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Freedom of Contract in an Augmented Reality: The Case of Consumer Contracts



Scott R. Peppet

ABSTRACT

This Article argues that freedom of contract will take on different meaning in a world in which new technology makes information about places, goods, people, firms, and contract terms available to contracting parties anywhere, at any time. In particular, our increasingly “augmented reality” calls into question leading justifications for distrusting consumer contracts and strengthens traditional understandings of freedom of contract. This is largely a descriptive and predictive argument: This Article aims to introduce contract law to these technologies and consider their most likely effects. It certainly has normative implications, however. Given that the vast majority of consumer contracting occurs in physical space, the introduction of ubiquitous digital information into these transactions has profound consequences for contract law.

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[I]ndividuals buy a[n] . . . automobile without knowing whether the car they buy will be good or a lemon. . . . [T]he bad cars sell at the same price as good cars since it is impossible for a buyer to tell the difference between a good and a bad car; only the seller knows.

—Nobel Prize winner George Akerlof¹

Worried about ending up with a used car that's a lemon? . . . A CARFAX Vehicle History Report can include information about reported lemon titles, as well as other issues such as flood damage and open recalls. If the used car you're buying is a lemon, CARFAX can help you find out.

—www.lemoncheck.com²

INTRODUCTION

Digital information suddenly pervades our experience of physical space. Roughly 35 percent of American adults own a smartphone,³ among those under the age of forty-five, the figure jumps to 58 percent.⁴ Smartphone adoption is strong across demographic and socioeconomic categories,⁵ and is increasing quickly.⁶ In 2011, smartphone sales were, for the first time, greater than

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1. George A. Akerlof, *The Market for "Lemons": Quality Uncertainty and the Market Mechanism*, 84 Q.J. ECON. 488, 489–90 (1970).
 2. CARFAX LEMON CHECK, <http://www.lemoncheck.com> (last visited Jan. 15, 2012).
 3. There is no standard definition of what constitutes a smartphone. In general, such devices combine mobile internet connectivity, computational power, location awareness, and an operating system that permits software development. For a discussion of the definition of smartphone, see Andrew Charlesworth, *The Ascent of Smartphone*, ENGINEERING & TECH., Feb. 2009, at 32, 32–33.
 4. See AARON SMITH, PEW INTERNET & AM. LIFE PROJECT, 35% OF AMERICAN ADULTS OWN A SMARTPHONE (2011), available at http://www.pewinternet.org/~media/Files/Reports/2011/PIP_Smartphones.pdf (providing statistics); see also Mike Isaac, *Smartphones Dominate U.S. Mobile Purchases*, WIRED, June 30, 2011, <http://www.wired.com/gadgetlab/2011/06/android-iphone-growth> (providing statistics).
 5. See SMITH, *supra* note 4, at 2 (reporting high adoption rates among African Americans and Latinos and among those younger than twenty-nine in lower-income households).
 6. See Sean Ludwig, *Annual Smartphone Sales Will Top 1 Billion by 2016, Says IMS*, VENTUREBEAT (July 27, 2011), <http://venturebeat.com/2011/07/27/annual-smartphone-sales-will-top-1-billion-by-2016-says-ims> (reporting increased smartphone sales year after year, and projecting sales of one billion devices by 2016).

personal computer sales,⁷ and analysts predict that the majority of American adults will own a smartphone by the second quarter of 2012.⁸

This surge in ubiquitous internet access has opened the door to a range of mobile applications designed to saturate our daily experiences with previously unavailable information. In this increasingly “augmented reality,”⁹ for example, a consumer shopping in a bricks-and-mortar retailer can learn instantly about a product’s capabilities, safety record, environmental friendliness—or contract terms. Snap a picture of an object—such as a book cover or DVD—and Google Goggles will return search results about that object.¹⁰ Use your phone’s camera to scan the bar code on a potential purchase, and Amazon or Consumer Reports will instantly return price comparisons and consumer reviews.¹¹ Enter a merchant’s name or enable your smartphone’s location capabilities, and the

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7. See Jake Mintz, *When the Web Meets the Real World*, FORBES, Aug. 4, 2011, <http://www.forbes.com/sites/ciocentral/2011/08/04/when-the-web-meets-the-real-world-moving-beyond-qr-codes> (providing statistics and describing a new wave of mobile internet applications).
 8. See Horace Dediu, *Phone Tipping Point Countdown Reset*, ASYMCO (May 7, 2011), <http://www.asymco.com/2011/05/07/phone-tipping-point-countdown-reset> (reporting that smartphone adoption is increasing by 1.3 percent per month).
 9. I will generally use the term augmented reality (AR) to describe the mobile, pervasive computing technologies that are rapidly bringing together physical and digital space. The term was coined by Tom Caudell and David Mizell. See generally Thomas P. Caudell & David W. Mizell, *Augmented Reality: An Application of Heads Up Display Technology to Manual Manufacturing Processes*, PROC. OF THE IEEE TWENTY-FIFTH HAWAII INT’L CONF. ON SYS. SCI. 659 (1992). Augmented reality is often defined as augmenting the physical senses—particularly visual—with digital information. See, e.g., Ronald T. Azuma, *A Survey of Augmented Reality*, PRESENCE: TELEOPERATORS & VIRTUAL ENVIRONMENTS 355 (1997) (“AR allows the user to see the real world, with virtual objects superimposed upon or composited with the real world.”); Paul Milgram & Fumio Kishino, *A Taxonomy of Mixed Reality Visual Displays*, E77-D IEICE TRANSACTIONS ON INFO. & SYS. 1321, 1322 (1994) (defining augmented reality as “any case in which an otherwise real environment is ‘augmented’ by means of virtual (computer graphic) objects”). I use the term somewhat more broadly. My interest is in the convergence of digital and physical space generally, not merely in the real-time augmentation of digital video. Augmented reality is the most useful term to describe all of the various ways in which technology is beginning to bring the digital and the physical worlds together. Other candidates include ubiquitous computing, pervasive computing, physical computing, tangible media, ambient informatics, “wearware,” and “everyware.” See generally WOODROW BARFIELD & THOMAS CAUDELL, FUNDAMENTALS OF WEARABLE COMPUTERS AND AUGMENTED REALITY, at xii (2001) (reviewing various terminology); ADAM GREENFIELD, EVERYWARE: THE DAWNING AGE OF UBIQUITOUS COMPUTING 1 (2006) (same).
 10. Google Goggles is an image-based search service. See *Google Goggles*, GOOGLE MOBILE, <http://www.google.com/mobile/goggles/#text> (last visited July 7, 2011).
 11. See AMAZON, <http://www.amazon.com> (last visited July 5, 2011); CONSUMER REPORTS, <http://www.consumerreports.org> (last visited July 5, 2011). Various others offer similar services. See, e.g., SCANLIFE, <http://www.scanlife.com> (last visited July 1, 2011) (providing barcode and augmented reality code scanning applications for various smartphone platforms).

Better Business Bureau's mobile app will return reviews and ratings of that seller or other local businesses, grade each merchant on a scale of A+ to F, and indicate which merchants are Better Business Bureau accredited.¹² Enter the Vehicle Identification Number (VIN) of the used car you are test driving, and CarFax will tell you whether you are buying a lemon.¹³

Our augmented reality can provide information about more than just goods, firms, and contract terms: We also have access to information about each other. Consider a startling example. In July 2011, privacy economist Alessandro Acquisti demonstrated a prototype of an iPhone application that could take a photograph of a person, compare that photograph to the millions of public profile pictures available through Facebook,¹⁴ and, if a match were found, guess the person's name and the first five digits of that person's Social Security number.¹⁵ The application succeeds a staggering 30 percent of the time.¹⁶ Acquisti notes that "[t]he application is an example of augmented reality, in which offline and online data blend together. . . . In addition to its privacy implications . . . the age of augmented reality . . . may carry even deeper-reaching . . . implications."¹⁷ Although privacy scholars have considered the implications of facial recognition technologies,¹⁸ what might these technologies imply for contract law? What will it mean when merchants can identify each consumer, search for information about that consumer, and

12. See BETTER BUSINESS BUREAU, <http://www.bbb.org> (last visited July 5, 2011).

13. See *supra* note 2 and accompanying text (quoting CarFax's "LemonCheck" service).

14. Facebook requires that all users display their name and at least one profile picture publicly. There are no privacy settings for these public aspects of a user's profile. See FACEBOOK, <http://www.facebook.com> (last visited July 1, 2011).

15. See Alessandro Acquisti, Ralph Gross & Fred Stutzman, *Privacy in the Age of Augmented Reality* 5 (working draft) (on file with author) ("To illustrate the possibility of real-time identification, we developed a smart phone demo application that captures the image of a person and then overlays on the screen her predicted name and SSN."); see also Julia Angwin, *Face-ID Tools Pose New Risk*, WALL ST. J., Aug. 1, 2011, <http://online.wsj.com/article/SB10001424053111903341404576480371062384798.html> (describing Acquisti et al.'s study).

16. See Acquisti et al., *supra* note 15, at 5.

17. *Id.* For example, police departments in several states have begun deploying iPhone-based facial recognition applications to identify criminals. See Emily Steel & Julia Angwin, *Device Raises Fear of Facial Profiling*, WALL ST. J., July 13, 2011, <http://online.wsj.com/article/SB10001424052702303678704576440253307985070.html> ("Dozens of law-enforcement agencies from Massachusetts to Arizona are preparing to outfit their forces with controversial hand-held facial-recognition devices as soon as September . . ."). In addition to facial recognition, the hardware add-on for the iPhone can scan irises and take fingerprints. *Id.*

18. For a useful overview, see Note, *In the Face of Danger: Facial Recognition and the Limits of Privacy Law*, 120 HARV. L. REV. 1870 (2007).

tailor the shopping experience or their standard form contracts based on that consumer's characteristics?¹⁹

This Article considers the implications of these recent developments²⁰ for contract law, and, particularly, for freedom of contract. Consider the classic case *Williams v. Walker-Thomas Furniture Co.*,²¹ in which the D.C. Circuit famously held that a contract could be unconscionable if there was “an absence of meaningful choice on the part of one of the parties together with contract terms which are unreasonably favorable to the other party.”²² From 1957 to 1962, the Walker-Thomas furniture store had extended credit to Ms. Williams for the purchase of various pieces of furniture. In each instance, the contract contained a cross-collateralization provision making each purchased item collateral for every other item; no item could be paid off completely until all other items had been paid off. In 1962, Ms. Williams purchased a stereo for \$514; when she defaulted on her payments, the store sought to repossess many of her earlier purchases as well. The court found the clause unenforceable, in part because Ms. Williams was not sufficiently informed about the collateralization clause.²³

For a moment, however, imagine that *Walker-Thomas* had occurred today. How might the facts and outcome have been different? What if Ms. Williams had been standing in the furniture store with her smartphone, and could easily have searched for information on the store's reputation or the fairness of its contracts?²⁴ What if she had used the Pissed Consumer app on her iPhone to learn that the furniture store had received five red stars, indicating

19. See *infra* Part III.B.

20. Most of these services launched their mobile applications in the first half of 2011. The Better Business Bureau application launched June 22, 2011; the Consumer Reports application launched June 8, 2011; the Cars.com application launched on May 11, 2011, and integrated Carfax.com vehicle reports on August 1, 2011. Although to avoid tedium this Article does not catalog this throughout the Article, most of the mobile services discussed in this Article were launched in late 2010 or early 2011.

21. 350 F.2d 445 (D.C. Cir. 1965).

22. *Id.* at 449; see also Arthur Leff, *Unconscionability and the Code—The Emperor's New Clause*, 115 U. PA. L. REV. 485, 552–54 (1967) (drawing the distinction between procedural and substantive unconscionability).

23. *Walker-Thomas*, 350 F.2d at 449.

24. There is evidence that the reputation of the store was well known in the neighborhood. See William Raspberry, *The Day the City's Fury Was Unleashed: Lessons of the Riots*, WASH. POST, Apr. 3, 1998, at A1 (suggesting that the Walker-Thomas Furniture Co. was targeted by looters during the 1968 riots as revenge for its well-known business practices).

a high volume of consumer complaints about its contracts;²⁵ or if her GPS-equipped phone had automatically notified her when she entered the store that the furniture seller had been branded “consumer unfriendly” and its location electronically tagged by a local consumer group; or if her social network used Facebook Places or Foursquare,²⁶ and had left location-based electronic notes warning her about the store’s practices? Moreover, what if the written contract itself had contained a quick response (QR) code (Figure 1) in the margins next to the collateralization clause that, when scanned by her phone’s camera, played a short video explaining the clause to Ms. Williams in laymen’s terms?²⁷ Would any of these quite plausible modern scenarios have changed the outcome of this seminal contracts case, the unconscionability doctrine, or, more generally, the contours of freedom of contract?

FIGURE 1.



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25. Pissedconsumer.com is a popular website that allows consumers to review products and merchants; it also provides a mobile application for use on smartphones. See PISSED CONSUMER, <http://www.pissedconsumer.com> (last visited July 5, 2011). A search of Pissed Consumer reveals hundreds of reviews regarding credit-related repossessions, like those at issue in *Walker-Thomas*. See, e.g., *AmeriCredit*, PISSED CONSUMER, <http://americredit.pissedconsumer.com> (last visited July 5, 2011) (providing over 150 complaints about the repossession tactics of AmeriCredit); see also *infra* Part I.B (discussing this and other consumer review services).
26. The popular “check in” service that Foursquare is actively promoting includes consumer reviews as a part of its offerings. See Rachel King, *Foursquare Takes on Yelp With Public User Review Pages*, ZDNET (Aug. 1, 2011, 10:32 AM), <http://www.zdnet.com/blog/btl/forusquare-takes-on-yelp-with-public-user-review-pages/53677>.
27. A QR code is a matrix or two-dimensional barcode readable by QR-enabled readers, cell phones, computers, or other devices. QR codes can be created at no cost, and QR readers can be downloaded free of charge. If the reader scans Figure 1 with a QR-enabled reader, the computer will be redirected to a web-enabled video introduction to augmented reality and to the main arguments of this Article. For those without a QR code reader, the video can be seen by visiting Scott Peppet, *Augmented Reality & Freedom of Contract*, available at <http://lawweb.colorado.edu/events/mediaDetails.jsp?id=2807> (last visited Dec. 27, 2011).

These are no longer the speculations of science fiction. These are today's technologies, and they create pressing questions for contract law. This Article focuses on the impact of an augmented reality on the interpretation and enforcement of contracts, and, particularly, on courts' willingness to police consumer contracts for unfair or one-sided terms. It explores this topic using the case of consumer standard form contracts—like the contract in *Williams v. Walker-Thomas*—because in the last few decades contract scholars have argued extensively about freedom of contract in this context.²⁸ It is part of a nascent body of legal scholarship grappling with the impact of information technology developments on markets, law, and society. Traces of this thought can be found in information privacy scholarship,²⁹ information technology writings,³⁰ and legal literature considering new technologies.³¹ This Article is the first in this line of scholarship to consider the implications of an augmented reality for contract law.

These implications are profound. Although contract scholars in the last decade have focused extensively on e-commerce and online contracting,³²

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28. See Melvin Aron Eisenberg, *The Limits of Cognition and the Limits of Contract*, 47 STAN. L. REV. 211, 240 (1995) (“The problems raised by the use of form contracts have been a major preoccupation of contract law scholars for the past forty years.”). Standard form contracts are an obsession for contract scholars. See, e.g., Randy E. Barnett, *Consenting to Form Contracts*, 71 FORDHAM L. REV. 627 (2002); Russell Korobkin, *Bounded Rationality, Standard Form Contracts, and Unconscionability*, 70 U. CHI. L. REV. 1203 (2003); Todd D. Rakoff, *Contracts of Adhesion: An Essay in Reconstruction*, 96 HARV. L. REV. 1173 (1983); W. David Slawson, *Standard Form Contracts and Democratic Control of Lawmaking Power*, 84 HARV. L. REV. 529 (1971); Symposium, “Boilerplate”: *Foundations on Market Contracts*, 104 MICH. L. REV. 821 (2006).
 29. See, e.g., DANIEL J. SOLOVE, THE FUTURE OF REPUTATION: GOSSIP, RUMOR, AND PRIVACY ON THE INTERNET (2007); Julie E. Cohen, *Examined Lives: Informational Privacy and the Subject as Object*, 52 STAN. L. REV. 1373 (2000); A. Michael Froomkin, *The Death of Privacy?*, 52 STAN. L. REV. 1461 (2000); Paul M. Schwartz & William M. Treanor, *The New Privacy*, 101 MICH. L. REV. 2163, 2177 (2003).
 30. See, e.g., OSCAR H. GANDY, JR., THE PANOPTIC SORT: A POLITICAL ECONOMY OF PERSONAL INFORMATION (1993); GREENFIELD, *supra* note 9.
 31. See, e.g., Jerry Kang & Dana Cuff, *Pervasive Computing: Embedding the Public Sphere*, 62 WASH. & LEE L. REV. 93 (2005); Lior Jacob Strahilevitz, “*How’s My Driving?*” For Everyone (and Everything?), 81 N.Y.U. L. REV. 1699 (2006) [hereinafter Strahilevitz, “*How’s My Driving?*”]; Lior Jacob Strahilevitz, *Reputation Nation: Law in an Era of Ubiquitous Personal Information*, 102 NW. U. L. REV. 1667 (2008) [hereinafter Strahilevitz, *Reputation Nation*].
 32. See, e.g., Clayton P. Gillette, *Reputation and Intermediaries in Electronic Commerce*, 62 LA. L. REV. 1165 (2002); Robert A. Hillman & Jeffrey J. Rachlinski, *Standard-Form Contracting in the Electronic Age*, 77 N.Y.U. L. REV. 429, 478 (2002) (discussing online or e-commerce standard form contracting); Robert J. Mann & Travis Siebeneicher, *Just One Click: The Reality of Internet Retail Contracting*, 108 COLUM. L. REV. 984 (2008); Peter P. Swire, *Trustwrap: The Importance of Legal Rules to Electronic Commerce and Internet Privacy*, 54 HASTINGS L.J. 847 (2003); Hal R.

online commerce accounts for only 7 percent of all U.S. shopping, despite years of rapid growth.³³ Augmented reality, however, changes the 93 percent of consumer transactions that occur in Wal-Marts and shopping malls, automobile showrooms and Best Buys. Augmented reality reduces the differences between online and offline exchange; we are increasingly online all the time. Contract law and scholarship must begin to consider how ubiquitous information alters bricks-and-mortar transactions, which comprise the vast majority of consumer contracts.

