How Speech Lost Its Voice: The Informational Turn in US Free Speech Law

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ABSTRACT

In influential strains of late twentieth-century US legal discourse on free speech, speech and language have been disconnected from sound, and speech rendered as a form of writing. The effect of this is a free speech jurisprudence in which analysis of speech is less concerned with speakers and more concerned with messages. The article explores this situation by examining the legal reasoning in a 2001 case in which federal district court judges ruled that computer programs written in binary computer code (1s and 0s) were a form of "speech" covered by the First Amendment. They did so by equating speech with writing, drawing on a theorization of language in terms of information rather than as embodied social practice. The article argues that this logic follows the popularization of information theory and the rhetoric of disembodiment that grew out of this popularization in the latter half of the twentieth century.

This essay is about the presences and absences of sound in current US free speech law. Sound is currently oddly absent in free speech law. It was once a subject of discussion, from anxieties over the irrational "surplus value" of the sound of the human voice (and the way such sound was understood to index bodily emotion) to debates over sound trucks and phonographs in public places—technologies of amplification that cities sought to regulate as noise or public nuisance. Today, even discussions of the human voice, the medium of human speech, are far and few between in US law. Rather than a concern with voice, or with speaking, it is more common today to see a focus on messages, or the transfer of information.

Of course, voice as a political metaphor is still central to free speech law and discourse. Metaphorically, voice refers to the ability of agents to advocate and articulate political, social, or aesthetic visions and to effect change. Yet, often today legal decisions hinge not on the rights of specific speakers but on messages, or more specifically on

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whether particular textual objects or activities constitute speech. Legal scholars have argued that in such reasoning, various goods or economic transactions are classified as speech in order to gain constitutional protection from regulation that has little to do with classic First Amendment concerns. Such "opportunism" makes the First Amendment a tool to fend off economic regulation as much as (or even more than) a means of protecting civil rights, workers' rights, or democratic processes.[1] To explain this moment, legal scholars have looked at contemporary definitions of speech in law and to the history of ideas about freedom in law and politics.[2]

Yet, to understand this moment in US law, I argue, we need to also look in a different direction: toward genealogies of inquiry into speech as a social, cultural, and technical object. In particular, we need to attend to the legacies of midcentury engineering and information theory. This technical discourse, or more properly its adoption and popularization in fields from linguistics to economics, has shaped the legal conception of speech and paved the way to current legal reasoning about the First Amendment.

The present essay is an attempt to sketch out how US speech law has been shaped by work in these domains. As this is a wide-ranging endeavor, the essay is necessarily exploratory, offering an analysis of one small point in this history, a case in which the legal status of computer code as speech was defined: *Universal Studios v. Corley* (2001; hereafter, *Corley*). In this case, judges in federal district court crafted the current operative legal understanding of expressivity in computer code: that code is expressive in its textual form, but is physical action subject to regulation when run.[3] It has, further, become

1. I refer here to decisions in which antidiscrimination provisions were limited by free speech claims (e.g., *Masterpiece Cake Shop v. CCRC*, *Hurley v. Irish American Gay, Lesbian, and Bisexual Group of Boston*); the limitation of privacy laws to protect consumers in the name of the free speech of businesses (e.g., *IMS v. Sorrell*); the way that the court has protected corporate speech and interests over democratic processes and workers (e.g., *Citizens United v. FEC*, *Burwell v. Hobby Lobby*). For discussions of opportunism, see Frederick Schauer, "First Amendment Opportunism," Faculty Working Paper Series, Harvard Kennedy School of Government (2000), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=253832; Cass Sunstein, "Lochner's Legacy," *Columbia Law Review* 87 (1987): 873–919; cf. Genevieve Lakier, "The First Amendment's Real Lochner Problem," *University of Chicago Law Review* 87 (2020): 1243–46.

2. For examples of legal theorizations around the meaning and scope of speech in the law, see Frederick Schauer, *Free Speech: A Philosophical Inquiry* (Cambridge: Cambridge University Press, 1982); Leslie Kendrick, "First Amendment Expansionism," *William and Mary Law Review* 56 (2014): 1199–1219; Mark Tushnet, Alan Chen, and Mark Blochner, *Free Speech beyond Words: The Surprising Reach of the First Amendment* (New York: NYU Press, 2017). For sample historical analyses, see Laura Weinrib, *The Taming of Free Speech* (Cambridge, MA: Harvard University Press, 2016); Mark Graber, *Transforming Free Speech: The Ambiguous Legacy of Civil Libertarianism* (Berkeley: University of California Press, 1991).

3. Earlier cases like *Bernstein v. US Department of Justice* (1997) and *Junger v. Daley* (2000) had dealt with the publication of decryption source code, declaring in the first case that it was expressive

a precedent for categorizing artifacts such as 3D printer files, receipts, and databases as speech. *Corley* is of interest for these reasons and because it articulates a legal conceptualization of speech in which speaking as a social activity (and voice) disappears, conflated with notation systems and abstracted from material sites and means of articulation. In demonstrating the disarticulation of the legal category of speech from embodied social practices of speaking subjects, the essay contributes to a broader literature in the humanities and media studies critiquing the rhetoric of "disembodiment" that has been applied to information and digital communication technologies. The case examined here suggests that this rhetoric has shaped the legal conception of speech—a case I make at greater length elsewhere.[4] The essay concludes with some of the consequences of the adoption of this disembodiment of speech within the law.

