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A Penguin's Defense of the Doctrine of Equivalents

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A PENGUIN'S DEFENSE OF THE DOCTRINE OF EQUIVALENTS: APPLYING COGNITIVE LINGUISTICS TO PATENT LAW

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INTRODUCTION

There is no dearth of commentary about the doctrine of equivalents in patent law.[1] Many articles proclaim the doctrine's death, often noting its passage with unbridled delight.[2] Some articles provide empirical evidence to support the assertion that the doctrine of equivalents is dead.[3] Others simply yearn for the doctrine to fade

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[1] For just a few of the many possible examples, see Timothy R. Holbrook, *Equivalency and Patent Law's Possession Paradox*, 23 HARV. J.L. & TECH. 1 (2009); Michael J. Meurer & Craig Allen Nard, *Invention, Refinement, and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents*, 93 GEO. L.J. 1947 (2005); Nicholas Pumfrey et al., *The Doctrine of Equivalents in Various Patent Regimes – Does Anybody Have it Right?*, 11 YALE J.L. & TECH. 261 (2008); Harold C. Wegner et al., *The Future of the Doctrine of Equivalents*, 26 AIPLA Q.J. 277 (1998).

[2] *See, e.g.*, Charles W. Adams, *The Doctrine of Equivalents: Becoming a Derelict on the Waters of Patent Law*, 84 NEB. L. REV. 1113, 1113 (2006); John R. Allison & Mark A. Lemley, *The (Unnoticed) Demise of the Doctrine of Equivalents*, 59 STAN. L. REV. 955, 958 (2007); Lee Petherbridge, *On the Decline of the Doctrine of Equivalents*, 31 CARDOZO L. REV. 1371, 1404 (2010).

The doctrine's demise has also been heralded by non-academic law media. *See, e.g.*, Eugene R. Quinn, *A Slow Death? Killing the Doctrine of Equivalents*, 164 PAT. WORLD 50, 50 (2004), *available at* http://ipwatchdog.com/articles/Aug-04-Closing.pdf; Victoria Slind-Flor, *Doctrine of Equivalents Receives Death Blow in Federal Circuit*, N.Y. L.J., Dec. 14, 2000, at 5 (noting that "the doctrine of equivalents is now either dead or terminally ill").

[3] *See, e.g.*, Allison & Lemley, *supra* note 2.

from use, pointing out that no court has "articulated a convincing rationale" for the doctrine's continued use.[4] But maybe these scholars have it wrong. It may be true that the instances of doctrine of equivalents analysis in patent cases are on the decline and successful outcomes based on the doctrine waning further. But these observations tell only a small part of the story. This Article contends that, despite evidence to the contrary, the death of the doctrine of equivalents has been greatly exaggerated.[5]

The birth of the doctrine of equivalents was noble enough; it was created to soften the blow associated with literal interpretation of patent claim terms. During patent litigation, claims of the patent are generally construed as lists of necessary and sufficient features or conditions. During infringement analysis, if each and every claimed feature or condition is found in the accused device or process, infringement is found. Infringement, then, can be viewed like traditional set theory, where an object is deemed a member of a class if it meets the required attributes of the class.[6] The discontent with this system comes when the accused device or process does not squarely satisfy each of the features or conditions of the claim, yet is essentially the same as the patented invention. Courts have

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[4] *See* Adams, *supra* note 2, at 1116; Joshua D. Sarnoff, *Abolishing the Doctrine of Equivalents and Claiming the Future After* Festo, 19 BERKELEY TECH. L.J. 1157 (2004).

At least one commentator, however, rues the demise of the doctrine of equivalents. *See* John F. Duffy, George Wash. Univ. Law School, Thirteenth Annual Honorable Helen Wilson Nies Memorial Lecture in Intellectual Property Law: Innovation and Recovery (Oct. 21, 2009), *in* 14 MARQ. INTELL. PROP. L. REV. 237, 256 (2010) ("The demise of the doctrine of equivalents is a shame . . . .").

[5] With apologies to Mark Twain, who remarked, "The report of my death was an exaggeration." MARK TWAIN: THE COMPLETE INTERVIEWS 317 (Gary Scharnhorst ed., 2006).

[6] *See, e.g.*, ChangingMinds.org, Set Theory, http://changingminds.org/disciplines/argument/syllogisms/set_theory.htm (last visited March 31, 2011) ("In set theory, we say A is a member of B. . . . This means that A has *all* the attributes of B, that A is a B in all respects.").

been loath to excuse infringers who take the essence, if not the exact parameters, of the patented invention, whether intentionally or not.[7] The doctrine of equivalents was thus crafted to permit a finding of infringement, even where the accused device or process does not literally infringe the claim and to prevent an infringer from avoiding liability by making trivial changes.[8]

The aspirations of the doctrine, however, reach farther. Effective application of the doctrine eases the difficulty of describing and defining the boundaries of new inventions using words.[9] The doctrine moderates the differences between what the inventor invented, what the patent claims, and what of the invention could reasonably be described in the words of the claim.[10] But if the doctrine of equivalents is dead, as many contend, where does that leave us?

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[7] Patent infringement lies whether the alleged infringer has copied the device or process from the patent directly, independently invents the device or process, or knowing of the patent, attempts to make his invention different enough from the patented invention to escape liability. Although one of the justifications for the doctrine of equivalents is to prevent "unscrupulous copyists," the allegation of outright copying is rare. *See* Christopher A. Cotropia & Mark A. Lemley, *Frontiers in Empirical Patent Law Scholarship: Copying in Patent Law*, 87 N.C. L. REV. 1421, 1423–24 (2009).

[8] *See* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 21 (1997); Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 733 (2002).

[9] "Th[e] conversion of machine to words allows for unintended gaps which cannot be satisfactorily filled. Often the invention is novel and words do not exist to describe it. The dictionary does not always keep abreast of the inventor. It cannot. Things are not made for the sake of words, but words for things."

Autogiro Co. of Am. v. U.S., 384 F.2d 391, 397 (Ct. Cl. 1967). *See Festo*, 535 U.S. at 731 ("Unfortunately, the nature of language makes it impossible to capture the essence of a thing in a patent application.").

[10] *See* Kenneth D. Bassinger, *Allocating Linguistic Uncertainty in Patent Claims: The Proper Role of Prosecution History Estoppel*, 49 LOY. L. REV. 339, 340 (2003) ("The subtle nuances of inventive genius are not readily described by the often strict confines imposed by language."); *Festo*, 535 U.S. at 733 ("The doctrine of equivalents allows the patentee to claim those insubstantial alterations that were not captured in drafting the original patent claim but which could be created through trivial changes.").

Although language and its usage expand every day to allow for discussions of new ideas and technology, it still remains difficult, if not impossible, to describe any new invention in words. In short, the problems that gave rise to the doctrine are as present today as ever. If the problem remains, then perhaps the erstwhile solution provided by the doctrine of equivalents is also still vibrant. Despite the arguments and evidence that the doctrine is dead, the truth is more likely that the work previously done by the doctrine is now being performed at a different stage of the infringement analysis, and for good reason. Rather than requiring a specialized (and much derided) doctrine to soften the blow of literally interpreting language, this activity is more naturally performed at the time of construction and infringement determination. In fact, as humans, this is our intuition.

Cognitive linguistics is the study of how humans naturally think about and understand language. Some of this understanding comes from the mental creation of categories, organized around what is thought to be the "best" example of the category, *i.e.*, the prototype.[11] When new objects or experiences are encountered, they are not placed into mental categories based on a list of necessary and sufficient conditions, as is done in traditional set theory. Rather, cognitive linguistics has been described as a type of fuzzy set theory. When encountering something new, the natural tendency is to categorize the new object or experience based on the extent to which it resembles the prototype of the category in question versus the extent to which it resembles other prototypes and categories. The new object or experience may be categorized even if it lacks one or more of the characteristics of the prototype. An object or experience can be a "good" member of the category if it closely resem-

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[11] *See* Laura A. Janda, *Cognitive Linguistics* 13–15 (2006), http://ssrn.com/abstract=1408069.

bles the prototype, but a "lesser" member of the category if the resemblance is not so much. Thus cognitive linguistics allows for a kind of fuzzy definition of categories and members.

For a simple example, consider the category **bird**.[12] One way to define **bird** would be to develop a list of features that a bird must have, such as wings, feathers, and the ability to fly.[13] Many common birds, such as robins, wrens, sparrows, and cardinals, would fulfill all these criteria and be classified as **birds**. There are other animals that are birds that would not meet the given requirements; penguins do not fly or have regular feathers. Under usual set theory, the penguin is not a **bird** because it does not fulfill the necessary and sufficient criteria to be within **bird**. If instead we define **bird** as we do in cognitive linguistics, we may identify a particular bird, such as a robin, to be the prototype of the category **bird**. All other animals would then be compared to the prototypical robin to determine the extent of resemblance, and thus the level of membership in the category. Wrens, sparrows, and cardinals are easily classified as **bird** because the level of resemblance to a robin is quite high. Penguins, however, differ significantly from robins. Yet, in comparing the penguin to prototypes for other categories, such as the terrier for **dog** and the tabby for **cat**, it becomes clear that the penguin is most similar to, and thus is considered a member of, **bird**.

Returning to patent law—what if instead we interpret claims and determine infringement as is done in regular speech, using pro-

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[12] As a matter of convention, a given category will be indicated by bold text to distinguish it from a singular instance of the same.

