likely to author opinions stating a procedural methodological approach) or Holistics (i.e., those most likely to author opinions stating a holistic methodological approach). n158 The percentage of Federal Circuit opinions authored by each group was calculated for each period in the study. The authorship activity trend for the Proceduralists was found to be strongly positive and statistically significant. n159 Figure 5 depicts this result.

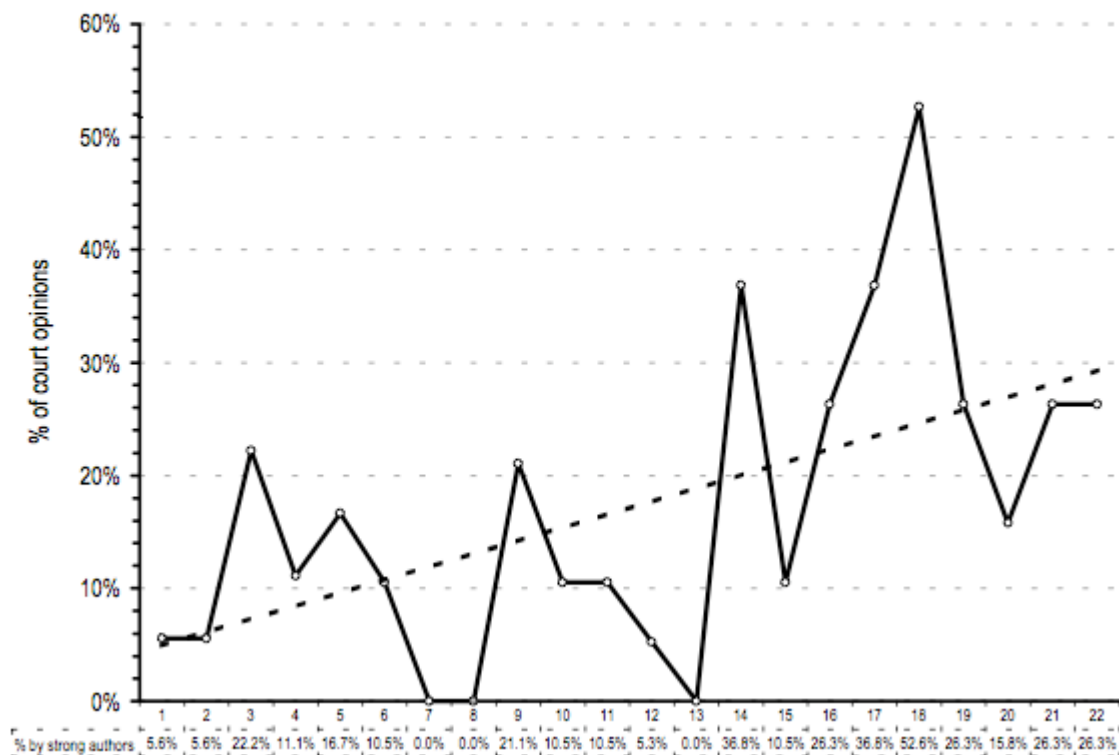
**Figure 5: Trends of Opinion Authorship Activity**

[\*1153] The downward-sloping line (% holistic) is the court's overall trend line taken from Figure 3. The trend line for Proceduralist author activity (% p authored) is relatively well-correlated and statistically significant. n160

Figure 5 reveals a major part of the answer posed by Figure 3: the Federal Circuit's claim construction jurisprudence becomes more procedural over time in large part because of the increasing authorship activity of the Proceduralist judges. A major factor in this increase in activity has been changes in judicial personnel: of the three judges defined as Proceduralists, only one was on the court throughout the period of the study; the remaining two joined the court after January 1, 2000. n161 The superimposed trendlines for the first and second half of the study reveal a sharp inflection point around mid-2000, which is when Judges Linn and Dyk (two of the three Proceduralists) began hearing cases.

While Figure 5 explains the decreasing incidence of the holistic methodological approach at the Federal Circuit, it does not offer much insight into the increasing extremism of the Federal Circuit depicted in Figure 4. Figure 6, however, depicts the authorship trends of a group of judges that fit within a definition of "strong" authors - those whose opinions were coded as evincing a strong methodological approach (irrespective of whether procedural or holistic) and fall within the top quartile of this statistic for all judges.

[\*1154]

**Figure 6: Opinion Authorship Activity of "Strong" Authors**

The trend line in Figure 6 suggests that the activity of "strong" authors on the Federal Circuit increased, perhaps by five-fold, during the period of the study. n162 Again, a large part of this can be attributed to personnel changes: two of the five judges classified as "strong" authors joined the court after January 1, 2000. n163 Combined, they account for 45% of all "strong" opinions authored.