BACKGROUND: SPEECH AND VOICE IN EARLY TWENTIETY-CENTURY LAW

Congress shall make no law . . . abridging the freedom of speech, or the press.
—First Amendment, US Constitution (1789)

Two key concerns in rulings and debates in twentieth-century US free speech law are the line between persuasion and coercion and the line between speech and conduct. The former turns up most often in decisions about when and whether governments may regulate some form of expression. If that expression tips over into coercion, the court is more open to regulation. One cannot force others to listen, for example, by unlimited volume of speech. In the early to mid–twentieth century, not only the volume but also the timbre of the human voice and the bodily copresence of interlocutors in (nonamplified) speech were possible sources of coercion. In decisions involving strikes, picketing, and public meetings, the potential power of the orator was a recurring source of anxiety. Some of these concerns hinged on physicality and copresence, the capacity for tempers to flare and words to turn to blows.[5] These worries were not only with the linguistic content of speech, or with words alone. Justice Robert Jackson, one of the

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and in the second that it was expressive but also conduct, and as such could be regulated with a lower level of judicial scrutiny than "pure speech." *Corley* drew more on the latter reasoning, cementing (for now) the legal approach to code as speech.

4. I elaborate this genealogy at greater depth in Jennifer Petersen, *How Machines Came to Speak* (Durham, NC: Duke University Press, forthcoming).

5. The imminent violence of copresence was central to the limits placed on the right to picket and to inflammatory speech in cases like *Thornhill v. Alabama* (1940) and *Chaplinsky v. New Hampshire* (1942), in which the court defined "fighting words" as beyond the scope of the First Amendment.

justices who decided many of these cases, from the late 1930s through the 1940s, made this explicit in a later dissent. Disagreeing with the majority's decision that a city could not restrict public meetings or speech that disparaged other religions (e.g., anti-Semitic and anti-Catholic invective on the public streets), Jackson declared: "Written words are less apt to incite or provoke to mass action than spoken words, speech being the primitive and direct communication with the emotions. Few are the riots caused by publication alone, few are the mobs that have not had their immediate origin in harangue."[6]

In this, Jackson echoed early twentieth-century sociologists' fears about crowds, which focused on physical gatherings and copresence as a source of irrational, coercive influence (in which the will of individuals was bypassed by more primitive physical impulses). By the 1930s and 1940s, these concerns had shifted to the amplification and transmission of the human voice via technological means: radio and sound trucks. Legal cases dealing with sound trucks focused on the sonic quality of the amplified voice—in particular the volume of such speech (and the need to set limits on this volume). Radio brought up another set of worries, about the influence of the affective or irrational nonlinguistic aspects of the human voice—the idea that the charisma and emotions of the speaker might be transported via the air (on the waves of sound, as it were), what Paul Lazarsfeld and his team of researchers referred to as the "surplus value" of the voice. This surplus value meant that the voice communicated more than the printed word: "In addition to the actual content which you want to present, the voice of the speaker can express the way he feels about something . . . even if a man uses nonsense syllables, you can tell whether he means to express anger, or amazement, or any other of a number of emotions."[7]

I start here to highlight that discussions of speech were, from the 1930s through the early 1950s, engaged directly with bodies and the nonlinguistic qualities of voice, from volume to timbre and the ability of the voice to carry or convey physical or aesthetic impressions of emotion and other psychic states.[8] (In the 1960s, discussions of voice were supplanted by discussions of embodied protest, including the right to occupy

6. Kunz v. New York 340 U.S. 290 (1951), 307.

7. Marjorie Fiske, Suggested Line of Approach Script. Retailers' Use of Radio, 1943, Box 6 BASR archives, Columbia University. See also Paul Lazarsfeld, *Radio and the Printed Page* (New York: Duell, Sloan, & Pearce, 1940); Hadley Cantril and Gordon Allport, *The Psychology of the Radio* (New York: Peter Smith, 1941). For a more detailed analysis of emotion and the voice of the radio speaker, see Brenton Malin, *Feeling Mediated: A History of Media Technology and Emotion in America* (New York: NYU Press, 2014).

8. Speech had a double meaning: it might refer specifically to embodied utterances or more generally to the expression of thought and opinion, which was not strictly limited to the act of speaking. Still, there was a stronger separation of speaking and writing (and other media) in early twentieth-century legal decisions.

physical space and engage in symbolic speech that was often visual.)[9] This is a stark point of contrast for discussions of speech today, which often focus on messages and their informational content—which is almost always rendered as linguistic.[10] In order to showcase this historical development, in the next section I examine the legal decision in *Corley*, a case that illustrates the disembodiment of speech in the law.

CODE: SPEECH OR WRITING?

In the 1990s, the confluence of the ability to disseminate computer programs online, decryption research, and the rise of the free software movement (and the idea of coding as an artistic and political endeavor) combined to create the conditions of the possibility to argue that computer code was speech. The argument and idea that code was a form of expression fit within common sense.[11] That it made legal sense as speech depended on a host of other factors, which I explore below.