[13] The **bird** example given in this paragraph is drawn from work done by Eleanor Rosch, who is considered among the founders of the cognitive linguistics and prototype theory. *See, e.g.*, Eleanor Rosch, *Principles of Categorization*, *in* COGNITION AND CATEGORIZATION 27 (Eleanor Rosch & Barbara B. Lloyd eds., 1978). *See also infra* Section IIA .

totypes and categories? As an everyday matter, we already know how to soften the blow of literally interpreting language. By viewing the claim as construed as the prototypical member of the category **claim**, then an allegedly infringing device or process can be compared to the construed claim language to determine if it bears sufficient resemblance to the prototype to be categorized as such. If so, the accused device or process becomes a reasonably strong member of **claim**, and thus infringes. In this light, the decline in the application in the doctrine of equivalents may simply signal that the old, set theory-based infringement analysis has given way to the prototype categorization method. To wit—the doctrine of equivalents is not truly dead, because a penguin is still a bird.

This Article, in Part I, describes the life and alleged death of the doctrine of equivalents, including where the doctrine of equivalents comes from and why so many commentators presume or pray for it to be moribund. Part II explicates in more detail the notions from cognitive linguistics discussed above, specifically categories, prototypes, and members. Part III of this Article connects these two disparate discussions and explains why cognitive linguistics demonstrates that the underlying notions behind the doctrine of equivalents are present in everyday human understanding of language. Regardless of when and where it is done, how people understand and think about language can simply not be divorced from patent law. This Article concludes that the heart and soul of the doctrine of equivalents is still very much alive.

I. THE FUZZY LIFE OF THE DOCTRINE OF EQUIVALENTS

[T]he doctrine of equivalents . . . relieve[s] an inventor from a semantic strait jacket when equity requires . . .

-- Chief Judge Howard Markey, Federal Circuit[14]

A patent infringement lawsuit generally involves construing the asserted claims of a patent and comparing the claims as construed to an allegedly infringing device or process.[15] Ideally, claims are construed early in patent litigation, as the interpretations often decide, or at least significantly direct the outcome of, the case.[16] During claim construction, each party typically offers its own definitions; the plaintiff proffers an interpretation of disputed terms that will result in a likely finding of infringement, the defendant submits definitions that will prohibit a finding of infringement and may also affect the invalidity of the patent. The judge then defines the terms, giving boundaries to the scope of the patent claims; basically, the judge constructs a fence around the patentee's exclusive territory.[17]

The jury, or judge in a bench trial, then determines whether the alleged infringing device or process fits within the bounds of the

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[14] Perkin-Elmer Corp. v. Westinghouse Elec. Corp., 822 F.2d 1528, 1532-33 (Fed. Cir. 1987).

[15] An additional step of analyzing any defenses asserted, such as invalidity or inequitable conduct, may also occur. While outside the scope of this paper, this step too revolves around the understanding of patent claims. *See, e.g.*, Rockwell Int'l Corp. v. United States, 147 F.3d 1358, 1362 (Fed. Cir. 1998).

[16] *See, e.g.*, Markman v. Westview Instruments, Inc., 52 F.3d 967, 989 (Fed. Cir. 1995) (en banc) (Mayer, J., concurring) ("[T]o decide what the claims mean is nearly always to decide the case."), *aff'd*, 517 U.S. 370 (1996).

[17] *See* Craig Allen Nard, *Certainty, Fence Building, and the Useful Arts*, 74 IND. L.J. 759, 759 (1999) ("Patent law is about building fences."). *But see* Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PA. L. REV. 1743, 1799 (2009) (concluding that patent law would benefit from thinking of claim construction in terms of sign posts rather than fence posts).

claims as construed.[18] Literal infringement is found if every element or limitation of the construed claim is present in the accused device or process—in other words, the necessary and sufficient conditions are met or the accused device or process falls within the defined fence.[19] Where the accused device or process does not fall squarely within the boundaries of the asserted claim as construed, liability for infringement may still be found under the doctrine of equivalents.[20] The doctrine essentially creates, outside of the fence, a relatively narrow fuzzy area in which the alleged infringer may still be held liable. The doctrine's main justification is fairness—patent protection would be "hollow and useless" if a competitor can avoid an infringement finding by including a trivial difference that would move the infringer from within to just without the fence constructed by the judge.[21]

But in creating this fuzzy area outside the border of the patent claims, however beneficial to the patentee, the doctrine defeats, or at least diminishes, the public notice function performed by patent claims.[22] Patent claims should provide information about what subject matter is open for public use and experimentation, as well as what is not available for use without infringement.[23] Given the individual importance of each of these two competing interests—fairly maintaining patent value versus fulfilling the public notice

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[18] *See, e.g.*, Bai v. L & L Wings, Inc., 160 F.3d 1350, 1353 (Fed. Cir. 1998).

[19] *See* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 28 (1997).

[20] *See* Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 727 (2002) ("[A] patent protects its holder against efforts of copyists to evade liability for infringement by making only insubstantial changes to a patented invention.").

[21] *See* Graver Tank & Mfg. Co. v. Linde Air Prods. Co., 339 U.S. 605, 607 (1950).

[22] *See Warner-Jenkinson*, 520 U.S. at 29.

[23] *See, e.g.*, Athletic Alternatives v. Prince Mfg., 73 F.3d 1573, 1581 (Fed. Cir. 1996); Burk & Lemley, *supra* note 17, at 1791 ("The ostensible purpose of [patent claims include] placing the public on notice as to the limits of the patent, warning the public away from the claimed technology, and demarcating the boundary between infringing and non-infringing activity.").

function—it is not surprising that the doctrine of equivalents has lived a much storied life. The doctrine has received extensive treatment by the Supreme Court, spanning over a century and a half, and even more analysis at the hands of the Federal Circuit since its inception in 1982.[24] A brief look at the Court's treatment of the document demonstrates the difficulties in balancing fairness with notice.

A. IN THE BEGINNING

Early in the United States patent system, patent scope was determined not via claims, but by the patent document as a whole, in a practice known as central claiming.[25] Particularly, the patentee's exclusive territory included the embodiments described in the full description and drawings of the patent.[26] In 1854, the Supreme

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[24] Supreme Court treatment ranges from 1854 in *Winans v. Demead*, 56 U.S. (15 How.) 330, 334-36 (1854), to 2002, in *Festo*, 535 U.S. 722. In the mere 28 years the Federal Circuit has been in existence, it has heard some 577 cases about the doctrine of equivalents, measured by searching all cases of the Federal Circuit that mention the doctrine of equivalents at least 5 times. LexisNexis, http://www.lexisnexis.com (last visited Apr. 6, 2011) (search performed by searching for "atl 5 (doctrine of equivalents)" after following the "Federal Legal - U.S." hyperlink, then "Find Cases," then "Federal Courts by Circuit," then "Federal Cases by Circuit," then "Federal Circuit - US Court of Appeals Cases"). The earliest case discovered by the search was *SSIH Equip. S.A. v. U.S. Int'l Trade Comm'n*, 718 F.2d 365 (Fed. Cir. 1983); the most recent case is *Siemens Med. Solutions USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 2011 US App. LEXIS 3546 (Fed. Cir. Feb. 24, 2011).

[25] *See* Adams, *supra* note 2, at 1117; Karl B. Lutz, *Evolution of the Claims of U.S. Patents*, 20 J. PAT. OFF. SOC'Y 134, 135-37 (1938).

[26] Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512, 1565-66 (Fed. Cir. 1995) (Nies, J., dissenting), *rev'd sub nom.* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17 (1997).

> "The majority in Winans endorsed central claiming, subordinating the claim to the fuller description and the drawings of the invention contained in other parts of the patent. . . . It continued to be left to the courts to sift through the entirety of the patent description to determine what were the

Court recognized a significant limitation of the central claiming system, namely that the patent's scope was constrained to only the embodiments depicted. But to limit the scope to only the embodiments described was unfair; to expect the patentee to illustrate every possible modification and option was impractical.[27] The Supreme Court addressed this shortfall in the case of *Winans v. Demead*.[28] In this case, the patent taught a train car with a circular bottom to better distribute the weight of the load; the alleged infringer made similar train cars that were octagonal rather than circular.[29] The Court reversed the trial court's holding of no infringement, remanding the case to determine if the octagonal shape was "so near to a true circle as substantially to embody the patentee's mode of operation, and thereby attain the same kind of result as was reached by his invention."[30]

Central claiming gave way to peripheral claiming in the Patent Act of 1870.[31] This made mandatory the inclusion of claims at the end of the patent document and set forth the claims as the boundary of the exclusive territory granted by the patent.[32] In many respects the peripheral claiming system was a positive change. First, the patentee was able to more clearly delineate the metes and bounds of his invention, rather than having to rest on what the

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material elements embodying the 'principle' or 'essence' of the invention . . . ."

[27] *Winans*, 56 U.S. at 343–44.

[28] *See id.*

[29] *See id.* at 331–32.

[30] *See id.* at 344.

[31] *See Hilton Davis*, 62 F.3d at 1566 ("The amendment of the patent statute by the Act of 1870, while a small language change, was interpreted to effect a major change from central to peripheral claiming, or at least a modified form of peripheral claiming.").

[32] 35 U.S.C. § 112 (2006) ("The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.").

court believed to be inventive.[33] Second, the patentee could realistically provide a number of potential embodiments without creating an unwieldy patent document, as would have been required under the central claiming system. Specifically, rather than having to fully describe each potential embodiment that the inventor wished to cover in the patent specification, he could more broadly describe a "preferred" embodiment and then use multiple claims to signal variations on that preferred embodiment.[34] Both of these changes should have diminished the need for the doctrine of equivalents.

Nearly a century passed before the Supreme Court next spoke on the doctrine of equivalents. In 1950, the Court affirmed the viability of the doctrine in *Graver Tank & Manufacturing Co. v. Linde Air Products Co.* Again, focusing on fairness, the Court reasoned that the doctrine was necessary to prevent competitors from making insignificant changes to a patented invention without liability, thereby devaluing the patent.[35] After the Court affirmed the doctrine of equi-

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[33] *See* Adams, *supra* note 2, at 1119.