Welfare economics generally assumes that informed, rational decisionmakers will reach efficient, welfare-maximizing contracts in competitive markets.³⁴ Contract scholars have long argued about whether these two conditions hold in the consumer context—whether, in short, consumers are sufficiently informed and rational to read and understand standard form contracts.³⁵ Classical law and economics argues that they are, and that markets will therefore discipline firms to only offer reasonable standard form consumer contracts. Some disagree: Asymmetric information arguments for distrusting consumer contracts claim that consumers have insufficient information for markets to correct standard form contracts; bounded rationality arguments for policing consumer contracts claim that consumers are insufficiently rational to do so.³⁶ Together, these two arguments have justified

Varian, *Computer Mediated Transactions*, 100 AM. ECON. REV. 1 (2010) (exploring the ways in which computer technology is changing transactions and contracting); Avery Wiener Katz, *Is Electronic Contracting Different? Contract Law in the Information Age* 5 (2004) (unpublished manuscript) (on file with author).

33. See Geoffrey A. Fowler, *E-Commerce Growth Slows, but Still Out-Paces Retail*, DIGITS (Mar. 8, 2010, 6:01 AM), <http://blogs.wsj.com/digits/2010/03/08/e-commerce-growth-slows-but-still-out-paces-retail>. Estimates assume that e-commerce might increase to 8 percent by 2014 and to 20 percent at some point in the future—still a notable minority of transactions. See *id.*
34. See, e.g., RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 3 (8th ed. 2011); Benjamin E. Hermalin, Avery W. Katz & Richard Craswell, *Contract Law* § 2.2.1, in *THE HANDBOOK OF LAW & ECONOMICS* (A. Mitchell Polinsky & Steven Shavell eds., 2007) (discussing core principles of the welfare economics of contract).
35. See *infra* Parts II.A, III.A.
36. See ROBERT COOTER & THOMAS ULEN, *LAW & ECONOMICS* 231 (5th ed. 2008) (“The farther the facts depart from the ideal of perfect rationality and zero transaction costs, the stronger the case for judges’ regulating the terms of the contract by law.”); Katz, *supra* note 32, at 5 (discussing these reasons as the “canonical justifications for interfering with contractual freedom on efficiency grounds”).

In addition, we sometimes restrict freedom of contract because of externalities and concerns about commodification. Augmented reality will also change these justifications, but that is not relevant to consumer standard form contracts. I hope to explore the impact of augmented reality on externality and commodification arguments in another essay.

judicial scrutiny of consumer standard form contracts in the past decades using unconscionability and other similar contract doctrines.

This Article makes three claims relevant to these debates. First, an augmented reality profoundly changes the transaction cost economics of consumer contracting.³⁷ In particular, changes in information technology have radically lowered the costs of both sorting³⁸ and signaling³⁹—the two economic means by which consumers and firms choose and learn about their contracting partners⁴⁰—and have made new forms of sorting and signaling possible in traditional bricks-and-mortar transactions. Part I makes this argument by briefly introducing augmented reality technologies to the legal literature.⁴¹ It then reviews a typology of the types of information these technologies can deliver

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37. For an introduction to transaction cost economics, see Oliver E. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 J.L. & ECON. 233, 233 (1979) (describing economics as “preoccupied with the origins, incidence, and ramifications of transaction costs”); see also Oliver Williamson, *Transaction Cost Economics*, in THE HANDBOOK OF NEW INSTITUTIONAL ECONOMICS 41 (Claude Ménard & Mary M. Shirley eds., 2005) (providing an overview of the field).
 38. Sorting or “screening” theory assumes that an uninformed party will filter counterparties based on what observable characteristics or information are available, if the desired characteristic is unobservable. See, e.g., Roger Klein, Richard Spady & Andrew Weiss, *Factors Affecting the Output and Quit Propensities of Production Workers*, 58 REV. ECON. STUD. 929 (1991) (exploring the example of employers sorting job applicants based on high school graduation as a proxy for perseverance).
 39. Signaling “refers to actions taken by an informed party for the sole purpose of credibly revealing his private information.” N. GREGORY MANKIW, PRINCIPLES OF ECONOMICS 487 (5th ed. 2009). Put differently, “[information asymmetries] may give rise to signaling, which is the attempt by the informed side of the market to communicate information that the other side would find valuable.” WILLIAM A. MCEACHERN, ECONOMICS: A CONTEMPORARY INTRODUCTION 619 (5th ed. 2000). Economists focus on signals that are difficult to fake and thus are self-verifying. See, e.g., DIANE COYLE, THE SOULFUL SCIENCE: WHAT ECONOMISTS REALLY DO AND WHY IT MATTERS 163 (rev. ed. 2010) (describing how Indian villagers borrow huge sums to pay for expensive weddings to signal their caste and social status); Paul Herbig & John Milewicz, *Market Signaling Behavior in the Service Industry*, 1 ACAD. MARKETING STUD. J. 35, 39 (1997) (explaining that service businesses like banks and law firms spend vast sums on elaborate office buildings to signal their quality and solvency to potential clients). Modern signaling theory began with Michael Spence, *Job Market Signaling*, 87 Q.J. ECON. 355 (1973); see also Michael Spence, *Competition in Salaries, Credentials, and Signaling Prerequisites for Jobs*, 90 Q.J. ECON. 51 (1976) (discussing his classic example of signaling through educational achievement).
 40. Sorting and signaling are the two ways in which we overcome information asymmetries. For an overview of sorting and signaling, see John G. Riley, *Silver Signals: Twenty-Five Years of Screening and Signaling*, 39 J. ECON. LITERATURE 432 (2001); see also Michael Spence, *Informational Aspects of Market Structure: An Introduction*, 90 Q.J. ECON. 591, 592 (1976) (“[Signaling and sorting] are opposite sides of the same coin.”).
 41. See *infra* Part I.A.

to today's consumers: information about places, goods, people, firms, and contract terms.⁴² This typology provides many examples that demonstrate that in an augmented reality, consumers and sellers can sort and signal each other more effectively and at lower cost than they could in the traditional analog economy.

Second, these decreased sorting and signaling costs may at least partially undermine asymmetric information arguments for distrusting consumer standard form contracts. In an augmented reality, consumers can more easily sort firms and firms' contracts using proxies of contract quality such as consumer reviews, thereby bypassing firms with oppressive or one-sided contract terms (and creating market pressure on such firms to reform their contracts). When consumers have mobile internet applications that search over 40 million consumer reviews for over 4 million products from the aggregated websites of over one thousand retailers and consumer review services—as they do today using the SearchReviews mobile app⁴³—firms are less likely to use one-sided or oppressive contract terms.⁴⁴ This makes it more likely that standard form consumer contracts will be fair, and thus courts in an augmented reality are more likely to enforce such contracts as written. Part II presents this argument,⁴⁵ but also considers possible complications to it.⁴⁶

Third, the information available in an augmented reality may help “debias”⁴⁷ consumers and make their decisions more rational. Part III argues that decreased sorting and signaling costs challenge the bounded rationality arguments that behavioral law and economics scholars have made in the consumer contracting context.⁴⁸ In particular, augmented reality can provide consumers with highly salient and easily available information about contractual risks at the point of sale.⁴⁹ This makes it more likely that consumers will evaluate contracting decisions rationally, which in turn suggests that, in an augmented reality, courts may more often enforce consumer contracts as written.

42. See *infra* Part I.B.

43. See SEARCHREVIEWS, <http://www.searchreviews.com> (last visited July 5, 2011) (providing a mobile barcode-based application that searches a massive aggregated data set of consumer reviews).

44. See *infra* Part II.B.1 (discussing this sorting argument).

45. See *infra* Part II.

46. See *infra* Part II.B.2.

47. On debiasing generally, see Christine Jolls & Cass R. Sunstein, *Debiasing Through Law*, 35 J. LEGAL STUD. 199, 210 (2006).

48. See *infra* Part III (discussing behavioral law and economics arguments about cognitive biases in standard form contracts and the range of possible debiasing techniques).

49. See *infra* Part III.B (discussing how such information may counteract optimism and availability effects).

Taken together, these three claims support the broader conclusion that technological change that increases the quantity and quality of information available to contracting parties is likely to strengthen traditional approaches to freedom of contract in the context of consumer contracts. This Article thus concludes by making a general assertion about contract theory: (1) the contours of what we consider freedom of contract are fundamentally shaped by the availability of information, and (2) the availability and structure of information in the economy is not a constant but is instead dependent on the state of evolution of the economy's information architecture. Debates that assume some intrinsic nature of freedom of contract, autonomy, consent, subjugation, and bargaining power are fundamentally contingent. These concepts change as information economics change. Our historical and technological moment begets one conception of the contours of freedom of contract; other moments will beget other conceptions. To me this seems obvious, and yet there is remarkably little in contract theory that acknowledges the reality of technological and historical change.⁵⁰ Instead, certain technological and economic facts are generally taken as given, and debate ensues based on the faulty premise that those givens will remain constant into the future. This exploration of how augmented reality may change contract law demonstrates that contract scholars must acknowledge the technological and historical contingencies of their arguments, particularly in this era of rapid technological change.

I. SORTING AND SIGNALING IN AN AUGMENTED REALITY

Each time you watch professional sports on television, you experience augmented reality technologies: the yellow line drawn across a football field showing yardage to a first down, the strike box showing a baseball pitcher's virtual target, or the flags of Olympic swimmers seeming to shimmer in their pool lanes.⁵¹ These technologies are everywhere and are increasingly powerful.⁵²

50. For a notable exception, see Katz, *supra* note 32, at 1 (“[T]he growth of electronic commerce reflects changes in the relative importance of various institutional transaction costs Accordingly, arrangements that were optimal . . . under previous configurations of transaction costs may no longer be so under configurations that will develop in the future.”).

51. See Jeff Braun, *American Football: That Magic Yellow Line*, ILLUMIN, Dec. 27, 2011, <http://illuminate.usc.edu/195/american-football-that-magic-yellow-line> (explaining how the yellow line is created); SPORTVISION, <http://www.sportvision.com/about.html> (last visited July 7, 2011) (providing examples of AR from various sports).

52. For an overview, see generally BARFIELD & CAUDELL, *supra* note 9.

This Part introduces augmented reality and ubiquitous computing technologies that are changing the economy's information architecture. Although I hesitate to begin with a technological primer, legal audiences are sometimes unaware of the rapid advances in and deployment of these technologies. It is impossible to consider the ramifications of augmented reality for contract law without understanding the state and pace of technological innovation.

This Part also presents a typology of the information that augmented reality technologies make available to consumers. This information is ultimately more important than which specific technological delivery method becomes popular. Put differently, whether we augment our experience of physical space via an iPhone or digital eyeglasses, for contract it matters most what information those technologies can transmit to transacting consumers and firms, and how that information allows consumers and firms to sort and signal at lower cost.

A. An Introduction to Augmented Reality Technologies

The retinal displays of the *Terminator* movies⁵³ and the augmented reality glasses in *Minority Report*⁵⁴ have made for good science fiction, but these technologies are no longer as futuristic as they seemed even a decade ago.⁵⁵ This Part explores the history of augmented reality, the state of today's technologies, and what the near future promises in terms of state-of-the-art delivery methods.

It is important to stress that today's smartphones are sufficiently advanced to raise the doctrinal questions at issue in this Article. Put differently, further technological advance is not necessary for my argument to matter—the technologies in today's pockets suffice. Nevertheless—and at the risk of sounding too much like science fiction—it is worth briefly exploring the information delivery methods currently available or under development.

53. THE TERMINATOR (Orion Pictures 1984); TERMINATOR TWO: JUDGMENT DAY (TriStar Pictures 1991); TERMINATOR THREE: RISE OF THE MACHINES (Warner Bros. 2003).

54. MINORITY REPORT (Twentieth Century Fox 2002).

55. The *Terminator* series featured augmented reality eyeglasses with sophisticated digital display technologies, and *Minority Report* featured a series of augmented reality display technologies. See *supra* notes 53–54.

1. A Brief History

Augmented reality has been developing for decades. In 1968, Ivan Sutherland created a working prototype of the first augmented reality system.⁵⁶ The system consisted of a helmet with a digital display that the user could wear to look around the room and see digital information overlaid on the physical world. In the first prototypes, the head-mounted display was so heavy that it had to be suspended from the ceiling—leading to the system’s nickname, the Sword of Damocles.⁵⁷

The goal of early experimental systems was to bring digital information to the user’s experience of the physical world. Experimental augmented reality systems included outdoor navigation systems for the visually impaired,⁵⁸ various backpack-based systems combining head-worn displays, location awareness, and computational ability,⁵⁹ guided campus tours using mobile augmented reality,⁶⁰ and battlefield information augmentation systems.⁶¹ These systems, developed primarily in the 1990s, seem crude today, but they demonstrated the potential for using digital information to augment physical experience.⁶²

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56. See Ivan E. Sutherland, *A Head-Mounted Three-Dimensional Display*, PROC. FALL JOINT COMP. CONF. 757 (1968).
 57. See STEPHEN CAWOOD & MARK FIALA, AUGMENTED REALITY: A PRACTICAL GUIDE 2 (2007) (explaining the origins of the “Sword of Damocles” nickname).
 58. See Jack M. Loomis et al., *Personal Guidance System for the Visually Impaired Using GPS, GIS, and VR Technologies*, PROC. VIRTUAL REALITY & PERSONS WITH DISABILITIES CONF. (1993).
 59. The Timmith backpacks were early pioneers, as was the Touring Machine. See Steve Feiner et al., *A Touring Machine: Prototyping 3D Mobile Augmented Reality Systems for Exploring the Urban Environment*, PROC. OF THE FIRST IEEE INT’L SYMP. ON WEARABLE COMPUTERS 74 (1997); Bruce H. Thomas et al., *A Wearable Computer System With Augmented Reality to Support Terrestrial Navigation*, PROC. OF THE SECOND IEEE INT’L SYMP. ON WEARABLE COMPUTERS 168 (1998).
 60. See, e.g., Tobia Hollerer et al., *Situated Documentaries: Embedding Multimedia Presentations in the Real World*, PROC. OF THE THIRD IEEE INT’L SYMP. ON WEARABLE COMPUTERS 79 (1999) (demonstrating an augmented reality system contained in a backpack).
 61. See Simon Julier et al., *BARS: Battlefield Augmented Reality System*, NATO INFO. SYS. TECHNIQUES SYMP. ON “NEW INFO. PROCESSING TECH. FOR MILITARY SYSTEMS” (2000).
 62. They also show the immediate appeal of augmented reality to gamers. See Bruce Thomas et al., *ARQuake: An Outdoor/Indoor Augmented Reality First Person Application*, PROC. OF THE FOURTH INT’L SYMP. ON WEARABLE COMPUTERS 139 (2000) (presenting a system extending the personal computer game *Quake* to the physical world for users equipped with a mobile AR backpack); see also Adrian David Cheok et al., *Human Pacman: A Sensing-Based Mobile Entertainment System With Ubiquitous Computing and Tangible Interaction*, PROC. OF THE SECOND WORKSHOP ON NETWORK & SYSTEM SUPPORT FOR GAMES 106 (2003) (presenting interactive outdoor human Pacman game using GPS).