Yet, the idea that code is speech makes more sense politically than descriptively. Computer code may be likened to language, in the metaphor of programming languages, but it is a language that is never spoken. Accordingly, it would make more sense to argue that code is a form of writing. (And, in fact, that is exactly what those arguing for full protection of code did in *Universal City Studios et al. v. Corley*.)[12] It is symptomatic of the abstraction of speech from embodied practices of speaking that the legal argument that code is speech in fact hinged on an analogization of code to writing.

The case was a David and Goliath narrative, pitting libertarian hackers and free software advocates against giants of the content industry (eight major Hollywood movie studios). The studios were suing the owners of several websites that had hosted or pointed to a program, DeCSS, that could decrypt the content scrambling system (CSS) that major studios used to prevent unauthorized copying and viewing (e.g., preventing a DVD bought in Europe from being viewed on a machine in the United States, or anyone from viewing a movie on a computer running Unix).

Among the defendants was Eric Corley, a cyberlibertarian hacker who also went by the name Emmanuel Goldstein (after the fictional dissident leader in George Orwell's

9. In the 1970s and 1980s, mediation was a more central concern in Supreme Court free speech decisions.

10. For a discussion of some of the difficulties the courts have had in explaining why nonlinguistic expression should be covered by freedom of speech, see Tushnet et al., *Free Speech beyond Words*.

11. See Tom Streeter, *The Net Effect: Romanticism, Capitalism, and the Internet* (New York: NYU Press, 2011).

12. See Brief for Defendants, Universal v. Reimerdes: https://www.2600.com/dvd/docs/2001/0126-speech.html; this argument followed a line of reasoning begun by Phil Salin in 1991, when he argued that software was a form of writing and thus protected under freedom of speech, http://philsalin.com/patents.html.

dystopian novel *1984*). Corley was the publisher of *2600: The Hacker Quarterly*, a hub of information and advocacy for those interested in using computer networks and programs as tools to dismantle systems they registered as oppressive. Corley alternately argued that posting DeCSS on the 2600.com website was a form of political critique and civil disobedience and that it was journalism.[13] Centrally, he and his supporters argued, the program was a form of protected free speech. That code, speech, and writing were equivalent was a key element of this argument.

This was central to the broader advocacy around the case, as well. To protest the suppression of DeCSS, hackers published poems including the decryption key to unscramble CSS, transposed the program into a music file, printed the DeCSS program on T-shirts, performed it as spoken word in public places, and posted and shared the program in various other forms.[14] All of these forms were protected free speech, they argued, and they were equivalent to the DeCSS program, so the distinction between posting code online and publishing a written version in a journal (or performing it in public, etc.) was illogical.[15] These were among the arguments made by a number of computer scientists in an influential amicus brief for Corley et al.[16] The brief argued that if an English language description of the program, or a spoken word rendition, was a form of speech, then the program was, too. It did not matter whether it was expressed via vocal cords, printed on a T-shirt, rendered as a diagram, or in a different computer language—each was a different expression of the same text (the program): "At root, computer code is nothing more than text, which, like any other text, is a form of speech. The Court may not know the meaning of the Visual BASIC or Perl texts . . . but the Court can recognize that the code is text."[17]

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13. From the transcripts of his deposition, it appears that the recourse to journalism was at the suggestion of Corley's lawyers; the deposer tries to get Corley to argue that the posting was an act of civil disobedience (and thus, a conscious legal infraction). Deposition of Emmanuel Goldstein, US District Court, Southern District of New York, June 27, 2000, https://www.2600.com/dvd/docs/2000/0627-goldstein.txt.

14. On this activism, and how it fit in to the free software movement, see Gabriella Coleman, *Coding Freedom: The Ethics and Aesthetics of Hacking* (Princeton, NJ: Princeton University Press, 2013).

15. Computer science professor David Touretzky compiled a list of these versions of the program to argue the "absurdity" of drawing a line between these different forms of mediation: https://www.cs.cmu.edu/~dst/DeCSS/Gallery/.

16. Touretzky was one of the signatories of this brief; he also provided what was by all accounts compelling oral testimony; Amy Harmon, "Free Speech Rights for Computer Code; Suit Tests Power of Media Concerns to Control Access to Digital Content," *New York Times*, July 21, 2000, https://www.nytimes.com/2000/07/31/business/free-speech-rights-for-computer-code-suit-tests-power-media-concerns-control.html.

17. Brief for Defendants, Universal v. Reimerdes, https://www.2600.com/dvd/docs/2001/0126-speech.html.

This argument—that code is text and that text is speech—proved persuasive and compelling, driving the judges' discussion of computer code and their decision in the case. There were other arguments for the defendants. A host of esteemed legal and other scholars signed on to a brief critiquing the overreach of the Digital Millennium Copyright Act (the DMCA, the object of Corley's critique) and arguing that the suppression of the DeCSS program suppressed users' freedom of speech (fair use, or the right to access and use information in order to critique and create).[18] The fair use argument, like Corley's argument that posting the code was a form of political protest against a bad law (the DMCA), was largely ignored by the judges who decided the case. Also ignored were programmers' arguments that coding was a creative, even artistic, endeavor and a form of political expression. These arguments were central to the larger struggle over the cultural and legal status of code and to the free software movement.[19] They were central to the hacker community in this case, as evidenced by the form of protest organized over the regulation of DeCSS, which relied heavily on poetry: writing the program in haiku form (and printing this poem on T-shirts) and performing it as a spoken word poem.