[34] Robert H. Resis, *Reducing the Need for Markman Determinations*, 4 J. MARSHALL REV. INTELL. PROP. L. 53, 55 (2004).

> "The Federal Circuit also has held that the claims are not limited to the preferred embodiment(s) disclosed in the detailed description. To avoid being limited to what they specifically disclose, patent applicants can simply draft dependent claims that are broader than their preferred embodiment(s). Regardless, patent applicants are presumably not limited to the preferred embodiment(s)."

However, the claims cannot extend well beyond the scope of the written description. *See, e.g.*, Amgen, Inc. v. Chugai Pharm. Co., 927 F.2d 1200, 1214 (Fed. Cir. 1991) ("[T]he scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification to persons of ordinary skill in the art."); O'Reilly v. Morse, 56 U.S. (15 How.) 62, 113 (1854) ("[H]e claims an exclusive right to use a manner and process which he has not described and indeed had not invented, and therefore could not describe when he obtained his patent. The court is of the opinion that the claim is too broad, and not warranted by law.").

[35] Graver Tank & Mfg. Co. v. Linde Air Prods. Co., 339 U.S. 605, 607-08 (1950). The flip side of protecting the patentee, as noted in dissent, is that the use of the doc-

valents in *Graver Tank*, it seemed as though the doctrine would flourish—and it did. Not until some forty-seven years after *Graver Tank* did the Supreme Court take up the doctrine of equivalents yet again, this time to rein it in just a bit. In *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, the Court reaffirmed the doctrine of equivalents, but balanced the doctrine with what is now known as "all elements rule."[36] This limitation on the doctrine was added to salvage some sort of public notice of the scope of patent protection. The Supreme Court also discussed the rule of prosecution history estoppel, a previously-recognized limitation on the doctrine of equivalents that also addressed public notice.[37]

Even after *Warner-Jenkinson*, the doctrine of equivalents would have seemed to have a fairly robust life. The Federal Circuit, however, found the all-elements and the prosecution history estoppel rules difficult to apply; to make things easier, the court imposed an absolute bar in cases of prosecution history estoppel.[38] If a claim

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trine of equivalents imposes the great cost of uncertainty of claim scope. *See id.* at 617 (Black, J., dissenting).

[36] *See* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 40 (1997). The "all elements" rule requires that the doctrine of equivalents is to be performed on an element-by-element basis. *See id.*

[37] *See id.* at 30. *See also* Graham v. John Deere Co., 383 U.S. 1, 33 (1966) (noting that "claims that have been narrowed [during prosecution] in order to obtain the issuance of a patent by distinguishing the prior art cannot be sustained to cover that which was previously by limitation eliminated from the patent."). Prosecution history estoppel is also called file wrapper estoppel in earlier cases. *See Warner-Jenkinson*, 520 U.S. at 30.

[38] It is not too surprising that the Federal Circuit went in this direction post-*Warner-Jenkinson*. In the case's first trip to the Federal Circuit from the trial court, the Federal Circuit affirmed the trial court's finding of infringement under the doctrine of equivalents. Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512, 1528–29 (1995). The Supreme Court granted certiorari, vacated the Federal Circuit's opinion, and remanded the case in light of its new decision. Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 40–41 (1997). On remand, the Federal Circuit affirmed the infringement finding with respect to one of the two patents at issue, but remanded for the trial court to determine prosecution history estoppel with respect

was subject to a narrowing amendment during prosecution, the doctrine of equivalents was wholly unavailable to the patentee. Instead, the patent would be limited to its literal scope, improving public notice. And this bright line rule signaled what many assumed was the doctrine's death march.

B. AND THEN THE "END"

In 2002, the Supreme Court weighed in on the doctrine of equivalents, and particularly the Federal Circuit's bright line rule, in the case of *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*[39] The Court held that the complete bar imposed by the Federal Circuit was inconsistent with both the rationale for the doctrine (the ability to avoid infringement by making a trivial modification) as well as the reason for the prosecution history estoppel limitation (preserving public notice).[40]

The *Festo* Court hinged its opinion on the difficulties of language—namely the inability to perfectly describe an invention in words; the doctrine prevents the patentee from being unfairly limited by his words.[41] However, the test ultimately set forth in the

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to the second patent. Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 114 F.3d 1161, 1162–63 (1997).

[39] Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722 (2002).

[40] *Id.* at 737–38.

[41] *Id.* at 738.

> "It does not follow, however, that the amended claim becomes so perfect in its description that no one could devise an equivalent. After amendment, as before, language remains an imperfect fit for invention. The narrowing amendment may demonstrate what the claim is not; but it may still fail to capture precisely what is."

See Adams, *supra* note 2, at 1151–52 (noting that the exceptions to prosecution history estoppel are based on whether at the time of amendment one skilled in the art could reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent).

case has little to do with language or preserving patent value. *Festo* provides a list of three circumstances that would permit a patentee to seek infringement under the doctrine of equivalents, even if a narrowing amendment had been made to that claim:[42] that the equivalent was unforeseeable at the time of amendment, that the reason for amendment bears only tangential relation to the equivalent in question, or that there may be some other reason, such as the limitations of language, that the patentee could not reasonably be expected to have described the insubstantial substitute in question.[43] The one rebuttal that may actually be related to the problem being solved—the inadequacy of language—is the one that is most circumspect.[44] In any case, all three circumstances are to be interpreted narrowly.[45] In the end, it seems that public notice prevailed over fairness.

Although many scholars point to *Festo* as sounding the doctrine of equivalents' purported death knell, others argue that the doctrine of equivalents died when the *Markman* opinion was issued in 1996. In *Markman*, the Supreme Court took the task of claim construction from the jury and rested interpretation power solely with the judge.[46] Theoretically, the doctrine of equivalents and the bases for *Markman* are at odds. The purpose of *Markman* was to improve claim construction, because uniform claim constructions and cer-

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[42] *See Festo*, 535 U.S. at 740–41.

[43] *Id.* at 740–41.

[44] The Federal Circuit did note on remand that "the third criterion may be satisfied when there was some reason, such as the shortcomings of language, why the patentee was prevented from describing the alleged equivalent when it narrowed the claim." Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 344 F.3d 1359, 1370 (Fed. Cir. 2003) (en banc).

[45] *See id.* (noting that "some other reason" must be construed narrowly); *id.* at 1377 (Rader, J., concurring) (limiting the foreseeability criterion to after-arising technologies); Cross Med. Prods. v. Medtronic Sofamor Danek, Inc., 480 F.3d 1335, 1342 (Fed. Cir. 2007) (reaffirming that the tangential rebuttal must be applied narrowly).

[46] Markman v. Westview Instruments, Inc., 517 U.S. 370, 384 (1996).

tainty of claim scope would better serve the public notice function.[47] The doctrine of equivalents, on the other hand, realizes that uniform claim constructions may result in unfairness and purposefully makes the claim scope inconsistent or fuzzy. [48]

In addition to theoretical tension, there is a procedural basis for blaming *Markman* for the decline of the doctrine of equivalents. Before *Markman*, patent infringement cases proceeded generally in one step, as a jury would construe the claims as part of the overall infringement determination. After *Markman*, patent infringement cases were split into two prongs, the judge's claim construction and the jury's determination of infringement based on the claims as construed. Often, the claim construction rendered by the judge proves to be dispositive on the question of literal infringement.[49] Infringement under the doctrine of equivalents still lingers, however, as the question of whether an element in the accused device or process is equivalent to the claimed element is a question of fact. Therefore, the judge has incentive to find non-infringement under the doctrine of equivalents on summary judgment to get the patent case off his docket.[50] Parties generally welcome this, because an opinion that addresses both literal infringement and infringement under the doctrine of equivalents is ripe for appeal to the Federal Circuit. The decline in successful doctrine of equivalents cases may very well be

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[47] *See id.* at 390.

[48] John R. Thomas, *Claim Re-Construction: The DOE in the Post*-Markman *Era*, 9 LEWIS & CLARK L. REV. 153, 155–56 (2005).

[49] *See* Markman v. Westview Instruments, Inc., 52 F.3d 967, 989 (Fed. Cir. 1995) (en banc) (Mayer, J., concurring) ("[T]o decide what the claims mean is nearly always to decide the case."), *aff'd*, 517 U.S. 370 (1996); *id.* at 999 (Newman, J., dissenting) ("Deciding the meaning of the words used in the patent is often dispositive of the question of infringement.").

[50] *See* Allison & Lemley, *supra* note 2, at 977; Petherbridge, *supra* note 2, at 1377.

a sign of a general judicial desire to avoid lengthy and complex patent trials.[51]

From this discussion, it is easy to see why the many commentators assume the doctrine of equivalents is dying, if not already dead. Certainly the doctrine's appearance and its successful use seem to be on the downturn. However, a bit of life lurks beneath the surface. This is where the idea of cognitive linguistics proves insightful.

II. COGNITIVE LINGUISTICS — THE FUZZY EDGES OF WORDS

Language is the source of misunderstandings.
- Antoine de Saint-Exupéry[52]

Linguistics is simply the study of language.[53] Traditional linguistics begins with the pieces of language and examines how they are put together for communication. For example, sounds (phonemes) are joined to make words that serve as basic building blocks (morphemes), to which we can add prefixes and suffixes to create additional words.[54] All of these words have meanings (semantics).[55] The words are combined based on a grammar, or set of rules, to form a sentence or complete idea (syntax).[56] Finally, a group of

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[51] *See* Peter J. Ayers, *Armed and Ready: Defeating Patent Infringement Claims by Summary Judgment*, 81 J. PAT. & TRADEMARK OFF. SOC'Y 421, 448 (1999) (noting that filing for summary judgment on infringement issues after claim construction will result in avoiding an entire trial, at best, or having the case remanded for trial, at worst).