In addition to this early work on augmented reality display systems, an intertwined development was occurring simultaneously: the conception and beginnings of ubiquitous computing. Mark Weiser, a researcher at the Xerox Palo Alto Research Center, coined the phrase in a brief essay titled “Ubiquitous Computing #1.” In that and other papers, Weiser developed the concept of “invisible computing” distributed throughout the environment.⁶³ Rather than massive mainframe computers or even desktop computers, Weiser imagined small, lower-power, but plentiful computers embedded in everyday objects, capable of networking together to provide information to individuals in a decentralized manner. As Weiser put it, “The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.”⁶⁴

Finally, mobile communications technology developed simultaneously but quite independently. IBM and BellSouth introduced the first smartphone in 1992—it served as a phone, calculator, address book, fax machine, and email device; had one megabyte of memory; and cost nine hundred dollars.⁶⁵ The Global Positioning System (GPS) came online in 1993; the first mobile phones with GPS and internet connectivity arrived in 1999; and the first commercial camera phone was sold in 2000. Mobile technology advanced and spread throughout the 2000s, and by 2008, mobile developers were beginning to present phone-based augmented reality applications.⁶⁶

2. Today’s Delivery Methods

These developments have come together to augment physical reality with digital information. In 2010, we entered a new phase of the computer revolution. Suddenly, most of us carry a device—phone, tablet, or computer—capable of constant connection to the internet, impressive computational power, and location awareness.⁶⁷ Our devices know where we are, which direction we are moving, and what is around us. This not only allows these devices to

63. See GREENFIELD, *supra* note 9, at 11 (providing history).

64. Mark Weiser, *The Computer for the 21st Century*, 3 MOBILE COMPUTING & COMMUN. REV. 3, 3 (1999).

65. See *IBM Simon*, WIKIPEDIA, [http://en.wikipedia.org/wiki/Simon_\(phone\)](http://en.wikipedia.org/wiki/Simon_(phone)) (last modified Oct. 12, 2011).

66. See, e.g., Daniel Wagner et al., *Pose Tracking From Natural Features on Mobile Phones*, PROC. OF THE SEVENTH IEEE INT’L SYMP. ON MIXED & AUGMENTED REALITY 125 (2008).

67. See *supra* notes 3–8 and accompanying text.

instantly search for information, but also allows for applications that “push”⁶⁸ context-relevant information to us based on our location, our proximity to other people, our social network, or other criteria. Yelp,⁶⁹ Junaio,⁷⁰ and Layar⁷¹ are all examples of popular early augmented reality platforms. An iPhone, iPad, or Droid user can use these applications to virtually look down a street and see which restaurants have good reviews,⁷² what digital information is available about local landmarks,⁷³ and even which houses belong to registered sex offenders.⁷⁴

These context-aware technologies are increasingly sophisticated. For example, Layar⁷⁵ and Junaio⁷⁶ recently added object recognition and visual search capabilities. A user can now point a smartphone at a printed newspaper article and share the digital version of that article with friends online. Or, customers of a coffee shop can aim their smartphones at an icon on the menu and instantly review—or see reviews of—various items.⁷⁷ As these technologies continue to develop, consumers will increasingly have instant access to information about the products and services around them, without having to search for it. Instead, such data will be made available as the consumer’s augmented

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68. Push technologies provide context-relevant information to the user of an augmented reality device such as a smartphone without the user having to request the information. *Push Technology*, WIKIPEDIA, http://en.wikipedia.org/wiki/Push_technology (last modified Jan. 6, 2012).
 69. YELP, <http://www.yelp.com> (last visited July 7, 2011); see also Ben Parr, *Easter Egg: Yelp Is the iPhone's First Augmented Reality App*, MASHABLE (Aug. 27, 2009), <http://mashable.com/2009/08/27/yelp-augmented-reality>.
 70. JUNAIO, <http://www.junaio.com> (last visited July 10, 2011) (providing an augmented reality software platform for mobile application developers).
 71. LAYAR, <http://www.layar.com> (last visited July 1, 2011) (providing a “beautiful, fun augmented reality app that shows you the things you can’t see”).
 72. See *id.*
 73. See WIKITUDE, <http://www.wikitude.com> (last visited July 1, 2011) (providing an AR application that layers point of interest information over a smartphone’s camera display).
 74. See Claudine Beaumont, *iPhone App Tracks Sex Offenders*, TELEGRAPH (July 28, 2009, 9:05 AM), <http://www.telegraph.co.uk/technology/apple/5918923/iphone-app-tracks-sex-offenders.html>; VISION 20/20, <http://locator.thevision2020.com> (last visited Oct. 12, 2011).
 75. See Eric Smalley, *Your Phone Will Soon Recognize Things It Sees*, CNET (Aug. 30, 2011, 4:33 PM), http://news.cnet.com/8301-17938_105-20099536-1/your-phone-will-soon-recognize-things-it-sees (describing Layar’s new “visual search” capabilities that allow smartphones to recognize text, images, objects, barcodes, and QR codes, thereby allowing users to interact with and learn about objects in their environment).
 76. See Kit Eaton, *Can Life Be as Browsable as the Web? Augmented Reality Outfit Metaio Thinks So*, FAST COMPANY (Aug. 29, 2011), <http://www.fastcompany.com/1776893/augmented-reality-outfit-junaio-aims-at-a-sci-fi-future-with-object-recognition> (describing Junaio 3.0, which includes object, image, and barcode recognition).
 77. See Smalley, *supra* note 75 (describing these features).

reality device—smartphone, tablet, or otherwise—recognizes products, retrieves relevant information about those products, and shares that information with the consumer.

Search is no longer the paradigm. Google's Eric Schmidt has emphatically asserted that in the near future, search will not be Google's business; rather, pushing relevant information to users in real time will be more important.⁷⁸ Already, the majority of some types of Google searches originate on mobile devices.⁷⁹ Apple's Steve Jobs heralded the rise of mobile computing and the decline of the personal computer,⁸⁰ and some expect next generation iPhones to contain radio frequency identification (RFID) scanners to permit an entirely new generation of context-sensitive smartphone applications.⁸¹ Qualcomm—a leading maker of mobile computing chips—has invested heavily in augmented reality technologies, and expects these applications to drive smartphone sales over the next few years.⁸² Although many first generation applications have been crude or game-like, technologists understand that the potential of augmented reality is not in whiz-bang visuals but rather in providing consumers with relevant information in real time—information that in many cases has never before been available without incurring significant costs.⁸³

78. See Holman W. Jenkins, Jr., *Google and the Search for the Future*, WALL ST. J., Aug. 14, 2010, at A9 (quoting Schmidt as saying, “[O]ne idea is that more and more searches are done on your behalf without you needing to type. I actually think most people don’t want Google to answer their questions. . . . They want Google to tell them what they should be doing next.”).

79. See Joab Jackson, *Google: Mobile Map Search Surging Past Desktop Use*, COMPUTERWORLD (May 25, 2011), http://www.computerworld.com/s/article/9217067/Google_Mobile_map_search_surging_past_desktop_use.

80. See *Apple Special Event: June 6, 2011*, APPLE, <http://events.apple.com.edgesuite.net/11piubpwiqubf06/event> (last visited Oct. 12, 2011) (announcing Apple's iCloud service, and discussing the decline of the personal computer versus mobile devices).

81. See, e.g., Neil Hughes, *Use of RFID in Apple's iPhone 5 Expected to Have a "Unique" Twist*, APPLE INSIDER (Feb. 17, 2011, 11:50 AM), http://www.appleinsider.com/articles/11/02/17/use_of_rfid_in_apples_iphone_5_expected_to_have_a_unique_twist.html (discussing speculation about RFID in the iPhone 5). The introduction of RFID scanning would provide smartphones with yet another means to learn about the physical environment near a user. If RFID tags become commonplace in consumer goods, for example, smartphones could read those tags and push information to a consumer about the products in the consumer's shopping cart at the grocery store or on a display in a shopping mall.

82. See *Qualcomm Announces Commercial Release of Its Augmented Reality Platform*, QUALCOMM (Apr. 27, 2011), <http://www.qualcomm.com/news/releases/2011/04/27/qualcomm-announces-commercial-release-its-augmented-reality-platform>.

83. See GREENFIELD, *supra* note 9, at 24–25 (“Maybe it’s easiest simply to describe it as information detached from the Web’s creaky armature of pages, sites, feeds and browsers, and set free instead in the wider world to be accessed when, how and where you want it.”).

3. Tomorrow's Delivery Methods

In the last few years, these components have come together in millions of smartphones, tablets, and other devices. As Mike Kuniavsky has argued, “we are at the beginning of the era of computation and data communication embedded in, and distributed through, our entire environment.”⁸⁴ Suddenly, augmented reality has moved out of the laboratory and into the market.

As discussed above,⁸⁵ additional developments in delivery methods are unnecessary for the doctrinal discussion that follows in Parts II and III; today's smartphones suffice. It is worth pausing, however, to consider briefly several technologies that exist but are not yet available to consumers. These delivery methods are truly futuristic, but they illustrate the likely directions of augmented reality's ongoing evolution. Moreover, they illustrate the important point that although today's smartphones already raise questions for contract law, today's smartphones are not the terminus of augmented reality's development. Far from it, today's smartphones are relatively crude augmented reality devices just beginning to bring digital information to physical space. Although we cannot predict with accuracy which information technologies will succeed in the future, we can predict with confidence that these technologies will continue to develop, become more sophisticated, and provide consumers with information in more useful, salient, and seamless ways.

Various display technologies under development promise to integrate augmented reality into daily life. For example, several companies are working on projecting information directly onto car windshields and windows. Recent innovations include heads up vehicle navigation displays that project maps and information directly onto the windshield, creating the sensation that driving directions are on the road in front of the driver.⁸⁶ Similarly, Toyota is developing car windows that give backseat passengers the ability to interact with the passing outside world by drawing on and querying the window with their fingers.⁸⁷ A child could touch a passing tree, for example, and the window

84. MIKE KUNIAVSKY, SMART THINGS: UBIQUITOUS COMPUTING USER EXPERIENCE DESIGN 3 (2010); *see also id.* at 10 (“By 2005 . . . the era of ubiquitous computing had begun.”).

85. *See supra* note 55 and accompanying text.

86. *See Vehicle Displays: Head Up Displays*, MICROVISION, http://www.microvision.com/vehicle_displays/head_up_displays.html (last visited July 7, 2011) (demonstrating MicroVision's proposed consumer heads up display system).

87. *See* Dave Banks, *Toyota's "Window to the World" Offers Backseat Passengers Augmented Reality*, WIRED, July 29, 2011, <http://www.wired.com/geekdad/2011/07/toyotas-window-to-the-world-offers-backseat-passengers-augmented-reality>.

might display the word “tree” to teach vocabulary, or touch a passing building to query the window for the building’s distance from the car.

Wearable displays are also in development. You can currently purchase ski goggles that will project GPS and weather information directly to you as you ski,⁸⁸ and somewhat odd-looking sunglasses with embedded augmented reality displays capable of overlaying digital information on your natural field of view.⁸⁹ Various firms are working to develop regular eyeglasses that can project digital information to their wearer,⁹⁰ and researchers are even trying to embed display technologies in contact lenses.⁹¹ The ability to access digital information—email, instant messages, walking or driving directions, lecture notes, product information, and so on—directly through your eyeglasses would obviously bring augmented reality to a dramatically different level than being forced to use your smartphone. Although early prototypes exist, this technology is not yet consumer-ready.⁹²

Finally, innovators are working on various other delivery methods to integrate the physical and digital worlds. Consider MIT computer scientist Pranav Mistry’s much lauded SixthSense project.⁹³ SixthSense combines a smartphone (for location awareness, computation power, and internet connectivity) with a digital camera and small LCD projector that the user wears on a pendant around the neck. The projector displays text and images onto the user’s physical environment; the user can then interact with these projections through hand gestures that the camera detects and the smartphone processes.

88. See Paul Ridden, *World First GPS Goggles With Head Mounted Display*, GIZMAG (Oct. 8, 2010), <http://www.gizmag.com/zeal-recon-transcend-gps-head-mounted-display-goggles/16605>.

89. See VUZIX, http://www.vuzix.com/consumer/products_wrap920ar.html (last visited July 7, 2011) (selling the Wrap 920AR glasses).

90. Early versions of eyeglass displays are now available; prototypes of future systems show the direction that leading firms are exploring. See *Wearable Displays: Mobile Device Eyewear*, MICROVISION, http://www.microvision.com/wearable_displays/mobile.html (last visited July 7, 2011) (providing examples of eyewear prototypes); see also *3D Display System*, NIT DOCOMO, <http://www.nttdocomo.com/technologies/future/3D/index.html> (last visited July 7, 2011) (providing examples of Docomo’s eyeglass prototypes).

91. See Babak A. Parviz, *For Your Eye Only: A New Generation of Contact Lenses Built With Very Small Circuits and LEDs Promises Bionic Eyesight*, IEEE SPECTRUM, Sept. 2009, at 36 (describing contact lens research).

92. See Yohan Baillot & Christine Perey, Position Paper, Int’l AR Standards Meeting, AR Eyewear and Mobile Devices: The Challenges Ahead (Feb. 17, 2011), http://www.perey.com/ARStandards/Baillot-Perey-AR_Eyewear_and_Mobile_Devices.pdf (discussing challenges of developing augmented reality eyewear).

93. See *About*, SIXTHSENSE, <http://www.pranavmistry.com/projects/sixthsense> (last visited June 13, 2011) (describing SixthSense and providing videos of its user interface).

In combination, these simple technologies allow SixthSense to create stunning applications. If a user picks up a book in a bookstore, SixthSense scans the cover, detects what book it is, and then projects book reviews or price comparison information directly onto the cover of the book using the LCD projector.⁹⁴ Similarly, if a user holds a product in a grocery store—such as a roll of paper towels—SixthSense can augment that physical object with information about its environmental qualities (for example, by projecting onto the paper towels a red, yellow, or green icon indicating how “green” the towels are).⁹⁵ The system can identify people using facial recognition and project digital nametags onto their chests as they approach. Finally, SixthSense can project a video or other multimedia content onto the physical world. For example, a newspaper reader can point at a story and see a video related to that story projected directly onto the newspaper—or a consumer reading a contract can see a video explaining that contract.⁹⁶

The digital magic wand or point-to-discover (P2D) project provides another example of future AR technology.⁹⁷ P2D is a handheld device that connects wirelessly to a smartphone. If the user points the wand at an object or location in the physical world, this cues the smartphone to provide information about that object or location. For example, you might point at a restaurant and immediately retrieve information about and ratings for that restaurant; point at a bus stop to learn when the next bus will arrive; or point at a building to learn its history or retrieve a directory of its merchants. The goal, as with the goal of all augmented reality technologies, is to more closely and seamlessly integrate digital information into physical space.

B. Sorting and Signaling Across Information Types

Having succumbed to the temptation to peer into the (near) future, let us return to more humble topics. Before turning, in Parts II and III, to the impact these technologies may have on contract doctrine, this Subpart categorizes the types of information these technologies can deliver to consumers. In other words,

94. *Id.*

95. *Id.*

96. *Id.*

97. See *Overview*, POINT TO DISCOVER, <http://p2d.ftw.at> (last visited Oct. 12, 2011) (explaining the Point-to-Discover research project). For an overview of such developments, see Peter Fröhlich et al., *On the Move, Wirelessly Connected to the World*, 54 COMM. ACM VIRTUAL EXTENSION, Jan. 2011, at 132 (discussing mobile spatial interaction research).

rather than reviewing the technologies themselves—the glasses or contact lenses or heads up displays—consider briefly a typology of the information those technologies can now transmit to each of us, and the ways those technologies change the ability of consumers and firms to sort and signal each other as they contract.

1. Places

Over the past year, location-based applications for smartphones have proliferated. These devices increasingly contain GPS technology to provide location awareness, and, combined with internet connectivity, this permits smartphones to provide location-relevant information about the places we visit.

Early and simple examples include museum and city walking tours; information about nearby restaurants or other retail establishments; and directions to movies or the nearest ATM machine.⁹⁸ But location-sensitive information can also have more profound implications for contracting. The popular website Zillow, for example, aggregates publicly available information to display price information about almost every house in the United States; this information is now available on smartphones as well. You can point your iPhone down a street and see, on a map, prices overlaid on each house.⁹⁹ Various companies are layering more and more information into such maps. This includes displays of criminal activity in the area¹⁰⁰ or quality ratings of neighborhood schools.¹⁰¹ This sort of information could be of obvious import in real estate transactions.¹⁰²

In addition, as discussed above in the context of *Williams v. Walker-Thomas Furniture Co.*,¹⁰³ consumers can now easily augment physical locations with

98. See *supra* notes 58–61 and accompanying text (discussing examples of such applications).

99. See ZILLOW, <http://www.zillow.com> (last visited July 5, 2011).

100. See CRIME MAPPING, <http://www.crimemapping.com> (last visited July 27, 2011) (providing map overlays of police reports about criminal activity for a variety of U.S. cities).

101. See, e.g., *Fixing D.C.'s Schools*, WASH. POST, <http://www.washingtonpost.com/wp-srv/metro/interactives/dcschools/scorecard.html> (last visited Dec. 27, 2011) (providing an interactive map showing school ratings, percentage of classes taught by highly qualified teachers, crime incidents, health inspection violations, and delay in repairs for city schools).

102. Such information can impact disclosure and misrepresentation, for example. See, e.g., *Reed v. King*, 193 Cal. Rptr. 130, 133 (Ct. App. 1983) (holding that a seller's failure to disclose that a family was murdered in the house several years earlier was a material fact affecting the value of the property).