Instead of basing their decision on fair use, or creativity, or the ability for computer code—in itself, or in its functionality—to act as political expression, the judges focused instead on a resemblance to writing, a resemblance that became an ontology of code. Rather than accepting Corley's arguments that the program was a form of political expression, the decision classified it as the transmission of "dry" technical information.[20] Code was speech not on account of its origin in a particular speaker and his or her ideas, nor on account of what it said (e.g., that it was political speech or advocacy), but rather on account of the fact that it had a capacity to transmit information.

FROM VOICE TO DATA: A TECHNICAL THEORY OF SPEECH

The judge who first decided the DeCSS case reportedly came into the case assuming that computer programs were as expressive as a key to a car.[21] The comparison to an object is telling. The earlier legal cases dealing with decryption programs had pushed back against federal designation of decryption programs as a form of "munition," a thing subject to export restrictions (the cases arose in the 1990s, as posting programs online was considered a form of export and restricted). In a progression of cases, computer

18. Legal scholars Peter Jaszi, Julie Cohen, Yochai Benkler, and Lawrence Lessig were among those that signed on to the amicus brief.

19. Coleman, *Coding Freedom*.

20. Universal City Studios v. Corley, 273 F.3d 429 (2d Cir. 2001), 446.

21. Harmon, "Free Speech Rights." In the decision, Judge Jon Newman offered a similar metaphor, comparing the functionality of the program to that of a skeleton key, and arguing that its regulatability followed from that similarity. Universal City Studios v. Corley, 452–53.

programs went from being classified in the law as a thing (an object subject to regulation) to an expressive activity—or, given the human inflections of the term "activity," a set of functions. In other words, decryption programs went from being classified as inert objects to a set of processes with some ancillary expressive value.

Picking up on the brief from the computer scientists and engineers, which had argued that code was just another form of text, the judge deciding the case began his discussion by comparing computer code to natural languages—and math and music:

> Communication does not lose constitutional protection as "speech" simply because it is expressed in the language of computer code. Mathematical formulae and musical scores are written in "code," i.e., symbolic notations not comprehensible to the uninitiated, and yet both are covered by the First Amendment. If someone chose to write a novel entirely in computer object code by using strings of 1's and 0's for each letter of each word, the resulting work would be no different for constitutional purposes than if it had been written in English. The "object code" version would be incomprehensible to readers outside the programming community (and tedious to read even for most within the community), but it would be no more incomprehensible than a work written in Sanskrit for those unversed in that language.[22]

This is in some ways a very strange rationale. The law does not protect languages or notation systems per se but rather the ability to make statements that matter (that further one of the normative rationales for the First Amendment).[23] Mathematical equations and musical scores are not protected because their notational systems are similar to language or because they can be used to express the same ideas as language. Rather, they are protected for the value of what they convey for knowledge production (math) and for aesthetic and cultural values and experience (music). Music, as a number of legal theorists point out, is in fact a difficult, boundary case for First Amendment coverage because it does not convey the same type of ideas or messages as do words; many jurists feel that instrumental music should be protected but struggle to find precedents or normative rationales for this protection.[24]

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22. Universal City Studios v. Corley, 446–47.

23. The main normative rationales for free speech include protecting the autonomy of the speaker, the proximity of speech to democratic self-government, the social importance of a diversity of competing ideas, and to create more adaptable, tolerant communities (in which differences are addressed through words rather than violence). See Cass Sunstein, *Democracy and the Problem of Free Speech* (New York: Free Press, 1995); Schauer, *Free Speech*.

24. Legal scholars have pointed out that existing justifications for free speech do not clearly explain why instrumental music should be considered speech; see Tushnet et al., *Free Speech beyond Words*,

The decision went on to distinguish the expressivity of code from the expressivity of computer programs. Yet, this theorization of code as a form of language was central to the logic of the decision, and to the range and limit of expression granted to code.[25] Essential to the outcome of the case were two related propositions: that computer code represented ideas similar to natural language, just at a higher level of abstraction, and that computer code was not only machine-readable but human-readable. The former proposition argued an equivalence between programs and linguistic statements; as Judge Lewis Kaplan reasoned, taking a page from the computer scientists, "each form expresses the same idea, albeit in different ways": a spoken word rendition of a program or a T-shirt emblazoned with lines of code had the same meaning as the program itself.[26] For both judges and the computer programmers testifying on behalf of Corley, the social relations and materiality of communication were epiphenomenal to idea.

Whereas in the early twentieth century the legal discussions of speech had been closely tied to the act of oration, located in a speaking subject (and distinct from print or textual media), in *Corley*, speech was conceptualized in a highly abstracted, disembodied manner. It was a conceptualization in which speech is defined by reference to notation systems (subsuming speech as an embodied act to the manipulation of symbols) and in which the differences among notation systems were obscured. In this, the measure, or essence, of speech was not an embodied utterance but rather a potentially disembodied transmission of information.[27] This is the discursive ground on which the assertion that computer code, a poem (spoken or written), and a translation of computer code into English language instructions are equivalent (they can convey the same message or idea). As media scholars have argued, this equivalence only works at a high level of dematerialization.[28] In addition, the examples listed above may be logically

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15–69; David Munkittrick, "Music as Speech: A First Amendment Category unto Itself," *Federal Communications Law Journal* 62 (2010): 665–90. John Greenman argues that musical scores might be seen as ideational but that the sound of music (represented by those very scores) cannot be; see "On Communication" *Michigan Law Review* 106, no. 7 (2008): 1337–78.