[52] *See* ANTOINE DE SAINT-EXUPÉRY, THE LITTLE PRINCE 60 (Richard Howard trans., South China Printing 2000) (1943).

[53] *See* Peter M. Tiersma, *The Judge as Linguist*, 27 LOY. L.A. L. REV. 269, 269 (1993).

[54] *See, e.g.*, Jiri Janko, Note, *Linguistically Integrated Contractual Interpretation: Incorporating Semiotic Theory of Meaning-Making into Legal Interpretation*, 38 RUTGERS L.J. 601, 613–17 (2007).

[55] *See id.*

[56] *See id.*

ideas or sentences, when considered in context, can acquire additional meaning (pragmatics).[57]

Cognitive linguistics takes a different approach, starting with a conversation as a whole and breaking it down based on the function and use of language. Rather than viewing language as a combination of little bits of sounds and words, as is the case in traditional linguistics, cognitive linguistics view language as a reflection of the human mind.[58] In this way, understanding language can tell us interesting things about how human beings see and comprehend the world.

For the purposes of this paper, and perhaps for understanding language in any case, the focus must be the set of words that humans use to perceive, appreciate, and discuss their world.[59] Knowledge of language, or more precisely the creation of vocabulary, comes generally from use. Consider how children acquire their first language. The initial words learned are those used for labeling—that is, mapping a word to a concept, such as *dog* or *mama*. But the child then learns that all animals are not dogs and all caregivers or women are not mama. The child then has to learn how far to extend the labeled concept and by what measure things fit within or without the concept.[60] Language acquisition thus extends from labeling to categorization, a key feature of cognitive linguistics.[61]

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[57] *See id.*

[58] *See, e.g.*, Carl S. Bjerre, *Secured Transactions Inside Out: Negative Pledge Covenants, Property and Perfection*, 84 CORNELL L. REV. 305, 355 (1999).

[59] *See, e.g.*, DAVID A. WILKINS, LINGUISTICS IN LANGUAGE TEACHING 111 (Hodder Arnold 1974) (1972) ("[W]ithout grammar very little can be conveyed, without vocabulary nothing can be conveyed.") (emphasis omitted).

[60] Yanqing Chen, *A Cognitive Linguistic Approach to Classroom English Vocabulary Instruction for EFL Learners in Mainland China*, 2 ENG. LANGUAGE TEACHING 95, 95 (2009) ("[C]ognitive linguistics is an approach that is 'based on our experience in the world and the way we perceive and conceptualize it,' an approach to the analysis of natural language that focuses on language as an instrument for organizing,

A. PROTOTYPE SEMANTICS

When encountering a word or situation for the first time, it is natural for us to determine how the new word or situation relates to words and situations we have encountered before. Perhaps it fits within one or more existing categories created from other encounters; perhaps it calls for the definition of the new category, distinguished from the existing categories. In short, meaning comes from experiences, experiences are stored in categories, and future experiences will be stored via inclusion in and relationships to existing categories.[62] Categorization approximates how we, as humans, experience the world and how we conceptualize and process our experiences.

Traditionally, categorization calls to mind set theory. Each category is a set, and the set is defined by a list of necessary and sufficient conditions.[63] An object that satisfies the list of conditions is a member of the set, or category.[64] An object that does not satisfy the entire list is not. Whether an object satisfies any one criterion is a binary question, as is membership in the set.[65] But this does not align with how we intuitively think about language. Human beings do not encounter new experiences armed with a list of conjunctive criteria to be established.[66] Further, objects we encounter in the

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processing, and conveying information . . . .") (citation omitted), *available at* http://www.ccsenet.org/journal/index.php/elt/article/view/343/306. *See also* Janda, *supra* note 11, at 16 ("The urge to categorize is very strong, and it seems that in order to process, store, manipulate, and access information, human beings need to organize it in categories.").

[61] *See* Chen, *supra* note 60, at 96.

[62] *See, e.g.*, WILLIAM CROFT & D. ALAN CRUSE, COGNITIVE LINGUISTICS 74 (2004).

[63] Tom Cunningham, *Categories versus Rules*, 4 (1998) (unpublished student project), http://meansandends.com/TomCunningham/files/categorisation.pdf.

[64] *See id.*

[65] *See id.*

[66] *See* GEORGE LAKOFF & MARK JOHNSON, METAPHORS WE LIVE BY 71 (1980).

world rarely meet binary criteria or fit perfectly within one category.[67] It is this realization that gave rise to the idea of prototype semantics.

The idea that language is not defined by a set of strictly defined categories (as is the case in set theory) developed from the work of philosophers, linguists, and psychologists beginning in the mid-20th century. Wittgenstein noticed that, while classical category theory required clear boundaries based on common properties and binary membership, reality calls for fuzzy boundaries.[68] Rather than a list of necessary and sufficient conditions, categories are defined by family resemblances, with membership in the category being a matter of degree.[69] Others observed that words can become members of a category based on relationships to other words in the category, even in the absence of family resemblance.[70] Labov demonstrated that, even if a set of subjects initially identified an object as belonging to one category, a slight change in the object may result in any number of categories being identified by the same subjects.[71]

The true breakthrough in prototype semantics is generally attributed to Eleanor Rosch, who greatly influenced cognitive linguistics by developing the theory of prototypes and categorization.[72] She showed that the subconscious human mind organizes all expe-

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[67] *See id.*

[68] *See* GEORGE LAKOFF, WOMEN, FIRE, AND DANGEROUS THINGS: WHAT CATEGORIES REVEAL ABOUT THE MIND 16–17 (1987).

[69] *See id.*

[70] *See id.* at 18–20.

[71] For example, all subjects uniformly identified a curved object having a handle and a certain height/width ratio as a "cup." However, when the ratio was altered slightly, the subjects returned a number of identifications, such as "cup," "mug," and "bowl." *See* Cunningham, *supra* note 63, at 5; William Labov, *The Boundaries of Words and their Meanings*, *in* FUZZY GRAMMAR: A READER 67, 76–85 (Bas Aarts et al. eds., 2004).

[72] *See* Lakoff, *supra* note 68, at 39.

riences into categories.[73] Within these categories are hierarchies and between categories are relationships.[74] Each category has a prototypical member, a "best" representation of the category or a member "par excellence."[75] Other members of the category are peripheral members.[76] All peripheral members bear some relationship to the prototypical member, but they may have varying degrees of similarity, or unequal status, as members.[77]

The **bird** example discussed in the Introduction represents one of Rosch's best known studies. In a survey of university students, she first explained how members of a category could be better members or worse members of a category.[78] She then asked the students to rate over 50 members of a category on a scale of 1 to 7, based on how good a representative they considered the particular member to be for the given category.[79] In one study, the category was **bird** and she defined the category based on thirteen attributes that are common to birds: eggs, beak, wings, fly, cage, feathers, colors, etc.[80] A robin shared the most attributes of these thirteen than did other members of **bird** and thus became the prototypical bird.[81] Based on the students' responses, there was a big discrepancy between sparrows (very much like **bird**) and penguins (very unlike **bird**)—even though the list of 50-plus members contained only birds.[82]

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[73] *See id.*

[74] *See* Janda, *supra* note 11, at 13–18.

[75] *See id.*

[76] *See id.*

[77] *See id.*

[78] *See* Cunningham, *supra* note 63, at 6–7; Eleanor Rosch, *Cognitive Representations of Semantic Categories*, 104 J. EXPERIMENTAL PSYCH.: GEN. 192, 192–223 (1975).

[79] *See* Rosch, *supra* note 78, at 192–223.

[80] *See id.*

[81] *See id.*

[82] *See id.*

Recent linguistics research has further developed the field of prototype semantics. One example is the introduction of fuzziness. Linguists have determined that the boundaries between categories are fuzzy, or non-binary, as are the boundaries of criteria ascribed to any given category.[83] The degree of membership in any category is also fuzzy.[84] Additionally, the criteria associated with categories are not simply definitional, but instead represent high-level abstract conceptualization as well as important cultural beliefs.[85]

Fuzzy logic is a mathematical manifestation of the same idea. In fuzzy logic, binary results represent the end of a continuum and most observations fall somewhere along the scale.[86] The field of fuzzy logic is much more developed and complex than this, but the message is the same—the observable world does not work in absolutes, but in varying degrees.[87] Although true as well in prototype semantics, the idea of weighted criteria may be easier to understand in terms of mathematical fuzzy logic. In addition to permitting satisfaction of membership criteria to various degrees, fuzzy logic also permits criteria of different importance.[88] For example, the criterion that a member of **bird** has feathers may be more important than the criterion of the ability to fly. Thus, a bird that has feathers and flies would be a good member of **bird**. All other criterion being equal, a bird that has feathers, but does not fly, may still be a reasonably strong member of **bird.** However, a bird that does not have feathers, but does fly, would be a much lesser member of **bird**, even

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[83] *See* Cunningham, *supra* note 63, at 9; JOHN R. TAYLOR, LINGUISTIC CATEGORIZATION: PROTOTYPES IN LINGUISTIC THEORY 38 (2d ed. 1995).

[84] *See* Taylor, *supra* note 83, at 51.

[85] *See id.* at 82–83.

[86] *See, e.g.*, BART KOSKO, FUZZY THINKING: THE NEW SCIENCE OF FUZZY LOGIC 18 (1993); DANIEL MCNEILL & PAUL FREIBERGER, FUZZY LOGIC 12 (1993).

[87] *See, e.g.*, MARTIN GARDNER, WEIRD WATER & FUZZY LOGIC 158 (1996).

