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Claim Construction, Appeal, and the Predictability of Interpretive Regimes

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I. INTRODUCTION

In patent law, there are few problems more significant, or more hotly debated, than the problem of interpretation. Interpretation is central to patent law because questions of patent infringement and patent validity cannot be resolved without first defining the scope of the patent right. That scope is defined by words – "claims" – which mark the boundaries of the inventor's property right. Like any legally operative language, patent claims must be interpreted in order to resolve questions about the rights and obligations they create. Questions of patent infringement and patent validity require us to map the words of the claims onto complex technological, commercial, and legal landscapes. But if interpretation is at the core of patent law, there are many who claim that core is now rotten. Debates over whether the fundamental inquiry of patent law is broken, and what to do if it is, engross not only observers of the patent system, but also the judges of the U.S. Court of Appeals for the Federal Circuit, the appellate court entrusted with the control of patent law[1].

The Supreme Court set the stage for the debate in *Markman v. Westview Instruments*[2] when it declared that the interpretation, or "construction," of patent claims was a question reserved exclusively for the

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1. *See* 28 U.S.C. § 1295(a)(1), (a)(4).

2. 517 U.S. 370 (1996).

judge and not the jury.[3] Since *Markman*, the question of how to structure the claim construction process has divided the judges of the Federal Circuit, at times bitterly.[4] The Federal Circuit framed the modern regime of claim construction in *Cybor Corp. v. FAS Technologies, Inc.*[5] when it ruled en banc that claim construction was a pure question of law subject to *de novo* review on appeal.[6] *Cybor*'s refusal to defer to district courts on claim construction issues severely fragmented the Federal Circuit, yielding five additional separate opinions from judges of the court. But the decision seems to have settled little. In 2006, the court's refusal to re-examine *Cybor* matched *Cybor* itself in terms of controversy, drawing no less than six separate opinions.[7] In the interim, an avalanche of critical commentary decrying the *Markman-Cybor* regime's "unpredictability" has stoked the claim construction debate.[8] The principal fuel has been a large number of empirical studies finding that the Federal Circuit reverses district court opinions based on claim construction issues at an unacceptably high rate.[9] At least as far as empirical studies are concerned, no aspect of patent law has been scrutinized more closely than the claim construction process.

High claim construction reversal rates trouble observers and participants because claim construction is fundamental to determining a patent's scope. In nearly all instances, we define what "the patent" or "the invention" is solely by reference to the scope of the patent's claims.[10]

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3. *Id.* at 391.

4. *See, e.g.*, Phillips v. AWH Corp., 415 F.3d 1303, 1334-35 (Fed. Cir. 2005) (en banc) (Mayer, J., dissenting) ("If we persist in deciding the subsidiary factual components of claim construction without deference, there is no reason why litigants should be required to parade their evidence before the district courts or for district courts to waste time and resources evaluating such evidence. . . . Eloquent words can mask much mischief. The court's opinion today is akin to rearranging the deck chairs on the Titanic – the orchestra is playing as if nothing is amiss, but the ship is still heading for Davey Jones' locker.")

5. 138 F.3d 1448 (Fed. Cir. 1998) (en banc).

6. *Id.* at 1456.

7. Amgen Inc. v. Hoechst Marion Roussel, Inc., 469 F.3d 1039 (Fed. Cir. 2006) (denying rehearing en banc).

8. *See, e.g*, Kimberly A. Moore, Markman, *Eight Years Later: Is Claim Construction More Predictable?*, 9 LEWIS & CLARK L. REV. 231, 231 n.2 (2005) (collecting criticisms from judges, scholars, and other commentators) [hereinafter Moore, Markman].

9. *See, e.g.*, Gretchen Ann Bender, *Uncertainty and Unpredictability in Patent Litigation: The Time Is Ripe for a Consistent Claim Construction Methodology*, 8 J. INTELL. PROP. L. 175, 207 (2001); Kimberly A. Moore, *Are District Court Judges Equipped to Resolve Patent Cases?*, 15 HARV. J.L. & TECH. 1, 8-10 (2001) [hereinafter Moore, *District Court Judges*]; Moore, Markman, *supra* note 8, at 239-46; Andrew T. Zidel, *Patent Claim Construction in the Trial Courts: A Study Showing the Need for Clear Guidance from the Federal Circuit*, 33 SETON HALL L. REV. 711, 741-42 (2003); Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 BERKELEY TECH. L.J. 1075, 1104 (2001).

10. *See, e.g., In re* Larson, 292 F.2d 531, 535 (C.C.P.A. 1961) (Rich, J., concurring) (explaining that the patent statute requires the inventor to "define in 'claims' that part of his

Once the district court construes the claims, all subsequent determinations of whether "the patent" is infringed or whether "the invention" is patentable are governed by that definition. Patent infringement actions are often lengthy, costly, and complex;[11] hence, litigants find it disconcerting that after having litigated a case under the district court's definition of the patent's scope, they must begin anew after the Federal Circuit reverses the district court's claim construction on appeal.[12]

The perception of high reversal rates has prompted repeated proposals to change the way patent claims are construed, or even to restructure patent adjudication process entirely. One common proposal is that the Federal Circuit should abandon its *de novo* standard of review for claim construction issues. Judges and commentators, contending that *de novo* review leads to high reversal rates, have argued that the Federal Circuit should accord greater deference to district court claim construction decisions.[13] Other proposals focus on district court capabilities, rather than the structure of appellate review, as the root cause of high reversal rates. The common premise of these arguments is that generalist district courts lack the legal or technical expertise required to accurately construe patent claims.[14] These arguments have been persuasive

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disclosed invention which possesses the attributes of patentability under the statute, for until he does, his 'claims,' which under well-settled precedents define the scope and content of his patent monopoly, cannot be granted or allowed").

11. *See* James Bessen & Michael J. Meurer, *Lessons on Patent Policy from Empirical Research on Patent Litigation*, 9 LEWIS & CLARK L. REV. 1, 2 ("Patent litigation has been called the sport of kings; it is complex, uncertain, and expensive."); 153 CONG. REC. H1430, 1430-31 (daily ed. Feb. 12, 2007) (statement of Rep. Berman) ("Patent law is an extremely complex body of law involving analysis of intricate technologies, and Federal district court judges spend an inordinate amount of time on patent cases, even though patent cases only make up 1 percent of the docket. The combination of the complex science and technology, the unique patent procedures and laws, the administration of the courts and their dockets, and the sheer number of issues raised by patent litigation makes improvement of the patent adjudication system a uniquely complicated, difficult, but necessary, task.").

12. The Federal Circuit's refusal to entertain claim construction interlocutory appeals compounds this problem.

13. *See, e.g.*, *Amgen*, 469 F.3d at 1040-41 (Michel, C.J., & Rader, J., dissenting from denial of rehearing); *id.* at 1044-45 (Rader, J., dissenting from denial of rehearing); *id.* at 1045 (Gajarsa, J., Linn, J., & Dyk, J., concurring in denial of rehearing) ("Our concurrence should not be read as . . . an unqualified endorsement of the en banc decision in *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448 (Fed. Cir. 1998) (en banc). In an appropriate case we would be willing to reconsider limited aspects of the *Cybor* decision."); *id.* at 1045-46 (Moore, J., dissenting from denial of rehearing); *see also* Craig Allen Nard, *A Theory of Claim Interpretation*, 14 HARV. J.L. & TECH. 1 *passim* (criticizing *de novo* standard of review).

14. *See, e.g.*, *Improving Federal Court Adjudication of Patent Cases: Hearing Before the Subcomm. on Courts, the Internet and Intellectual Property of the H. Comm. on the Judiciary*, 109th Cong. 109-59 (2005) (statement of Kimberly A. Moore, Professor of Law, George Mason University School of Law) (citing reversal rate in support of proposal to allocate patent cases to select district court judges) [hereinafter *Hearings*]; 153 CONG. REC. H1430, 1432 (daily ed. Feb. 12, 2007) (statement of Rep. Issa) (arguing that federal judges may lack expertise to construe

enough to prompt legislation that would, on an experimental basis, divert patent cases in select districts to judges with patent law expertise or interest.[15] More radical proposals include diverting patent cases to specialized patent trial courts, which would exist outside of the current judicial regime,[16] or entrusting claim construction questions to administrative rather than judicial bodies.[17]

I wish in this Article to explore three closely related questions at the core of this debate. First, is instability or unpredictability in adjudication of claim construction as serious a problem as many believe? Many studies have examined the rate at which district courts err on claim construction issues, but few have shown that claim construction is more error-prone than any other issue in patent law. But even if the Federal Circuit reverses the district courts on claim construction issues at an unusually high frequency, the stability of claim interpretation rulings between trial and appeal is of secondary importance compared to the predictability of claim interpretation before trial begins. Measures proposed to increase the stability of claim construction between trial and appeal may decrease the predictability of claim construction *ex ante*.

Second, assuming claim constructions are reversed unusually frequently on appeal, what accounts for the instability of claim construction rulings? Conventional explanations posit that the Federal Circuit's jurisprudence is too indeterminate, or that district courts need more expertise to accurately construe patent claims. But neither theory sufficiently explains why claim construction rulings, and not other patent law questions, are peculiarly unstable between trial and appeal. Perhaps it is not differences between trial and appellate decisionmakers that lead them to reach discordant results in claim construction. Rather, it is possible that

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patent claims). An implicit premise of this argument seems to be that the Federal Circuit possesses expertise lacking in the district courts.

15. House Bill 5418, which the House of Representatives passed in 2006, and House Bill 34, which the House passed in 2007, would establish a trial program under which judges are voluntarily designated as "patent-friendly" judges. A judge in that district would have the option to decline to hear a patent case, at which point the case would be reassigned to one of the "patent-friendly" judges in the same district. H.R. 34, 110th Cong. § (1)(a) (2007) (establishing experimental program); H.R. 5418, 109th Cong. (2006). While not the only argument invoked, the claim construction reversal rate has been cited as the most prominent evidence in support of such proposals. *See Hearings*, *supra* note 14; 153 CONG. REC. H1430, 1431 (daily ed. Feb. 12, 2007) (statement of Rep. Berman in support of House Bill 34) ("The impetus behind this bill, in part, is the high reversal rate of district court decisions. The Federal Circuit Court of Appeals . . . reverses over 30 percent of the district court patent claim constructions.")

16. *See, e.g.*, Arti K. Rai, *Specialized Trial Courts: Concentrating Expertise on Fact*, 17 BERKELEY TECH. L.J. 877, 889 (2002); Gregory J. Wallace, Note, *Toward Certainty and Uniformity in Patent Infringement Cases After* Festo *and* Markman*: A Proposal for a Specialized Patent Trial Court with a Rule of Greater Deference*, 77 S. CAL. L. REV. 1383 (2004).

17. John F. Duffy, *On Improving the Legal Process of Claim Interpretation: Administrative Alternatives*, 2 WASH. U. J.L. & POL'Y 109, 198 (2000).

differences between the trial and appellate *processes* generate these discordant results. These differences may be rooted in both the unique position that interpretation occupies in patent adjudication, and in the particular cognitive processes by which legal observers reach legal interpretations.