25. Per the decision, code was expressive in textual form but regulatable action when run.

26. The initial, district court decision made this statement; see Universal v. Reimerdes, 326. A similar logic was apparent in the appeal (*Corley*), where Judge Newman discussed the possibility of writing a novel in 1s and 0s.

27. The decision delicately avoided whether a program might express an idea, pointing out that speech need not express an idea but covered facts, information about prices, and other "dry" data.

28. Wendy Chun argues that many discussions of code, including those that equate code with output, overlook functional consequences of programs' reliance on libraries and operating systems and other sources in order to execute; Wendy Hui Kyong Chun, *Programmed Visions: Software and Memory* (Cambridge, MA: MIT Press, 2013).

equivalent, but they are not equivalent in terms of function or meaning. The English language instructions convey the same ideas as the program, but they cannot be put to use in the same way. Further, it is far from clear that a spoken rendition of a program (say, at a café) or a T-shirt emblazoned with the program express the same idea as the program on a computer screen.[29] Mediation and context matter.

The set of equivalences offered here—and on display in various other sites of discussion about machinic speech—owes a debt, I want to suggest, to a history of thinking about communication as signal processing. The ways the judges located—and limited—expression in code in the *Corley* case bears traces of the abstraction and quantification of communication developed by communication engineers working on problems of compression and cryptography from the 1920s through the post-WWII period. The decision approached a new medium not in terms of its social uses, the extent to which it was used to express opinions, or the political or nonpolitical nature of expression in the medium—all common lines of reasoning in First Amendment law. Rather, it focused on the possibility of information transmission and processes of coding and decoding. In this, I argue, we can see the influence of information theory, as it was popularized and translated into the social sciences.

The idea of information—and, more specifically, the idea that communication could be productively quantified and modeled at a high level of abstraction as information transmission—was adopted by a range of social scientists, from linguistics to economics from the 1950s onward.[30] For these social scientists, this abstraction and quantification promised a more objective analysis of social activities that were notoriously difficult to model, predict, or compare. Information, or information theory, seemed to provide the tools to do so, allowing a variety of seemingly disparate activities to be compared and analyzed in similar terms (for instance, think of the flattening of a number of types of production as "information work" in sociological and economic discussions of the information society).

I now turn to the development of information theory at Bell Labs and its popularization by Claude Shannon and Warren Weaver. In particular, I seek to show how the mathematical theory of communication developed there reconceptualized communication away from many of the social and contextual concerns associated with speech in social science and humanistic discussions of speech at midcentury. The mathematical

29. The T-shirt and the reading are highly likely to be read as political statements about freedom and decryption; the computer program may in some contexts be read this way, but in others it may appear more instrumental.

30. See Ronald Kline, *The Cybernetics Moment, or Why We Call Our Age the Information Age* (Baltimore: Johns Hopkins University Press, 2015).

theory offered instead a model for analyzing communication in the abstract—as transmission in any medium, from voice to pictures—without reference to the intentions of a speaker or the interpretation of an audience. This conceptualization of communication, which traveled widely and influenced many disciplines in the 1960s through at least the 1980s, has deeply shaped both academic and lay conceptualizations of communication.

COMMUNICATION AS INFORMATION TRANSMISSION

It was the publication of Claude Shannon's article "A Mathematical Theory of Communication" in 1948 and its popularization by Warren Weaver that spurred the interest among scholars in disparate fields in information theory.[31] Of particular attraction here was the abstract nature of the model, which aimed to describe transmission regardless of content or medium (the human voice, Morse code, and images could all be modeled in an equivalent manner).[32]

While much in the original theory was transformed in this translation from communication engineering to various social sciences, some of the reasons for its appeal, and the ability of popularizers like Warren Weaver to urge broad adaptation, had to do with the types of problems that Shannon and other engineers at Bell Labs before him were trying to solve. Key among these were problems of encoding and compression linked to maximization of bandwidth and the use of the same lines for multiple signal types.[33] Such problems required that communication be theorized in terms that could be applied to multiple signal types (e.g., voice, image, telegraphy) and that messages be reduced to the most basic form required for accurate reproduction at the receiver. In other words, the imperatives of efficiency and profit argued for a quantification of communication abstracted from context or media, and which could be applied across a variety of types of communication—the generality of the "general theory of communication" that helped so many people see applications in other fields.[34]

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31. The technical article was widely requested and cited in a range of disciplines. It was republished as a book, containing commentary by Warren Weaver encouraging a broad interpretation and application of the theory in 1949; Weaver's commentary also appeared as an essay in *Scientific American* the same year.

32. For more on the influence of Shannon's work and the different meanings attributed to information, see Kline, *Cybernetics Moment*.

33. Jonathan Sterne, *MP3: The Meaning of a Format* (Chapel Hill, NC: Duke University Press, 2012).

34. Shannon and Weaver articulated the mathematical theory as a general theory of communication. As Jonathan Sterne (ibid.) points out, there are a series of generalizations (or abstractions) going on: Harry Nyquist developed a general theory of telegraphy based on analysis of specific telegraph systems; Ralph Hartley generalized this to a theory of communication systems; Claude Shannon would build on the work of both men to offer a general theory of communication ("the mathematical theory of communication").