[88] *See, e.g.*, R.E. Bellman & L.A. Zadeh, *Decision-Making in a Fuzzy Environment*, 17 MGMT. SCI . B141, B149–50 (1970).

though it too meets the other criteria, because the feather criteria was deemed more important.

B. CONNECTIONS, HIERARCHIES, AND TAXONOMIES

One of the benefits of thinking about language in terms of fuzzy categories is the ability to recognize relationships between various categories in a way that may not be possible with traditional sets. One relationship between categories is based on a taxonomic hierarchy.[89] Superordinate categories are more broad, but related, categories; subordinate categories are more specific, but related, categories.[90] The basic level is the one at which category members have similarly perceived overall shapes.[91] Basic level categories are the first level understood by children and represent the most commonly used labels.[92] Moreover, it is the basic level at which our knowledge is organized.[93] A word commonly understood by a child learning to talk is the term *dog*. Later, the child will learn the superordinate **animal**, a category to which dog belongs, and subordinates, such as retriever or poodle, which belong, among others, to the category **dog**.[94] In another example, if *chair* is the basic level word, a superordinate category may be **furniture**. Other members of **furniture** may be *table* and *bed*. Similarly, there may be subordinate, peripheral members of **chair**, such as *recliner* and *stool*. The fuzzy boundaries of the categories allow for more inclusive subordinate and superordinate memberships, resulting in a more complete taxonomy.

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[89] *See, e.g.*, Croft & Cruse, *supra* note 62, at 96–97; *Cognitive Linguistics*, http://cogling.wikia.com/wiki/Levels_of_categorization (last visited Mar. 3, 2011).

[90] *See* Croft & Cruse, *supra* note 62, at 96–97.

[91] *See id.*

[92] *See* Janda, *supra* note 11, at 16.

[93] *See id.*

[94] *See* Lakoff, *supra* note 68, at 46.

There are also connections within categories. This permits chaining, such that there may be peripheral members that have no particular feature in common with the prototypical member.[95] The nearest members to each member in the category have similar features, but the members at the ends of the spectrum may have nothing in common.[96]

Another feature of categorization is that these categories are not pigeon holes, as they are in set theory. Rather, the categories may be interrelated and objects may be members, to varying extents, of multiple categories. Consider a fallen log—it can be considered to have a seat, because it can be sat upon. Having a seat is an important attribute of the category **chair**. But certainly a log is not a very good member of **chair** because it does not include other characteristics of **chair**, such as a back or 4 legs. A log may be a fairly good member of **nature** and a subordinate member of category **tree**, but it can also be a poor member of **chair** at the same time. This concept also allows for constructing a web of words that would be nearly opposites in set theory but instead may bear some level of relation, such as terms like *black* and *white*, or *fingers* and *toes*, or *cops* and *robbers*.[97] Network building serves to link all the labels and categories that exist in our minds and lays the groundwork for a process that continues for as long as we are exposed to new words (and new meanings for old words)—that is, for the rest of our lives.[98]

Because these concepts and relationships seem a bit elementary, it may be tempting to deny the value of this aspect of prototype semantics. Consider, however, the differences between acquiring language and later learning a second language. Take a native English

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[95] *See* Janda, *supra* note 11, at 13.
[96] *See id.*
[97] *See id.*
[98] *See id.*

speaker who is learning to speak Spanish. The Spanish words will not be cemented in the subject's network, as are English words. Instead, the network building involved is most often a mapping of the second language onto the first, without creating categories or associations between the Spanish words themselves.[99] Rather than learning *dog* in relation to external experiences, the subject learns that *perro* stands for *dog*.[100] In contrast, very young children exposed to parents speaking different languages (*e.g.*, a mother speaks English to the child and a father speaks Spanish), the children learn both languages at a similar rate and exhibit no preference for either language. This is because the child is independently creating both language networks at the same time, rather than mapping a second language onto a primary network.

C. CATEGORIZATION IN ACTION

To truly see the benefit of prototype semantics, a more detailed illustration is helpful. Recall that traditional interpretation is definitional; a word is defined by a set of features or rule-like properties that are binary, necessary, and sufficient conditions.[101] Under a definitional view, we might determine that a member of set **chair** includes a seat, four legs, and a back, where the back is connected to one side of the seat and the four legs are connected to the other side of the seat.[102] Under traditional definitional interpretation (similar

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[99] *See* Lakoff, *supra* note 68, at 97.

[100] *See id.*

[101] *See* Andrew Auchincloss Lundgren, *Perspectives on Patent Claim Construction: Re-examining* Markman v. Westview Instruments *Through Linguistic and Cognitive Theories of Decisionmaking*, 12 U. BALT. INTELL. PROP. L.J. 173, 207–08 (2004); Linda Coleman & Paul Kay, *Prototype Semantics: The English Word* Lie, 57 LANGUAGE 26, 26–27 (1981).

[102] *Chair Definition*, MERRIAM-WEBSTER.COM, http://www.merriam-webster.com/dictionary/chair (defining "chair" as "a seat typically having four legs and a back for one person") (last visited Sept. 22, 2011).

to set theory), if a newly encountered object does not meet all of these criteria, it is not a chair. But we can think of all sorts of chairs that cannot be members of category **chair** as defined. Imagine a stool (often no back, often having only 3 legs), a fancy Swedish chair that has a base rather than legs (no legs), or even a bean bag (no distinct seat, legs, or back). Perhaps you could make the argument that none of these examples are really chairs. And yet, if a guest to your house asked for a chair, you might reasonably direct them to any one of these objects, at least in a pinch. Similarly, we can think of things that do meet the criteria for chair, but that we would be unlikely to provide when asked for a chair, such as a sofa (having a seat, four legs, and a back, where the back is connected to one side of the seat and the legs are connected to the other). Even more extreme, a bed with a headboard could conceivably meet the criteria to fit in the category **chair**. The problem is that membership in the set **chair** is binary. Under set theory, there is no possibility of "almost a chair" for a 3-legged stool or "like a chair but different" for a sofa.[103]

To illustrate how prototype semantics would work differently, consider a particular construct that has been used for experiments in this area. First a schema, or a list of properties associated with the category, is created.[104] In traditional set theory, these properties are binary or dichotomous; in prototype semantics, the properties may be binary or may be fuzzy, allowing for multiple levels on which the property is met.[105] Membership in the category is fuzzy in much

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[103] A reasonable objection would be to use more or less precision when defining the conditions that define **chair**. However, if you make the definition more lax, more false "positives" will occur; if you tighten up the definition, more false "negatives" will occur. Even putting those risks aside, it is impractical to draft a list of perfect conditions for any and every particular human encounter.

[104] *See* Coleman & Kay, *supra* note 101, at 27.

[105] *See id.*

the same way.[106] Rather than a dichotomous category set (member or not member), category membership in prototype semantics is represented as a gradient, where the levels satisfaction of properties goes towards degree of membership, but the properties may carry different weights.[107] Taken together, the more prototype properties an object includes (and at a higher level of gradient and/or carrying a greater weight), the higher the object will score—that is, the more or better of a member of the category set forth by the schema.[108]

Returning to the category **chair**, we can use the terms that were necessary and sufficient under traditional set theory (seat, 4 legs, back, and the connections between) as the schema. But now, we can more accurately represent our real-life experiences with various types of chairs by permitting non-binary satisfaction of criteria. For instance, the stool would satisfy the seat criteria fully, but would only meet the 4-legs property to some extent. Taken together, the criteria satisfied by the 3-legged stool would be less than a given chair that would fit in the category **chair** when defined in set theory, because that chair necessarily would include all of the criteria perfectly. The difference is that under prototype semantics, the 3-legged stool would still likely rise to a gradient level that would include it in **chair**, albeit at some lower level of membership. Additionally, it may be more important for a chair to have a back than to have 4 legs, so that a 3-legged seat with a back would be a better member of **chair** than a 3-legged seat without a back, but a 3-legged seat with a back would be nearly as good a member of **chair** as a 4-legged seat with a back. Similar inferences can be drawn so that the category **chair** may include the chairs that were previously excluded in traditional set theory, *i.e.*, the Swedish design chairs (no

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[106] *See id.*
[107] *See id.*
[108] *See id.*

legs, but seat and backs), ergonomic chairs (legs but no back), and even bean bags (no legs, no backs).

The inclusion of a bean bag in category **chair** raises the question of where the line is drawn between a poor member of a category and an object that is not a member of the category. For example, it is conceivable that a chair could be built with no seat. This imagined piece of furniture has 4 legs, a back, and maybe even arms, just no seat. Would this object be a member of **chair**? Maybe—if it had sufficient membership qualities to fall within the gradient of **chair**. However, it would certainly not be a very good member and may not have enough in common with the category schema to even be included in **chair**. One idea that protects against the absurd result of including a chair with no seat in the category is that the properties of the schema that are most tied to the human experience and interaction with the object are given greater weight.[109] Thus, our experiences with chairs would lead us to assign much more value to having a seat (something to sit on) than to the other criteria. The seat-less chair would likely fall below the threshold criteria for membership.

Categories with fuzzy boundaries, defined by non-binary criteria, are helpful to understand how we acquire language and use it to assimilate and interact with the world around us. The development of prototype semantics provided great insight into how people think about language. The question, then, is how prototype semantics might afford the same insight in the patent law world.

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[109] *See* Janda, *supra* note 11, at 16.

III. IMPLICATIONS FOR THE DOCTRINE OF EQUIVALENTS

The limits of my language mean the limits of my world.
-- Ludwig Wittgenstein[110]

It is astonishing is how little patent law draws from the linguistics field, despite the frequent searching by commentators and courts for alternative approaches. The analogies between patent law and cognitive linguistics are remarkable. Prototype semantics, and particularly the aspect of non-binary categorization, are advantageous for looking at the doctrine of equivalents, a doctrine specifically designed to create a fuzzy boundary around the fences created by claim construction.