To briefly summarize, the results over time show the following key trends:

Trend 1: A gradual but significant shift in methodological approach to claim construction away from holistic, in favor [\*1155] of the procedural approach (Figure 3).

Trend 2: A substantial increase in the extremism of the Federal Circuit's claim construction jurisprudence, measured by the frequency of "strong" methodological approaches (Figure 4).

In both cases, changes in court personnel seem to be at the core of the developments. Trend 1 is largely explained by the increasing activity of Proceduralist judges - a factor substantially driven by the addition of Judges Linn and Dyk to the court in 2000. Similarly, Trend 2 results in large part from the increasing authorship activity of judges with a propensity to write "strong" methodological opinions, a factor again influenced by the arrival of Judges Linn and Dyk.

From an institutional evaluation perspective, these results are mixed. While Trend 1 (Figure 3) demonstrates a movement towards proceduralism, it nonetheless makes clear that the holistic methodological approach remains a current (and apparently enduring) feature of the Federal Circuit's jurisprudence. This in turn suggests that the methodological split noted in Part IV.A is likely

to remain for the foreseeable future, thereby reducing the predictability and stability of the jurisprudence and potentially keeping the district court reversal rate at relatively high levels.

Trend 2 (Figure 4) offers an arguably more positive view of the jurisprudential developments. Here, there are two plausible stories. The first is that the marked increase in extremism is evidence of an ongoing doctrinal struggle over claim construction at the Federal Circuit, where the addition of Proceduralist judges such as Linn and Dyk has spurred their Holistic brethren (Judges Bryson and Lourie) to adopt a more aggressive approach. This view is less compelling, however, when one considers the relatively low rate of disputes concerning claim construction that appear in the jurisprudence; the population contains only about a 5% rate of alternative claim construction opinions (as expressed in dissents or concurrences). n164

Thus, the more plausible story related to Trend 2 is that the Federal Circuit is indeed responding to the Markman II mandate by increasingly focusing on - and developing - claim construction guidelines. Thus, the trend towards polarization is a byproduct of the clearer and sharper ways by which the court is analyzing claims (or, more precisely, expressing its analysis of them). While part of this [\*1156] development seems to have been a move towards the procedural forms of analysis, the more significant observation may be that the court is attempting to fulfill the Markman II requirement of a coherent doctrine of claim construction. Under this view, the jurisprudence prior to Markman II may have been relatively less clear or evinced relatively weaker forms of analysis, and the important shift is the increase in stronger (and thus more clearly stated) methodological forms.

Whichever explanation one chooses - a struggle for supremacy over claim construction methodology or the expected result of doctrinal development - the trends generally support the view that the Federal Circuit is (1) increasingly focusing on the methodological approach to claim construction and (2) gradually moving to a more unified (procedural) methodological scheme. n165 Both of these must be considered broadly positive developments, likely to move the Federal Circuit closer to its mandate of uniformity and predictability....

### Footnotes:

+Assistant Professor, University of Pennsylvania Law School. Web site: [http:// polk.pennlaw.net](http://polk.pennlaw.net). Comments appreciated: [polk@law.upenn.edu](mailto:polk@law.upenn.edu).

++J.D., University of Pennsylvania Law School, 2002. Thanks to Jason Johnston, Mark Lemley, Kristin Madison, Craig Nard, Nate Persily, Richard Posner, Arti Rai, Kim Lane Scheppelle, Reed Shuldiner, Phil Weiser, and participants at workshops at the University of Pennsylvania Law School, the George Washington University Law School, and the 2003 American Law and Economics Association for helpful comments on earlier drafts. Thanks also to Christian Chu for his data; to Kristin Madison, Dan Kessler, and Reed Shuldiner for statistical advice; and to Patrick Mirville, Bill Mulherin, and Ron Day for research assistance. All errors are our own. For more information and related research, see <http://www.fedcir.org>.

n1. The Federal Circuit was created by the Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (codified as amended in scattered sections of 28 U.S.C.).

n2. This fact is widely acknowledged. See, e.g., Mark D. Janis, Patent Law in the Age of the Invisible Supreme Court, 2001 U. Ill. L. Rev. 387, 387 ("The Court of Appeals for the Federal Circuit ... has become the de facto supreme court of patents.").

n3. See generally Fred Warshofsky, *The Patent Wars: The Battle to Own the World's Technology* (1994) (noting the critical nature of patents in economic development).

n4. See, e.g., John R. Allison & Mark A. Lemley, *The Growing Complexity of the United States Patent System*, 82 B.U. L. Rev. 77, 79 (2002) ("By almost any measure ... the patents issued in the late 1990s are more complex than those issued in the 1970s.").