Finally, given the potential causes of instability or unpredictability in claim construction, what measures are likely to improve matters? If unpredictability is rooted in differences between the processes by which courts interpret claims, then the commonly proposed solutions – more deference or specialized courts – are unlikely to improve the predictability of claim construction. Predictability can be achieved only by closely controlling the process through which interpretive information is generated and received, and by aligning the process of interpretation as closely as possible between trial and appellate courts. These prescriptions run counter to both the current claim interpretation regime and to most contemporary reform proposals.

II. IS CLAIM CONSTRUCTION TOO UNPREDICTABLE?

A. *The Evidence for Unpredictability*

Judge Rader may have launched a thousand studies when, dissenting in *Cybor*, he asserted that the Federal Circuit had reversed nearly 40% of district court claim construction decisions in the two years following *Markman I*.[18] Since Judge Rader's calculation, computing claim construction reversal rates has been a popular sport: numerous studies have reported claim construction reversal rates from about 25% to 50%.[19] Based on these statistics, the notion that the reversal rate is "too high" has become firmly ingrained in the minds of commentators, practitioners, and judges alike,[20] and is typically the first premise invoked in support of arguments to overhaul the current system of adjudicating patent infringement disputes.[21]

Two problems arise in relying on such statistics. The first is a rela-

18. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1476 (Fed. Cir. 1998) (en banc).

19. *See* Moore, Markman, *supra* note 8, at 234-36 (reviewing empirical studies).

20. *See, e.g.*, *Guidelines for Patent Claim Construction: Post-*Phillips – *The Basics of a* Markman *Hearing*, 16 FED. CIR. B.J. 13, 13 (2006) ("[T]he appellate reversal and remand rates for claim-construction decisions have remained persistently high."); Paul M. Schoenhard, *Reversing the Reversal Rate: Using Real Property Principles to Guide Federal Circuit Jursprudence*, 17 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 299, 300 (2007) ("There is a pervasive perception that the Court of Appeals for the Federal Circuit reverses district court rulings in patent cases at an inordinately high rate.").

21. *See* Amgen Inc. v. Hoechst Marion Roussel, Inc., 469 F.3d 1039, 1040 (Fed. Cir. 2006) (Michel, C.J., dissenting from denial of rehearing) (citing high reversal rates as reason to reexamine the efficacy of claim construction *de novo* review); *Hearings*, *supra* note 14, at 10 (citing high reversal rates as reason for directing patent cases to selected courts).

tively minor methodological concern: the magnitude of the reversal rate depends upon the choice of denominator. Reversal frequencies are obtained by dividing the number of claim construction reversals by the number of claim construction cases. Concealed beneath this calculation's apparent simplicity are disagreements about exactly how to measure the number of claim construction cases. Does it include instances where the appellate court affirmed the district court's judgment without opinion,[22] where the issue of claim construction was incidental to either court's opinion[23] or where the district court's claim construction was incorrect but the judgment was nonetheless affirmed?[24] What about those cases where claim construction was litigated but not contested on appeal – or where the case was never appealed at all? Which database of court opinions should provide the dataset's foundation? Each choice affects the reversal rate's magnitude, and not every study details its inclusion or exclusion criteria. Yet most of these complications have been recognized by thoughtful commentators,[25] and are an obstacle primarily in comparing the results of one study with another.[26]

The second problem, while related to the first, is far more serious. Despite the many anecdotal and empirical analyses suggesting that the rate at which the Federal Circuit overturns district court claim construction decisions is "high,"[27] there is almost no evidence showing that the claim construction reversal rate is "high" *relative to anything else.* Debating which methodology yields the most accurate measure of claim construction reversal rates accomplishes little unless we can agree that some level of reversal should be cause for concern. Presumably, our view of whether claim construction reversal is problematic would depend on whether claim construction reversal rates are exceptional compared to reversal rates involving other legal issues. Unfortunately, very little literature reports a comparison between claim construction

22. *See* Moore, Markman, *supra* note 8, at 235-37 (discussing the effect of including or excluding summary affirmances).

23. *Compare* R. Polk Wagner & Lee Petherbridge, *Is the Federal Circuit Succeeding? An Empirical Assessment of Judicial Performance*, 152 U. PA. L. REV. 1105, 1145-47 (2004) (restricting empirical study to opinions with "observable claim construction analysis"), *with* Jeffrey A. Lefstin, *The Measure of the Doubt: Dissent, Indeterminacy, and Interpretation at the Federal Circuit*, 58 HASTINGS L.J. 1025, 1070 n.158 (2007) (including all opinions in which claim construction was appealed).

24. *See* Moore, Markman, *supra* note 8, at 239 (demonstrating the possibility of affirmances notwithstanding claim construction errors).

25. *See, e.g., id.* at 234-38.

26. The exclusion of summary affirmances substantially elevates the reversal rate. *See id.* at 235-36. Authors other than Moore have not included summary affirmances in their calculations, which at least renders them comparable to each other.

27. *See supra* notes 20-21; Moore, Markman, *supra* note 8, at 246 (describing reversal rate as "high").

reversal rates and those for other legal issues.[28] Reversal rate measurements for other legal issues do exist, primarily in the political science literature; when compared with these reversal statistics, claim construction reversal rates do not appear to be exceptional.[29] But reversal rate comparisons between different studies are unreliable, if not completely meaningless. Discrepancies between the underlying datasets and discrepancies between data collection methods mean that each study's statistics are tied to that study's methodology and are usually not comparable to statistics from other studies.[30]

Perhaps the only studies that permit direct comparisons of reversal rates are those of Professor (now Judge) Kimberly Moore.[31] Professor Moore reported that, from April 1996 through December 2000, the Federal Circuit reversed a district court's claim construction decision in 33% of claim construction appeals resolved on the merits.[32] In a separate study regarding district court cases tried between 1983 and 1999 and then appealed to the Federal Circuit, Professor Moore found that the Federal Circuit reversed or vacated district court judgments at a frequency of 20% on infringement issues, 22% on invalidity issues, 24% on enforceability issues,[33] and 15% on willful infringement issues.[34]

Assuming that Professor Moore's methodology remained constant between the studies, and discounting the difference in time frames, there is no reason to doubt these data's accuracy. This comparison does suggest that district courts are reversed more frequently on claim construction than on other issues.[35] Nonetheless, it is a relatively small foundation for the vast volume of commentary asserting that district courts face significantly greater difficulties with claim construction than with other questions of patent law.[36]

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28. *See* Moore, Markman, *supra* note 8.

29. For example, Songer, Sheehan, and Haire reported reversal rates ranging from 25% to 36% for all cases at the various U.S. Circuit Courts of Appeal for the period 1925 to 1988. *See* DONALD R. SONGER, REGINALD S. SHEEHAN & SUSAN B. HAIRE, CONTINUITY AND CHANGE ON THE UNITED STATES COURTS OF APPEALS 105 (2000).

30. *See supra* text accompanying notes 21-25; *see also* Moore, Markman, *supra* note 8, at 234-38 (showing how changes in inclusion criteria affect reversal rates).

31. *See generally* Moore, *District Court Judges*, *supra* note 9.

32. *Id.* at 11-12.

33. Inequitable conduct issues presumably dominate this category.

34. Kimberly A. Moore, *Judges, Juries, and Patent Cases – An Empirical Peek Inside the Black Box*, 99 MICH. L. REV. 365, 399 [hereinafter Moore, *Judges, Juries, and Patent Cases*]; Moore, *District Court Judges*, *supra* note 9, at 17.

35. There may, however, be some question whether these numbers prove a statistically significant difference in the probability of reversal between claim construction and other issues. *See infra* note 55.

36. The fact that claim construction reversal and invalidity or infringement reversal are highly correlated further complicates this comparison. Further, as Moore points out, reversal frequency might be measured either by the percentage of cases that were reversed, or by the percentage of

B. *Post-Trial Versus* ex ante *Reckonability*

Setting aside such evidentiary questions, let us assume that the consensus of the literature is correct, and that district courts are reversed more frequently on claim construction than on other issues. If so, then claim construction is the most significant source of instability in patent litigation during the interval between the district court and the Federal Circuit decisions. We could undoubtedly remedy this state of affairs by according more deference to the district courts' claim construction decisions on appeal, as both commentators and judges have proposed.[37] Yet, while consistency between trial and appellate courts is certainly desirable, it cannot be our only goal. If we desired only perfect stability, we could dispense with the appellate process altogether.

If stability of a district court ruling is but one of several competing aspirations for a patent adjudication process, how important is this goal? More stable district court claim constructions would increase judicial efficiency by reducing the number of cases in which the Federal Circuit required a district court to repeat the entire trial. Parties, more confident that the district court's judgment would coincide with the Federal Circuit's, might be more likely to settle cases following a district court judgment, or might accept the district court's decision and carry on with their lives rather than filing an appeal. But not all disputes in patent litigation are about claim construction. Many patent cases will include infringement and invalidity disputes that do not depend on how the claims are construed. Some fraction of these infringement and invalidity disputes will be litigated to a final judgment, virtually guaranteeing an appeal in light of an appeal's miniscule cost relative to that of a full trial.[38]

More to the point, what occurs between the district court's judgment and the Federal Circuit's judgment is ultimately a question about

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claim construction decisions that were reversed. *See* Moore, *District Court Judges*, *supra* note 9, at 11; Moore, Markman, *supra* note 8, at 238. The percentage of district court claim construction decisions the Federal Circuit reversed in Moore's study was 28%. *See* Moore, *District Court Judges*, *supra* note 9, at 11. Because more than one claim construction may be at issue in a given case, the percentage of cases reversed will always exceed the percentage of claim construction decisions reversed. In general, if we assume each district court legal determination carries with it a certain probability of error or disagreement with the appellate court, then the reversal probability will increase as the number of legal determinations per case increases.

37. See *supra* notes 13.

38. One survey of patent litigation cost estimated the median total trial cost as $500,000 to $2,500,000, depending on the amount at risk. AM. INTELLECTUAL PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY 2003, at 22 (2003). The cost of an appeal would be on the order of 1% of this total. *See* David M. Trubeck et al., *The Cost of Ordinary Litigation*, 31 UCLA L. REV. 72, 91 (1983) (finding that, on average, 0.9% of attorney time during trial is spent on appeals and enforcement).

one step in the internal workings of the judicial process. We might, if so inclined, treat the entire judicial system as a black box, one in which complaints go in and final judgments come out, without worrying about the system's internal fluctuations. Traditionally, legal practitioners' ability to accurately predict appellate outcomes after trial – what Karl Llewellyn dubbed "reckonability" – has received the lion's share of our attention.[39] But at least in patent litigation, it is questionable whether this particular step in the judicial process warrants the degree of attention it has received.