103. 350 F.2d 445 (D.C. Cir. 1965).

digital information.¹⁰⁴ The mobile application Foursquare, for example, allows a user to review a retailer or restaurant and to leave that review for other users that enter that particular physical location.¹⁰⁵ Google has recently acquired patents on similar location-based virtual note technologies.¹⁰⁶ These technologies allow consumers to communicate with and learn from each other in entirely new ways. In the analog world, you might have learned about a good restaurant or a bad merchant if you happened to talk with a friend who had personal experience with that retailer. In an augmented reality, however, you can now learn from your social network or from the universe of strangers who have visited that retailer, just by visiting the retailer and seeing information tagged to that location. This makes a merchant's entire reputation available to each consumer that enters the store, thereby dramatically lowering the cost for consumers to sort merchants and determine with which merchants to transact.

It is hard to overstate the radical nature of this shift to ubiquitous location-based information. In the traditional or analog economy, consumers had few ways to search for information about a given merchant. The owners of your favorite local breakfast spot, for example, have always known about the restaurant's food quality and record of health code violations, but a potential customer standing outside on the sidewalk could not access this information. As with all sorting problems,¹⁰⁷ consumers were thus forced to sort merchants by relying on imperfect proxies. Merchants would try to signal their quality to consumers by investing in the architecture or furnishings in their stores, through expensive advertising, or through branding. In an augmented reality, consumers can access other consumer reviews indexed by location, giving them entirely new ways to sort their contracting partners.

104. Various applications allow consumers to leave digital notes connected to a physical location. See, e.g., STIKI NOTES, <http://www.stikinotes.com> (last visited Dec. 27, 2011) (allowing consumers to leave digital location-based notes for each other).

105. Foursquare is a very popular electronic check-in service that allows consumers to check into a location via their cellular phones. See FOURSQUARE, <http://www.foursquare.com> (last visited June 2, 2011).

106. Google recently acquired Xybernaut Corp., one of the early patent-holders on location-based virtual note technologies. See Bill Slawski, *Google Acquires Virtual Post-It Notes Patents*, SEO BY THE SEA (Mar. 28, 2011, 9:38 AM), <http://www.seobythesea.com2011/03/google-acquires-virtual-post-it-notes-patents>.

107. See *supra* note 38 and accompanying text.

2. Goods

In addition to information about places, we can now instantly access a great deal of information about goods. Two points are relevant here. First, information about goods is increasingly available through mobile computing. Second, the quantity and quality of information about goods are exploding, as goods become connected to the internet and become capable of recording and transmitting vast stores of information about themselves.

First, consider accessibility. Goods possess what some in design call an “information shadow.”¹⁰⁸ A good’s information shadow is the composite of all of the available information about it—its origins, makeup, and manufacturer; market information about its price; consumer and professional reviews of its quality and performance; government safety information; and any other relevant information.

Goods have always had such a shadow, but in an analog world it was cost-prohibitive to search for and to use such information. You might have talked to a friend about which car to buy, but it was impossible to collect reviews from hundreds of acquaintances. “The complexity of finding, organizing, and accessing this information divided the world of objects and the world of information shadows.”¹⁰⁹ At the start of the digital era, goods largely remained divorced from their information shadows. “Even if accessible through a computer, information shadows were unavailable when they could provide the most value: in choosing between different products to buy, or in figuring out how to use a new tool.”¹¹⁰

Mobile computing increasingly makes a good’s information shadow instantly accessible from anywhere. As mentioned, smartphones can now scan an object’s bar code to pull up reviews of that product. The iPhone application Fooducate allows you to scan the bar code of one of over 200,000 food products and learn the complete nutritional information about that food.¹¹¹ Almost half of Android and iPhone users have scanned a barcode with their phones; nearly a quarter have scanned an image of a product to search for

108. See KUNIAVSKY, *supra* note 84, at 72 (“The digitally accessible information about an object can be called its information shadow.”).

109. *Id.*

110. *Id.*

111. See FOODUCATE, <http://www.fooducate.com> (last visited July 14, 2011).

information about that product.¹¹² Moreover, preliminary research seems to suggest that consumers prefer—and may even be willing to pay for—the ability to access product information and reviews while shopping in physical space.¹¹³ As databases of information about goods become more organized, complete, and available, consumers will increasingly have access to the information shadows of the objects with which they interact or that they wish to purchase in the physical world.

Second, goods can now signal to consumers in entirely new ways. This is as important as consumers being able to sort high-quality from low-quality goods by accessing digital information. Shoes,¹¹⁴ refrigerators,¹¹⁵ wine bottles,¹¹⁶ car tires,¹¹⁷ and even cattle¹¹⁸ can now record relevant data about themselves and report such data electronically to consumers.¹¹⁹ This is the “Internet of Things”¹²⁰—a connected web of “smart” objects capable of generating and transmitting data on themselves. Consider these startling statistics: In 2008, there were more objects connected to the internet than there were people on Earth; in 2011, just twenty typical American households generated as much internet traffic as the entire internet in 2008, in part because of the increasing

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112. See Dan Butcher, *Mobile Bar Code Scanning Has Become Mainstream: Survey*, MOBILE COMMERCE DAILY (Jan. 20, 2011), <http://www.mobilecommercedaily.com/2011/01/20/mobile-bar-code-scanning-has-become-mainstream-survey> (providing statistics on scanning via various smartphone platforms).
 113. See Tobias Kowatsch et al., *The Role of Product Reviews on Mobile Devices for In-Store Purchases: Consumers' Usage Intentions, Costs and Store Preferences*, 6 INT'L J. INTERNET MARKETING & ADVERTISING 226, 235–36, 239–40 (2011) (finding that consumers may be willing to pay between 2 and 5 percent of a product's cost to have access to reviews of that product).
 114. See *Xsens ForceShoe*, XSSENS, <http://www.xsens.com/en/general/forceshoe> (last visited July 30, 2011) (introducing a sensor-filled shoe capable of measuring gait, torque, and other kinematics of the foot).
 115. See Suzanne Kantra, *Are You Ready for a Smart Fridge?*, DIGITAL LIFE ON TODAY (May 2, 2011, 7:46 AM), http://digitallife.today.com/_news/2011/05/02/6557879-are-you-ready-for-a-smart-fridge (discussing refrigerator models capable of detecting the food inside and monitoring food “sell by” dates).
 116. See EPROVENANCE, <http://www.eprovenance.com> (last visited July 10, 2011) (offering RFID solutions to track the temperature and care of wine).
 117. See Nilay Patel, *Pirelli Cyber Tire Adds Some Smarts to Your Slicks*, ENGADGET (Aug. 28, 2008, 8:28 PM), <http://www.engadget.com/2008/08/28/piirelli-cyber-tire-adds-some-smarts-to-your-slicks> (discussing the Cyber Tire, which can record pressure, temperature, and vehicle load).
 118. See Dave Evans, *The Internet of Things*, PLATFORM (July 15, 2011, 9:00 AM), <http://blogs.cisco.com/news/the-internet-of-things-infographic> (discussing a Dutch startup named Sparked that allows farmers to track cattle wirelessly).
 119. See GREENFIELD, *supra* note 9, at 18–23 (providing examples of digitally connected objects).
 120. The term “Internet of Things” was coined at the MIT Auto-ID Center in 1999. See KUNIAVSKY, *supra* note 84, at 79.

number of connected devices; and by 2020, there will be 50 billion internet-enabled objects.¹²¹

The ability of goods to share information with consumers is, again, a radical change. As one recent ubiquitous computing study put it:

Smart products—products that share information with consumers—are designed to combine the online and offline world. . . . Whereas today's in-store products provide only static information, future smart products may provide information about their journey to their current location (e.g. multiple countries of origin), information about their ingredients (e.g. news articles on problems with a particular supplier) and possibly some embedded intelligence . . . (e.g. the types of difficulties others have had [with] the product). . . . Benefits for consumers could be: First, in terms of search, the user should be able to quickly discover available online information, e.g., comparable products plus rich descriptions of its use and limits; [i]n terms of experience, the user should be able to learn from others how well-liked the product was, how long it lasted, etc.; and in terms of credence, the user should be able to find out how the company treated returns, failures, etc. These benefits could make purchase decisions easier.¹²²

Essentially, these technologies allow goods to signal quality to consumers in new ways.

Consider automobiles. Cars have long had unique identifiers or VINs. Until recently, however, searching for information based on a VIN was relatively difficult. Today, Carfax.com¹²³ allows you to search based on a VIN and learn the vehicle's owner history, mileage, recall information, and warranty information. It will also report whether the vehicle has ever been in a flood or seriously damaged in an accident, whether its airbags have deployed, or whether it has ever been branded a lemon under state lemon laws.¹²⁴

Cars are acquiring the ability to transmit this information to consumers directly, rather than through an intermediary like CarFax. Some project that cars will increasingly be equipped with RFID or other technologies that will

121. See Evans, *supra* note 118.

122. Florian Resatsch et al., *Do Point of Sale RFID Based Information Services Make a Difference?: Analyzing Consumer Perceptions for Designing Smart Product Information Services in Retail Business*, 18 ELECTRONIC MARKETS 216, 218 (2008).

123. See CARFAX, <http://www.carfax.com> (last visited Jan. 15, 2012).

124. See CARFAX LEMON CHECK, *supra* note 2.

allow them to broadcast information to nearby consumers.¹²⁵ Manufacturers are already realizing the power of allowing cars to speak for themselves. Nissan, for example, has begun labeling cars with QR codes that consumers may scan to access information about the vehicle's make, model, and features. As these signaling technologies evolve, goods will be able to share far more information about themselves—including difficult-to-fake signals of quality, such as repair history.

The same is true of many other goods for which such information might prove valuable. Among consumer goods, computers, appliances, cameras, and other high-value electronics come to mind. Beyond the consumer realm, all forms of commercial, agricultural, and industrial machinery are obvious candidates. Goods are increasingly smart, and information about smart goods is increasingly available to augment our interactions with the physical world.

3. People and Firms

People and firms also have information shadows—a digital self that augments the physical self. Consumers and firms can increasingly learn about each other prior to transacting by accessing these information shadows. Consider reputation. A person's reputation is just a Google search away.¹²⁶ Moreover, the internet has generated new user-generated reputation ranking systems. For example, eBay posts reputational measures of honesty for its buyers and sellers.¹²⁷ Firms, too, have discovered that their virtual reputations are at least as important as their traditional, word-of-mouth reputations.¹²⁸ Public report cards for doctors and hospitals are being touted as a means to correct an ailing health care system.¹²⁹ And rating sites—in which homeowners rate contractors, electricians, or plumbers;¹³⁰ clients rate lawyers;¹³¹ students

125. See Adam Blum, *NFC and the Internet of Things*, VENTUREBEAT (June 21, 2011), <http://www.venturebeat.com/2011/06/21/nfc-and-the-internet-of-things> (“[A]ll cars will have [near field communications] tags embedded, containing specifications, statistics and web links for more information on the vehicle.”).

126. See, e.g., Diane Coutu et al., *We Googled You: Should Fred Hire Mimi Despite Her Online History?*, HARV. BUS. REV., June 2007, at 37, 40 (“Google anyone hard enough, and you’ll find some dirt.”).

127. See EBAY, <http://www.ebay.com> (last visited Sept. 23, 2011).

128. See, e.g., Nicholas Thompson, *More Companies Pay Heed to Their ‘Word of Mouse’ Reputation*, N.Y. TIMES, June 23, 2003, at C4.

129. See HEALTHGRADES, <http://www.healthgrades.com> (last visited Sept. 23, 2011).

130. See ANGIE’S LIST, <http://www.angieslist.com> (last visited Sept. 23, 2011).

131. See AVVO, <http://www.avvo.com> (last visited Sept. 23, 2011); MARTINDALE.COM, <http://www.martindale.com> (last visited Sept. 23, 2011).

rate professors;¹³² tenants rate landlords;¹³³ and consumers rate brands and manufacturers¹³⁴—now provide the public with heretofore delayed, disaggregated, or nonexistent data about reputation.

Lior Strahilevitz calls the increased availability of reputational information the “reputation revolution”¹³⁵ and argues that these technologies will create profound changes in law and public policy. In particular, Strahilevitz focuses on the ways in which reputational technologies can influence our regulation of discriminatory practices.¹³⁶ In addition to these social or policy implications, digital reputations play a role in contracting by permitting consumers and firms to sort reputable from disreputable contracting partners.

We have already seen examples of consumers learning about firms through online consumer and intermediary reviews of locations and goods, and the next Subpart—on contract terms—provides more evidence of the ways in which such information changes the sorting process for consumers. Augmented reality also changes sorting and signaling for firms learning about consumers. As already discussed, facial recognition technologies are now available, rather than just being the stuff of science fiction.¹³⁷ We can also identify others by the electronic devices they carry or by biometric markers, such as iris scanning.¹³⁸ As these technologies evolve and integrate into the economy, firms will increasingly be able to identify consumers individually. As Jerry Kang has put it:

[E]nvision a future where we can “right click” on any object . . . and receive contextually relevant information. People already “Google” each other before going on dates or to interviews. Think about having the option of one-click “Googling” anyone you walk past, *as you walk past*. . . . This process could become automated; no specific “request” to pull information will be required. Rather, software will manage our datasense and constantly seek out and filter information about nearby people.¹³⁹

132. See RATE MY PROFESSORS, <http://www.ratemyprofessors.com> (last visited Sept. 23, 2011).

133. See APARTMENT RATINGS, <http://www.apartmentratings.com> (last visited Sept. 23, 2011).

134. See EPINIONS, <http://www.epinions.com> (last visited Sept. 23, 2011).

135. See Strahilevitz, *Reputation Nation*, *supra* note 31, at 5.

136. See Strahilevitz, “*How’s My Driving?*,” *supra* note 31, at 1702 (“[This Article] explores the use of information aggregation technologies to deter, detect, and punish citizen misconduct.”).

137. See *supra* notes 14–18 and accompanying text.

138. See Julia Angwin, *Iris Recognition: The New Fingerprinting?*, DIGITS (July 13, 2011, 11:40 AM), <http://blogs.wsj.com/digits/2011/07/13/iris-recognition-the-new-fingerprinting> (discussing improvements in iris recognition technologies).

139. Kang & Cuff, *supra* note 31, at 110.

Beyond focusing on reputation, scholars have focused on the ways in which firms sort consumers by mining aggregated data, such as credit histories. The privacy field is dominated by Daniel Solove's concept of the "digital dossier," for example, which is a metaphor for the aggregate of information available in public and private databases about a given person.¹⁴⁰ Data aggregators now possess huge amounts of information about each of us: Corporate data mining links at least seven thousand transactions to each individual in the United States per year—approximately half a million transactions over one's lifetime.¹⁴¹ In a world in which firms can identify consumers—as Acquisti's study shows they increasingly can¹⁴²—firms can link consumers to these digital dossiers and thereby acquire detailed profiles on the interests, habits, income levels, and shopping patterns of those that walk through their doors.

4. Contract Terms

Finally, in addition to having information about places, goods, people, and firms, consumers increasingly have ubiquitous mobile access to information about contract terms.

Various websites allow consumers to share information, including reviews and complaints related to contract terms. For example, *pissedconsumer.com*, *complaintsboard.com*, *ripoffreport.com*, *complaints.com*, *consumeraffairs.com*, *scamfound.com*, and others host thousands of consumer comments about contracting problems. Consider just a few examples. On March 20, 2011, a reviewer posted under the subject heading "Never Never Sign a Contract with Dish Network":

According to Dish TV customer service . . . their contract allows them to raise their rate every year if the [sic] want to[]. WHAT????? I cannot find my original contract to dispute this but this is a shady underhanded way or [sic] strong arming extra money out of their

140. See DANIEL J. SOLOVE, *THE DIGITAL PERSON: TECHNOLOGY & PRIVACY IN THE INFORMATION AGE 1–2* (2004) (defining the digital dossier).

141. Jason Millar, *Core Privacy: A Problem for Predictive Data Mining*, in *LESSONS FROM THE IDENTITY TRAIL: ANONYMITY, PRIVACY AND IDENTITY IN A NETWORKED SOCIETY* 103, 105 (Ian Kerr et al. eds., 2009).

142. See *supra* note 14 and accompanying text.

customers who are stuck in a contract. . . . DO NOT EVER sign a contract with Dish TV. . . .¹⁴³

Or consider this May 28, 2011, review titled “Beware of Contract Fine Print”:

MessageEnvy—a massage spa that provides a discount rate for monthly massages with a one-year minimum membership. If you decide to cancel, please be aware that you must give 30 days notice in writing and your membership continues during that time. So basically you need to visit the MessageEnvy spa exactly 30 days before the end of your membership or otherwise you get charged another monthly credit.¹⁴⁴

Thousands of similar reviews contain exerted complaints about consumers being locked into contracts for longer than expected,¹⁴⁵ excessive cancellation fees,¹⁴⁶ and contract terms that mislead consumers about expected benefits or contract coverage.¹⁴⁷

In many cases, multiple consumers have complained about the contract of a given merchant or product. These negative reviews are easy to find. For example, a Google search for “Anytime Fitness” brings up negative reviews in the top five search results.¹⁴⁸ A search for “Anytime fitness contract complaints” brings up complaints posted on pissedconsumer.com, complaintsboard.com, ripoffreport.com, consumercomplaints.com, my3cents.com, scamfound.com, the Better Business Bureau, and a variety of geographically-based consumer complaint sites.¹⁴⁹ A search for the same terms on pissedconsumer.com returns almost two hundred negative reviews, many of which have been viewed

143. *Never Never Sign a Contract With Dish Network*, PISSED CONSUMER (Mar. 20, 2011), <http://dish-network.pissedconsumer.com/never-never-sign-a-contract-with-dish-network-20110320227723.html>.