n5. See 28 U.S.C. 44(a) (2000) (authorizing up to twelve judges). As of January 2004, all seats are filled. Of the current judges, two have advanced degrees in scientific fields (Judges Newman and Lourie both hold Ph.D.s in Chemistry), four have professional patent-related experience (Judges Newman, Lourie, Gajarsa, and Linn), three have policy-legislative experience (Judges Michel, Rader, and Prost), and two have advanced degrees in economics or business (Judges Gajarsa and Prost). See U.S. Court of Appeals for the Federal Circuit, *Judicial Biographies*, at <http://www.fedcir.gov/judg-bios.html> (last modified Jan. 22, 2004).

n6. See S. Rep. No. 97-275, at 14-16 (1981), reprinted in 1982 U.S.C.C.A.N. 11, 14-15 (stating that the creation of a centralized court to hear suits related to patents will provide doctrinal stability in the field of patent law, which will decrease unnecessary uncertainties in the patent system and thereby increase innovation); Comm'n on Revision of the Fed. Court Appellate Sys., *Structure and Internal Procedures: Recommendations for Change* (1975), reprinted in 67 F.R.D. 195, 220 (1975) ("The additional appellate capacity for nationally binding decisions which a national court of appeals would provide can be expected to fulfill [the monitoring] function [over the complex area of patent law and policy]."). Perhaps the seminal work considering the formation of the Federal Circuit and its theoretical basis is Rochelle Cooper Dreyfuss, *The Federal Circuit: A Case Study in Specialized Courts*, 64 N.Y.U. L. Rev. 1 (1989).

n7. Note in particular the Supreme Court's decision in *Markman v. Westview Instruments, Inc.* (Markman II), 517 U.S. 370, 388-90 (1996), allocating the authority to interpret patent claims to judges. The importance of Markman II is explored at length below. *Infra* Part I.

n8. The decisions in *Markman v. Westview Instruments, Inc.* (Markman I), 52 F.3d 967 (Fed. Cir. 1995), and *Cybor Corp. v. FAS Technologies, Inc.*, 138 F.3d 1448 (Fed. Cir. 1998), are especially relevant in this context, as we discuss below. *Infra* Part I.

We note, however, that the Supreme Court's opinion in *Holmes Group, Inc. v. Vornado Air Circulation Systems, Inc.*, 535 U.S. 826, 834 (2002), holding that permissive counterclaims arising under the patent law do not trigger Federal Circuit appellate jurisdiction, may represent a shift in that Court's thinking by at least raising the possibility of patent decisions being made by bodies other than the Federal Circuit.

n9. We analyze the implementation of these goals (i.e., those expressed in the legislative proceedings surrounding the creation of the Federal Circuit) on their own terms, rather than analyze whether they are ultimately socially beneficial. Several commentators have argued that uncertainty with respect to at least some aspects of the patent system might be useful. See, e.g., Ian Ayres & Paul Klemperer, *Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies*, 97 Mich. L. Rev. 985, 986 (1999) ("The combination of [uncertainty and delay in patent litigation] might induce a limited amount of infringement that enhances social welfare ..."); Howard F. Chang, *Patent Scope, Antitrust Policy, and Cumulative Innovation*, 26 RAND J. Econ. 34, 50-51 (1995) (arguing that courts could achieve optimal incentive for successive innovations by implementing a randomized policy that delivered to patentees, on average, the correct payoff for an innovation's actual social value in light of subsequent innovations); Jerry R. Green & Suzanne Scotchmer, *On the Division of Profit in Sequential Innovation*, 26 RAND J. Econ. 20, 21-22 (1995) (arguing that patent scope should be varied for successive innovations to ensure that each innovator is appropriately incentivized); Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. Econ. Persp. 29, 35-36 (1991) (noting that uncertainty in the scope of patent protection may create incentives encouraging the development of new products); see also *infra* Part III.D.4 and note 180 (discussing the uncertainty that results from panel dependency). Analyzing whether the goals of the Federal Circuit are themselves worthy is a question beyond the scope of this Article. However, for a discussion of some underlying difficulties surrounding the goals of the Federal Circuit, see Arti K. Rai, *Engaging Facts and Policy: A Multi-Institutional Approach to Patent System Reform*, 103 Colum. L. Rev. 1035, 1037-38 (2003).