Most of the non-legal actors who obtain, assert, or infringe patents are presumably *ex ante* indifferent to disagreements between levels within the judicial system or disagreements about claim construction methodologies. The acts preceding entanglement in the patent system, such as investing in new patentable technology, or marketing a potentially infringing product, are deliberate ones. Ideally, decisions whether to undertake these acts should be based on an accurate assessment of the scope of potential or existing patent rights. Such assessments are far more frequent and economically significant than those made by parties attempting to forecast the outcome of an appeal before the Federal Circuit because few patents are litigated and fewer still proceed to trial, even under the current "unpredictable" claim construction regime.[40] Therefore, whether a practitioner can adequately predict the scope of a patent's claims *ex ante* is a far greater concern than whether a practitioner can predict the internal operations of the patent litigation process. If we are concerned about whether the patent system furthers the end of properly allocating resources to innovation and competition, then predictability is paramount not during the interval between trial and appeal, but rather before any litigation begins. This time period is when participants in the patent system decide whether to invest resources in developing inventions, whether to pursue patent protection, whether to embark upon potentially infringing business ventures, or whether to initiate

39. *See* KARL N. LLEWELLYN, THE COMMON LAW TRADITION: DECIDING APPEALS 17-18 (1960) (defining the problem as the "reckonability" of appeals). After spending 382 pages on an appeal's predictability once the trial has finished, Llewellyn spends two pages noting that his study may have value for "office counsel" as well. *Id.* at 382-84 (discussing these conclusions applicability to counseling). Llewellyn denied the predictability of ultimate outcomes during the pre-litigation stage, arguing that prior to commencement of a legal action the "whole picture must be discounted as still subject to skewing or scuttling by the uncontrollable possible early appearance in some unhappy forum of a parallel situation botched by some other outfit in the doing and by ninnies in the litigating." *Id.* at 17.

40. *See* Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1501 (2001) (estimating that only about 2% of all issued patents are ever litigated, with fewer than 0.2% reaching a court).

infringement litigation. Accordingly, accurate predictability regarding the scope of patent claims is most useful during this time period.

If pre-litigation predictability is paramount, our goal in designing a system of patent adjudication should not be to permit a practitioner to predict whether a district court's claim construction will be upheld on appeal. Our goal should be to permit the practitioner to adequately predict the scope of a claim as it would be construed by a final judicial decisionmaker, whether at the trial or appellate level. Ossifying a district court's claim construction – for instance, by instituting a more deferential standard of review – would not promote *that* sort of predictability, unless district court judges are inherently more "reckonable" than Federal Circuit judges. If anything, the opposite seems more likely to be true: the experienced patent practitioner, inasmuch as they are experienced in patent law and accustomed to wrestling with the scope of patent claims, resembles the specialized Federal Circuit judge more than the generalized district court judge, who spends far less time addressing patent issues.

This line of reasoning suggests that we can achieve predictability simply by ensuring that the predictor and the decisionmaker share the same knowledge and experience. In other words, think like an appellate judge, and you can predict their decisions. If we are still concerned with the stability of district court claim construction rulings on appeal, we can stabilize those rulings by encouraging trial judges to approach these issues more like appellate judges. For example, provide a trial court judge the background and experience of a Federal Circuit judge – perhaps by making the trial judge into a patent law specialist – and one should expect the trial court judge to reach decisions that more closely resemble those of the appellate court.

I believe this prospect, though facially attractive, is ultimately naïve. Even if endowed with similar background and experience, practitioners, trial judges, and appellate judges will not reach the same interpretive outcomes under the current claim construction regime. To explain why, we must delve deeply into a question which has not received the attention it deserves: if claim construction rulings are unusually vulnerable on appeal, why is that so? That question is itself a species of a more general – and perhaps deceptively simple – question: why is it that trial and appellate judges disagree?

III. WHY IS INTERPRETATION EXCEPTIONAL?

A. *Indeterminacy and Deference*

The most natural (and most common) explanations for unusually high claim construction reversal rates are two: either that the law of

claim construction is too indeterminate to yield predictable outcomes[41] or that the *de novo* standard of review leaves district court rulings too vulnerable to challenge on appeal.[42] While both explanations certainly contribute to the incidence of reversals, neither ultimately can account for disproportionately high claim construction reversal rates.

Before we ask why the Federal Circuit might reverse district courts' claim construction decisions, we might begin by asking why appellate courts, in general, ever reverse trial court decisions. Barring an intervening change in the law, all such reversals represent some form of disagreement between trial and appellate judges. One potential source of disagreement between judges is legal indeterminacy.[43] If all judicial observers agreed that particular legal principles dictated one and only one outcome given a particular set of facts – and if judicial observers conscientiously followed those principles in resolving a case[44] – then few or none would disagree on the case's disposition.[45] But if, for whatever reason,[46] similarly situated observers find different outcomes (or multiple outcomes) permissible under a given legal regime, then disagreement may arise because judges exercise personal discretion in deciding the outcome of an indeterminate case.[47]

If claim construction doctrine is less determinate than other aspects of patent law, then we would certainly observe an increased frequency of reversal on claim construction issues relative to other patent issues.

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41. *See, e.g.*, Dan L. Burk & Mark A. Lemley, *Quantum Patent Mechanics*, 9 LEWIS & CLARK L. REV. 29, 52-55 (2005) (arguing that claim construction is indeterminate).

42. *See, e.g.*, Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1476 (Fed. Cir. 1998) (en banc) (Rader, J., dissenting in part) (stating that de novo standard of review has yielded high reversal rates).

43. Whether this is true is primarily a matter of faith I do not address in this Article. If asked, judges by large margins report that they follow *clear and applicable* precedent. *See, e.g.*, J. WOODFORD HOWARD, JR., COURTS OF APPEALS IN THE FEDERAL JUDICIAL SYSTEM 164 (1981) (describing the results of surveying U.S. Circuit Court of Appeals judges); Lefstin, *supra* note 23, at 1030-39.

44. Whether judicial observers do in fact follow clear and applicable precedent is largely unknowable. *See supra* note 41.

45. Here, I am employing an operational definition of legal determinacy, concerned primarily with outcomes. *See* Lefstin, *supra* note 23, at 1030-31. The question is not whether particular legal principles are determinate in any absolute or philosophical sense, but whether a particular community of observers (i.e., federal judges) would agree that the law constrains outcomes.

46. We may recognize what we might call genuine legal errors – instances where the law is sufficiently clear that all similarly situated observers would agree it dictates a particular outcome, but one or more legal actors have, on this occasion, failed to perceive the controlling principles. One might imagine legal principles that are very difficult for observers to perceive but yield agreement once they become perceptible. Operationally such principles are indeterminate until they become universally recognized.

47. *See* Lefstin, *supra* note 23, at 1033 (citing SONGER, SHEEHAN & HAIRE, *supra* note 29, at 104-05) (describing consensus among political scientists that dissent at intermediate appellate courts reflects legal indeterminacy).

However, we would also observe an increased frequency of appellate dissent. The same lack of legal constraint that permits trial and appellate judges to disagree also permits appellate judges to disagree among themselves. The correlation between reversal and dissent has been verified by empirical studies showing that reversal of the lower tribunal is associated with an increased probability of dissent at the appellate level.[48] Thus, if the law of claim construction were unusually indeterminate, an increased rate of reversal should be accompanied by an increased rate of dissent. Such an increase has not been observed. Based on a comprehensive study of dissent within the Federal Circuit, I have shown that from 1998 to 2005 there was little or no evidence that claim construction issues provoked dissents any more frequently than other patent law issues.[49] Taking dissent as a measure of legal indeterminacy, the law of claim construction seems no less determinate than any other aspect of patent law. Nor is there any evidence that claim interpretation is any less determinate than another well-established interpretive regime, contract interpretation.[50]

Therefore, if claim construction is exceptional, it is not exceptional simply because district courts are reversed at elevated frequencies. Rather, it is exceptional because such reversals are not accompanied by a corresponding elevation in dissent frequencies at the Federal Circuit.[51] Accepting the truth of all the empirical studies, what we must explain is why claim construction issues are characterized by a discrepancy between reversal rates and dissent rates that is *not* observed for other issues.[52] Legal indeterminacy, which should influence both reversal and

48. Lefstin, *supra* note 23, at 1063-64 (noting a high correlation between reversal and dissents). Note that while reversal is a significant contributor to the probability of dissent in an individual case, the correlation between dissent and reversal in the aggregate is less impressive. *See* SONGER, SHEEHAN & HAIRE, *supra* note 29, at 104-05 (noting that Circuits with high dissent rates tend to have high reversal rates and vice versa, though the low degree of inter-Circuit variability means the conclusion is not robust). As to the correlation between dissent and reversal at the individual case level, see, for example, VIRGINIA A. HETTINGER, STEFANIE A. LINDQUIST & WENDY L. MARTINEK, JUDGING ON A COLLEGIAL COURT: INFLUENCES ON APPELLATE DECISION MAKING 64, 71 (2006), which found that dissent is more likely in U.S. Circuit Court of Appeals opinions when the opinion reverses the trial court, and Charles M. Lamb, *A Microlevel Analysis of Appeals Court Conflict: Warren Burger and His Colleagues on the D.C. Circuit, in* JUDICIAL CONFLICT AND CONSENSUS 179, 183-84 (Sheldon Goldman & Charles M. Lamb eds., 1986).

49. Lefstin, *supra* note 23, at 1069-72.

50. *Id.* at 1087.

51. *Id.* at 1072.

52. If we compare the reversal rates reported by Lefstin, *supra* note 23, at 1064, to the dissent rates reported by Moore, *District Court Judges*, *supra* note 9, at 15-16, the following ratios of reversal to dissent result: claim construction, 4.0:1; infringement, 2.7:1; invalidity, 2.9:1; inequitable conduct, 2.8:1. These comparisons are limited by differences in methodology and time frame between the studies, and with a small number of comparisons it is entirely possible that infringement, invalidity, and inequitable conduct's similarity is coincidental. Nonetheless, this close correspondence between patent issues other than claim construction seems remarkable,

dissent rates, cannot by itself account for this discrepancy.[53]

Likewise, the lack of deference that the Federal Circuit accords district court claim construction, though it may increase reversal frequency, is insufficient to explain why claim construction provokes more reversals without a corresponding increase in dissents. Suppose an exceedingly deferential standard of review: the appellate court could not reverse unless it was convinced that the trial judge's decision was completely unreasonable. Certainly few reversals would result. But there would also be few dissents. Presumably, most appellate judges would agree with each other regarding whether the trial judge had acted within reason or not. Likewise, suppose the appellate court was entirely unconstrained and free to rule according to the personal viewpoints of the appellate judges. Discrepancies between the personal viewpoints of trial and appellate judges would yield numerous reversals, but discrepancies between the personal viewpoints of the appellate judges would also yield numerous dissents.[54]

Moreover, while the question has not been studied directly, the available empirical data do not support the hypothesis that the rate of district court reversals correlates with the appellate standard of review. After claim construction, the issue on which district courts were reversed most frequently in Professor Moore's study was unenforceability.[55] Unenforceability determinations, whether questions of inequitable

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especially since claim scope decisions must correlate to some degree with claim infringement, validity, or enforceability decisions.

53. One could also account for the discrepancy between claim construction and other patent issues – not by asking why reversals are high, but rather by asking why dissents are low. If appellate judges preferentially suppress dissent on claim construction issues, then the reversal to dissent ratio increases. If Federal Circuit judges suppress internal dissent regarding claim construction questions, then claim construction truly is indeterminate, as the elevated district court reversal rates indicate. This scenario seems unlikely. It is difficult to imagine why the Federal Circuit would suppress internal disagreement about claim construction more frequently than it would suppress internal disagreement about other patent issues.