144. *Beware of Contract Fine Print*, PISSED CONSUMER (May 28, 2011), <http://message-envy.pissedconsumer.com/beware-of-contract-fine-print-20110528240139.html>.

145. *See, e.g., Protect Ameica [sic] Lied of Length of Contract*, PISSED CONSUMER (Aug. 1, 2011), <http://protect-ameica.pissedconsumer.com/protect-ameica-lied-of-length-of-contract-20110801252674.html>.

146. *See, e.g., Refusal to Cancel a Contract: Life Alert Complaint*, PISSED CONSUMER (Mar. 31, 2011), <http://life-alert.pissedconsumer.com/refusal-to-cancel-a-contract-20110331229880.html>.

147. *See, e.g., Misleading Contract/Hidden and Surprise Fees*, PISSED CONSUMER (May 29, 2011), <http://adt.pissedconsumer.com/misleading-contract-hidden-and-surprise-fees-20110529240312.html> (complaining that a security system contract excluded monitoring of glass breakage and contained hidden permit fees).

148. *See* GOOGLE, <http://www.google.com> (search terms “Anytime Fitness”) (last visited Jan. 25, 2012).

149. *Id.* (search terms “Anytime Fitness contract complaints”) (last visited Oct. 12, 2011).

thousands of times by searching consumers.¹⁵⁰ Pissed Consumer indexes and sorts these reviews as well as aggregates the ratings to give Anytime Fitness a “Five Red Star” score.¹⁵¹

In addition to providing such consumer reviews, intermediaries provide rankings of consumer goods and services that include scores related to contract terms. J.D. Power & Associates, for example, maintains a website that provides consumer information about a variety of products. On the website, J.D. Power ranks credit cards based on their contractual terms, allocating scores from “among the best” to “the rest.”¹⁵² Other sites provide similar rankings of credit card contract terms.¹⁵³ Sites rate other types of contract terms as well, including health care plans, insurance contracts, airline frequent flyer clubs,¹⁵⁴ automobile manufacturer warranties,¹⁵⁵ and computer warranties.¹⁵⁶

It is difficult to judge the quality of such consumer and intermediary reviews, but it is easy to assess their quantity: The past few years have witnessed an explosion of contract-related information on review sites. At least for large firms and popular products, a consumer looking for information about a merchant’s contracts need only do a simple Google search.

Information about contract terms will likely increase over time in both quantity and quality. Augmented reality delivery methods make it more convenient and less costly for consumers to access such information, which will increase demand. Consumers can search for contract information on their smartphones. In addition, however, the newest mobile applications use location information to push such information to users without requiring them to search for it.¹⁵⁷ And some apps—such as SearchReview’s mobile platform—aggregate consumer reviews from thousands of websites, thereby providing a much-simplified consumer search experience.¹⁵⁸

150. See *Anytime Fitness*, PISSED CONSUMER, <http://anytime-fitness.pissedconsumer.com> (last visited July 5, 2011).

151. *Id.*

152. See *Credit Card Ratings*, J.D. POWER, <http://www.jdpower.com/Finance/ratings/credit-card-ratings> (last visited July 7, 2011).

153. See, e.g., CARDRATINGS.COM, <http://www.cardratings.com> (last visited July 1, 2011).

154. See, e.g., WEBFLYER, <http://www.webflyer.com> (last visited July 1, 2011).

155. See CARS.COM, <http://www.cars.com> (last visited July 1, 2011).

156. See CLEARANCE CLUB, <http://www.clearanceclub.com> (last visited July 1, 2011).

157. See, e.g., BETTER BUSINESS BUREAU, *supra* note 12 (providing reviews of local businesses based on location information).

158. See SEARCHREVIEWS, <http://www.searchreviews.com> (last visited July 5, 2011) (aggregating 40 million reviews from over a thousand websites).

In addition, mobile computing technologies make it much easier for consumers to supply information by creating reviews on their mobile devices. The popular website The Consumerist, for example, built a “Consumer Tipster” feature into its mobile application for the iPhone.¹⁵⁹ According to The Consumerist, this is a “free, fun, and simple way to tell the editors of Consumerist.com about any scams, rip-offs [or] shoddy products . . . Use the Tipster app to snap a quick picture of the offending item, write up your comment, and submit to The Consumerist.”¹⁶⁰ The Better Business Bureau’s mobile application has a similar feedback feature,¹⁶¹ as does Pissed Consumer’s iPhone platform.¹⁶² Thus, augmented reality technologies not only allow customers to access information about products and contract terms, but also encourage them to generate and disseminate that information. This Article now turns to exploring how this explosion of accessible information interacts with consumer contract doctrine.

II. THE EFFECTS ON ASYMMETRIC INFORMATION ARGUMENTS FOR DISTRUSTING CONSUMER CONTRACTS

Part I explored augmented reality technologies, the types of information those technologies can now make available to contracting parties, and some of the ways in which such information permits new forms of low-cost sorting and signaling. Each of those types of information—about places, goods, people, firms, and contract terms—has been available before, but often at significant cost. Today, this data is more accessible, more often, and to more people. The information infrastructure of the economy has shifted underneath the feet of contract doctrine. This Part considers the implications of that shift.

In the consumer context, we hesitate to enforce contracts as written either because of information asymmetries that create market failure or because of doubts about the parties’ capacity to contract.¹⁶³ This Part focuses on the first

159. See *Consumer Tipster by Consumer Reports*, iTUNES APP STORE, <http://itunes.apple.com/us/app/consumerist-tipster/id443045014?mt=8> (last visited Sept. 23, 2011).

160. *Id.*

161. See *BBB Search by Council of Better Business Bureaus*, iTUNES APP STORE, <http://itunes.apple.com/us/app/bbb-search-find-local-businesses/id440014505?mt=8> (last visited Sept. 23, 2011).

162. See *PISSED CONSUMER*, *supra* note 25.

163. See *supra* note 36 and accompanying text.

Recent contracts scholarship has begun to articulate a new and somewhat different concern about standard form contracts: that firms may include seemingly inefficient terms in such contracts as a means to differentiate between different types of consumers. See, e.g., Jonathan

of these two justifications for limiting traditional freedom of contract: the class of cases in which information-related market failures make a transaction suspect by dampening competition in the market for the terms in question and thereby creating opportunity for exploitative terms.¹⁶⁴ In these cases, we intervene to police contracts because we distrust that individual choice will maximize welfare.¹⁶⁵ Standard form contracts between firms and consumers—like those at issue in *Walker-Thomas*—are the best example.

After reviewing the arguments for and against judicial distrust of consumer contracts, this Part considers the primary effects that augmented reality will have on this debate. Ultimately, it concludes that an augmented reality will

Klick, *The Microfoundations of Standard Form Contracts: Price Discrimination vs. Behavioral Bias*, 32 FLA. ST. U. L. REV. 555, 560–64 (2005) (offering a hypothesis about standard form contracts as a price discrimination mechanism); see also David Gilo & Ariel Porat, *The Hidden Roles of Boilerplate and Standard-Form Contracts: Strategic Imposition of Transaction Costs, Segmentation of Consumers, and Anticompetitive Effects*, 104 MICH. L. REV. 983, 988–1003 (2006); Jason Scott Johnston, *The Return of Bargain: An Economic Theory of How Standard-Form Contracts Enable Cooperative Negotiation Between Businesses and Consumers*, 104 MICH. L. REV. 857 (2006).

Although there is insufficient space to address these discriminatory contracting arguments in this Article, I cannot resist adding a note that augmented reality technologies might impact such arguments. In particular, it seems likely that if sellers can directly identify consumers—through facial recognition or other biometric means, for example—then sellers are unlikely to need to engage in discriminatory contracting to sort classes of consumers. Other, more direct data will be available to sellers to price-discriminate, at least in some cases. Put differently, if augmented reality erodes consumers' anonymity, discriminatory contracting will become an unnecessary contractual complication.

The normative valence of this argument is unclear. On the one hand, contracts may become simpler and easier to understand if firms do not overly complicate contractual terms to serve this discriminatory function. This may suggest, again, that standard form contracts will more likely be enforced as written in an augmented reality. On the other hand, of course, some may doubt that discriminatory contracting—offering different contracts to different consumers or groups of consumers—is socially optimal, even if it is welfare-enhancing for particular firms or individual consumers.

This discussion is, ultimately, yet another application of the increased availability, and decreased cost, of sorting and signaling. As these costs go down, firms can sort consumers in new ways, thus making discriminatory contracting possible without the need to use the contract itself as a proxy for a consumer's type. In addition, consumers will be able to signal to firms in new ways—something heretofore not considered in this literature. Certain consumers may want their type known to firms, so that they can reap economic benefit by inducing firms to offer them special terms. For now, these arguments will have to wait for another day.

164. See MICHAEL J. TREBILCOCK, *THE LIMITS OF FREEDOM OF CONTRACT* 102–46 (1993) (discussing information-related limits on freedom of contract). For a useful overview, see Shmuel I. Becher, *Asymmetric Information in Consumer Contracts: The Challenge That Is Yet to Be Met*, 45 AM. BUS. L.J. 723, 725–35 (2008) (reviewing literature on information asymmetries and standard form contracts).

165. See Hermalin, Katz & Craswell, *supra* note 34, § 2.3.2 (discussing asymmetric information as a justification for limiting freedom of contract).

force both judges and scholars to take account of the ways in which digital information is now available to consumers in bricks-and-mortar transactions, and that this convergence of physical and digital space in an augmented reality will create doctrinal pressure to defer to contracts as written. Whether a contracting party has access to a smartphone (or some other augmented reality device) may be—or may become—an important element in determining that party's contractual rights and obligations.¹⁶⁶

A. Information Asymmetries and Freedom of Contract

Classical contract law assumed that contracting parties were best positioned to arrange their affairs and that judicial intervention into those affairs was largely unwarranted.¹⁶⁷ These assumptions aligned with basic welfare economics, which posits that informed parties will reach efficient agreements under optimal conditions.¹⁶⁸ Over the last century, however, the traditional tendency to enforce contracts as written has been under attack—particularly in the context of standard form consumer contracts.¹⁶⁹ Courts and consumer advocates are suspicious of such “adhesion contracts,”¹⁷⁰ assuming that they contain one-sided, pro-seller terms harmful to consumers.¹⁷¹ As a result, modern courts

166. As discussed above, *see supra* notes 84–97 and accompanying text, smartphones merely represent the current state of technological development augmenting physical space with digital information. Future innovations will augment reality in new ways, some of which we can predict and some of which we cannot. My references to smartphones in Parts II and III should thus be taken as placeholders for “smartphones or other future augmented reality technologies, including tablets, heads up displays, or other ubiquitous, embedded innovations.”

167. The classical Willistonian view emphasized formalist ideas of freedom of contract as enforcing agreements as written. *See* GRANT GILMORE, *THE DEATH OF CONTRACT* 43 (1974) (characterizing the Willistonian view); STEPHEN A. SMITH, *CONTRACT THEORY* 59 (2004) (defining freedom of contract as “the idea, fundamental in the orthodox understanding of contract law, that the content of a contractual obligation is a matter for the parties, not the law”).

168. *See supra* note 34 and accompanying text.

169. *See* Avery Wiener Katz, *The Economics of Form and Substance in Contract Interpretation*, 104 COLUM. L. REV. 496, 498 (2004) (“As is well known to both students and scholars of contract law, . . . for the past one hundred years . . . the historical trend . . . has been to water down . . . formal doctrines in favor of a more all-things-considered analysis of what the parties may have meant in the individual case.”); *see also* ROBERT A. HILLMAN, *THE RICHNESS OF CONTRACT LAW: AN ANALYSIS AND CRITIQUE OF CONTEMPORARY THEORIES OF CONTRACT LAW* 125–71 (1997) (exploring the history of contextualist reforms in contract law).

170. *See* Friedrich Kessler, *Contracts of Adhesion: Some Thoughts About Freedom of Contract*, 43 COLUM. L. REV. 629 (1943) (coining the term); Todd D. Rakoff, *Contracts of Adhesion: An Essay in Reconstruction*, 96 HARV. L. REV. 1174 (1983).

171. *See* Johnston, *supra* note 163, at 861 (“By the 1970s, both courts and commentators had reached a virtual consensus regarding the evil of form contracts.”).

are more likely than their classical predecessors to question, alter, or reject a contract's written terms on grounds of unconscionability or unfair surprise.¹⁷²

1. The Law and Economics of Standard Form Contracts

By the late 1970s, however, law and economics scholars began to argue that suspicion of standard form contracts might be misguided, even in consumer contracts. Standardized terms create efficiencies by reducing transaction costs—bargaining over every contract would be overly cumbersome.¹⁷³ Moreover, even if most consumers never read standard form contracts (thereby tempting sellers to include abusive terms), a relatively small cadre of sophisticated and vigilant consumers might suffice to force sellers to include only moderate, efficient terms in their contracts.¹⁷⁴ So long as this informed minority creates competitive pressure,¹⁷⁵ merchants will offer consumers efficient terms because failure to do so would result in consumers taking their business elsewhere.¹⁷⁶ As Michael Trebilcock has put it:

To the extent that there is a margin of informed, sophisticated, and aggressive consumers in any given market, who understand the terms of the standard form contracts on offer and who either negotiate over those terms or switch their business readily to competing suppliers

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172. See, e.g., F.H. Buckley, *Introduction to THE FALL AND RISE OF FREEDOM OF CONTRACT* 1, 8–9 (F.H. Buckley ed., 1999) (“The decline of formalism has plausibly weakened . . . the security of exchange in contract law—the expectation that promises made in a contractual setting will be enforced. The excuses which promisors may invoke to excuse performance, such as unconscionability . . . are much broader in scope today than they were in the nineteenth century.”); John E. Murray, Jr., *Contract Theories and the Rise of Neoformalism*, 71 *FORDHAM L. REV.* 869, 881 (2002) (“The rejection of formalism is pervasive in the new contract law.”); Robert E. Scott, *The Death of Contract Law*, 54 *U. TORONTO L.J.* 369, 374 (2004) (“The upshot is this: While state enforcement and interpretation under classical contract law is relatively formal or ‘rule-like’ (hard to obtain but, once liability attaches, equally hard to escape), contractual liability under the new contract law is context-specific or ‘standard-like’ (easy to impose liability in any particular situation, but equally easy to escape it).”).
173. See COOTER & ULEN, *supra* note 36, at 302–04 (explaining these justifications).
174. See Alan Schwartz & Louis L. Wilde, *Imperfect Information in Markets for Contract Terms: The Examples of Warranties and Security Interests*, 69 *VA. L. REV.* 1387, 1450–52 (1983) (providing this argument about standard form contracts).
175. See David Gilo & Ariel Porat, *Viewing Unconscionability Through a Market Lens*, 52 *WM. & MARY L. REV.* 133, 174–75 (2010).
176. See COOTER & ULEN, *supra* note 36, at 303 (“The relevant question is whether a market is competitive or monopolistic. The fact that a contract was made on a standard form does not establish a presumption in either direction.”); David Horton, *Unconscionability in the Law of Trusts*, 84 *NOTRE DAME L. REV.* 1675, 1691 (2009) (“[A]ny attempt to set aside a form clause must explain why sellers lack incentives to draft the clause to mirror consumers’ predilections.”).

offering more favourable terms, they may in effect discipline the entire market, so that inframarginal (less well informed, sophisticated, or mobile) consumers can effectively free-ride on the discipline brought to the market by the marginal consumers, although there is the potential for a collective action problem if every consumer attempts to free-ride on the efforts of others in effective monitoring of contract terms.¹⁷⁷

Put differently, if consumers have sufficient information to compare terms across different suppliers' contracts, suppliers will have reason to provide efficient contracts without unreasonable terms.¹⁷⁸

"New formalism,"¹⁷⁹ or neoformalism, thus uses law and economics to re-justify enforcing contracts as written.¹⁸⁰ Some neoformalists have confined their arguments to commercial contracting contexts,¹⁸¹ but many of these scholars also doubt the utility or necessity of judicial policing of consumer contracts. Economically, such intervention is only justified when one of two conditions holds: Either the seller has monopoly power and thus has the ability to impose burdensome and inefficient terms, or there is no likelihood that consumers can or will inform themselves about such terms in a standard form contract.¹⁸² Absent such market failure, judicial intervention—for unconscionability¹⁸³ and even for

177. TREBILCOCK, *supra* note 164, at 120 (citations omitted).

178. See Alan Schwartz, *How Much Irrationality Does the Market Permit?*, 37 J. LEGAL STUD. 131, 136–37 (2008) (arguing that suppliers will provide efficient terms when consumers are informed).

179. See generally David Chamy, *The New Formalism in Contract*, 66 U. CHI. L. REV. 842 (1999).

180. See Katz, *supra* note 169, at 499–500 (discussing new formalism).

181. See, e.g., Geoffrey P. Miller, *Bargains Bicoastal: New Light on Contract Theory*, 31 CARDOZO L. REV. 1475, 1477–80 (2010) (arguing that commercial parties systematically choose New York law to govern their contracts; that New York law tends towards more formalist, strict construction of contracts; and that this supports Schwartz and Scott's model); Alan Schwartz & Robert E. Scott, *Contract Theory and the Limits of Contract Law*, 113 YALE L.J. 541, 543 (limiting their theory to contracts between relatively sophisticated firms).