n10. See, e.g., Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 *Berkeley Tech. L.J.* 1075, 1078-79 (2001) (suggesting the Federal Circuit has failed to achieve greater predictability); John F. Duffy, *On Improving the Legal Process of Claim Interpretation: Administrative Alternatives*, 2 *Wash. U. J.L. & Pol'y* 109 (2000) (considering future innovations in claim interpretation that might solve procedural inefficiencies inherent in the current system of consolidated Federal Circuit review of patent appeals); Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 *Nw. U. L. Rev.* 1495, 1496 (2001) (asserting that a more intensive patent evaluation process is unwarranted); Craig Allen Nard, *Process Considerations in the Age of Markman and Mantras*, 2001 *U. Ill. L. Rev.* 355, 357 (2001) [hereinafter Nard, *Process Considerations*] (calling for the Federal Circuit to accept interlocutory appeals of district court claim interpretations in order to promote certainty); Craig Allen Nard, *A Theory of Claim Interpretation*, 14 *Harv. J.L. & Tech.* 1, 82 (2000) [hereinafter Nard, *Claim Interpretation*] (contending that the Federal Circuit uses a theory of claim construction called "hypertextualism" and concluding that it is responsible for the court's failure to achieve certainty and coherence in its jurisprudence); Rai, *supra* note 9, at 1040 (arguing that the Federal Circuit has arrogated power over fact finding to the detriment of the patent system); Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 *Nw. U. L. Rev.* 77, 79 (1999) (asserting that legal change has been out of step with the "instrumental goals of intellectual property").

n11. The views of the bar are noted by various authors, e.g., Luke L. Dauchot, *The Federal Circuit's De Novo Review of Patent Claim Construction: A Need for a More Balanced Approach*, 18 *Intell. Prop. L. Newsl. (Am. Bar. Ass'n Sec. on Intell. Prop., Chicago, Ill.)*, Fall 1999, at 1, 1 (arguing for the Federal Circuit to give greater deference to trial court interpretations); Ted D. Lee & Michelle Evans, *The Charade: Trying a Patent Case to All "Three" Juries*, 8 *Tex. Intell. Prop. L.J.* 1, 11-20 (1999) (characterizing the Federal Circuit as a "second jury" in patent cases); Paul R. Michel, *The Court of Appeals for the Federal Circuit Must Evolve to Meet the Challenges Ahead*, 48 *Am. U. L. Rev.* 1177, 1186-1200 (1999) (addressing oft-cited practitioner concerns); Douglas D. Salyers, *The Paper Side of Jury Litigation in Patent Cases - Don't Become Just Another Statistic in The Federal Circuit*, in *Patent Litigation 1999*, at 557, 566-88 (PLI *Intell. Prop. Course, Handbook Series No. G-572*, 1999).

n12. The reported opinions of judges, other than those on the Federal Circuit, have been largely negative. One district court judge has stated publicly that the Federal Circuit is full of "little green men who don't know Tuesday from Philadelphia." Victoria Slind-Flor, *The Markman Prophecies*, *IP Worldwide*, March 13, 2002, at 28, 30 (quoting Judge Samuel Kent of the Southern District of Texas); see also *id.* ("Frankly, I don't know why I'm so excited about bringing this [patent case] to closure. It goes to the Federal Circuit afterwards. You know, it's hard to deal with things that are ultimately resolved by people wearing propeller hats." (quoting Judge Kent in *O.I. Corp. v. Tekmar Co.*, No. 95-CV-113 (S.D. Tex. June 17, 1996))).

n13. Note also that everyone seems to agree (without much discussion) that patents have become, on balance, more valuable assets under the Federal Circuit's tutelage. See, e.g., Donald S. Chisum et al., *Principles of Patent Law* 33-34 (2d ed. 2001). But strength or scope, of course, is not the same as consistency; it is entirely possible that the Federal Circuit has increased the "mean" strength of a patent (its likelihood of being upheld, its enforceable scope, etc.), while maintaining the earlier variance and unpredictability in outcomes.

n14. There are, however, several notable examples of empirical studies on this subject, such as Chu, *supra* note 10; Lemley, *supra* note 10; Kimberly A. Moore, *Are District Court Judges Equipped to Resolve Patent Cases?*, 15 *Harv. J.L. & Tech.* 1 (2001).

n15. There is, of course, absolutely nothing wrong with doctrinal analysis using selected (i.e., important or symbolic) judicial opinions. Our point is to note that the systematic nature of this study offers insights that are not captured by the literature. Prior analyses of the Federal Circuit's approach to claim construction include: Duffy, *supra* note 10; Nard, *Process Considerations*, *supra* note 10; Nard, *Claim Interpretation*, *supra* note 10; Rai, *supra* note 9; Rai, *supra* note 10; John M. Romary & Arie M. Michelsohn, *Patent Claim Interpretation After Markman: How the Federal Circuit Interprets Claims*, 46 *Am. U. L. Rev.* 1887 (1997); John R. Thomas, *Of Text, Technique, and the Tangible: Drafting Patent Claims Around Patent Rules*, 17 *J. Marshall J. Computer & Info. L.* 219 (1998); Gwendolyn Dawson, *Note, Matchmaking in the Realm of Patents: A Call for the Marriage of Patent Theory and Claim Construction Procedure*, 79 *Tex. L. Rev.* 1257 (2001).



n16. For examples of such studies, see Chu, *supra* note 10; Moore, *supra* note 10. As Part I notes in more detail, such result-studies, while descriptively quite valuable, do not allow many conclusions to be drawn concerning the judicial approach taken by the Federal Circuit.

n17. Claim construction is a uniquely appropriate doctrine for this sort of analysis, in particular because this area is where the court's mandate for uniformity and predictability is at its most explicit and broadly recognized. *Infra* Part I.

n18. 517 U.S. 370 (1996).

n19. The procedural approach is characterized by adherence to a relatively strict rules-based hierarchy of interpretive sources, with a particular emphasis on the ordinary meaning of disputed patent claim language. The holistic approach is a far less structured analysis, utilizing the array of possible interpretive information in a flexible, case-specific fashion. *Infra* Part II.B.