54. This argument assumes sufficient legal indeterminacy to permit trial and appellate judges to disagree with each other about what the case's outcome should be.

55. *See* Moore, *District Court Judges*, *supra* note 9, at 17. One might ask whether the difference in reversal between unenforceability and other issues – or, for that matter between claim construction and other issues – is significant. In another study, Moore stated that because all cases in the relevant population were scored, the results are by definition statistically significant. *Id.* at 9 n.37. It is true that Moore's data establish the hypothesis that reversal rates differ by issue without the need for further statistical tests. However, that hypothesis alone is of little interest. What *is* of interest is whether these differences reflect any systematic discrepancy between trial and appellate processes – that is, whether the observed differences in reversal frequencies indicate that the *probability of reversal* is significantly different for different issues. It does, however, require statistical analysis to decide whether the observed differences in reversal rates support the hypothesis that reversal probability differs from issue to issue or whether the observed differences might simply arise by chance.

conduct, laches, or equitable estoppel,[56] are reviewed under an abuse of discretion standard.[57] If the standard of review alone could explain reversal rates, then enforceability determinations ought to be subject to fewer reversals than other issues, not more.

If neither legal indeterminacy nor the standard of review can explain the discrepancy between claim construction reversal rates and dissent rates, what can? Having just derided an excessive focus on the internal operation of the judicial system, it would be difficult to assert that the question is interesting in its own right. Rather, I show in the following sections that the issue is significant because claim construction's *ex ante* predictability – and what we might do to promote such predictability – depends strongly on the explanation for the observed discrepancies between inter-court and intra-court disagreement rates.

B. *The Decisionmakers' Characteristics*

A priori, a systematic discrepancy between case outcomes in different courts must be rooted in one of two causes: differences among the decisionmakers of the respective courts, or differences in the process by which each court reaches its judgments.[58] Let us first consider differences between the trial and appellate decisionmakers. The simplest explanation for why Federal Circuit judges agree with each other more frequently than they agree with district court judges when deciding claim construction issues is that Federal Circuit judges are better at construing claims than district judges. According to this explanation, the appellate judges are more likely than the district judge to perceive the objectively correct claim construction.[59] Thus, if the appellate judges are more likely to perceive an objectively correct claim construction, their claim constructions will tend to coincide more frequently with each others' than they will coincide with that of the trial judge.

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56. Moore did not report the reversal rate by category but did include these issues within an unenforceability category. Moore, *Judges, Juries, and Patent Cases*, *supra* note 34, at 13 n.105.

57. *See* A.C. Aukerman Co. v. R.L. Chaides Constr. Co., 960 F.2d 1020, 1028 (Fed. Cir. 1992) ("As equitable defenses, laches and equitable estoppel are matters committed to the sound discretion of the trial judge and the trial judge's decision is reviewed by this court under the abuse of discretion standard."); Kingsdown Med. Consultants, Ltd. v. Hollister Inc., 863 F.2d 867, 876 (Fed. Cir. 1988) (en banc) ("As an equitable issue, inequitable conduct is committed to the discretion of the trial court and is reviewed by this court under an abuse of discretion standard."), *vacated by* 866 F.2d 1398 (Fed. Cir. 1989). The court reviews enforceability questions' underlying factual determinations for clear error. *Kingsdown*, 863 F.2d at 876.

58. "Process" as used here includes the parties' actions before each tribunal, and the discrepancies in the decisionmaking process' other inputs.

59. This argument of course presupposes that there is such a thing as an "objectively correct claim construction." But for purposes of this argument, an objectively correct claim construction is a meaning on which experienced or skilled observers tend to agree, whether or not the meaning is true in any absolute sense.

For those seeking claim construction stability or predictability, this explanation for the divergence of reversal and dissent rates is comforting. Unless Federal Circuit judges are blessed with exceptional innate talent, their superior skill in claim construction must come from experience. Few Federal Circuit judges have had extensive patent law experience prior to their appointments.[60] It follows that anyone with equal capacity could become as accurate as these appellate judges if they devoted as much of their time to wrestling with the questions of claim constructions. To achieve predictability, all the practitioner needs is experience. To achieve stability, trial courts need the same, perhaps in the form of specialized patent courts.

While comforting, and likely true in measure, this explanation is not entirely convincing. Studies comparing reversal rates between district courts that hear many patent cases, and those that hear few, have not shown that active district courts are affirmed regarding claim construction issues significantly more frequently than their less active counterparts.[61] Nor do the district courts compare unfavorably to existing specialized tribunals. Taking the ratio of dissents to reversals as a measure of tribunal competency,[62] the district courts in patent cases fare equally well, or better, than specialized tribunals such as the Boards of Contract Appeals, the Court of Appeals for Veterans Claims, or the Court of Federal Claims.[63] Moreover, attributing the high reversal rate to the inexperience of the district courts does not explain why district courts would have more difficulty with claim construction than with other aspects of patent law. If we seek to explain why claim construction provokes more reversals than other patent issues, we would have to postulate some advantage in the Federal Circuit's experience that increases its accuracy relative to the district courts in claim construction, but not in other matters of patent law.

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60. *See* Debra D. Peterson, *Can This Brokered Marriage Be Saved? The Changing Relationship Between the Supreme Court and Federal Circuit in Patent Law Jurisprudence*, 2 J. MARSHALL REV. INTELL. PROP. L. 201, 225 (2003) (noting that in 2003 only three of seventeen active and senior judges serving on the Federal Circuit practiced patent law before their appointments).

61. Chu, *supra* note 9, at 1125-26.

62. *See* Lefstin, *supra* note 23, at 1065. Measuring the ratio of dissents to reversals, the dissent ratio normalizes for the effect of legal indeterminacy. As previously discussed, indeterminate legal regimes elevate both reversal and dissent frequencies. Assuming that indeterminacy affects reversal and dissent rates equally, dividing one rate by the other eliminates the effects of indeterminacy. The ratio that remains measures the appellate court's tendency to disagree with the lower tribunal for reasons other than legal indeterminacy. Therefore, in this context, lower tribunal "competency" only indicates that the appellate court tends to agree with the lower tribunal's judgment.

63. *See id.* at 1064-65 (showing that ratio of dissents to reversals for district courts in patent cases exceeds that of most specialized tribunals reviewed by the Federal Circuit).

One might argue that technological expertise provides such an advantage.[64] Although the technical details of the underlying invention potentially impinge on any issue resolved in patent infringement litigation, they do so frequently in claim construction disputes.[65] Yet, the details of the invention that may be critical to claim construction are not necessarily technologically complex.[66] And if in a given case the claim construction inquiry is highly dependent on the invention's technical details, that dependence would tend to eliminate any advantage deriving from legal experience in construing patent claims. Each patent is evaluated largely *sui generis* – according to the language used by the inventor and those skilled in the field of the invention[67] and by the patent document itself, which is said to be the best lexicon for establishing the meaning of its claims.[68] Case law defines a few general, non-technological words and structures employed in patent claims,[69] but judicial experience cannot shed light on a particular word's meaning in an individual patent claim the same way that it might shed light on contract terms ubiquitous in particular industries like insurance or real estate.

If the relative expertise of trial and appellate decisionmakers cannot account for claim construction's exceptional nature, perhaps the difference between trial and appellate judges lies not in their skill construing claims per se, but in their ability to perceive the underlying rules of claim construction. We might suppose that underlying, determinate claim construction principles exist and are followed by Federal Circuit judges, but are not perceived or followed by district court judges. Following these rules, Federal Circuit judges agree with each other, but the district judges who do not perceive the same rules tend to be reversed. While the notion that the Federal Circuit agrees on claim construction principles may seem strange in light of the sharp disagreements at the

64. While most Federal Circuit judges lack technological experience, they do have access to a pool of judicial clerks who likely possess such experience. Legislative proposals to improve district court patent adjudication have included funding for law clerks with technical expertise. *See, e.g.*, H.R. 34, 110th Cong. § 1(f)(2) (2007).

65. *See, e.g.*, 153 CONG. REC. H1430, 1432 (daily ed. Feb. 12, 2007) (statement of Rep. Issa) (noting technical complexity of some patent claims).

66. For example, in *Phillips* itself the Federal Circuit had to determine whether partitions within walls described as "baffles" must be perpendicular to the wall or instead could be at an angle. Phillips v. AWH Corp., 415 F.3d 1303, 1309 (Fed. Cir. 2005) (en banc).

67. *See id.* at 1313 ("'The inventor's words that are used to describe the invention – the inventor's lexicography – must be understood and interpreted by the court as they would be understood and interpreted by a person in that field of technology.'" (quoting Multiform Desiccants, Inc. v. Medzam, Ltd., 133 F.3d 1473, 1477 (Fed. Cir. 1998))).

68. *See* Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996) (describing patent specification as the best source of meaning for interpreting claims).

69. *See* 3 DONALD S. CHISUM, CHISUM ON PATENTS § 8.06[1] (describing claim language and structure conventions).

Federal Circuit in the decade since *Markman*,[70] the reader should bear in mind that most of these disagreements concern the related questions of whether claim construction is a legal or factual determination, and the deference that ought be accorded to trial court claim constructions on appeal. Neither of these disagreements should lead to disagreements about claim construction *outcomes*, except to the extent that appellate judges who give more credence to district court determinations might tend to affirm even though they themselves would have construed the claim differently.[71]

It would not be surprising if Federal Circuit judges perceived underlying rules of claim construction more clearly than district judges, since the Federal Circuit judges are the ones who make the rules. On this view, the reason why claim construction differs from other patent issues is historical, rather than experiential. Although claim construction principles are as determinate as other aspects of patent law, the Federal Circuit has not articulated its claim construction principles with the same clarity found in other aspects of patent law. Perhaps the reason for claim construction's exceptional nature is that, unlike other principles of patent law, the substantive law of claim construction is almost entirely a creature of Federal Circuit precedent.[72] Principles embedded solely in the Federal Circuit's jurisprudence may be more difficult for outside observers to perceive, compared to principles set forth by statute or other sources.[73]

But regardless of how the law of claim construction came to be so obscure, this explanation for the divergence of claim construction from other aspects of patent law is also comforting in the end. Determinate principles of claim construction do exist, meaning that sufficiently informed observers can predict and agree upon the interpretation of a patent claim. To promote stability and predictability, the Federal Circuit

70. Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996).

71. In light of the conflict over claim construction's factual character and the standard of review, the excess of claim construction reversals relative to dissents is even more curious than it first appears. Disagreements about the nature of appellate review ought to yield more dissents at the appellate level, but not more reversals. And, if the minority of Federal Circuit judges who advocate more deference to the district courts actually accord that deference *sub rosa* when deciding cases, the reversal rate ought to be even lower.

72. The patent statute requires the inventor to provide "one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention," 35 U.S.C. § 112, but does not set forth any principles for interpreting claims. The exception is for functional claiming (commonly referred to as "means-plus-function" claims) authorized by paragraph 6 of § 112, in which case the statute directs that the claim be construed to cover the structures or acts described in the specification as performing the recited functions, and their equivalents. *See id.*

73. For example, principles deriving from Supreme Court precedent or from established historical tradition may be equally apparent to all observers.

simply needs to articulate its claim construction jurisprudence with greater clarity. Alternatively, practitioners, commentators, and trial court judges need to do a better job recognizing and explicating the principles that underlie the Federal Circuit's decisions.