Engineers working at Bell Labs in the 1920s began to work with such a conceptualization of information as a solution to problems of efficiency and measurement: or how to represent and quantify the diverse communications (originally termed "intelligence") transmitted along the system wires.[35] They needed a standard of measurement that could be applied to what, socially, appeared as a heterogeneous mix of talk, type, informal and formal messages, and social relations.[36] In a 1928 paper, Ralph Hartley proposed "information" as such a unit of measurement. It had the benefit, he argued of being free of "the psychological factors" involved in messages that confounded measurement and analysis. In addition to avoiding messy concerns of interpretation and misinterpretation (problems that could be located in users and senders, not the system), these psychological factors included the amount of shared knowledge between sender and receiver, even the question of shared language.[37] Importantly, this information was not a description of content, but a measure of the uncertainty in encoding and decoding:

> let us consider what factors are involved in communication; whether conducted by wire, direct speech, or any other method. In the first place, there must be a group of physical symbols, such as words or dots and dashes or the like, which by general agreement convey certain meanings of the parties' communication. In any given communication, the sender mentally selects a particular symbol and by some bodily motion, as of his vocal mechanism, causes the attention of the receiver to be directed to that particular symbol. At each selection there are eliminated all of the other selections which might have been chosen.[38]

By focusing on the number of choices involved, engineers could define the minimum data required to reproduce or decode a message at the point of reception. Anything beyond this was redundant and could be eliminated while still preserving the content

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35. Bernard Geoghegan, "Information," in *Digital Keywords: A Vocabulary of Information Society and Culture*, ed. Benjamin Peters (Princeton, NJ: Princeton University Press, 2016), 173–83.

36. In this way, the development of information in the Bell Labs context can be understood as part of the project of quantification in which numbers come to replace local knowledge as more universally legible and fungible representations described by Theodore Porter, *Trust in Numbers* (Princeton, NJ: Princeton University Press, 1995).

37. By psychological factors, Hartley meant the extent to which the communicants understood each other, variables that were beyond the purview of the network. Harry Nyquist was another engineer at Bell Labs who also did key early work on information theory, influencing Claude Shannon's work.

38. As such, information was a useful term for measuring—and comparing—transmission via the discrete signals of telegraphy and the analog waves of telephony (as well as radio and televisual transmission); Ralph Hartley, "Transmission of Information," *Bell System Technical Journal* 7, no 3 (July 1928): 536.

of the message. In this way, the project of transmission was not about perfect fidelity but about the conditions of sufficient intelligibility, or legibility.[39]

The bodily motion of the vocal mechanism was, in the work of Hartley and later Shannon and Weaver, an indication of choice rather than a component of communication—a signal that could be understood as distinct from the medium of its transmission, whether that was the human body (the vocal mechanism), or the electronic wave of telephonic or televisual transmission.[40] In the popularization of information theory, this was a source of the idea that information was "disembodied." Yet, as others have shown, the very criteria of intelligibility (and signal) were defined through the study and measurements of perception (psychoacoustics) and vocalization carried out on particular bodies.[41] Still, these criteria became abstracted to apply to multiple contexts and types of communication. And the acoustic qualities of voice associated with naturalness and a "human" quality—what social scientists described as the "surplus value" of the human voice—were deemphasized in favor of the accuracy of message content (words).[42]

In these ways, the material as well as semantic and psychological aspects of communication were bracketed.[43] Questions of meaning and social situation were external to the system, and the human qualities of voice were downplayed in favor of legibility. This bracketing had pragmatic benefits. It not only made it easier to measure and calculate the seemingly ephemeral goods conveyed via communication systems, but also provided a foundational logic for constructing a more fully automated communication system, in which messages were relayed and decoded by machine or by operators who did not need to comprehend the particular messages they relayed. Such efficiencies were a substantial driver of early information theory.[44]

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39. On the conceptualization of fidelity in Bell Labs research on telephony, see Mara Mills, "Deaf Jam: From Inscription to Reproduction to Information" *Social Text* 102, no 28 (2010): 35–58. I use "legibility" here to highlight the focus on decoding and notation in many of the applications and translations of this work.

40. Hartley, "Transmission of Information," 555–63. The essay applied the calculation of maximum transmission rate to face-to-face speech, radio transmissions, and pictorial transmission (experiments in TV).

41. Mara Mills, "Deafening: Noise and the Engineering of Communication in the Telephone System" *Grey Room* 43 (2011): 118–43; Jonathan Sterne, *MP3*.

42. Mills, "Deafening."

43. Yet, in other ways they were not. Measures based on bodies, from psychoacoustics to the parameters of "normal" hearing, were embedded in the communication systems; Sterne, *MP3*; Mara Mills, "Media and Prosthesis: The Vocoder, The Artificial Larynx, and the History of Signal Processing" *Qui Parle* 21 (2012): 107–49.

44. Sterne, *MP3*; see also Warren Weaver's description of the ideal communication system in "The Mathematics of Communication" *Scientific American* 181, no. 1 (1949): 11–15.