This section discusses two main observations and a conclusion. First, the process of claim construction, or the search for meaning of claim terms, is inconsistent with how we acquire and understand language. The results are definitions that are thorny to work with. Second, these imperfect claim constructions are then used as necessary and sufficient conditions to determine infringement; but when dealing with language, it is difficult to make determinations based on definitional, or binary, criteria. The result of these shortcomings is a flawed infringement analysis. Rather than dealing with this, the courts created the doctrine of equivalents to compensate.

If the doctrine of equivalents is dead, as has been reported, does that mean that the problems of language no longer exist in infringement analysis? My conclusion is no; rather, courts have begun *sub silentio* to deal with the imperfections in claim construction and infringement analysis that was previously addressed by the doctrine. Because a more natural way to interpret and apply language is through fuzzy categorization, it makes sense that the artificial

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[110] LUDWIG WITTGENSTEIN, TRACTATUS LOGICO-PHILOSOPHICUS § 5.6 (C.K. Ogden trans., 1922), *available at* http://www.gutenberg.org/files/5740/5740-pdf.pdf.

leeway that had been accomplished by the doctrine of equivalents actually occurs elsewhere—namely in more instinctive claim constructions and infringement comparisons. In other words, the doctrine of equivalents is not truly dead.

A. CLAIM CONSTRUCTION VERSUS FUZZY CATEGORIZATION

The first step of infringement analysis is always claim construction.[111] Claim construction, or defining the words that delineate the patentee's exclusive territory, is implicated in the doctrine of equivalents because one of the justifications for the doctrine is the difficulty of capturing inventions in words.[112] I assert that part of this difficulty is due to the fact that the process of claim construction clashes with how we generally acquire and understand language. In part because it is unnatural to think about words in definitional terms and in part because the claim interpretations will be subsequently used to determine infringement, the process of claim construction should be less about finding definitional meaning and more about building new connections with existing categories. Two aspects of current claim construction practice are particularly incompatible: first, claim terms are to be construed in a vacuum, and second, a judge's personal understanding of claim terms is not relevant. Both of these rules conflict with how language is generally understood and have lead to claim constructions requiring flexibility at application.

The existing claim construction mantra is as follows. Claims are to be given their "ordinary and customary meaning" that would be

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[111] *See, e.g.*, Acumed LLC v. Stryker Corp., 483 F.3d 800, 804 (Fed. Cir. 2007).

[112] *See supra* Section I.B; Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 731 (2002) ("The language in the patent claims may not capture every nuance of the invention or describe with complete precision the range of its novelty.").

given to them by someone of ordinary skill in the relevant art.[113] To determine the ordinary and customary meaning, the courts look at intrinsic evidence, including the claim itself, the specification, and the record of communication between the patentee and the Patent Office created during patent acquisition, known as the prosecution history.[114] Courts may also consider extrinsic evidence, such as dictionaries, treatises, and expert testimony, but this evidence is considered less reliable than the intrinsic evidence.[115]

First, because claims are to be construed in light of the intrinsic evidence, the implication is that the accused device is not to be considered.[116] In any case, the accused device has no bearing on how a person of skill in the art would interpret the claim terms.[117] The Federal Circuit has allowed that courts should focus on the aspects of the accused device that are in dispute, but does not permit the court to construe claims by making a side-by-side comparison.[118] While this rule helps in preventing the judge from deciding the in-

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[113] *See, e.g.*, Phillips v. AWH Corp., 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

[114] *See id.* at 1314.

[115] *See id.* at 1317–19.

[116] *See, e.g.*, SRI Int'l v. Matsushita Elec. Corp., 775 F.2d 1107, 1118 (Fed. Cir. 1985) ("A claim is construed in the light of the claim language, the other claims, the prior art, the prosecution history, and the specification, *not* in light of the accused device.") (emphasis in original).

[117] *See* Peter S. Menell et al., *Patent Claim Construction: A Modern Synthesis and Structured Framework*, 25 BERKELEY TECH. L.J. 711, 816 (2010).

[118] *See* Wilson Sporting Goods Co. v. Hillerich & Bradsby Co., 442 F.3d 1322, 1326–27 (Fed. Cir. 2006); Pall Corp. v. Hemasure Inc., 181 F.3d 1305, 1308 (Fed. Cir. 1999) ("Although the construction of the claim is independent of the device charged with infringement, it is convenient for the court to concentrate on those aspects of the claim whose relation to the accused device is in dispute."); Scripps Clinic & Research Found. v. Genentech, Inc., 927 F.2d 1565, 1580 (Fed. Cir. 1991) ("Of course the particular accused product (or process) is kept in mind, for it is efficient to focus on the construction of only the disputed elements or limitations of the claims."), *overruled by* Abbott Labs. v. Sandoz, Inc., 566 F.3d 1282, 1291 (Fed. Cir. 2009).

fringement case via the claim construction,[119] it causes claim construction look more like learning a second language than understanding a first language.

Recall that language acquisition and understanding comes from categorization and, perhaps more importantly for understanding, the creation of relationships or connections between categories.[120] But if we are simply mapping one word to another, such as mapping the Spanish word *perro* to *dog*, then the only connection made is that one word equals another. Defining terms in a patent based on the words in the specification or the words in a dictionary is very similar. What is missing are the connections between the basic level word (or, perhaps in patent law, the claim term at issue) and any superordinates and subordinates that may elaborate on meaning. With the foreign language example, simply mapping *perro* to *dog* may eliminate making a connection that a *perro* is one type of *animal* or that a *caniche* is a particular type of *perro.*[121] Also missing are connections between the basic level word and words in the same category that have a different sense. For example, knowing that the Spanish word *silla* means *chair* does not provide the related connections that a recliner (*reclinable*) is a fairly good chair but a log (*tronco de madera*) is a very poor chair.

To make claim construction more akin to language acquisition and understanding, a judge would need to interact with the invention and/or the accused device to permit him to create his own cat-

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[119] *See* Markman v. Westview Instruments, Inc., 517 U.S. 370, 384 (1996). *But see* Markman v. Westview Instruments, Inc., 52 F.3d 967, 989 (Fed. Cir. 1995) (en banc) (Mayer, J., concurring) ("To decide what the claims mean is nearly always to decide the case."), *aff'd*, 517 U.S. 370 (1996).

[120] *See supra* Section II.

[121] The English word *animal* translates to the Spanish word *animal* and the term *poodle* translates to *caniche*. *Animal and Poodle Translaitons*, LAROUSSE ONLINE ENGLISH-SPANISH DICTIONARY, http://www.larousse.com/en/dictionaries/english-spanish (last visited Apr. 10, 2011) (searched for "animal" and "poodle").

egories and connections. Although abolished over 130 years ago, an early Patent Act required the inventor to submit a working model of the invention to the Patent Office as part of the patent acquisition process.[122] There are significant upsides and downsides to requiring the patentee to submit a working model, including the fact that not all patentees reduce their inventions to practice.[123] However, in the midst of an infringement trial, it is pretty clear that at least the alleged infringer has an actual device or process that the judge could encounter. This, too, has the downside of potentially affecting the judge's claim construction in favor or against infringement, but the advantage would be that the claim construction rendered could reflect the categorizations and connections that the judge made based on his encounter with the technology.

Second, meaning is typically tied to the categories and connections that have been made based on past experiences. Even though the words being considered are public, we necessarily think about and consider them differently, based on personal previous encounters.[124] Judges were given the task of construing patent claims, in part because of their expertise,[125] including the categories and connections they personally created. This confidence should signal that judges' past experiences should play a role in claim construction. However, in the face of frequent criticism and appellate reversal, judges have expressed anxiety about this supposed competence.[126] Further, the Federal Circuit has impliedly rejected the use of a

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[122] *See* Kendall J. Dood, *Patent Models and the Patent Law: 1790–1880 (Part I)*, 65 J. PAT. OFF. SOC'Y 187, 190, 217 (1983).

[123] *See generally* Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65 (2009) (describing the costs and benefits of an early filing system, which does not require a working model).

[124] *See, e.g.*, Edward S. Adams & Torben Spaak, *Fuzzifying the Natural Law – Legal Positivist Debate*, 43 BUFF. L. REV. 85, 95 (1995).

[125] *See* Markman v. Westview Instruments, Inc., 517 U.S. 370, 388–89 (1996).

[126] *See* Peter Lee, *Patent Law and the Two Cultures*, 120 YALE L.J. 2, 81 (2010).

judge's own categorizations and connection, stating that if the judge knows what a particular term means, then the court might look to a dictionary to define the term.[127] In doing so, the courts ignore a vast resource, the judges' own categories and connections, which could offer enhanced claim constructions. In turn, richer claim constructions may alleviate the need for the doctrine of equivalents as a hedge against the inability to express inventions in language.

B. FUZZY SET MEMBERSHIP

After claim construction, infringement analysis proceeds by comparing the accused device or process to the claims as construed.[128] Literal infringement is found if the device or process falls squarely within the territory delineated by the claims.[129] Another justification for the doctrine of equivalents is to prevent unfairness if a portion of the accused infringer's device or process falls slightly on the outside of the claimed territory.[130] I contend that this too clashes with how we think. Again we are forcing a definitional framework in an area where it is more natural to think in fuzzy categories and sets. This too creates a system that requires the doctrine of equivalents' flexibility.

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[127] *See* Phillips v. AWH Corp., 415 F.3d 1303, 1314 (Fed. Cir. 2005) ("In some cases, the ordinary meaning of claim language . . . may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words. In such circumstances, general purpose dictionaries may be helpful." (internal citations omitted)).