These dichotomous categories were developed through an analysis of the jurisprudence itself, which reveals that the form of methodological approach uniformly drives disputes over claim construction (though we are the first to formally define the dueling analytic methods). The data suggests that differences in methodological approach underlie both Federal Circuit reversals of district court claim constructions as well as dissenting and concurring opinions produced by members of the court itself. *Infra* Part II.E.3.

n20. These parallel trends - a gradual change in methodological approach and increasing polarization - are likely to account for the high reversal rates found by other studies, see Chu, *supra* note 10; Moore, *supra* note 14, as well as the sense of concern among court observers, see *supra* notes 10-12.

n21. Panel dependency is a frequent criticism of the Federal Circuit - a critique that is consistently refuted by the judges themselves. *Infra* Part III.D.

n22. As authors, the judges utilize the holistic methodological approach in a frequency range from 7.1% to 69.0%. *Infra* Part III.C.

n23. *Infra* Part III.D.

n24. The remaining judges have no statistically significant effect on the claim construction analysis. *Infra* Part III.D.1.

n39. 35 U.S.C. 112 (2000).

n40. Giles S. Rich, *Extent of Protection and Interpretation of Claims - American Perspectives*, 21 *Int'l Rev. Indus. Prop. & Copyright L.* 497, 499 (1990) ("The U.S. is strictly an examination country and the main purpose of the examination, to which every application is subjected, is to try to make sure that what each claim defines is patentable. To coin a phrase, the name of the game is the claim.").

n41. No - at least not in U.S. Patent No. 5,202,835 (issued Apr. 13, 1993), entitled "Trolling Motor With Heading Lock." See *Johnson Worldwide Assocs. v. Zebco Corp.*, 175 F.3d 985, 992 (Fed. Cir. 1999) (holding that the meaning of the term "'coupled' ... is not limited to a mechanical or physical coupling").

n42. Not a twelve-degree rise in U.S. Patent No. 5,456,202 (issued Oct. 10, 1995), entitled "Planing Boat Hull." See *Schoell v. Regal Marine Indus.*, 247 F.3d 1202, 1208-09 (Fed. Cir. 2001) ("[A] twelve degree V-shape [keel] cannot be both V-shaped and generally flat.").

n43. The standard used by the PTO is the "broadest reasonable interpretation," which is not a standard present in the non-PTO context. In *re Graves*, 69 F.3d 1147, 1152 (Fed. Cir. 1995) (quoting *DeGeorge v. Bernier*, 768 F.2d 1318 (Fed. Cir. 1985)); see also U.S. Patent & Trademark Office, *Manual of Patent Examining Procedure* 2111 (2003) ("During patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." (quoting *In re Hyatt*, 211 F.3d 1367, 1372 (Fed. Cir. 2000))); *infra* note 142 (describing in further detail the PTO's use of the "broadest reasonable interpretation" standard).

n44. Some commentators, notably Professor Duffy, suggest that the PTO's constructions should be given increased deference, due to its technical competence and lower operating cost. Duffy, *supra* note 10, at 126-35.

n45. See, e.g., William F. Lee & Anita K. Krug, Still Adjusting to Markman: A Prescription for the Timing of Claim Construction Hearings, 13 Harv. J.L. & Tech. 55, 59 (1999).

n46. See Duffy, *supra* note 10, at 118 (explaining that the Federal Circuit has treated claim construction "as a purely legal question").

n47. See, e.g., Nard, Process Considerations, *supra* note 10, at 372-74 (decrying the denial of interlocutory appeals). Many district court judges, however, simply enter summary judgment for one of the parties after construing the claims, creating a de facto interlocutory appeal. See John R. Lane & Christine A. Pepe, Living Before, Through, and With Markman: Claim Construction as a Matter of Law, 1 Buff. Intell. Prop. L.J. 59, 64 (2001) ("Litigants have developed the practice of using preliminary injunctions and summary judgment motions to obtain early claim construction rules and possible pre-trial Federal Circuit review of the district court's claim construction.").

n48. See, e.g., *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1341-48 (Fed. Cir. 2001) (describing the canons of construction the Federal Circuit employs in claim construction analysis).