C. *Interpretive Processes: Information Content and Information Order*

Up to this point, the possibilities I have explored are fairly conventional and lead to conventional solutions for improving the predictability of claim construction. But there is another explanation for why the decisions of trial courts and appellate courts fail to converge on claim construction questions. This explanation depends not on differences between trial judges and appellate judges, but rather on differences between the trial and appellate decisionmaking processes. It is commonly assumed, usually implicitly, that trial judges and appellate judges decide the same case. They do not. Trial judges and appellate judges base their decisions on different information, and the processes by which they acquire that information diverge even more than the information itself. The combination of these effects may hold serious implications for any attempt to bring predictability or stability to the claim construction process.

1. Information Set and Contextual Effects

Each stage of a litigated case, from its antecedent basis in the extrajudicial world through its final resolution on appeal, may entail the loss or transformation of information presented during the earlier stages. Not all facts present in the real world are uncovered during discovery, not all evidence revealed in discovery is introduced at trial, and not all evidence or argument introduced at trial is considered on appeal.[74] Therefore, the set of information appellate judges consider arrives, to greater and lesser extents, pre-filtered. In some contexts, we are already familiar with the idea that trial judges and appellate judges have access to different sets of information. For example, the deferential standard of review accorded to witness credibility determinations reflects the view that trial participants had access to more information, namely, witness demeanor, than the appellate court could glean from a written record.[75]

74. *See* Steven Hartwell, *Legal Processes and Hierarchical Tangles*, 8 Clinical L. Rev. 315, 338 (2002).

75. *See, e.g.*, The Quickstep, 76 U.S. 665, 669 (1869) ("The difficulty of discovering the truth in collision cases, which are mainly trials of fact, grows out of the character of the evidence, which is always more or less conflicting. The court that can see the witnesses, hear their statements, observe their demeanor, and compare their degree of intelligence, is better able than an appellate tribunal to reconcile differences in testimony, or, if that be not possible, to ascertain the

But how could the information available to a trial judge differ from that considered by appellate judges in interpreting a written document like a patent claim? Consider the set of information a judge or other actor might employ to construe patent claims: (1) the information intrinsic to the patent itself, such as the language of the claims, the patent's disclosure, and the record of the patent's prosecution before the Patent and Trademark Office;[76] (2) formal extrinsic evidence offered at or before a trial, typically expert testimony about how artisans skilled in the applicable invention field would understand the disputed language;[77] (3) informal "extrinsic evidence" particular to the judge in question - the sum of the interpreter's prior linguistic experience, as well any sources of meaning consulted by the interpreter outside the formal record;[78] and (4) information the litigating attorneys have conveyed to the interpreter in the form of briefs or oral argument.

The trial and appellate judges equally share the first set of information – the intrinsic record particular to the patent – and this record should not account for systematic divergences in their perceptions or ultimate decisions. With respect to the second set, however – formal extrinsic evidence – the trial and appellate judges' roles are quite different. The trial judge shapes the record, deciding which extrinsic evidence is admissible and which is not. Two possible consequences follow from this unique role. Most obviously, the trial judge may be exposed to extrinsic evidence that does not appear in the appellate record. In the course of deciding whether to admit evidence, the trial judge examines that evidence. Though the evidence may eventually be denied admission, the trial judge's exposure to the evidence may influence his or her understanding of the claim language. Experimental studies have shown that exposure to inadmissible evidence can significantly influence

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real nature of the transaction. The District Court that tries the case in the first instance enjoys this advantage, and the finding of facts by it, if followed by the concurrent judgment of the Circuit Court, is entitled to so much weight in this court, that it will be presumed a correct conclusion was reached, and before the decision will be disturbed it must manifestly appear that it was wrong.").

76. It is conventional in patent law to refer to the written record of the negotiations between the patent applicant and the patent examiner, and the prosecution history, as "intrinsic evidence," although such material might be considered extrinsic in contract or statutory interpretation. *See* Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996) (describing prosecution history as "intrinsic evidence").

77. *See, e.g.*, Phillips v. AWH Corp., 415 F.3d 1303, 1318 (Fed. Cir. 2005) (en banc) ("We have also held that extrinsic evidence in the form of expert testimony can be useful to a court for a variety of purposes, such as to provide background on the technology at issue, to explain how an invention works, to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.").

78. *See* Pac. Gas & Elec. Co. v. G. W. Thomas Drayage & Rigging Co., 69 Cal. 2d 33, 36-37 (Cal. 1968) (describing the judge's prior linguistic education and experience as a source for construing a contract's meaning).

judges' decisions, even when the same judge decides to exclude the evidence.[79] Although these studies did not examine the effect of excluded evidence on interpretive questions, it may be that linguistic information absent from the record on appeal similarly influences trial judges' decisions on claim construction.

Less obviously, the very act of defining the record may shape the judge's linguistic perspective, irrespective of the content. Readers who teach first-year law students have almost certainly been asked whether a particular case or a piece of doctrine should be included in a student's outline. One response is that it does not matter whether they include the information in their outline. What matters, for purposes of learning the law, is that they have struggled with the question of whether to include the information in their outline. The trial judge's linguistic worldview may similarly be altered by the process of deciding which evidence ought to be admitted or excluded at trial, and this experience is not shared with other interpreters like appellate judges.

The third set of information, linguistic experience accumulated by the judge over his or her life and any information the judge might obtain independently, will vary from judge to judge. But there is no reason to expect that appellate judges will be more similar to each other than to district judges in this respect.[80] It is true that the communal nature of the appellate bench may lead to linguistic convergence between appellate judges with respect to this third set of information. Appellate judges might share with each other any extra-record information they uncover, and if such information is decisive it could promote greater accord between appellate judges than between the appellate panel and the trial judge. But neither the sharing of new information, nor any other mechanism by which the judges of a collegial court might reach an accord, seems unique to claim construction. Nonetheless, it is noteworthy that

79. Wistrich, Guthrie and Rachlinski presented fictional scenarios to judges attending judicial educational conferences and measured how exposure to inadmissible information influenced the judges' resolution of the fictional cases. *See* Andrew J. Wistrich, Chris Guthrie & Jeffrey J. Rachlinski, *Can Judges Ignore Inadmissible Information? The Difficulty of Deliberately Disregarding*, 153 U. PA. L. REV. 1251, 1281-84 (2004) (describing experimental design). Inadmissible evidence of several types influenced judges' decisions in both civil and criminal contexts – even when the judges had ruled that the evidence was inadmissible. *See id.* at 1323 ("Taken together, our studies show that judges do not disregard inadmissible information when making substantive decisions in either civil or criminal cases. We think the reason is that they are unwittingly influenced by inadmissible information and that they cannot ignore it much of the time."); *id.* at 1297, 1303, 1307, 1311 (showing that judges who ruled to suppress evidence nonetheless were influenced by that evidence).

80. Likewise, there is no reason to expect that variation in linguistic experience between judges exceeds variation in other characteristics, such as policy preferences. Therefore, variations in linguistic experience would not explain why interpretation might provoke more (or less) disagreement than other legal issues.

the Federal Circuit has reserved for itself (as well as for trial judges) the right to consult dictionaries in the course of claim construction, whether or not such evidence has been introduced in the record.[81] In this respect, the court has deliberately chosen not to limit the set of extra-record linguistic information available for claim construction.

The last set of information, the arguments presented by the parties, possesses the greatest potential to vary between trial and appeal. The issues argued on appeal are usually a subset of those argued at trial, meaning that issues the appellate judges never review may have influenced the trial judge's decision. Even for those issues common to both trial and appeal, advocates may advance more (or less) persuasive arguments on appeal than they did at trial, leading to a divergence between trial and appellate courts even when the facts and issues considered by both courts remain nominally identical. Yet such divergence may arise in any appeal, on any legal issue. How could it account for a peculiarly salient divergence between trial and appellate courts on claim construction issues?

One possibility is that interpretive questions in general are particularly susceptible to argumentative context. While there has been little comparison between the psychology of interpretation and other cognitive processes, experimental studies show that the depth of semantic processing in sentence recognition – the extent to which the interpreter actually analyzes a word's meaning – depends on the fit between the word and the surrounding narrative context.[82] At least under experimental conditions, pragmatic processing in sentence context can completely override a word's actual core lexical meaning.[83] It is, therefore, possible that interpretation is innately more susceptible to contextual effects than other cognitive processes. But whether these effects, observed in real-time sentence processing, would persist in a sustained and reflective process, such as legal interpretation, remains unknown.

Regardless of the precise cognitive relationship between argument and semantics, claim construction may be particularly susceptible to a shift in argument because it underlies so many other patent litigation issues. Given that the claims define the invention, questions of infringement, novelty, non-obviousness, adequate disclosure, enforceability,

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81. Phillips v. AWH Corp., 415 F.3d 1303, 1322-23 (Fed. Cir. 2005) (en banc) ("[J]udges are free to consult dictionaries and technical treatises at any time in order to better understand the underlying technology and may also rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents." (internal citation omitted)).

82. Anthony J. Sanford, *Context, Attention and Depth of Processing During Interpretation*, 17 MIND & LANGUAGE 188, 198 (2002).

83. *Id.* at 191-94.

inventorship, and more may depend on how the patent's claims are construed. Claim interpretation is therefore consequentialist: regardless of whether the black-letter law insists that claims be construed independently of other legal issues surrounding the patent, it is reasonable to expect that judges will test the validity of their interpretations by considering what outcomes follow, just as all lawyers test a rule's validity by considering the outcomes it would dictate given real or hypothetical facts. The Federal Circuit itself, in criticizing the current tendency of parties to stipulate infringement or non-infringement to obtain early review of the trial court's claim construction,[84] has acknowledged that claim construction questions are deeply embedded in the context of other issues arising in patent litigation - perhaps so deeply that they cannot be meaningfully addressed without reference to that context.[85] It follows that a judge's view on claim construction may be influenced not only by a shift in argument on claim construction, but also by a shift in argument on any number of issues that are presented on appeal.[86] Claim construction may be inherently more unstable between trial and appeal because, as compared to other issues which can be resolved discretely, there are many more opportunities for the information set relevant to claim construction to vary between trial and appeal.

2. Order Effects and Path Dependence of Interpretation

Despite the potential for trial and appellate judges to receive different sets of information relevant to claim construction, the significant dif-

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84. The Federal Circuit does not grant interlocutory appeals regarding claim construction questions, rather it prefers to wait until the district court issues a final judgment of infringement or non-infringement based on that claim construction. In response, litigants have begun stipulating to summary judgment of infringement or non-infringement and appealing that judgment to the Federal Circuit. *See* M.I.T. v. Abacus Software, 462 F.3d 1344, 1350-51 (Fed. Cir. 2006); Wilson Sporting Goods Co. v. Hillerich & Bradsby Co., 442 F.3d 1322, 1326-27 (Fed. Cir. 2006).