182. See generally Alan Schwartz & Louis L. Wilde, *Intervening in Markets on the Basis of Imperfect Information: A Legal and Economic Analysis*, 127 U. PA. L. REV. 630, 666–82 (1979) (making this argument); see also Richard A. Epstein, *The Neoclassical Economics of Consumer Contracts*, 92 MINN. L. REV. 803, 804–05 (2008) ("There are . . . two sets of . . . circumstances in which the neoclassical theory accepts that some government intervention *may* make sense: private monopoly and imperfect information."); Michael I. Meyerson, *The Efficient Consumer Form Contract: Law and Economics Meets the Real World*, 24 GA. L. REV. 583, 595 (1990) ("[I]nefficient transactions occur because consumers do not read form contracts, or do not understand the terms, and are thus unaware of their contents.").

183. See Richard Craswell, *Property Rules and Liability Rules in Unconscionability and Related Doctrines*, 60 U. CHI. L. REV. 1, 63 (1993) ("[M]ost economists conclude that contracts should be overridden only if there is some 'market failure' which prevents [an efficient] outcome from

fraud¹⁸⁴—is unjustified. So long as markets and parties are reasonably informed, freedom of contract should prevail.¹⁸⁵ As Richard Posner has put it, “what is important is not whether there is haggling in every transaction but whether competition forces sellers to incorporate in their standard contracts terms that protect the purchasers.”¹⁸⁶

This argument’s force, of course, turns on the empirical claim that a sufficient number of consumers can and will adequately inform themselves to police standard form contracts and create market discipline.¹⁸⁷ The debate turns on information.¹⁸⁸ The question is whether consumers learn sufficiently to discipline sellers, either through their own direct experiences with a given seller or product, from friends or other consumers, or from third-party intermediary information providers.¹⁸⁹

being realized.”); *id.* at 49 (arguing that courts should intervene in imperfect markets only when they are in a better position to select efficient terms).

184. Fraud is most likely in transactions about which little information is independently available *ex ante*. See Richard Craswell, *Interpreting Deceptive Advertising*, 65 B.U. L. REV. 658, 720 (1985). Put differently, fraud is most likely in transactions involving “experience” and “credence” goods and least likely in transactions involving “search” goods. See Meyerson, *supra* note 182, at 597 (“Deception is . . . most likely to involve credence qualities, or experience qualities of infrequently purchased goods.”). Thus, as increased information should lead to fewer unconscionable terms, increased information should lead to fewer instances of fraud.
185. See COOTER & ULEN, *supra* note 36, at 231 (“The farther the facts depart from the ideal of perfect rationality and zero transaction costs, the stronger the case for judges’ regulating the terms of the contract by law.”).
186. POSNER, *supra* note 34, at 144. For a different argument—that standard form contracts may be efficient even if they contain one-sided, pro-seller terms, see Johnston, *supra* note 163, at 878 (arguing that such one-sided terms allow sellers to bargain with consumers after the contract is formed, thereby constraining buyers’ opportunism through *ex post* consumer screening); see also Gilo & Porat, *supra* note 175, at 139–40 (arguing that if competition exists, contracts should be enforced even if information gaps exist between firms and consumers).
187. See Avery Weiner Katz, *Standard Form Contracts*, in THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW 502, 502–05 (Peter Newman ed., 1998); see also David M. Grether, Alan Schwartz & Louis L. Wilde, *The Irrelevance of Information Overload: An Analysis of Search and Disclosure*, 59 S. CAL. L. REV. 277 (1986).
188. See COOTER & ULEN, *supra* note 36, at 304 (“The real problem with this kind of contract is the buyer’s ignorance, not the absence of bargaining.”); Korobkin, *supra* note 28, at 1217 (“[T]he principal problem is one of information acquisition.”).
189. See Howard Beales, Richard Craswell & Steven C. Salop, *The Efficient Regulation of Consumer Information*, 24 J.L. & ECON. 491, 501–02 (1981) (exploring how consumers produce some pre-purchase information themselves from prior purchasing experiences, gain some information from other consumers, and learn some information from intermediaries, such as journalists, rating intermediaries, and others); Epstein, *supra* note 182, at 811, 813–14 (discussing these learning mechanisms, and asserting that “the neoclassical case for markets rests on the . . . qualified assumption that learning actually matters”).

Over the past few decades, many have doubted that consumers can or will inform themselves about standard form contract terms.¹⁹⁰ In most transactions, a consumer has no incentive to read a standard form contract: The consumer most likely will not understand the legal language anyway and knows that the risk of the contract terms being invoked is very low.¹⁹¹ Moreover, a small cadre of informed buyers may not appear because the benefits of processing complex contract terms may not justify the costs.¹⁹² Even if some informed buyers do emerge, they may discipline outrageous but not merely marginal terms, again because of the costs of finding and analyzing all of the terms in standard form contracts.¹⁹³

2. The e-Commerce Complication

On the sidelines of this debate, a few contract scholars have asked whether e-commerce transactions conducted online might differ from traditional bricks-and-mortar transactions in ways that change these asymmetric information arguments. Two lines of inquiry have evolved. First, do consumers read electronic standard form agreements more consistently than they read paper contracts? Second, even if they do not, do consumers have access to other sources of information—such as consumer reviews—that might discipline consumer contracts and thus make e-commerce contracts more efficient than their paper counterparts? Consider each argument.

In their early work on e-commerce contracting, Robert A. Hillman and Jeffrey J. Rachlinski saw that “[t]he ease with which consumers can compare business practices, including the content of standard forms, suggests that consumers

190. See, e.g., Meyerson, *supra* note 182, at 596 (“[I]t is particularly inappropriate to make an assumption of perfect consumer knowledge.”).

191. Even Judge Posner admits to not reading boilerplate contract terms. See David Lat, *Do Lawyers Actually Read Boilerplate Contracts? Richard Posner and Evan Chesler Don't; Do You?*, ABOVE THE LAW (June 22, 2010, 2:42 PM), <http://abovethelaw.com/2010/06/do-lawyers-actually-read-boilerplate-contracts-judge-richard-posner-doesnt-do-you>.

192. See Shmuel I. Becher & Tal Z. Zarsky, *E-Contract Doctrine 2.0: Standard Form Contracting in the Age of Online User Participation*, 14 MICH. TELECOMM. & TECH. L. REV. 303, 311 (2008) (reviewing literature skeptical of the “informed minority” theory); R. Ted Cruz & Jeffrey J. Hinck, *Not My Brother's Keeper: The Inability of an Informed Minority to Correct for Imperfect Information*, 47 HASTINGS L.J. 635, 657–58 (1996).

193. See Robert A. Hillman, *Online Boilerplate: Would Mandatory Website Disclosure of E-Standard Terms Backfire?*, 104 MICH. L. REV. 837, 853 (2006) (noting that watchdog groups “may be insufficient to deter businesses from drafting *marginal* terms that may not create significant reputational concerns but would harm consumers just the same”).

do not need judicial intervention to protect themselves from business abuse.¹⁹⁴ Writing in 2002—early in the commercial internet’s evolution—they naturally focused on the solitary consumer sitting at home in front of a personal computer. E-commerce generally gives a consumer access to a standard form contract in advance of purchase, sufficient time to read the contract, and the privacy to do so away from the pressure of salespeople or other distractions. This increases the likelihood that a consumer will read the contract. Despite these advantages, Hillman and Rachlinski concluded that these new technologies did not radically change consumer contracting: “[C]ourts cannot simply assume that the new tools available to e-consumers will suffice to protect them against exploitation.”¹⁹⁵ Others have since taken up the argument over whether consumers read electronic standard form contracts. Not surprisingly, the available empirical evidence suggests that they do not.¹⁹⁶

Part I illustrated, however, that, since Hillman and Rachlinski’s seminal essay, we have witnessed the spread of technologies permitting mass consumer and intermediary reviews of products, brands, and merchants.¹⁹⁷ A second line of argument has thus recently developed: In e-commerce transactions, consumers have access to a great deal of information beyond just the contract itself. If that information creates competitive pressures on firms to moderate their contract terms, judicial interference in consumer contracts in the e-commerce environment may be less justified:

The important question in the consumer transaction context asks whether contract law should hold consumers responsible—by denying them access to protective doctrines such as unconscionability . . . that are based upon bargaining power weaknesses—for their failure to take reasonable, low-cost steps to improve their bargaining power and protect their ability to withhold consent. . . . If a single Internet search would [show problems with a contract], did

194. Hillman & Rachlinski, *supra* note 32, at 478.

195. *Id.* at 492.

196. See Robert A. Hillman & Ibrahim Barakat, *Warranties and Disclaimers in the Electronic Age*, 11 YALE J.L. & TECH. 1, 2 (2009) (finding that consumers do not read online terms); Florencia Marotta-Wurgler, *Are “Pay Now, Terms Later” Contracts Worse for Buyers? Evidence From Software License Agreements*, 38 J. LEGAL STUD. 309, 309–17 (2009) (reviewing literature). *But see* Shmuel I. Becher & Esther Unger-Aviram, *The Law of Standard Form Contracts: Misguided Intuitions and Suggestions for Reconstruction*, 8 DEPAUL BUS. & COM. L.J. 199, 212–17 (2010) (presenting empirical evidence that consumers may read standard form contracts more often than assumed).

197. See *supra* notes 103–107, 111–113, 128–135 and accompanying text.

the consumer lack bargaining power, or just fail to access a cheap and readily available source?¹⁹⁸

Put differently, the internet allows consumers to evaluate a broad range of goods pre-purchase that previously could only be evaluated post-purchase. Both “experience goods”—which generally can only be evaluated after personal experience with the good—and “credence goods”—which are difficult to evaluate even after experience—may transform into “search goods”—which are capable of evaluation pre-purchase¹⁹⁹—if the internet aggregates sufficient information about those goods from multiple consumers or watchdog intermediaries.

Shmuel I. Becher and Tal Z. Zarsky have recently pursued this line of argument, asserting that “the online realm creates market conditions and information flows that may allow market forces to assure balanced [standard form contracts].”²⁰⁰ They focus on consumer-to-consumer product reviews and claim that certain indicia of robust consumer-to-consumer information flow should temper courts’ willingness to interfere in consumer contracts. These indicia include that the firm promotes robust consumer conversation about the firm’s products on its website and that there is heavy consumer-to-consumer information flow.²⁰¹ Conversely, if the firm frequently changes its standard form contracts, engages in discrimination between consumers by offering one set of terms to the informed minority but another, more onerous set of terms to the uninformed majority, or tampers with information exchange between consumers, then such actions might justify judicial intervention.²⁰²

This line of inquiry is new and certainly not settled. There are various empirical questions to be answered, and some early work suggests that online product reviews are not always a good proxy for the quality or fairness of consumer contract terms.²⁰³ At the same time, however, online review sites are still in their infancy, as are mobile applications that both bring their content to bricks-and-mortar transactions and allow consumers to easily augment physical space with review information from their mobile devices. These services are likely to continue to improve in both quality and quantity. In general,

198. Daniel D. Barnhizer, *Propertization Metaphors for Bargaining Power and Control of the Self in the Information Age*, 54 CLEV. ST. L. REV. 69, 108 (2006).

199. For discussion of these different types of goods, see generally Phillip Nelson, *Information and Consumer Behavior*, 78 J. POL. ECON. 311 (1970) (drawing distinctions between search, experience, and credence goods).

200. Becher & Zarsky, *supra* note 192, at 345.

201. *See id.* at 358–59.

202. *See id.* at 359–60.

203. *See infra* Part II.C.1 (discussing problems with online reviews as a proxy for contract quality).

therefore, the implications seem clear: secondary sources of information have the potential to discipline consumer contracts, even if those contracts generally remain unread.

B. Two Effects on Asymmetric Information Arguments

This background lays the foundation for considering the consequences of an augmented reality for asymmetric information arguments in the context of standard form contracts.

To date, contract scholarship has assumed that there are two distinct transactional spheres: a set of contracting experiences that occur in the physical world and a separate set of online e-commerce experiences that occur in digital space. The offline consumer is generally assumed to be uninformed and incapable of creating market pressure to discipline standard form contracts; the online consumer may be better informed, and in some instances sufficiently informed to create such pressure, thereby lessening the need for courts to police e-commerce contracts.

As we saw in Part I, however, augmented reality technologies collapse the distinction between physical and digital space. This collapse will change asymmetric information arguments for policing consumer standard form contracts. In an augmented reality, consumers in physical space have access to the full panoply of information available in digital space, which may allow them to effectively sort firms, products, and contract terms before entering into a contract.²⁰⁴ This suggests that many more consumer contracts may become efficient, and that judicial resort to unconscionability and other doctrines to police such contracts may be less and less justified.

At the same time, however, a seller's cost of explaining contractual terms to consumers in bricks-and-mortar transactions is also dropping. This may

204. The argument in this Subpart has certain limited parallels with Fairfield's recent "search theory" of contract. See generally Joshua A.T. Fairfield, *The Search Interest in Contract*, 92 IOWA L. REV. 1237 (2007). Fairfield argues that contract theorists need to attend more to the reality that parties can search for contracts with which they agree, and that when they choose not to search for or review contracts in this way, this may be a rational response to search costs. See *id.* at 1253–54. I agree that search costs matter. Fairfield's focus, however, is primarily on the benefits of standardization. See Joshua Fairfield, *The Cost of Consent: Optimal Standardization in the Law of Contract*, 58 EMORY L.J. 1401 (2009). My focus, on the other hand, is on showing how technology is decreasing transaction costs—particularly sorting and signaling costs—and thereby changing asymmetric information arguments for distrusting consumer contracts.

actually have somewhat perverse effects if sellers use augmented reality explanations to insulate questionable contract terms from judicial scrutiny.

Consider each argument in turn:

1. Consumers Sorting Sellers: Increased Consumer Access to Information in Physical Space

In an augmented reality, a consumer purchasing a lawnmower in a hardware store—or a computer in an Apple store, or an automobile at a local car dealership—has access to the same information about the goods arrayed in the store as another consumer has to the same goods displayed online. This information-rich environment will likely create doctrinal pressure to enforce standard form contracts against consumers, because it becomes more difficult to argue that the consumer suffered from an information deficit during the transaction.

The relevant question may not be whether a given consumer read a standard form contract. Instead, the question may be whether consumers had ubiquitous access to consumer and intermediary reviews that could have indicated problems with the product or contract. If so, there may be sufficient competitive pressure on the seller to discipline its contracts.

The doctrinal question of import may thus be whether a given consumer had a smartphone (or other such device) at the time of contracting. Rather than focusing on educational background or even literacy, courts may have to begin to wrestle with the reality that technologically enabled consumers have an advantage over those without access to such information. According to the Pew Internet & American Life Project, roughly 62 percent of Americans have accessed digital data—other than voice—from a mobile device.²⁰⁵ Approximately 35 percent of Americans own a smartphone.²⁰⁶ Of those, 68 percent use their smartphones to browse the internet daily; approximately one quarter use it as their primary vehicle for online browsing.²⁰⁷

There is some overlap, of course, between socioeconomic factors and access to augmented reality technology. Smartphone ownership is predictably greater among the affluent. Those earning \$150,000 or more in annual

205. See JOHN HARRIGAN, PEW INTERNET & AM. LIFE PROJECT, MOBILE ACCESS TO DATA AND INFORMATION 1 (2008), available at http://www.pewinternet.org/~media/Files/Reports/2008/PIP_Mobile.Data.Access.pdf.

206. See SMITH, *supra* note 4, at 2.

207. *Id.* at 3.

household income are over three-and-a-half times more likely to own a smartphone than those in the lowest income bracket of \$10,000 or less.²⁰⁸ Put slightly differently, roughly three quarters of high income earners own a smartphone; less than one quarter of low income earners do.²⁰⁹ More than half of those with household incomes above \$75,000 own smartphones.²¹⁰ Smartphone ownership also correlates with education level: Those with college degrees are more likely to own a smartphone than those without.²¹¹ Smartphone ownership varies by race: African Americans and Latinos are more likely than whites to own smartphones—roughly 44 percent of African Americans and Latinos own smartphones versus 30 percent of whites.²¹² Finally, smartphone ownership correlates strongly with age. For example, even among those with lower household incomes, the young are more likely to own smartphones. Thirty-nine percent of 18–29 year olds earning less than \$30,000 per year own smartphones, which is roughly equivalent to the national average.²¹³ By comparison, smartphone ownership among low-income seniors is very low: roughly 4 percent.²¹⁴

These statistics suggest that the effects of augmented reality technologies on the consumer experience are not uniform across demographics, and that as new, more advanced augmented reality devices begin to integrate into daily life, certain segments of the population will adopt them more quickly. We can also assume that use patterns vary by demographic, although we have relatively little data on usage as opposed to adoption. In other words, certain groups of smartphone (or other device) owners may begin to use their augmented reality capabilities to investigate goods or contracts prior to making a purchase whereas other groups may not. At this point, the data on such use differences is insufficiently granular to make predictions about how exactly these technologies will impact consumer purchasing decisions.