n49. Indeed, the patent law features canons to avoid the use of canons. See, e.g., *Autogiro Co. of Am. v. United States*, 384 F.2d 391, 397 (Ct. Cl. 1967) ("In utilizing all the patent documents, one should not sacrifice the value of these references by the 'unimaginative adherence to well-worn professional phrases.'" (quoting Felix Frankfurter, *Some Reflections on the Reading of Statutes*, 47 Colum. L. Rev. 527, 529 (1947))); see also *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1248 n.2 (Fed. Cir. 1998) (citing Karl N. Llewellyn, *Remarks on the Theory of Appellate Decision and the Rules or Canons About How Statutes Are to Be Construed*, 3 Vand. L. Rev. 395, 401-06 (1950) (illustrating the tractability of canons of construction)).

n50. See, e.g., *Markman I*, 52 F.3d at 993 (Mayer, J., concurring) (asserting that claim construction often determines the outcome of patent cases).

n51. See, e.g., *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997) (addressing the claim scope available under the doctrine of equivalents).

n52. *Markman II*, 517 U.S. at 372.

n53. *Id.* at 376.

n54. See William Redin Woodward, *Definiteness and Particularity in Patent Claims*, 46 Mich. L. Rev. 755, 758 (1948) ("Probably the first examples of real patent claims in the modern sense were contained in the patent granted to Robert Fulton on February 9, 1811, which included several separate statements in the form of claims.").

n55. Act of July 4, 1836, ch. 357, 6, 5 Stat. 117, 119.

n56. Act of July 8, 1870, ch. 230, 26, 16 Stat. 198, 201.

n57. In patent parlance, the "specification" is the document itself, which includes a written description, the claims, and often, drawings or diagrams.

n58. *Markman II*, 517 U.S. at 379-81.

n59. *Id.* at 382.

n60. *Id.* at 383-84.

n61. See *id.* at 384 n.10 ("We conclude that our precedent supports classifying the question as one for the court ..."); see also *id.* at 387 (noting the "fine" line drawn between questions of interpretation and infringement, and the roles of the judge and jury, in nineteenth-century Supreme Court patent cases); cf. *id.* at 388 (suggesting such precedent provided "no clear answers").

n62. *Id.* at 388.

n63. *Id.* at 389 (quoting Woodward, *supra* note 54, at 765). The Court downplayed the influence of credibility determinations, which it described as "the jury's forte," in claim construction analyses, reasoning that credibility determinations would rarely be a deciding factor and that, to the extent they existed, they would be "subsumed within the necessarily sophisticated analysis of the whole document." *Id.*

n64. *Id.* at 388.

n65. The Court's discussion noted that it was especially concerned with uniformity of treatment concerning a particular patent - one that presumably might be litigated nearly contemporaneously in multiple jurisdictions. See *id.* at 390 ("We see the importance of uniformity in the treatment of a given patent as an independent reason to allocate all issues of construction to the court."). By designating the interpretive issue as a matter of law, *Markman II* suggested that principles of *stare decisis* might serve to maintain intrajurisdictional uniformity prior to appellate review. See *id.* at 391 (noting that issue preclusion would be unavailable against new and independent infringement defendants). On this ground, however, the Court's concerns seem overstated; the district courts have used their discretionary case management tools to largely avoid any potential intrajurisdictional conflicts concerning the same patent. See, e.g., *Genfoot, Inc. v. Payless ShoeSource, Inc.*, No. 03-398-SLR, 2003 WL 22953183, at 2 (D. Del. Dec. 3, 2003) (stating that transfer of venue to consolidate cases involving the same patents and parties is the "norm" because it "promotes judicial administration and consistency of results").

n66. For example, the Court made an explicitly empirical assumption about the prevalence of conflicting expert testimony on claim construction. See *Markman II*, 517 U.S. at 389 ("In theory there could be a case in which a simple credibility judgment would suffice to choose between experts ... but our own experience with document construction leaves us doubtful that trial courts will run into many cases like that.").

n67. See *id.* at 388 (noting that "judges often do [interpret] and are likely to do better [at interpreting]" written instruments).

n68. See *id.* at 390-91 (discussing the benefits of uniform treatment of patents and citing the creation of the Federal Circuit as an example of the push for such uniformity).

n69. See *id.* (discussing intrajurisdictional certainty).

n70. *Id.* at 389 (quoting Woodward, *supra* note 54, at 765). This reasoning, of course, has the flavor of circularity about it: citing the existence and strength of judicially-created doctrine as a reason to allocate interpretive authority to judges. The Court here clearly assumed a stronger baseline in favor of judicial interpretation than it seemed to have acknowledged earlier in the opinion. See *supra* note 61 (citing the Court's acknowledgment that precedent provided "no clear answers").