85. *See Abacus Software*, 462 F.3d at 1351 ("Moreover, the stipulated judgment does not identify which of the many claim construction rulings are dispositive. While it is highly undesirable to consider these issues in the abstract, here as in *Lava Trading*, we have proceeded to do so."); Lava Trading, Inc. v. Sonic Trading Mgmt., LLC, 445 F.3d 1348, 1350 (Fed. Cir. 2006) ("Without knowledge of the accused products, this court cannot assess the accuracy of the infringement judgment under review and lacks a proper context for an accurate claim construction."). Despite the view that claim scope should not depend on the allegedly infringing subject matter, the Federal Circuit's concern is not misplaced. Aside from the argument that claims should be construed to preserve their validity in light of the invalidity arguments advanced by the accused infringer at trial, the resolution with which claim limitations must be construed, or whether they need be construed at all, depends on the particular infringement question at issue. By analogy, in a property dispute between two neighbors, the boundary line between them may be defined and examined in great detail, but other property boundaries receive no attention because they are not in dispute.

86. *See, e.g.*, Neomagic Corp. v. Trident Microsystems, Inc., 287 F.3d 1062, 1069 (Fed. Cir. 2002) (noting that a judge's claim construction may change as parties modify their infringement arguments).

ference between trial and appeal may not lie in the set of information considered by trial and appellate judges. It may lie instead in the *process* by which the trial and appellate judges receive that information. Trial judges receive information over an extended period of time. The district judge may be exposed to new facts, law, and argument over several years as a case proceeds from pleadings to post-verdict motions. The kind of information and argument presented to the trial court changes as the case evolves. The exposure typically will be intermittent. Full patent trials frequently take several years, during which time many other matters pending on the court's docket will interrupt the judge's focus on claim construction issues.

Within that time lies significant potential for variation in the claim construction process. The Federal Circuit has not constrained district courts to follow a particular procedure for construing claims. Included in this freedom is the discretion to construe the claims at any point prior to the submission of the case to a jury.[87] Some courts construe claims as early as possible, during or before discovery, or even during a preliminary injunction hearing.[88] Other courts construe claims in the context of summary judgment, while still other courts do not do so until just before they instruct the jury on the questions of infringement or invalidity. Because information accumulates constantly during litigation, the set of information available for claim construction depends on the point at which the claims are construed. It follows that the outcome of claim construction may depend on the timing of claim construction. In fact, judges who construe claims early occasionally modify their initial claim construction decisions in light of additional evidence, argument, or understanding accumulated during trial.[89] Such shifts demonstrate conclusively that claim interpretation may be sensitive to the linguistic framework that progressively evolves over the course of litigation.

We might well ask at this point, if judges are free to modify their claim construction decisions as a trial proceeds, will all claim construction processes not converge on a common meaning in the end, regardless of when the claims are first construed? They will not. Claim construction decisions arising from different processes will diverge, even if the final set of linguistic information is the same, because the order in which

87. *See infra* note 124 and accompanying text.

88. *See infra* Part IV.

89. *See, e.g.*, Jack Guttman, Inc. v. Kopykake Enters. Inc., 302 F.3d 1352, 1361 (Fed. Cir. 2002) ("District courts may engage in a rolling claim construction, in which the court revisits and alters its interpretation of the claim terms as its understanding of the technology evolves." (internal citation omitted)); *Neomagic*, 287 F.3d at 1069 ("As the district court's understanding of the technology evolved, and as the parties fine-tuned their infringement arguments, the court periodically modified the original construction of the disputed terms.").

information is received may alter the outcome of the interpretive process. The process by which the decisionmaker receives information may alter claim construction outcomes, no less than the process by which ingredients are added may alter outcomes in cooking or chemistry.

A rich literature in experimental psychology documents the influence of the information process on outcome in medical, legal, military, political, and other contexts.[90] Specifically, three reported effects are relevant for our purposes: (1) the order in which observers receive evidence or arguments influences their final decision;[91] (2) where decisionmaking requires observers to evaluate multiple pieces of evidence, outcomes depend on whether observers evaluate information step-by-step, as each new piece of information is received, or whether they evaluate information at the end-of-sequence stage, after all the information has been received;[92] and (3) the effect of information order is modulated by holding the decisionmaker accountable for personal judgments.[93] These effects are observed not only with naïve subjects in artificial experimental contexts, but also when experts, such as experienced physicians and military personnel, make decisions in naturalistic settings.[94]

Could order effects lead to systematic divergence between trial and appellate claim construction outcomes? Consider first the nature of the trial and appellate processes. The trial judge accumulates information sequentially, dependent on the judge's trial management decisions and the litigants' tactical choices. The appellate perspective is retrospective, with all aspects of the case being laid forth at once. Appellate judges receive, at a single point in time, the arguments of both parties presented in their appellate briefs and those portions of the trial record that the parties include in their respective appendices.[95] All of the intrinsic and extrinsic evidence is presented to them at the same time, as are the par-

90. *See* Leonard Adelman & Terry Bresnick, *Examining the Effect of Information Sequence on Patriot Air Defense Officers' Judgments*, 53 ORG. BEHAV. & HUM. DECISION PROCESSES 204 (1992); Gretchen B. Chapman, George R. Bergus & Arthur S. Elstein, *Order of Information Affects Clinical Judgment*, 9 J. BEHAV. DECISION MAKING 201, 201-11 (1996); Robin M. Hogarth & Hillel J. Einhorn, *Order Effects in Belief Updating: The Belief-Adjustment Model*, 24 COGNITIVE PSYCHOL. 1 (1992); Michael S. Schadewald & Stephen T. Limberg, *Effect of Information Order and Accountability on Causal Judgments in a Legal Context*, 71 PSYCHOL. REP. 619 (1992).

91. James H. Davis, *Order in the Courtroom*, *in* PSYCHOLOGY AND LAW: TOPICS FROM AN INTERNATIONAL CONFERENCE 251 (Dave J. Müller, Derek E. Blackman & Antony J. Chapman eds., 1984).

92. Hogarth & Einhorn, *supra* note 90, at 5-7.

93. Schadewald & Limberg, *supra* note 90, at 623.

94. *See* Adelman & Bresnick, *supra* note 90, at 225 (air defense officers classifying radar targets as friend or foe in air defense simulations); Chapman, Bergus & Elstein, *supra* note 90 (clinical physicians diagnosing cancer based on case histories).

95. *See, e.g.*, FED. R. APP. P. 3 (describing distribution of briefs, record, and files to merits panels); FED. R. APP. P. 30 (specifying content of appendices).

ties' final and refined arguments regarding claim construction and other issues whose resolution depends upon the claim construction.[96] The parties repeat and elaborate those arguments to the entire appellate panel essentially simultaneously during a single oral argument.

The distinction between sequential and simultaneous presentation is highly significant in light of the experimental evidence demonstrating that information order affects how decisionmakers form and revise their beliefs. According to the dominant psychological model of belief processing, new information received sequentially is processed by adjusting a current opinion, or "anchor," in light of the additional information.[97] Primacy and recency effects of information order arise because earlier or later information may be weighted disproportionately relative to other information, although the circumstances that give rise to primacy versus recency effects are not well understood.[98] Regardless of whether primacy or recency effects predominate, the differential weighting of information according to the timing of its presentation poses clear implications for the claim construction process. The trial and appellate courts' claim construction decisions may diverge because the trial and appellate interpretive processes receive information in quite different modes and orders.

Beyond primacy and recency effects, the more compact presentation the parties make before appellate judges, as compared to the sequential presentation of information the parties make before the trial judge, might favor an end-of-sequence evaluation by the appellate judges and a step-by-step evaluation by the trial judge.[99] This shift in response mode further increases the likelihood that divergent claim construction decisions will emerge between trial and appeal. Trial judges are also more personally accountable for their judgments than appellate judges. Not only is the trial judge's decision far more likely to be reviewed by a higher court, but the trial judge must also grapple with the consequences of his or her decisions on the litigants as trial unfolds. Nor can the trial judge hide behind the relative anonymity of a panel decision. At least under experimental conditions, personal accountability can modulate the effect of information order on legal judgments,[100]

96. The trial judge may be likened to a referee who makes decisions in real time as he or she trots up and down the field with the players; the appellate judges, however, may be likened to replay referees who review tapes taken from select vantage points.

97. Hogarth & Einhorn, *supra* note 90, at 8.

98. *See, e.g.*, Adelman & Bresnick, *supra* note 90, at 224-26 (finding overweighting of earlier information in contradiction to recency effect predicted by the Hogarth-Einhorn model).

99. A step-by-step or end-of-sequence response mode does not necessarily correlate with a step-by-step or end-of-sequence cognitive process. *See* Hogarth & Einhorn, *supra* note 90, at 12-14.

100. *See* Schadewald & Limberg, *supra* note 90, at 619, 623.

leading to yet more possibilities for cognitive discrepancies in claim construction processes between trial and appeal.

But these order and process effects may influence all kinds of legal determinations, not just interpretive ones.[101] Why might they be particularly prominent in interpretation? Interpretive questions, and claim construction in particular, may be more susceptible to order effects based on the particular cognitive processes at work.[102] Legal interpretation, though frequently requiring close attention to written context or expert testimony, is ultimately a question of language and meaning. The process of attaching meaning to a word, or associating a physical structure with a word,[103] may be cognitively deeper and more primitive than the more abstract determinations demanded by patent law.[104] If interpretation questions require more primitive and less analytical cognitive processes than other legal determinations, then questions of meaning may be more sensitive to the effects of information order and evaluation mode than other legal questions. Experimentally, cognitive psychologists have shown that a subject's interpretation of vague or ambiguous language in a survey question may be manipulated by changing either the content of previous survey questions, or simply by changing the grouping of the questions in the survey instrument.[105] If interpretation is susceptible to semantic and pragmatic context, then both the content of the surrounding legal dispute, and the order in which that content is

101. *See, e.g., id.* (investigating order and accountability effects on experimental tax law scenarios).

102. Experimental comparisons between interpretation and other cognitive processes are lacking.

103. Claim construction is usually, though not exclusively, conducted for the purpose of comparing the subject matter defined by the claims with an accused device or process, or with some device or process described by the prior art.

104. Consider, for example, the difference between evaluating claim construction questions such as whether the term "member" includes structures of more than one piece, see *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359 (Fed. Cir. 2002), and invalidity inquiries such as whether one of ordinary skill in the art would be able to make and use the subject matter of a claim without undue experimentation. It is true that claim interpretation also formally proceeds from the perspective of one skilled in the art, see *Phillips v. AWH Corp.*, 415 F.3d 1303, 1332 (Fed. Cir. 2005) (en banc) (Mayer, J., dissenting), but in questions of word meaning or sentence syntax the inquiry frequently must rely on ordinary linguistic principles.