These were among the hallmarks of the mathematical theory of communication popularized by Shannon and Weaver. The mathematical theory allowed a communication system to handle multiple forms of communication similarly; it did not matter whether the message was the spoken or written word, or pixels. It was agnostic not only about the signal type, but also about content.[45] It allowed system builders to conceptualize communication less in qualitative (and contextual) terms of interpretation of particular messages, and more in quantitative terms of the reproducibility of messages in general. An emphasis on *legibility* meant that whether or not a message was actually perceived or understood at the destination was beyond the purview of communication engineering. In the popularization of the mathematical model, shaped by its chief popularizer, Warren Weaver, this agnosticism of content was generalized to uses of language and other modes of communication (well beyond the transmission of messages within a system). Shannon's theory, Weaver argued, applied broadly to the study of language and meaning. An array of different communication could be treated the same: "The mathematical theory of communication is so general that one does not need to say what kinds of symbols are being considered—whether written letters or words, or musical notes, or spoken words, or symphonic music, or pictures. The relationships it reveals apply to all these and to other forms of communication."[46] The relationships revealed, he made clear, included meaning and were best analyzed through statistical analysis.[47]

If Warren Weaver encouraged a broad interpretation and applicability of the general theory of communication, many midcentury scholars were eager adopters. Multiple fields adopted communication as a core metaphor and modeled social relations and biological processes in terms of messages and information, often on very different terms than employed by communication engineers. From the information society to the conceptualization of DNA in terms of information and even the modeling of structure and choice in human speech (in structural linguistics), all carry the influence of the Shannon-Weaver model.[48] For many of these adopters, information theory offered a way of assimilating and discussing a range of different communicative activity—speech, the dots and dashes

45. Claude Shannon, "A Mathematical Theory of Communication," *Bell System Technical Journal* 27 (1948): 379–423.

46. Weaver, "Mathematics of Communication," 11.

47. Ibid., 14–15.

48. Kline, *Cybernetics Moment*; Bernard Geoghegan, "From Information Theory to French Theory: Jakobson, Lévi-Strauss, and the Cybernetic Apparatus" *Critical Inquiry* 38 (2011): 96–126; N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999).

of Morse code, music, and images—in similar, quantitative terms.[49] Many things were stripped out of early information theory in this transfer. Perhaps most notably, the physicality of the measure of information in the early Bell Labs research was forgotten. Information became ephemeral and signals lost grounding in electricity, specific communication technologies, or organs of speech and hearing.

The way that information theory became, in this translation, a tool for treating knowledge and social practices as abstract, disembodied phenomena has been documented by others.[50] What I argue here is that this influence has shaped legal reasoning, in particular in cases of mediation. The popularized version of information theory, in particular as expressed in economics, became a tool for legal reasoning. It first showed up in a series of cases in the 1970s, where justices declared that they could not make a clear distinction between advertisements, corporate expenditures, and traditional forms of free speech (e.g., political speech).[51] While *Corley* is not the first case to draw on this tradition, it is the first to do so in order to define what counts as "speech" for legal purposes in a new medium.

In *Corley*, we see "speech" defined in highly abstract, dematerialized terms. The individuals and their expressive intent, and the benefit (or harm) to an audience were not part of the reasoning. That is, the argument by Corley and his supporters that posting DeCSS was a form of advocacy became irrelevant.[52] Corley and his supporters had argued that the DeCSS program was an act of civil disobedience, that code was an artistic and political practice, a practice of freedom.[53] The reasoning of the decision ignored these claims. The judges looked, instead, to the question of transmission: could code convey or carry a message?

To answer this question, they examined code as a notational system. Each notation system, like the interchangeable types of data (telegraphy, telephony, images) in early information theory, was formally equivalent in that it could transmit the same linguistic content (an idea, as expressed in a language like English). This content was defined

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49. Kline, *Cybernetics Moment*.

50. See, e.g., Hayles, *How we Became Posthuman*; Sterne, *MP3*; Kline, *Cybernetics Moment*; Michael Hobart and Zachary Schiffman, *Information Ages: Literacy, Numeracy, and the Computer Revolution* (Baltimore: Johns Hopkins University Press, 1998).

51. The decisions drew on economics scholarship that in turn drew on Fritz Machlup, one of the economists who leaned heavily on information theory; see Kline, *Cybernetics Moment*.

52. This claim likely would not have succeeded. What I want to argue is not that Corley should have won, but the way that the political element of the case was obscured in this line of legal reasoning.

53. For a detailed account of the discourse of coding as freedom that Corley and others worked within, see Coleman, *Coding Freedom*. The articulation of coding and free speech in these communities includes a set of values around transparency and citizen empowerment; the legal classification of code as speech entails none of these and has in fact been used in ways that undercuts these values.

solely in terms of the words conveyed, without any of the surplus value of intonation, performance, or presence associated with utterances in early twentieth-century law. In this reasoning, the boundary drawn around speech had to do with a capacity to convey a message.