n71. *Markman II*, 517 U.S. at 391.

n72. *Id.* at 390-91.

n73. 138 F.3d 1448 (Fed. Cir. 1998) (en banc).

n74. Duffy, *supra* note 10, at 119.

n75. Nard, *Claim Interpretation*, *supra* note 10, at 35.

n76. See *Cybor*, 138 F.3d at 1455-56.

n77. See *Markman II*, 517 U.S. at 378 ("The sounder practice, when available, is to classify a mongrel practice [like claim construction] by using the historical method ..."); see also *id.* at 384 (noting the difficulty of drawing the fact/law distinction in claim construction); *Cooter & Gell v. Hartmarx Corp.*, 496 U.S. 384, 401 (1990) (observing the difficulty in distinguishing between factual and legal issues); *United States v. McKinney*, 919 F.2d 405, 419 (7th Cir. 1990) (Posner, J., concurring) (determining the standard of review on the basis of facts versus law would be "absurd"); *Duffy*, *supra* note 10, at 122-23 & nn.51-53 (suggesting that *Cybor's* choice between standards of review "cannot be made on the basis of metaphysical distinctions between fact and law"); Gary Lawson, *Proving the Law*, 86 *Nw. U. L. Rev.* 859, 863 (1992) (describing the historical convention of the fact/law distinction).

n78. *Cybor*, 138 F.3d at 1456 ("We therefore reaffirm that, as a purely legal question, we review claim construction *de novo* on appeal ...").

n79. See *id.* at 1477 (Rader, J., dissenting) (arguing that "the trial judge enjoys a potentially superior position to engage in claim interpretation" over the Federal Circuit).

n80. *Duffy*, *supra* note 10, at 123 ("The majority's holding in favor of *de novo* review must be viewed as an implicit determination [regarding institutional design]"). *Duffy* (and others) have argued that the choice of *de novo* review in *Cybor* undermined the goal of uniformity, perhaps in an effort to increase procedural efficiency. See *id.* at 124 ("Both deferential and *de novo* standards trade one set of costs for another."); see also *Cybor*, 138 F.3d at 1476 (Mayer, C.J., concurring) (explaining that, as a matter of law, claim interpretation is subject to a 50% reversal rate on appellate review, which creates uncertainty and weakens the benefits of *Markman I*). Yet, it is not necessarily the case that a *de novo* standard of review will either undermine certainty or reduce the efficiency of the system. *De novo* review need not be viewed as an invasive mechanism by which the appellate court can put its stamp of approval on every decision. Instead, it can be viewed as a means to an end: a tool with which to develop and enforce rules governing claim construction. That is, if the *de novo* review process allows the Federal Circuit to establish clear guidelines for the interpretation of patent claims, certainty and efficiency would be enhanced, not diminished. Clear rules would allow district court judges to implement claim constructions with greater confidence, allow the parties to better evaluate their chances of success (both post-judgment and pre-litigation), and perhaps most significantly, result in patentees drafting clearer claims prior to a patent's issue. This general point - that patent rules are often best considered as *ex ante* incentive-based mechanisms - is one that one of us has made elsewhere. See R. Polk Wagner, *Reconsidering Estoppel: Patent Administration and the Failure of Festo*, 151 *U. Pa. L. Rev.* 159, 243 (2002) ("In the patent context, featuring significant informational challenges and costly *ex post* determinations of liability, a focus on the *ex ante* effects of any particular legal rule seems especially appropriate.").

n108. In any dispute over claim language, one party or the other will almost invariably be arguing for more weight to be added to the "contextual" information, or at least will present competing information that necessarily requires the court to determine the weight it should be given.

n109. In order to avoid potential confusion (or perhaps ideological baggage), these labels intentionally do not directly correspond with the well-known formalist (or "textualist") and pragmatist schools of interpretive method, though the methodological distinction drawn here obviously invokes at least aspects of that debate. See Daniel A. Farber, *The Inevitability of Practical Reason: Statutes, Formalism, and the Rule of Law*, 45 *Vand. L. Rev.* 533, 548-49 (1992) (arguing that the real competing "issue" between formalists' and pragmatics' interpretive schemes is "the utility of a strong literalism presumption"); see also William N. Eskridge, Jr., *Dynamic Statutory Interpretation* 50-57 (1994) (discussing the pragmatist approach); Richard A. Posner, *Overcoming Law* 4-21 (1995) (same); Frank H. Easterbrook, *The Role of Original Intent in Statutory Construction*, 11 *Harv. J.L. & Pub. Pol'y* 59, 59-66 (1988) (discussing the textualist/formalist approach); John F. Manning, *Textualism as a Nondelegation Doctrine*, 97 *Colum. L. Rev.* 673, 674-75 (1997) (same); Antonin Scalia, *Common-Law Courts in a Civil-Law System: The Role of United States Federal Courts in Interpreting the Constitution and Laws*, in *A Matter of Interpretation: Federal Courts and the Law* 3, 23-29 (Amy Gutmann ed., 1997) (same). To be sure, both claim construction methodologies described here acknowledge and consult essentially the same sources of meaning, including what pragmatists call "contextual" information. See, e.g., Nard, *Claim Interpretation*, *supra* note 10, at 43-52 (discussing pragmatic approaches to claim interpretation); see also Richard A. Posner, *The Problems of Jurisprudence* 296 (1990) (noting the necessity of contextual information in discerning