[128] *See* Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).

[129] *See, e.g.*, Abraxis Bioscience, Inc. v. Mayne Pharma (USA), Inc., 467 F.3d 1370, 1378 (Fed. Cir. 2006).

[130] *See* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 21 (1997); Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 733 (2002).

Literal infringement requires that "every limitation set forth in a claim must be found in an accused product, exactly."[131] If any limitation is missing from the accused device or process, there is no literal infringement.[132] To frame this slightly differently, to infringe is to be a member of set **claim**. Membership in **claim** is binary—either you infringe or you do not—and the criteria of membership are also assessed in binary fashion. Some case law even evokes the "necessary and sufficient" criteria of traditional, or definitional, set theory, stating that "each and every claim limitation" must be found in the accused device or process.[133]

Prototype semantics explains that we do not deal with words and concepts in a binary way.[134] Faced with a construed claim and an accused device or process, the judge must execute precisely the same mental task that we all perform upon encountering something new—determining whether the new object fits within one or more categories that exist, how well it fits within any given category, and how it is connected to other items in that and other categories. But the analysis for literal infringement does not permit this: either the accused device or process has element x, as construed, or it does not. The judge is not permitted to conclude that the accused device or process includes x', which is a really close match to x but is not x. In order to infringe, or fall within **claim**, only objects including x are considered.

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[131] Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed. Cir. 1995). Of course, another requirement of infringement is that the alleged infringer must not have the authorization of the patentee to practice the invention. 35 U.S.C. § 271(a) (2006) ("[W]hoever without authority makes, uses, [imports,] offers to sell or sells any patented invention . . . during the term of the patent . . . infringes the patent.").

[132] *See* Amgen, Inc. v. F. Hoffmann-La Roche, Ltd., 580 F.3d 1340, 1374 (Fed. Cir. 2009) (citing TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc., 529 F.3d 1364, 1379 (Fed. Cir. 2008).

[133] *See, e.g.*, *Abraxis Bioscience*, 467 F.3d at 1378.

[134] *See supra* Section II-A.

Returning to the simplistic **chair** example, the definitional criteria for **chair** include a seat, 4 legs, a back, and the connection between the seat and the back, as well as the connection between the seat and the legs. Literal infringement, like traditional set theory, requires accused device to include each of these elements exactly. An object that includes a seat, 4 legs, a back, and the given connections is a member of set **chair** and, for patent law purposes, a member of set **claim** and thus infringing. Consider now a chair that has a seat, 3 legs, a back, and the given connections—basically a 3-legged chair. If a houseguest were to ask for a chair, you would not hesitate to give them the 3-legged chair. But, because the 3-legged chair does not include each and every element of **chair**, and therefore **claim**, it does not infringe. It is not possible to meet the criterion of "4 legs" pretty well—the criteria are binary. It is not possible to be a very good member of **claim**—infringement too is binary. Given how we naturally think, to determine a 3-legged chair is not a **chair** seems wrong, particularly since the element "4 legs" may itself be the less-than-perfect construction of the claim term, as discussed above.

C. What Really Happened to the Doctrine of Equivalents

Based on the above discussion, it would appear that the doctrine of equivalents is exactly what is needed to handle some of the problems of language in patent law, both the crafting claims to cover the invention and the determination whether an accused device or process falls within the delineated territory.

Language has not gotten any less complicated nor has claim construction or infringement analysis improved. The justifications for the doctrine of equivalents remain as apt today as they were at the doctrine's creation. How then do we explain the evidence that the doctrine of equivalents is on the wane? I contend that the doctrine of equivalents is appearing less frequently in patent infringement cases because courts are starting to handle patent cases in a more natural manner, allowing fuzziness to be introduced during

the claim construction or literal infringement determinations, rather than as an afterthought that requires a special doctrine.

For an example of how this might work, consider again the category **bird**. If there was a claim covering **bird,** it might include the following elements: an animal having a body with wings, feathers, and a beak, as well as progeny that hatch from eggs and have the ability to fly.[135] These criteria create the fence, inside of which infringement is found. A robin has a body with wings, feathers, and a beak, hatched offspring, and can fly. And further, a robin meets each of these criteria very well. The robin then infringes **bird**. More often than the robin, however, the judge is presented with an accused device or process that is more akin to the penguin. The penguin meets the criteria of a body having wings and a beak very well. It easily meets the criteria of having progeny that hatches from eggs. But the judge is left with the penguin that has unusual feathers and cannot really fly. How does the judge analyze whether the penguin infringes **bird**?

One thing a judge can do is interpret the term "feather" in a fuzzy manner that includes more than just the type of downy feather typically thought of. The categories and connections in the judge's mind permit him to recognize that the term "feather" is not so limited. With this in mind, he can fairly consider that the penguin meets the criterion of a body having feathers.

Another thing he can do is apply the criterion of flight in a fuzzy way. A robin, as the prototypical member of **bird**, exhibits a very good ability to fly. Compared to the robin, the penguin's ability to fly is very poor. But say the penguin can propel itself with his wings a bit. The bird may not be doing what we consider flying, but he is showing some signs of flight. In definitional set theory, as tra-

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[135] This claim is not realistic, but does provide an illustration of the issue. A real life application of the theory is discussed below.

ditional infringement analysis is considered, there is no gradient of meeting the criteria—either it is or is not met. The penguin's level of flight is too low to meet the threshold, and so the criterion is not met. However fuzzy membership allows values in between met and not met. If the penguin satisfies the other criteria well or very well, and satisfies the flight criterion enough, then the penguin can still be found to be a member of **bird**. The penguin is just not as good a member.

When talking about patent infringement, this level of fluidity is not acceptable, because it can be over-inclusive. For example, it is possible that a platypus could be considered a very bad member of **bird**, based on the fact is has a beak and lays eggs, even though it is a mammal. To avoid an undue amount of "false positives," the judge can assign varying weights to the elements. For example, he may determine that it is very important for a bird to lay eggs and have feathers and wings, less important for a bird to have a beak, and not terribly important to be able to fly. Again, our prototypical **bird**, the robin, meets all the criteria well. A penguin meets the most important criteria, or at least fairly well depending on how the judge defines the term feather. The penguin also satisfies the less important criterion of having a beak. The penguin cannot fly, so he satisfies that element to a lesser degree. But all in all, the penguin meets a sufficient number of criteria to a reasonable degree of satisfaction, so the penguin is a member of **bird**. The platypus, however, would not meet enough of the criteria; in particular, the platypus does not meet two of the three key elements (having feathers and wings). Finally, the ultimate determination of infringement may not be binary. As long as the accused device or process, in this case the penguin, meets a threshold level of a combination of the criteria, it infringes. In the end, a penguin is still a **bird**.

Empirical or descriptive studies of patent opinions are unlikely to observe this shift from strict set theory to fuzzy infringement analysis because it is doubtful that a court would explain it was using intuitive prototype semantics instead of the doctrine. Why would a judge mention that he read a claim and understood it the

same way he read a newspaper and understood it? Because there is no named doctrine to hang upon it, the act of defining and applying claim language in a natural way would easily go unnoticed.

Of course, for the same reasons that it would be generally overlooked, it is difficult to point to clear evidence that demonstrates that this is indeed the case. There are, however, some data that support these contentions. First, judges are likely to be using prototype semantics in patent cases. In addition to the fact that it is a natural human reaction to language and thinking, judges who are uncomfortable with the claim construction process may resort to what seems effortless. Alternatively, judges who have had or fear having their claim construction rulings overturned on appeal have no incentive to do any sort of interpretation that goes beyond their intuitive means. Second, in dealing with the same problems that lead to the creation of the doctrine of equivalents in the United States, other countries have chosen approaches that look much more like cognitive linguistics. Third, there are small indications beginning to appear in case law that suggest that prototype semantics may be at work.

First, it is fair to assume that judges are using fuzzy categorization and prototype semantics. Judges, being human, would use the same system of categories and connections to think about their encounters with the world. It is unlikely that they can turn off this thinking when they are on the bench. And, even if they could, there are at least two reasons why they may choose not to. On one hand, some judges do not like patent cases and hope to get these cases off their dockets as quickly as possible.[136] On the other hand, there are

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[136] *See A Panel Discussion: Claim Construction from the Perspective of the District Judge*, 54 CASE W. RES. L. REV. 671, 682 (2004); Janice M. Mueller, *Crafting Patents for the Twenty-First Century: Maximize Patent Strength and Avoid Prosecution History Estoppel in a Post*-Markman/Hilton Davis *World*, 79 J. PAT. & TRADEMARK OFF. SOC'Y 499,

many judges who do make an effort to follow the Federal Circuit's claim construction jurisprudence, but they are frequently overruled on appeal, so much so that a number of these judges have spoken up.[137] The natural reaction, in either case, would be to follow the path of least resistance and perform claim construction and infringement determinations using ingrained prototype semantic-type analysis.

Second, although United States patent law is not completely in harmony with international patent laws, it is instructive to see how others handle the same problem. One useful example, known as "purposive construction," comes from the United Kingdom.[138] When construing the patent claims, the court is to ask whether a person of skill in the art would understand that a particular term required strict compliance, even should it not make much difference in the function.[139] This is consistent with fuzzy membership,

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503 (1997); *Edited & Excerpted Transcript of the Symposium on Ideas Into Action: Implementing Reform of the Patent System*, 19 BERKELEY TECH. L.J. 1053, 1108–09 (2004).