105. Fritz Strack, Norbert Schwarz & Michaela Wänke, *Semantic and Pragmatic Aspects of Context Effects in Social and Psychological Research*, 9 SOC. COGNITION 111, 118-19 (1991) (showing effect of preceding questions); *id.* at 122 (showing effect of grouping). This study also suggests that context effects may be particularly strong in asocial or non-interactive communicative contexts, in which the respondent must rely on static sources of meaning, rather than engage the contributor in a dynamic dialogue. *Id.* at 112-13. Legal interpretation generally requires extracting meaning from a static text or texts, and claim construction is even more asocial than other legal interpretation, because – unlike statutory or contract interpretation –the drafter's intent is of limited significance. Consequently, legal interpretation may be more sensitive to context and order than more dynamic and interactive modes of legal thinking.

presented or adjudicated, will influence the outcome of the interpretive process.

Patent claim construction may be unusually susceptible to order effects, even when compared to other interpretive regimes. I have already discussed why the content of claim construction, being so deeply embedded in other patent litigation issues, will vary between trial and appeal more than it will for other issues.[106] But claim construction's foundational nature has consequences for order effects as well, particularly when district courts construe claims early during a trial. Claims define the boundaries of a patent. Once the claims are construed, subsequent arguments about patent infringement and patent invalidity are framed within those boundaries. This framing poses two barriers, one psychic and one practical, to revising claim construction decisions in light of later-arriving information. The psychic barrier is simply that, having thought very hard about whether "the patent" is infringed, invalid, or enforceable, it may well be difficult to discard an initial conception of what "the patent" is. The practical barrier, from the judge's point of view, is that much of the litigation has already been conducted under the initial claim scope definition. Certain paths of discovery have already been permitted or forbidden based on the initial claim construction decision. Entire legal issues may have been excluded from the trial because arguments relevant to those issues became untenable once the claims were construed. To revise these decisions based on information that emerges as trial proceeds, the judge must be willing to impose significant costs in time and money upon all the participants, including litigants, jurors, and the judge him- or herself – as well as admit to the participants that he or she may have initially erred in construing the claims. While judges do on occasion revise claims midstream, it requires little imagination to see that judges have strong incentives to discount linguistic information received subsequent to the initial claim construction, relative to that received before the initial claim construction.

The circumstances at trial that promote differential weighting of earlier and later information, however, are not present on appeal. Appellate judges receive all the information relevant to claim construction essentially simultaneously, and choosing between competing claim constructions does not entail changing the mental frame of reference under which issues of infringement or invalidity have already been considered. Appellate judges may, in marginal cases, be motivated by concerns of judicial efficiency to preserve the district court's ruling rather than remand the case, but reversal imposes far fewer costs upon appellate

106. *See supra* Part III.C.1.

judges,[107] and the appellate panel's relationship with the litigants is typically over by the time it issues its decision. The consequences of changing one's mind, in short, are very different for appellate judges in the midst of writing opinions, when compared to trial judges in the midst of conducting ongoing trials. Thus, beyond purely cognitive effects of information order, the investment a trial judge has in the interpretive status quo places trial judges and appellate judges on quite different footings. Because the practical and psychological consequences of their interpretive decisions diverge, trial and appellate judges may reach different outcomes even if they share the same final set of interpretive information.

IV. THE CONVERGENCE OF PERSPECTIVE AND THE PATH TO PREDICTABILITY

In essence, what I have argued up to this point is that claim construction is highly path dependent. The meaning assigned to claims is the product not only of the particular and unique set of information articulated during litigation, but also of the particular and unique sequence by which that information is presented to the decisionmaker. Though appellate judges may differ in innate linguistic outlook from each other and the trial judge, the overriding influence shaping their interpretation is the common vantage point they share with each other – one that differs markedly from the one shared by the trial judge or the participants at trial. This common perspective leads to a concurrence of judgment with each other and a divergence of judgment from the trial judge. The result is the observed excess of reversal in comparison with the incidence of dissent.

Whether the trial or appellate perspective is ultimately more accurate in ascertaining claim construction is not a question this Article attempts to answer, one reason being that the question of what "accurate" claim construction entails lacks a readily articulable answer. But if this explanation for claim construction reversal frequency is correct, the implications for the adjudication of patent disputes are profound. "Better" trial judges – i.e., judges more specialized or knowledgeable in patent law – would not greatly improve the consistency of claim construction between trial and appeal because it is the discrepancy between the trial and appellate *processes* that leads to elevated claim construction reversal rates.[108]

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107. Except to the extent that summary affirmances spare the appellate judges the cost of writing an opinion.

108. Certainly we could expect some improvements with specialized judges; but it is noteworthy that in some experimental contexts, training the observers in the overall task and the

Nor would a more deferential standard of review improve matters. Fixing the district court's claim construction would increase stability in the interval between trial and appeal, although it may do so at the expense of accuracy (if we believe the appellate process provides the more accurate interpretation).[109] But it would not yield pre-litigation reckonability because the district judge's claim construction is the result of the unique and idiosyncratic evolution of the interpretive process over the course of a particular case.[110]

Indeed, pre-litigation predictability might actually *decrease* under a more deferential standard of review. If interpretive processes shape interpretive outcomes, then we must assume the perspective of the relevant interpreter to replicate his or her interpretive process. Whose perspective could practitioners more easily assume? The appellate judge, who decides after collecting the information set over a relatively short period of time? Or the trial judge, who makes his or her decision while embedded in a protracted, formalized process, a process that he or she is simultaneously called upon to shape? I suggest it would be easier for the practitioner to assume *ex ante* the appellate judge's coincident perspective, than it would be to assume the trial judge's sequential perspective. Furthermore, like the appellate judge, the practitioner *ex ante* may evaluate and revise claim constructions without significant costs (save, of course, those passed onto the client). If it is easier to replicate the appellate interpretation process than the trial interpretation process, more deference to trial courts will ultimately yield less predictability.[111]

If differences between information sets and information order account for the discrepancy between trial and appellate claim construction decisions, the means to achieve stability and predictability – whether in anticipation of, during, or after trial – seem clear. If we are concerned primarily with predictability and consistency between trial and appeal, then claim construction ought to occur late in the litigation process. Doing so maximizes the information available to the district

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evaluation of pieces of evidence did not significantly modulate the effect of information order. *See* Richard Tubbs et al., *Order Effects in Belief Updating with Consistent and Inconsistent Evidence*, 6 J. BEHAV. DECISION MAKING 257, 263 (1993). This study, therefore, suggests that information order effects arise from the process of integrating new information into the existing information set, rather than evaluating the individual piece of information. *Id.* at 267-68.

109. *See* Moore, *District Court Judges*, *supra* note 9, at 27-31 (suggesting that appellate claim interpretations are more accurate).

110. *See supra* Part III.C.

111. The counterargument is that the appellate panel sees a more restricted set of information – information accepted at trial and preserved in the appellate process – than the set of information initially seen by the district judge. *See* Hartwell, *supra* note 74 (describing narrowing of the available information set at each stage of litigation). Therefore, it may be easier to predict the set of information seen by the trial judge than to predict the set of information seen by the appellate judge, even if appellate order effects are easier to predict.

judge, ensures that pre-existing frames of reference or perceived decisional costs do not discourage interpretation, and makes the trial perspective correspond most closely with the appellate perspective. Quite apart from the concern of reversal on appeal, some district judges have expressed a preference for construing claims late in the trial, citing the need to interpret claims in the context of the litigated issues and the possibility that information elucidated during trial may shed light on the claims' meaning.[112] Their preference confirms that information timing and order affect district judges' claim construction decisions. Consequently, maximum predictability would likely be achieved by delaying claim construction as long as feasible at the trial level.[113]

Most litigated patent cases do not follow this prescription,[114] and this prescription is likely unpalatable for many patentees and practitioners.[115] An early definition of patent scope immensely simplifies nearly every succeeding litigation step. For example, accused infringers often argue that claims ought to be construed narrowly, in which case the allegedly infringing subject matter will not fall within the claim. But, should the claims be construed broadly, the claims will not meet the statutory standards for patent validity.[116] Early claim construction may permit the litigants to concentrate on infringement and ignore validity,

112. Vaughn R. Walker, Chief Judge, & William Alsup, District Judge, Northern District of California, Remarks at the San Francisco Bay Area Intellectual Property Inn of Court (Jan. 17, 2007); *see also* Thomson Consumer Elecs., Inc. v. Innovatron, S.A., 43 F. Supp. 2d 26, 28-29 (D.D.C. 1999) (noting that claim construction without an infringement or validity context requires the court to render "blind justice" and borders on an advisory opinion).

113. According to this model, the Federal Circuit ought to reverse less frequently when district courts construe claims *late* in the trial. This prediction merits empirical testing.

114. A 2002 survey of practitioners by the ABA Intellectual Property Law Section reported that claims were construed after trial began in just 6% of cases. *See* ABA SECTION OF INTELL. PROP. LAW, COMM. NO. 601 – FEDERAL TRIAL PRACTICE AND PROCEDURE, ANNUAL REPORT 2002-2003, at 2, 4-5 (reporting survey results), *available at* http://www.abanet.org/intelprop/annualreport05/content/02-03/COMMITTEE%20NO%20601.pdf. The survey found that claim construction occurred most frequently (in 78% of cases) after discovery but before trial. *Id.*

115. *See, e.g.*, David H. Binney & Toussaint L. Myricks, *Patent Claim Interpretation After* Markman *– How Have the Trial Courts Adapted?*, 38 IDEA 155, 184-85 (1997) (arguing claims should be construed at the close of discovery or earlier); 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, 70-71 (2001) (arguing for as early construction as possible); 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, 83-85 (1999) (arguing that construction in connection with summary judgment is optimal).

116. See Amgen, Inc. v. Hoechst Marion Roussel, Inc, 314 F.3d 1313, 1330 (Fed. Cir. 2003) ("It is axiomatic that claims are construed the same way for both invalidity and infringement. But because the features of the accused product or process are often undisputed, this axiom invites a common approach in the appellate arguments by accused infringers: the principal argument challenges the correctness of a trial court's broad claim construction; the contingent argument, assuming the trial court's claim construction is affirmed, challenges validity under 35 U.S.C. § 112 ¶ 1 of the asserted patents in light of that broad construction." (internal citation omitted)).

or vice versa. Claim scope may determine whether extensive discovery is necessary to investigate the allegedly infringing subject matter's details to thereby resolve the infringement question; whether the patentee's personnel and legal counsel may be deposed to determine whether the patentee has disclosed its best mode of practicing the invention;[117] or whether the patentee satisfied the duty of candor while prosecuting the patent before the Patent and Trademark Office.[118] Claim scope may also determine whether expert testimony concerning the state of the art is relevant to answer questions of non-obviousness[119] or enablement.[120] Early resolution of a claim-scope dispute may obviate the need to litigate these issues altogether. Further, if the *Markman-Cybor* regime's goal was to promote the early disposition of cases by summary judgment, construing claims late in the trial process may frustrate that goal.[121] Claim construction predictability advocates must consider whether predictability between trial and appeal is valuable enough to make such sacrifices worthwhile.

But less costly prescriptions also follow from the conclusion that reversal is a consequence of information effects. First, if the set of information available in a claim construction decision strongly influences outcome, we ought to define and circumscribe the kinds of information available during claim construction, and define the appropriate weight to be accorded to particular kinds of information. If all observers (judicial or otherwise) begin with approximately the same set of information, we maximize the likelihood of achieving consistent interpretations. Second, if information order and related effects shape interpretation, we ought to define and regularize the process by which information is received and processed during the claim construction inquiry. While no two information presentations will coincide exactly, the definition of a standard process would permit differently situated observers to follow the same path through the evidence relevant to claim construction. By standardizing the order and mode with which information is presented, we could minimize the effects of information order.