meaning); Stanley Fish, *Almost Pragmatism: Richard Posner's Jurisprudence*, 57 U. Chi. L. Rev. 1447, 1456 (1990) (same). The critical difference here is in the process (or absence thereof) by which such information is used, with the "procedural" methodology ascribing to a significantly more rigid hierarchy in classifying the status of competing information. This distinction, which is based more on the structure and import of information than its consideration, seems to comport with at least some views of the textualist interpretive approach. See, e.g., Manning, *supra*, at 696 ("Not even the most committed textualist would claim that ... texts are inherently 'plain on their face,' or that all interpretation takes place within the four corners of the Statutes at Large.").

n110. 175 F.3d 985 (Fed. Cir. 1999).

n111. *Id.* at 989-90 (citations omitted); see also *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998) ("The resulting claim interpretation must ... accord with the words chosen by the patentee ..."); *Co-mark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) ("In this case, the [disputed term] has a clear and well-defined meaning. This term is not so amorphous that one of skill in the art can only reconcile the claim language with the inventor's disclosure by recourse to the specification."); *Va. Panel Corp. v. MAC Panel Co.*, 133 F.3d 860, 865-66 (Fed. Cir. 1997) (concluding that intrinsic evidence does not require modification of the ordinary meaning of "reciprocating"); *York Prods., Inc. v. Cent. Tractor Farm & Family Ctr.*, 99 F.3d 1568, 1572 (Fed. Cir. 1996) ("Without an express intent to impart a novel meaning to claim terms, an inventor's claim terms take on their ordinary meaning."); *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 621-22 (Fed. Cir. 1995) (determining that the unmodified term "associating" is not limited to explicit association); *Specialty Composites v. Cabot Corp.*, 845 F.2d 981, 987 (Fed. Cir. 1988) (holding that the unmodified term "plasticizer" is given the full range of ordinary and accustomed meaning).

n112. 197 F.3d 1377 (Fed. Cir. 1999).

n113. *Id.* at 1381-83 (citations omitted). Note that, essentially by definition, the holistic methodological approach is more difficult to clearly discern from the cases. See also *Cultor Corp. v. A.E. Staley Mfg.*, 224 F.3d 1328, 1331 (Fed. Cir. 2000) ("Whether a claim must, in any particular case, be limited to the specific embodiment presented in the specification, depends in each case on the specificity of the description of the invention ..."); *Toro Co. v. White Consol. Indus.*, 199 F.3d 1295, 1301 (Fed. Cir. 1999) ("The specification does not describe an invention broader than [the] description of the cover and the restriction ring 'automatically' inserted and removed together."); *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1581 (Fed. Cir. 1997) ("All of the 'passage' structures contemplated by the written description are ... either non-smooth or conical.").

n151. Unless otherwise specified, the results in the following Section reflect opinions written for the court only; alternative opinions (dissents, concurrences) in the dataset were otherwise omitted.

n152. Overall observations (including alternative opinions) had the following profile (n=413):

	procedural	holistic
n	259	154
%	62.7%	37.3%

n153. Bin selection and separation was done on the basis of the overall dataset, including alternative opinions. Considering opinions for the court alone, bin size varies from sixteen to nineteen.

n154. The trend line was calculated according to the ordinary least squares (OLS) procedure. The slope of the trend line (m) is -0.672%. The square of Pearson's product moment (or coefficient of correlation  $r^2$ ) is 0.144, indicating some (though relatively weak) correlation between the period and percentage of holistic observations. The t-value (t) for the slope is 1.84, which indicates that the slope is statistically significant at the 95% level ( $p = .05$ ).

n155. Both trend lines are reasonably correlated and statistically significant. For the % strong data:  $m = 1.488%$ ,  $r^2 = 0.350$ ,  $t = 3.218$ ,  $p = .005$ . For the % holistic data:  $m = -1.360%$ ,  $r^2 = 0.286$ ,  $t = 2.833$ ,  $p = 0.01$ .

n156. Chu found that there was a statistically significant increase in the rate that the Federal Circuit changed claim constructions over time. Chu, *supra* note 10, at 1102. Note, however, that Chu's population covered only a twenty-eight-month subset of this study. *Id.* at 1092.