[137] *See, e.g.*, Judge James F. Holderman with Halley Guren, *The Patent Litigation Predicament in the United States*, 2007 U. ILL. J.L. TECH. & POL'Y 1, 6 ("As a result of the de novo standard of appellate review applied to our claim construction determinations, we United States district court judges feel like the late comedian Rodney Dangerfield because our opinions 'get no respect.'"); Victoria Slind-Flor, *The* Markman *Prophecies*, IP WORLDWIDE, Mar. 13, 2002, at 28, 30 (quoting Judge Samuel Kent as saying that, on the issue of claim construction, the Federal Circuit is full of "little green men who don't know Tuesday from Philadelphia" and that he does not get excited when ending a patent case because "[the case] goes to the Federal Circuit afterwards[, where] it's hard to deal with things that are ultimately resolved by people wearing propeller hats."), http://www.law.com/jsp/law/LawArticleFriendly.jsp?id=900005528997.

[138] *See, e.g.*, Catnic Components Ltd. v. Hill & Smith Ltd., [1982] R.P.C. 183, 243 (H.L.).

[139] *Id.*

> A patent specification should be given a purposive construction rather than a purely literal one derived from applying to it the kind of meticulous verbal analysis in which lawyers are too often tempted by their training to indulge. The question in each case is: whether persons with practical

because some elements of the claims may carry a higher weight, and thus require strict compliance, while others do not. Using the **bird** example, the element of progeny hatching from eggs may require strict compliance—if it does not lay an egg from which a baby hatches, it is not a member of **bird**. This element cannot be deviated from. But other elements, such as feathers and flying may carry less weight and not require strict compliance.

Finally, court opinions are starting to indicate a movement toward prototype semantics and fuzzy infringement. For example, consider the case *International Rectifier Corp. v. IXYS Corp.*[140] In this case, the patent was for a semiconductor device having, among other elements, a "polygonal region."[141] One of the issues disputed at trial was the meaning of that element. The district court, perhaps reflecting fuzzy categorization, interpreted that the "polygonal re-

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knowledge and experience of the kind of work in which the invention was intended to be used, would understand that strict compliance with a particular descriptive word or phrase appearing in a claim was intended by the patentee to be an essential requirement of the invention so that *any* variant would fall outside the monopoly claimed, even though it could have no material effect upon the way the invention worked.

[140] Int'l Rectifier Corp. v. IXYS Corp., 361 F.3d 1363 (Fed. Cir. 2004).

[141] *See* High Power Mosfet with Low On-Resistance and High Breakdown Voltage, U.S. Patent No. 4,959,699 (filed June 22, 1989). Claim 1 of the '699 Patent recites, in relevant part:

> A high power metal oxide silicon field effect transistor device exhibiting relatively low on-resistance and relatively high breakdown voltage; said device comprising: a wafer of semiconductor material having first and second opposing semiconductor surfaces; said wafer of semiconductor material having a relatively lightly doped major body portion for receiving junctions and being doped with impurities of one conductivity type; at least first and second spaced base regions of the opposite conductivity type to said one conductivity type . . . first and second source regions of said one conductivity type . . .
>
> at least said first base region being a cellular polygonal region; said cellular polygonal region being surrounded by said common conduction region; said first source region having the shape of an annular ring disposed within said cellular polygonal first base region.

gion" would "be generally but not perfectly polygonal—i.e., the surface expression of the base will be a closed figure with generally (not necessarily perfectly) straight sides."[142] The district court also noted that the corners may be rounded, not precisely angular.[143] This looks a lot like a fuzzy category of **polygonal**, where there exists a bit of leeway around the traditionally defined mathematical polygon. A perfect polygon with straight sides and angular corners would be a very good, or even prototypical, polygon. A shape with blurred sides and rounded corners would be a lesser polygon, but may still fit squarely in the category of **polygon**. The Federal Circuit, however, took a traditional set theory stance, noting that a polygon must be defined as "a closed plane figure bounded by straight lines."[144]

The need for the doctrine of equivalents has not lessened, so it makes sense that the problems that give rise to the doctrine are being addressed elsewhere in the patent infringement analysis. It also makes sense that the movement is in the direction of natural behavior—how we normally think and understand language. As judges resort less to the doctrine of equivalents and more to prototype semantics and fuzzy categorization, more instances of this type of analysis are likely to become more visible.

D. Adapting Patent Law to Fit Fuzzy Infringement

If the use of the doctrine of equivalents is waning because judges are beginning to use prototype semantics and fuzzy categorization to handle the problems the doctrine was created for, then patent law too needs to adjust. In addition to abolishing the doctrine of equivalents as a doctrine, there are at least two other

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[142] *See Int'l Rectifier*, 361 F.3d at 1370.
[143] *See id.*
[144] *See id.* at 1371-72.

changes that would aid in making fuzzy infringement analysis work: first, honor the categories and connections made by the district court by changing the standard of review for claim construction, and second, remove the prohibition on using working examples and accused devices for claim construction purposes.

The present standard of review for claim construction determinations is *de novo*.[145] Since its inception, various constituents have argued that *de novo* review is inappropriate for a number of reasons.[146] Regardless of the persuasiveness of other reasons to change the standard of review, if claim construction is taking into account the categories and categorizations existing in the district court judge's mind, then these inputs have to be available for appellate review. Fortunately, the winds of change seem to be blowing in the Federal Circuit on this issue; even absent the argument that factual review of a district court judge's categorizations and connections, it is likely that claim construction determinations will soon be afforded a more deferential review.[147]

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[145] *See* Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1451 (Fed. Cir. 1998) (en banc).

[146] One of the more vocal jurists calling for deferential review is Judge H. Robert Mayer of the Federal Circuit. *See, e.g.*, Phillips v. AWH Corp., 415 F.3d 1303, 1330 (Fed. Cir. 2005) (Mayer, J., dissenting) ("Now more than ever I am convinced of the futility, indeed the absurdity, of this court's persistence in adhering to the falsehood that claim construction is a matter of law devoid of any factual component.").

For examples from academic literature, see Thomas Chen, Note, *Patent Claim Construction: An Appeal for Chevron Deference*, 94 VA. L. REV. 1165 (2008); Jeffrey Peabody, *Under Construction: Towards a More Deferential Standard of Review in Claim Construction Cases*, 17 FED. CIR. B.J. 505 (2008); M. Reed Staheli, Comment, *Deserved Deference: Reconsidering the De Novo Standard of Review for Claim Construction*, 3 MARQ. INTELL. PROP. L. REV. 181 (1999).

[147] *See, e.g.*, Amgen Inc. v. Hoechst Marion Roussel, Inc., 469 F.3d 1039, 1041 (Fed. Cir. 2006) (Michel, C.J., dissenting from denial of petition for rehearing en banc) ("I believe the time has come for us to re-examine *Cybor*'s no deference rule."); *id.* at 1043 (Newman, J., dissenting from same); *id.* at 1044 (Rader, J., dissenting from same); *id.* at 1045 (joint opinion of Gajarsa, Linn & Dyk, JJ., concurring in denial of petition for rehearing en banc) (noting that a different case would provide a better

Changing patent law rules to allow for, or even encourage, introduction of working models and the accused device or process during claim construction does not have as much underlying support. However, even this proposal has been suggested to address other problems and is therefore not an impossible impediment to moving towards a system that acknowledges the prototype semantics and fuzzy categorization described herein. For example, there have been calls requiring a patentee to have built a prototype in order to obtain a patent.[148] I am not suggesting that a working model would be required, simply that claim construction and infringement analysis would be better served by lifting the prohibition on considering information that would be helpful for the judge to understand the invention.

There may be other changes to current patent infringement analysis that would also allow the court to make use of intuitive mental processes, such as fuzzy categories and connections. The key is to embrace prototype semantics as a better method for determining patent infringement, rather than celebrate the death of the doctrine of equivalents.

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vehicle to reconsider deferential review of claim constructions); *id.* at 1046 (Moore, J., dissenting from same).

[148] *See, e.g.*, Sean B. Seymore, *The Teaching Function of Patents*, 85 NOTRE DAME L. REV. 621, 642–43 (2010) (calling for a patent examiner to request a working model if the patent application's written description may be inadequate); Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 392–93 (2010) (noting that requiring a working model may increase commercialization but would be less than ideal); Cotropia *supra* note 123, at 120–22 (suggesting that the requirement of a working model would discourage premature patent filing).

CONCLUSION

A man who shouts "Your house is on fire" may not be able to define exactly what he means by your *and* house *and* is *and* on *and* fire, *but he might still be saying something quite important.*

-- J.B. Priestly[149]

Much ink has been spilled announcing the death of the doctrine of equivalents, more often in wishing good riddance to the doctrine rather than eulogizing the long-lived practice. These articles are focused on the wrong aspect, however. The doctrine was created for very sensible reasons; the problems language causes for drafting patent claims and determining infringement have not disappeared. But in their rush to cheer the doctrine's demise, most scholars have not looked at what has stepped into its place.

This Article suggests that the doctrine of equivalents is dead in name only. Patent infringement cases are still plagued by the difficulty of using words to create fences around a patentee's exclusive territory. And there is still the concern that an infringer may avoid liability if his accused device or process is just barely outside the defined fence. Rather than addressing these issues by performing a formulaic infringement analysis and then using the artificial doctrine of equivalents to create flexibility, now these problems are being tackled at their root—the language itself. Cognitive linguistics, and specifically prototype semantics, explains how we naturally acquire, understand, and think about language. It is a simple step to see how claim construction and infringement analysis are reflections of fuzzy categorization and non-binary membership sets. Viewing infringement analysis through a fuzzy lens not only makes sense, but also puts the judge in a position of doing what comes

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[149] *E.g.*, Gardner, *supra* note 87, at 51.

naturally. We regularly interact with our world in terms of categories and connections. It should not be surprising that the same analysis is occurring in patent infringement cases. The doctrine of equivalents will not truly die, because a penguin will still be a bird.