At the very least, however, these statistics suggest that courts may begin to differentiate between connected and disconnected consumers—between those with access to digital information about their transactions and those without such access, respectively. It may well be that a consumer's level of

208. *Id.* at 7 (“Smartphone ownership is highly correlated with household income.”).

209. *Id.* at 8.

210. *Id.* at 2.

211. *Id.* at 6.

212. *Id.* at 9.

213. *Id.*

214. *Id.*

connectedness becomes as important for the interpretation and enforcement of standard form contracts as any other factor.

Courts are also likely to look closely at the actual information available to consumers in a given context. As Part I explored, we are at the beginning of an augmented reality and the collapse of digital and physical space. A huge amount of new information is now available to consumers, but it is not perfectly comprehensive. If information about a given product or contract is unavailable, a consumer's ability to sort decreases and firms' temptations to include oppressive terms in their contracts increases. The point is that contract scholarship to date has distinguished between e-commerce or online transactions and traditional, bricks-and-mortar, consumer contracts. As augmented reality technology makes information available everywhere, that distinction is less and less relevant. The distinction that makes a difference is that between those with access to augmented reality technologies and those without.

2. Sellers Explaining Terms to Consumers: The Somewhat Unclear Implications of Decreased Costs of Explaining Contracts

In addition to consumers being better able to sort firms and distinguish good from bad contracts prior to purchase, augmented reality technologies create new, low-cost means for sellers to inform consumers about what certain contract terms mean.²¹⁵ Put simply, the transaction costs of contractual explanation are dropping, making it feasible for sellers to invest in explaining terms to consumers in a widespread way. Such explanation is itself a signal—but of what? The optimistic answer is that sellers willing to explain their terms to consumers through augmented reality technologies are signaling that they offer consumer-friendly terms. Firms may begin to use such technologies to advertise to consumers that their contracts are reasonable. The less charitable interpretation is that contract law currently privileges such explanation by insulating from later legal attack contractual terms that a seller has explained to its consumers. As a result, the signal sent by explanation is somewhat noisy: Consumers may not be able to determine whether a seller that explains its contractual terms through augmented reality technologies is doing so to signal that it has consumer-friendly terms or to insulate its consumer-unfriendly terms. This Subpart considers both possibilities. Intriguingly, in either case the

215. For discussion of signaling, see *supra* note 39 and accompanying text.

dropping cost of explanation may lead courts to more often enforce consumer contracts as written.

Begin by considering why sellers' costs of explaining consumer contracts are dropping. There are three reasons. First, firms can cheaply distribute text, audio, graphical, or video explanations to consumers at the point of sale. In an analog world, making a video presentation available to every consumer at the point of sale would have been impossibly cumbersome. No merchant was going to put a television at every cash register.²¹⁶ In an augmented reality, however, consumers carry with them a smartphone that can receive and display such a presentation. The distribution cost has shifted from the merchant to the consumer for reasons completely exogenous to the contract debate: Consumers want smartphones. This makes it possible for firms to create one presentation explaining a contract's terms and use it at scale, globally if necessary. In an augmented reality there is almost no incremental cost of distributing such a presentation to a thousand consumers across the country versus one consumer next door.

Second, this distribution scale permits firms to centralize such legal explanations. This gives firms control at the corporate level of the explanations given at the local level. Whereas in an analog world a corporate legal department might have forbade local salespeople from saying too much about contract terms for fear that local explanations would be incorrect or somehow create liability,²¹⁷ corporate counsel can control the message all the way down in an augmented reality. Not only does augmented reality allow a firm to scale explanation, it allows a firm to control that explanation as it scales.

Finally, the cost to firms of explanation drops because, in an augmented reality, firms can give consumers the choice about whether to watch a given explanation of a product or contract term. By simply embedding a QR code in a contract's margin,²¹⁸ a firm can signal to a consumer that explanatory material is available without forcing it on the consumer—as would be the case, for example, if a firm required each consumer to watch a video at checkout. This also avoids any negative stigma that might arise if a firm were to require video explanations prior to allowing consumers to enter a contract. Were a firm to impose mandatory video explanations, consumers would likely find the requirement suspicious and assume the worst about the firm's contracts or

216. See, e.g., *Hill v. Gateway 2000, Inc.*, 105 F.3d 1147, 1149 (7th Cir. 1997) (“Cashiers cannot be expected to read legal documents to customers before ringing up sales.”).

217. See Buckley, *supra* note 172, at 11 (noting the agency cost problems within a seller of allowing local salespeople to make representations about or change consumer contracts).

218. See *supra* note 27 and accompanying text (providing an example and description of QR codes).

products. But in an augmented reality, firms can embed explanations into the contracting experience without creating such stigma.

In addition to dropping the cost of explanation, augmented reality gives sellers the ability to prove that consumers in fact watched their explanations.²¹⁹ This can be an important element in an unconscionability analysis. As the court in *Weaver v. American Oil Co.*²²⁰ stated, “The party seeking to enforce such a contract has the burden of showing that the provisions were explained to the other party and came to his knowledge and there was in fact a real and voluntary meeting of the minds and not merely an objective meeting.”²²¹ In other words, a seller must be able to prove that a robust explanation of the contract’s terms was provided. Augmented reality facilitates such proof because digital technologies inherently permit tracking access. Thus, for example, it would be quite simple to track and record whether a consumer watched a video embedded in a paper contract. The seller’s computer servers could log when and to whom each video was played, and how long the consumer spent accessing that video. These reasons establish that the cost to sellers of explaining contractual terms to consumers is decreasing. Now consider the two possible consequences of this change: On the one hand, this might promote more consumer-friendly terms; on the other hand, it might do the opposite. First, there is the consumer-friendly possibility. Transaction cost economics teaches that as the transaction costs of disclosure drop, an unraveling effect can begin.²²² Firms with the best private information—for example, the best contract terms or product information—will disclose that information because they gain an advantage by informing consumers; firms with slightly less advantageous private information will then disclose in order to distinguish themselves from even worse firms; and so on, until all firms have disclosed.²²³

219. See *Hill*, 105 F.3d at 1149 (“And oral recitation would not avoid customers’ assertions . . . that the clerk did not read term X to them . . .”).

220. 276 N.E.2d 144 (Ind. 1971).

221. *Id.* at 148 (emphasis omitted); see also HILLMAN, *supra* note 169, at 140–41 (discussing *Weaver*).

222. See Robert H. Gertner, *Disclosure and Unraveling*, in THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW, *supra* note 187, at 605, 605.

223. *Id.* (arguing that in a market where some sellers disclose information, silence will be seen as an indication of inferior products or services).

Early works by Paul Milgrom²²⁴ and Sanford Grossman²²⁵ independently explored the unraveling process that occurs as those who can certify their quality distinguish themselves from the larger pool of lower-grade labor, products, or services.²²⁶ The theory of the unraveling effect holds that under conditions of information asymmetry but with verifiable information and penalties for fraud,²²⁷ each member of a pool will ultimately reveal its type, even if at first it seems unwise for a given member to do so. First, the firm with the best trait has reason to disclose its type because its trait is better than the average, and being lumped together with the rest of the pool is not in its self-interest. Once the best firm has disclosed its type, the average type remaining in the pool shifts. Now the second-best firm has a similar interest in disclosure. The average quality drops again. As the economist Robert Frank put it, “The unraveling process is set in motion, and in the end all [individuals] must either [disclose] or live with the knowledge” that others will assume they are of the “worst” type.²²⁸

In the consumer context, economists have long argued that disclosure laws are sometimes unnecessary if the conditions for unraveling prevail.²²⁹ The most profound trigger of unraveling is reduced transaction costs of disclosure and signaling: As it becomes easier to signal, the best firms will begin to do so.²³⁰

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224. See Paul R. Milgrom, *Good News and Bad News: Representation Theorems and Applications*, 12 BELL J. ECON. 380, 388 (1981) (discussing the salesman's incentive to fully disclose product quality because of a similar unraveling effect).
225. See Sanford J. Grossman, *The Informational Role of Warranties and Private Disclosure About Product Quality*, 24 J.L. & ECON. 461 (1981); S.J. Grossman & O.D. Hart, *Disclosure Law and Takeover Bids*, 35 J. FIN. 323, 323 (1980) (“[I]f there is no transactions cost then it will always be in the seller's interest to disclose the quality of [an] item voluntarily.”).
226. Although Grossman and Milgrom are generally credited with identifying the effect, Kip Viscusi first used the term “unraveling” in this context. See W. Kip Viscusi, *A Note on “Lemons” Markets With Quality Certification*, 9 BELL J. ECON. 277, 278 (1978) (“[E]nterprises or individuals at the above-average end of the quality spectrum successively distinguish themselves from the group in a process that unravels from the top down.”); see also W. KIP VISCUSI, RISK BY CHOICE: REGULATING HEALTH AND SAFETY IN THE WORKPLACE 86 (1983) (discussing unraveling).
227. There do not necessarily need to be formal or legal sanctions for misrepresentation. See Trevon Logan & Manisha Shah, *Face Value: Information and Signaling in an Illegal Market* (Nat'l Bureau of Econ. Research, Working Paper No. 14841, 2009), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1376153 (demonstrating that male sex workers disclose face pictures readily and accurately and that unraveling is sufficiently supported by informal enforcement mechanisms to overcome adverse selection).
228. ROBERT H. FRANK, PASSIONS WITHIN REASON: THE STRATEGIC ROLE OF THE EMOTIONS 106 (1988).
229. *Id.* (arguing that the unraveling effect makes disclosure laws unnecessary).
230. See Scott R. Peppet, *Unraveling Privacy: The Personal Prospectus and the Threat of a Full-Disclosure Future*, 105 NW. U. L. REV. 1153, 1191–92 (2011) (discussing reduced transaction costs and their impact on the unraveling effect).

Augmented reality technology, as discussed in Part I, drastically reduces the cost of signaling. The best firms thus may begin to include video or other augmented explanations alongside their standard form contracts. As they do so, other firms may be forced to follow.

Were such unraveling to take hold in the market of consumer contracts, it would create additional market pressure on sellers with consumer-unfriendly contracts to reform their contract terms. As sellers with the best terms explained their terms clearly to consumers, sellers with the worst terms would find themselves stigmatized for failing to explain their contracts, and would therefore need to improve their consumer contracts or suffer the market consequences. Given such market pressure, courts in such an unraveling market for consumer contracts could assume that terms were reasonably efficient, and could thus defer to those terms rather than policing them closely.

This is an optimistic story, but it may not be accurate. The unraveling effect depends on the uninformed party—in this case, consumers—attributing negative connotations to a given counterpart's choice to stay silent rather than disclose. In other words, unraveling is driven by stigma. If consumers cannot attach negative traits to those sellers that choose not to explain their contract terms, then no unraveling will occur: Sellers with consumer-unfriendly terms will be able to stay silent and not suffer undue market consequences.

One cannot know for certain what will happen as firms begin to realize that the cost of explaining contracts to consumers has changed—it is possible that some unraveling might occur, which would be beneficial to consumers and might lead courts to defer to consumer contracts as written. It seems somewhat unlikely, however, that a full unraveling will occur. This is primarily because contract law itself muddies the water for consumers by providing an alternative reason why a given firm might choose to explain its contract terms: Such explanation may insulate contract terms from later judicial scrutiny.

To understand this problem, return to *Williams v. Walker-Thomas Furniture Co.*²³¹ The *Walker-Thomas* court stressed that the cross-collateralization clause was not conspicuous—it was “hidden in a maze of fine print.”²³² This suggests that if *Walker-Thomas* had explained the term to Ms. Williams, any procedural unconscionability might have been cured.²³³ As Russell Korobkin has explained,

231. 350 F.2d 445 (D.C. Cir. 1965).

232. *Id.* at 449.

233. See Meyerson, *supra* note 182, at 612–13 (discussing *Walker-Thomas* and the possibility of a seller explaining complex terms, and arguing that “[a] seller wishing to ensure the enforceability of a

“To generalize the point, where lack of information could cause a market failure, sellers should be able to avoid an unconscionability determination by taking steps to insure that buyers have the information necessary for market forces to work.”²³⁴

Whether contract terms have been explained has long been a factor in unconscionability analysis.²³⁵ As the Uniform Commercial Code puts it, “The principle is one of prevention of oppression and unfair surprise . . .”²³⁶ Generally, if the party proposing terms explains those terms to the receiving party, a court will not find the explained provision procedurally unconscionable. As E. Allan Farnsworth explains:

[i]t is within the drafter’s power to take at least some steps to fend off a later attack based on unconscionability because unconscionability turns on factors peculiar to each transaction, such as relative bargaining power, the degree of sophistication, awareness and understanding, and the presence or absence of choice. Print can be made larger, language can be made clearer and more prominent, attention can be called to key provisions . . .²³⁷

This holds across contexts. Consider *American General Financial Services, Inc. v. Griffin*,²³⁸ in which the court held that an arbitration agreement between a lender and borrower was not unconscionable when the lender provided the borrower with a document explaining in simple terms what arbitration was and how it worked.²³⁹ Also consider *Caley v. Gulfstream Aerospace Corp.*,²⁴⁰ in which the court found an arbitration agreement to be enforceable, despite an apparent “bargaining disparity” between the corporate employer and its employees, because

subordinate clause should be able to do so by adequately disclosing the meaning and effect of that clause”).

234. Russell Korobkin, *A “Traditional” and “Behavioral” Law-and-Economics Analysis of Williams v. Walker-Thomas Furniture Company*, 26 U. HAW. L. REV. 441, 455 (2004).
235. See 8 SAMUEL WILLISTON & RICHARD A. LORD, A TREATISE ON THE LAW OF CONTRACTS § 18:9 (4th ed. 2010) (describing elements of unconscionability, including whether the terms were explained).
236. See U.C.C. § 2-302 cmt. 1 (2005); see also Leff, *supra* note 22, at 489 (noting that the original drafts of the UCC’s section 2-302 were clear that the bargain principle dominated; if there was sufficient “considered bargain[ing]” about a term, then courts should not interfere with that term even if it were unconscionable).
237. E. ALLAN FARNSWORTH, CONTRACTS § 4.29a (3d ed. 2004).
238. 327 F. Supp. 2d 678 (N.D. Miss. 2004).
239. *Id.* at 685–86. Other arbitration-related cases have found the same. See, e.g., *Sammy Enters. v. O.P.E.N. Am., Inc.*, No. 60069-9-I, 2008 WL 2010357, at *4 (Wash. Ct. App. May 12, 2008) (finding that arbitration in a standard form contract was not unconscionable where the cover page clearly stated that disputes would be sent to arbitration).
240. 428 F.3d 1359 (11th Cir. 2005).

the employer provided its employees with a cover letter to the agreement explaining the terms and the dispute resolution policy's importance.²⁴¹ Or *Ryan v. Dan's Food Stores, Inc.*,²⁴² in which an employee that signed an employment handbook containing an acknowledgement that his employment was at will later attempted to argue that the handbook was unconscionable.²⁴³ The court found that the handbook was not procedurally unconscionable, in part because the employer explained the handbook's terms to the employee.²⁴⁴

Cases also exist in which courts have found that a videotaped explanation of a contract can show intent to be bound or significantly reduce or altogether eliminate procedural unconscionability. In *Manning v. Brannon*,²⁴⁵ for example, the court held that a plaintiff who was injured during a skydive training jump could not recover against the skydiving company because the exculpatory contract signed by the parties was valid.²⁴⁶ The court held that the defendant's argument—that the plaintiff intended to enter the agreement—was supported by the fact that the plaintiff had watched a video explaining its terms prior to signing.²⁴⁷ Similarly, in *Hartung v. J.D. Byrider, Inc.*,²⁴⁸ the court found that an arbitration clause was not procedurally unconscionable because, among other things, the defendants played a “video with a skit to explain the documents” to the plaintiffs.²⁴⁹ Some consumer protection statutes have also incorporated requirements for video explanations intended to protect consumers.²⁵⁰

Courts are likely to continue this trend if video or multimedia augmented reality presentations become widely available to consumers. It would be difficult to find procedural unconscionability where rich descriptions of questionable terms were available to the consumer prior to contracting. This suggests that in the consumer context, courts may find new reasons to enforce

241. *Id.* at 1377–78.

242. 972 P.2d 395 (Utah 1998).

243. *Id.* at 399, 402.

244. *Id.* at 402–03.

245. 956 P.2d 156 (Okla. Civ. App. 1997).

246. *Id.* at 158.

247. *Id.*; see also *Burd v. KL Shangri-Law Owners, L.P.*, 67 P.3d 927, 930 (Okla. Civ. App. 2003) (noting that the plaintiff did not have access to a video as the plaintiff had in *Manning*; this supported the court's finding that the contract term at issue in *Burd* was insufficiently explained).

248. No. 1:08-cv-00960-AWI-GSA, 2008 WL 4615044 (E.D. Cal. Oct. 17, 2008).

249. See *id.* at *5; see also *Motsinger v. Lithia Rose-FT, Inc.*, 156 P.3d 156 (Or. Ct. App. 2007) (holding that an arbitration clause in an employment agreement was not procedurally unconscionable, in part because all employees were shown an explanatory video at the time of employment).