These prescriptions are precisely the opposite of the course the Fed-

117. *See* 35 U.S.C. § 112 (2006).

118. *See, e.g.*, Molins PLC v. Textron, Inc., 48 F.3d 1172, 1178 (Fed. Cir. 1995) (describing duty of candor in patent prosecution).

119. *See* 35 U.S.C. § 103(a) (2006) (barring patentability if invention would be obvious to a person having ordinary skill in the art).

120. *See* § 112 (requiring written description to enable person skilled in the art to practice invention).

121. One might compromise by delaying claim construction to immediately prior to summary judgment. However, while such compromise sacrifices the possibility of streamlining discovery, it would promote reckonability only to the extent that the district judge has more context for interpretation at the summary judgment stage than he or she would earlier in the litigation.

eral Circuit has chosen, particularly in the court's recent attempt to lay down the definitive law of claim construction in *Phillips*. In *Phillips*, the Federal Circuit, sitting en banc, reaffirmed that any evidence – the words of the claim, their context within the claim in question and within other claims, as well as "the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art"[122] – ought to be considered if relevant to claim construction.[123] And aside from expressing a general preference for intrinsic evidence over extrinsic evidence,[124] the court expressly declined to establish a hierarchy or weighting that would favor particular kinds of evidence over others.[125] The court therefore chose to leave the set of information available for claim construction – and the internal sorting of that set – largely unbounded.

The Federal Circuit has similarly declined to specify an order for the interpretative process. While *Markman* entrusted claim interpretation to the district judge,[126] the Federal Circuit leaves district judges free to construe claims by nearly any procedure and at any point during the litigation.[127] And although in the years leading up to *Phillips* the Federal Circuit seemed to be developing a defined order of consideration for the different forms of evidence relevant to claim construction,[128] the *Phillips* court rejected the proposition that district courts ought to follow a prescribed sequence of steps or algorithm in construing claims.[129] If the outcome of the interpretive process is particularly susceptible to order effects, then the Federal Circuit's refusal to dictate the legal or conceptual order of that process will continue to generate discrepancies between the district courts' and the Federal Circuit's claim construction decisions. While this lack of stability may not be as dire as many com-

122. Phillips v. AWH, 415 F.3d 1303,1314 (Fed. Cir. 2005) (en banc) (internal citations and quotations omitted).

123. The court did emphasize that the underlying inquiry was narrow: the claim's meaning is that which one skilled in the art of the invention would ascribe to it within the context of the entire patent. *Id.* at 1313.

124. *Id.* at 1317-19.

125. *See id.* at 1324 ("[W]hat matters is for the court to attach the appropriate weight to be assigned to those sources in light of the statutes and policies that inform patent law."); *cf.* U.C.C. § 2-208 (1998) (setting forth a hierarchy of evidence for contract interpretation).

126. *See* Markman v. Westview Instruments, 517 U.S. 370, 390-91 (1996) (holding that judges, not juries, should interpret patent claims).

127. *See* Binney & Myricks, *supra* note 115, at 163-70 (surveying diversity of district court timings); Lane & Pepe, *supra* note 115, at 63-64 (noting the flexibility of district court claim interpretation procedures).

128. *See, e.g.*, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 320 F.3d 1339, 1346-47 (Fed. Cir. 2003) (setting forth ordered process for defining claim term meaning).

129. *Phillips*, 415 F.3d at 1324. In this respect the Federal Circuit seems to have endorsed the "holistic" approach to claim construction identified by Wagner and Petherbridge, rather than the more rule-bound "procedural" approach. *See generally* Wagner & Petherbridge, *supra* note 23.

mentators fear, the Federal Circuit's cautious course in *Phillips* seems to guarantee that, at least between trial and appeal, claim construction decisions will remain unstable.

In this Article I have attempted to explain the apparently anomalous frequency with which district courts are reversed in patent claim construction decisions. But in conclusion let me suggest that claim construction, or patent law in general, is not the only field that demands an explanation for why trial courts are reversed so often. What we observe in claim construction, assuming the accuracy of the pertinent empirical studies, is essentially an excess of reversals over dissents. Although some legal regimes are more indeterminate than others, legal indeterminacy yields both reversals and dissents. Empirical study shows that the frequency of reversal and dissent is in fact correlated across the various legal regimes the Federal Circuit supervises.[130] More generally, empirical studies demonstrate that in a given case reversal of a district court correlates with dissent at the appellate level.[131] Claim construction is curious because the available empirical data suggest an elevated reversal rate without a significantly elevated rate of dissent.[132] This disparity suggests that factors other than legal indeterminacy are responsible for the rate at which the Federal Circuit reverses district courts on claim construction issues.[133] I have therefore sought the explanation for the elevated rate of reversal in reasons independent of the underlying substantive legal regime.

However, these reasons may be necessary to explain the incidence of reversal in all fields of law, not just the law of claim construction. To see why, consider a very simple model of trial and appellate decisionmaking.[134] Assume that, as for most litigation in the federal system, cases are decided by a trial court consisting of one judge and reviewed by an appellate court consisting of three judges.[135] Assume that each judge reaches a "correct" or "incorrect" outcome in a case, with a certain probability of reaching the correct result. Assume further that each judge, whether trial or appellate, has an identical probability of reaching

130. *See generally* Lefstin, *supra* note 23, at 1064-65.

131. *See* VIRGINIA A. HETTINGER, STEFANIE A. LINDQUIST & WENDY L. MARTINEK, JUDGING ON A COLLEGIAL COURT 71 (2006) (showing statistically significant influence of reversal parameter on odds of dissent).

132. *See supra* Part II.

133. *See supra* Part II.

134. This model is based on the one described by Gelfand and Solomon, here modified for one rather than three trial judges and three rather than seven appellate judges. *See* Alan E. Gelfand & Herbert Solomon, *A Study of Poisson's Models for Jury Verdicts in Criminal and Civil Trials*, 68 J. AM. STAT. ASS'N 271, 275 (1973).

135. *See, e.g.*, 28 U.S.C. § 46(c) (1996) (authorizing Circuit Courts of Appeal to sit in panels of three); 28 U.S.C. § 132(a) (2007) (authorizing district courts to sit as single judges).

a correct or incorrect outcome. Under such conditions, it is possible to demonstrate mathematically that appellate dissents ought to outnumber trial court reversals by a ratio of between about 1.5:1 and 2:1, depending on the probability of individual error.[136] Such ratios are not observed in practice. Studies of dissent and reversal at the U.S. Circuit Courts of Appeal show that, rather than dissents outnumbering reversals, reversals outnumber dissents by a ratio of somewhere between 3.2:1 and 3.9:1.[137] In other words, federal trial courts are reversed about 400% to 700%

136. This ratio is derived from the formulae provided by Gelfand and Solomon, as follows: if the probability of a judge reaching the correct result is given by μ, then μ also represents r, the probability of a district court reaching the correct decision. The probability of a court of three identical judges reaching the correct result is $r' = \mu^3 + 3\mu^2(1 - \mu)$. *Id.* at 275. This equation represents the probability of all three judges reaching the correct result (μ^3), plus the sum of the probabilities for the three permutations where two judges reach the correct result (μ^2) and one reaches the incorrect result ($(1 - \mu)$). The appellate court affirms when both courts reach the same result, correct or incorrect, and reverses when the courts reach different results. The probability of an affirmance is therefore the sum of the probability that both courts reach the correct result, and the probability that both courts reach the wrong result, $C = rr' + (1 - r)(1 - r')$. *Id.* The probability of reversal is therefore $1 - C$. Likewise, the probability of a unanimous decision by the appellate court of three identical judges is given by the relation $a = \mu^3 + (1 - \mu)^3$, i.e., all three judges reach the correct result (μ^3) or all three reach the wrong result ($(1 - \mu)^3$). The probability of a non-unanimous decision, yielding a dissent, is $1 - a$. *See id.* Calculation of the probability of dissent and reversal, and the ratio between the two, for various values of μ is shown in the following table:

μ (= r, 1 judge)	r', 3 judges	Reversal ($1 - C$)	Dissent ($1 - a$)	Dissents:Reversals
0.10	0.03	0.12	0.27	2.21
0.20	0.10	0.26	0.48	1.83
0.30	0.22	0.39	0.63	1.63
0.40	0.35	0.47	0.72	1.53
0.50	0.50	0.50	0.75	1.50
0.60	0.65	0.47	0.72	1.53
0.70	0.78	0.39	0.63	1.63
0.80	0.90	0.26	0.48	1.83
0.90	0.97	0.12	0.27	2.21

The ratio of dissents to reversals approaches 3 as μ approaches 0 or 1, but of course the number of dissents and reversals approaches 0 under such conditions.

137. *See* SONGER, SHEEHAN & HAIRE, *supra* note 29, at 105 (reporting rates of dissent and reversal at the U.S. Courts of Appeals from 1925-1988). While the rate of reversal remained relatively constant, varying from 26% to 31%, the rate of dissent increased from 3.13% in 1925-36 to 9.43% in 1970-88. *Id.* Calculation of the ratio of reversals to dissents from these rates yields ratios ranging from 3.23:1 to 3.92:1, except for 1925-36 in which the ratio is higher, 9.78:1. The proportion of cases reversed may be fairly constant over long periods of time and even across different judicial systems. Poisson's studies of civil cases appealed in all judicial departments of France from 1831 to 1833 found that 11,747 cases were affirmed at 5,410 reversed, yielding a reversal rate of 31.5%, quite close to that reported by Songer, Sheehan and Haire. *See* Gelfand & Solomon, *supra* note 134, at 276-77 (reproducing and analyzing studies performed by Poisson in France's judicial system from 1825-1833).

more frequently, relative to dissents, than they ought to be under the simple model.

We certainly may quibble with the simple model's assumptions. Appellate judges may be more accurate than trial judges at reaching a "correct" result, in part because they have more power to set the rules of what constitutes "correct."[138] Unquestionably, social and institutional pressures cause appellate judges to refrain from expressing dissent in some fraction of cases in which they nonetheless disagree with the majority's outcome.[139] Refining the simple model to account for these effects would increase the ratio of reversals to dissents, bringing the model more in line with the observed statistics. If, however, we are not convinced that these two refinements could account entirely for the rather large excess of observed reversals, we must look elsewhere for an explanation. The effects I have described here – essentially, the significance of perspective in judicial decisionmaking – may explain why the convergence of appellate judgments and their divergence from the judgments of trial courts are general features of the legal system.

138. Note, however, that the power to fashion rules of law leads to additional opportunities for dissent, in the form of disagreements about what that rule of law ought to be.

139. *See, e.g.*, LEARNED HAND, THE BILL OF RIGHTS 72 (1958) (arguing that dissent threatens to cancel "the impact of monolithic solidarity on which the authority of a bench of judges so largely depends"); *see also* Lefstin, *supra* note 23, at 1033-34 (reviewing structural judicial variables that suppress the expression of dissent).