The content of these messages did not matter—this was the point of Judge Kaplan's comment that the messages conveyed in code might be dry and technical. Meaning or intent was not a necessary component of "speech." What mattered was the capacity to convey information, a capacity that hinged on the ability of programmers to decode or read the program. Anything else, including the political and artistic value the programmers asserted, was like the psychological baggage referenced by engineers before them: if not irrelevant, a problem best dealt with outside of the judges' jurisdiction.[54]

This was an expansion of the meaning of speech—drawing on earlier decisions regarding commercial transactions—but it was an expansion that silenced the argument Corley and others were trying to make. By emphasizing transmission and *legibility*—that code was capable of conveying information to a specialized community of other programmers—the decision side-stepped a conversation about the alleged message of the DeCSS program (a confrontation Corley had hoped to stage) to either other programmers or users in general. The judges' particular classification of code as speech—a classification that relied on an abstraction of messages from contexts of communication—ironically made the message that Corley claimed he was trying to send unintelligible to the court. In this case, the consequence of the inability (or refusal) of the court to understand this message was that the activity Corley sought to portray as a political argument was codified as mere lawless action (theft of intellectual property).

I am suggesting that information in some ways replaced voice in speech law in the United States. This replacement is not complete by any means. (Nor is it a complete or accurate insertion of information theory in legal discourse. Rather, I have argued that an idea of information that derived from information theory has shaped legal discourse and case law.) There is still a more traditionally humanist strand of reasoning about speech in free speech law, in which speech rights are held by specific speakers, and in which issues of meaning and interpretation are central. Yet, at the same time there is another, more posthuman, way of reasoning about speech in the law. In this line of

54. Like the engineers at Bell Labs in the early twentieth century, the justices too had been struggling with the thorny problems of polysemy and interpretation in legal cases since the 1940s. If interpretation varied, the determination of the court might not be absolute and the determination of whether or not a proposition was likely to incite violence, or even whether it was obscene was a much trickier judgment. The direction of US law was into formalism and technical reasoning, to the point where many legal thinkers sought by the 1970s to reason like economists.

reasoning, speech is equal to information transfers. And debates about coverage—or whether or not a given action or artifact is open to protection from regulation as speech—hinge on transmission or legibility in the abstract, without reference to particular recipients (or rights holders). In these discussions, the question of authorial intent and audience interpretations are subsumed under the seemingly legal-technical categorization of the existence of information or a message (whose content is opaque or irrelevant). Legal boundary drawing around speech draws on characteristics of an efficient communication system as much as those of a particular human speaker.

CONCLUSION: MACHINE SPEECH

The conception of speech as information on display in the *Corley* decision is instructive as to the current moment and the legal conundrums that new communication technologies bring to the fore for free speech law. Today, algorithms and simple artificial intelligence present difficult cases for the law. From car alarms to Google maps, computers make decisions that are communicated to humans. With more and more of our environment governed by such machine signals, the question of whether they are classified as speech is consequential. Given the emphasis on negative liberty in US law, when and if these signals are classified as speech they are largely beyond the reach of regulation in the name of privacy, consumer rights, or safety—and perhaps beyond the reach of anti-discrimination law. The conception of speech as information then is not necessarily a move that would enhance the freedom of programmers, or users. It is as much, or more, a powerful deregulatory move, potentially shielding many devices and industries from regulation and other governmental interference.[55]

In fact, one of the main legacies of *Corley* is precisely this. It has been used as precedent to argue that grocery store receipts and databases of medical information are speech.[56] Notably, in these examples, the artifacts in question are not speech because of their meaning or political or social value, but rather by virtue of the fact that they convey some legible information. If, in *Corley*, the recognition of computer code as speech on grounds of legibility silenced the use of code for advocacy, in these examples, the right of information to be free and of messages to circulate has overridden legal efforts to protect the environment and patient (and consumer) privacy. In each, the

55. While this opportunism is a popular tactic for companies, including technology companies, for the latter so is the claim to be a pure conduit for the speech of others and thus immune from liability for the messages they transmit. Some companies, such as Google, have tried to have it both ways, claiming at one moment to be a speaker and at another to be a mere conduit.

56. Sorrell v. IMS Health Inc., 564 U.S. 552 (2011); Ciciline v. Jewel Food Stores 542 F. Supp. 2d 842 (2008). In the latter, anti-identity theft regulation was struck down because it infringed upon the store's speech (i.e., the information on the receipts).

beneficiaries were corporations or large industry interest groups. In other words, information takes the place of rights-holding speakers and edges out the interests of the public, and individual citizens. Messages, with a life of their own distinct from intentional speakers or listeners, can operate as subjects of the law.

In this form of legal reasoning, speech loses its voice. Embodied practices of expression take a back seat to systems and flows of information. "Speech" as information is abstracted from its social and material contexts. This abstraction allows disavowal of the social dynamics and stakes of communication. It often obscures competing social and political interests, by focusing on messages over speakers. This disavowal and obfuscation provide the grounds for opportunistic efforts to classify examples of "machine speech"—such as automated playlists, Google maps, and car alarms—as speech, beyond the realm of regulation (e.g., antitrust regulation) or liability.[57]

The outcomes traced here are, of course, a product of the political commitments of legal practitioners and the politics of judicial appointments (and the product of a highly organized effort to seat economically and socially conservative justices on the Supreme Court). But they are also, and less evidently, the product of the knowledge that judges and justices draw upon to reason about and define speech. We have seen a shift in the twentieth century from a cultural and institutional privileging of sources of knowledge in philosophy, anthropology, and sociology toward a privileging of knowledge based in engineering, economics, and computation. It is no surprise, then, that machines may speak or create messages covered by freedom of speech. Definitions of speech in the trajectory of legal reasoning analyzed here and in computation converge on a common historical proposition. In each, speech is made up of bits.

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