250. See, e.g., Kent H. Barnett, *Lending a Helping Hand?: A Guide to Kentucky's New Predatory Lending Law*, 93 KY. L.J. 473, 497 (2005) (discussing Kentucky's predatory lending law requiring lenders of high-cost home loans to make available a videotape explaining the borrower's rights).

contracts as written. This also suggests, however, that consumers may have difficulty determining why a given seller has chosen to use augmented reality technologies to explain its contract terms. That seller may be trying to signal that it has consumer-friendly terms, but it might just as likely be trying to insulate consumer-unfriendly terms from judicial scrutiny.

Intriguingly, in either scenario—an unraveling of consumer contracts that puts pressure on all sellers to improve their terms, or the use of explanation by firms to insulate their terms from judicial scrutiny—the legal effect is similar: Courts are more likely to defer to contracts as written. This somewhat paradoxical effect would depend on a court's willingness to enforce a contract so long as its terms have been explained. That, of course, could change, particularly if courts begin to see sellers that appear to be strategically using augmented reality explanations to insulate inefficient or oppressive terms. In that event, courts might focus on substantive unconscionability even in the absence of procedural unconscionability. Absent such change, however, the decreasing cost of augmented reality explanations seems likely to lead towards more formalist approaches to consumer contracts—whether or not this leads to pro-consumer standard form contract terms.

C. Three Counterarguments and Their Implications

To this point, I have considered the strongest arguments that information asymmetries will be dampened in an augmented reality. These arguments will likely raise several legitimate objections. This Subpart briefly considers three counterarguments: (1) that consumer review and intermediary information is of insufficient quality to aid consumers in exerting market pressure on firms over harsh contract terms; (2) that consumers will never be sufficiently motivated to learn about consumer contracts, even in an augmented reality; and (3) that such information will cause information overload, thereby raising—rather than lowering—transaction costs for consumers.

1. Questionable Information Quality

The first likely objection to these arguments is that both consumer-generated and intermediary-generated reviews may be insufficient to discipline firms with consumer-unfriendly contract terms. In other words, such reviews may not be an accurate proxy of contract quality, and therefore consumer reliance

on such reviews in an augmented reality may change certain aspects of product markets but not affect consumer standard form contracts.

There is an emerging technical literature about online consumer review mechanisms and how to ensure or improve review accuracy and quality.²⁵¹ Various general problems exist: inaccurately negative reviews submitted by competitors; inaccurately positive reviews planted by firms about their own products or services; the potential for reviews to skew towards the negative because only disgruntled consumers will be motivated to post reviews; the difficulty for a given user of determining to which reviews he should attend, given that a particular reviewer may have very different tastes or quality standards than the user; and how to best aggregate and simplify large numbers of reviews to accurately inform consumers without requiring them to read hundreds or thousands of detailed comments. Certain additional problems are relevant to the debate over consumer contract terms. In particular, some early empirical work suggests that product reviews—focused on whether consumers favored or disfavored a given product or service—may not necessarily be contract reviews. In other words, product reviews may not be accurate proxies of whether the contract contains pro-consumer terms.²⁵² The reason is simple: A consumer's online review of a product is likely to be multi-dimensional and judge that product based on many variables, such as product aesthetics, durability, the shopping or repair experience, whether the product lived up to expectations, the usefulness of the product, and, perhaps, the consumer's experience with the product's contract terms. The mixed nature of such reviews makes it difficult for them to serve as pure proxies for contract quality.

These are serious concerns, and I do not have a dispositive response to all of them. They raise empirical questions about the utility of online consumer and intermediary reviews, and about how sophisticated the market for such

251. See, e.g., Bing Liu, *Sentiment Analysis and Subjectivity*, in HANDBOOK OF NATURAL LANGUAGE PROCESSING (Nitin Indurkha & Fred J. Damerau eds., 2d ed. 2010); B. Pang & L. Lee, *Opinion Mining and Sentiment Analysis*, 2 FOUND. & TRENDS IN INFO. RETRIEVAL 1 (2008).

252. See, e.g., Nishanth V. Chari, *Disciplining Standard Form Contract Terms Through Online Information Flows: An Empirical Study*, 85 N.Y.U. L. REV. 1618, 1622 (2010) (suggesting that positive online consumer rankings of products often correlate with more *pro-seller* standard form contract terms and, therefore, that online rankings do not serve as useful consumer information as to the nature of such terms). Chari's study is among the first to empirically test some of the issues here. The study, however, attempted to correlate general product reviews (for example, how good is this product?) with the one-sidedness of contract terms. Although this is one useful means of consumer-to-consumer information exchange, Part I of this Article shows that consumers are now sharing information about contract terms much more directly, through particularized consumer reviews that discuss contract terms specifically.

review information is likely to become. To this point I have largely presented the optimistic assumption that such information will continue to improve in quantity and quality as these young technologies mature. Consumer review services, for example, may begin to offer easy means for consumers to rate different aspects of a product separately—giving a score to each of the dimensions mentioned above, for example, or at least indicating which dimension was most relevant to the consumer’s product experience. Such separation would allow a review site to display a scorecard about a given product or service that indicates consumers’ perceptions of each variable individually. Consumers’ experiences with contract terms seem likely to be one unique aspect of such a separation strategy. In addition, as noted in Part I, many existing reviews already focus on contract terms. Review services could easily begin to search for and categorize reviews based on key words like “contract,” thereby dampening the problem of multidimensionality without requiring additional work by consumers.

In addition, reviews are likely to become more sophisticated as online review services integrate with social networks. The travel-related review website TripAdvisor, for example, already integrates with the social network Facebook, allowing users on TripAdvisor to see whether their friends have posted reviews about a given hotel or location.²⁵³ This at least partially overcomes the objection that online reviews are unhelpful because individuals don’t know whether other consumers share their tastes and preferences.

Further, quantity and scale can, to some extent, ameliorate concerns over the quality or accuracy of any given review. Obviously ten thousand inaccurate reviews are no better than ten, but ten thousand reviews are unlikely to all be planted or skewed. Instead, large volume can give a consumer a general sense of the problems with a given product or service, thereby dampening the effects of any single review that is overly positive or negative.

Ultimately, these are empirical questions I cannot answer here. The solutions suggested above seem likely to develop as consumer review services evolve. We are only now beginning to experiment with the possibilities of consumer-to-consumer sharing of product information; it is too early to judge these offerings as imperfect when many were only launched in the last twelve months.

In addition, it is worth noting that my argument does not depend on the market for consumer standard form contracts becoming perfectly informed. I have simply made the related claims that this market is becoming better

253. See *What Does It Mean to Sign In With Facebook?*, TRIPADVISOR, http://www.tripadvisor.com/help/what_does_it_mean_to_be_facebook_connected (last visited Aug. 21, 2011).

informed as the cost of signaling and sorting drop—moving towards a perfect market, even if not attaining perfection. Even at this very early stage, however, augmented reality technologies bring new information to consumers that has previously been unavailable, suggesting that our approach to standard form contracts entered into in bricks-and-mortar transactions may change.

2. Consumer Motivation

Second, one could certainly object that consumers in an augmented reality are no more likely to be motivated to read, watch, or listen to contract-related information than they are when confronted with paper contracts. Put differently, no matter how augmented such information becomes, consumers will be indifferent to it. This may have a somewhat perverse effect: If consumers remain uninformed despite these additional sources of information, a formalist turn by the judiciary in contract cases will be unwarranted because firms will be able to insert exploitative terms into their contracts and will then be able to insulate those terms via augmented reality technologies that go unused by the consumer.

Robert Hillman has recently made a similar argument in the context of mandatory website disclosure of e-commerce contract terms.²⁵⁴ His concern is that requiring disclosure of contractual terms on a merchant's website—so that consumers could read such terms prior to purchase—might not increase consumer information (because consumers would still not read them) and might instead merely make those terms, however unconscionable, more enforceable under the theory that consumers had an opportunity to become informed and chose to ignore that opportunity.²⁵⁵ Procedural unconscionability might be difficult to establish if consumers had an opportunity to read the terms prior to contracting.²⁵⁶ He calls this a “legal backfire.”²⁵⁷

There are at least two possible responses in this context, one descriptive and one somewhat normative. The descriptive argument is that augmented reality technologies are likely to make it easier and easier for consumers both to access and to generate such information, as these information channels become

254. See Robert A. Hillman, *Online Boilerplate: Would Mandatory Website Disclosure of E-Standard Terms Backfire?*, 104 MICH. L. REV. 837, 840 (2006).

255. See *id.* (“[T]he only effects of [such proposals] may be to insulate businesses from claims of procedural unconscionability and to create a safe harbor for businesses to draft suspect terms.”).

256. See *id.* at 854 (“Perhaps marginal terms, insufficiently outlandish to motivate a court to strike them on substantive unconscionability grounds alone, will be enforceable because of their early disclosure on the website.”).

257. See *id.*

embedded into our surroundings and available through multiple means with almost no effort. Imagine, for example, that consumers could simply set their mobile devices to inform them of negative consumer review information—including, perhaps, setting a preference to be informed about negative reviews of contractual terms. The consumer's mobile device could then interact with physical products as the consumer shopped, retrieving and analyzing information about those products on the consumer's behalf. If a given product triggered the consumer's pre-set preferences, the device could shake, change color, or project a warning label onto the physical good to warn the consumer that the product raised concerns. The consumer would not have to do much of anything; the technology would make such information part of the consumer's shopping experience almost automatically.

In such a world, the argument that consumers will be insufficiently motivated to learn of contract terms seems mostly a remnant of our realization that consumers will not read paper contracts. That motivational hurdle, however, is outsized compared to the minimal motivation that may ultimately be required to become informed in an augmented reality.

If consumers do not even avail themselves of these almost costless means to become informed, the normative response may be to ask: At what point do we hold consumers responsible for understanding contracts when we live in an augmented reality in which digital information about products and terms is available prior to purchase and new sources of information (such as video explanations) can be ubiquitously available to consumers? I do not tackle this question here—it can wait until these evolutions occur. My hunch, however, is that courts and commentators are likely to find that these new sources of information justify holding consumers to their contracts. There is a limit to the realist or contextualist tendency that has led contract law away from formalism in the last century, and augmented reality is likely to reveal that limit.

3. Information Overload

A third possible objection runs in the opposite direction from the consumer motivation concern: Perhaps in an augmented reality, consumers will become so saturated with information that the information will become unhelpful.²⁵⁸ In other words, although an augmented reality might lower certain transaction

258. For a wonderful futuristic video depiction of what such a world might be like, see SCIVEE, <http://www.scivee.tv/node/17965> (last visited Dec. 27, 2011).

costs—related to search and data aggregation, for example—it may raise others. The effect may be that consumers become no better informed than at present about consumer contracts.

Again, I cannot dispose of this concern with a simple argument. It is far too early in the evolution of augmented reality technologies to know whether they will lead to an environment in which consumers are so overwhelmed with information that all information becomes useless. It seems likely to me that instead, products and services will evolve to simplify and organize information for consumers so that it remains useful, and will give consumers the option to choose when to be pushed information during a bricks-and-mortar transaction and when to keep that information from view. I am particularly interested in the ways in which scoring mechanisms—such as the five stars commonly used in consumer reviews—are already reducing massive amounts of data to user-friendly formats. A consumer standing in front of five lawnmowers in a hardware store will likely want distilled information about those five products or brands, not unrelated information about the power drill on a nearby shelf or overly complex information about each lawnmower's engineering specifications. But it is relatively easy to imagine efficient ways for augmented reality technologies to communicate condensed, useful information to that consumer—perhaps the consumer might point a mobile device at each lawnmower, and the device's screen will flash red if one of the products has serious product defects or contractual problems. What information the device displays might depend on preferences that the customer input into the device. Perhaps the device is set to warn only of serious problems with a given product, and the consumer can therefore shop safely in the assumption that there are no issues about which to be concerned unless the device notifies the consumer otherwise. Whatever the solution, it seems likely that technologies will evolve to help consumers better assimilate the increased amounts of information available in an augmented reality.

This may be an unsatisfying answer for some. Some might view it as overly optimistic about technological solutions to social problems. Those are fair criticisms. At the same time, it is, again, early in the evolution of these technologies. For now, it suffices to say that the information overload objection is at this point theoretical and that there are plausible, practical ways to solve it in the future if need be.

III. THE EFFECTS ON BOUNDED RATIONALITY ARGUMENTS FOR DISTRUSTING CONSUMER CONTRACTS

Let me summarize the argument to this point. Mobile computing augments physical space with digital information about places, goods, people, firms, and contract terms. This information has become rich and ubiquitously available to consumers during bricks-and-mortar transactions. Although distrust of standard form consumer contracts is strong, such distrust rests, in part, on the argument that consumers do not read standard form contracts and have insufficient information with which to evaluate those contracts prior to purchase. In an augmented reality, however, consumers have access to the internet everywhere, and can easily search for relevant information to make purchasing decisions. In addition, sophisticated mobile applications can now push such information to consumers based on their location or other variables, making it even easier for consumers to evaluate sellers and their contracts. This should discipline firms to reform one-sided contracts. All of this suggests that in an augmented reality, courts may again begin to enforce consumer contracts as written.

In addition to asymmetric information arguments, however, contract scholars have pursued a second line of argument in questioning standard form consumer contracts. The economic theory of contract assumes that parties have the capacity to make rational, informed decisions. However, if this assumption fails, there is no reason to protect the outcome of the parties' choices: We can only assume that the outcome will be welfare maximizing if the parties have contractual capacity. Problems with capacity are thus the second traditional justification for limiting freedom of contract.²⁵⁹

Contract doctrine has long protected certain classes of parties due to concerns about capacity to contract. Infirmary, minority, and intoxication are the traditional examples; lack of sophistication, lack of education, and lack of knowledge are more modern examples.²⁶⁰ More recently, behavioral law and economics scholars have begun to argue that cognitive heuristics, biases,

259. See FARNSWORTH, *supra* note 237, § 4.1 (discussing capacity as a limitation); Hermalin, Katz & Craswell, *supra* note 34, § 2.3.4 (discussing capacity and bounded rationality as justifications for limiting freedom of contract).

260. See Alan Schwartz, *A Reexamination of Nonsubstantive Unconscionability*, 63 VA. L. REV. 1053, 1076–82 (1977) (discussing the “inferences of incompetence” that courts sometimes make about the poor or undereducated).

and errors sometimes lead contracting parties to make faulty choices.²⁶¹ Although not fully incapacitating, these justifications for intervening in contractual arrangements rest on a similar argument—that consumers are incapable of fully rational decisionmaking and thus courts should police consumer contracts.

This Part argues that the convergence of physical and digital space in an augmented reality may limit these bounded rationality justifications for intervening in consumer contracts. This occurs for two primary reasons: (1) because increased information may inherently mitigate bounded rationality, and (2) because augmented reality technologies may permit low-cost debiasing interventions to directly dampen the effects of bounded rationality in consumer contracting.

A. Bounded Rationality and Freedom of Contract

In the last decade, contracts scholars have turned to behavioral law and economics²⁶² findings to question the efficiency of standard form contract terms.²⁶³ These arguments have been described as part of a “new realism” in legal theory,²⁶⁴ because, at a general level, they are arguments for paternalistic intervention into parties’ contracts.²⁶⁵ Essentially, this literature justifies judicial

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261. See, e.g., Shmuel I. Becher, *Behavioral Science and Consumer Standard Form Contracts*, 68 LA. L. REV. 117, 178 (2007) (“[B]ehavioral insights demonstrate that people sometimes make bad choices even where good information is available.”); Michael G. Faure & Hanneke A. Luth, *Behavioral Economics in Unfair Contract Terms: Cautions and Considerations*, 34 J. CONSUMER POL’Y 337, 342–45 (2011) (reviewing behavioral law and economics of standard form consumer contracts).
262. For a general introduction to behavioral law and economics, see BEHAVIORAL LAW AND ECONOMICS (Cass R. Sunstein ed., 2000); Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471 (1998); Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption From Law and Economics*, 88 CALIF. L. REV. 1051 (2000).
263. See generally Oren Bar-Gill, *Seduction by Plastic*, 98 NW. U. L. REV. 1373 (2004); Colin Camerer et al., *Regulation for Conservatives: Behavioral Economics and the Case for “Asymmetric Paternalism”*, 151 U. PA. L. REV. 1211 (2003); Gillian K. Hadfield, *An Expressive Theory of Contract: From Feminist Dilemmas to a Reconceptualization of Rational Choice in Contract Law*, 146 U. PA. L. REV. 1235 (1998); Ronald J. Mann, *“Contracting” for Credit*, 104 MICH. L. REV. 899 (2006).
264. See Victoria Nourse & Gregory Shaffer, *Varieties of New Legal Realism: Can a New World Order Prompt a New Legal Theory?*, 95 CORNELL L. REV. 61, 77 (2009) (“Behavioral economics represents a frontal assault within economics itself on the simplifying assumptions of neoclassical law and economics.”).
265. See generally J.D. Trout, *Paternalism and Cognitive Bias*, 24 LAW & PHIL. 393 (2005) (connecting paternalism arguments to the behavioral law and economics of contract).

intervention on the grounds that errors in consumers' decisionmaking make it possible for sellers to include exploitative contract terms in their standard form contracts.²⁶⁶ This is the bounded rationality rationale for limiting freedom of contract.

Melvin Eisenberg launched this approach to standard form contracts in his seminal 1995 article, *The Limits of Cognition and the Limits of Contract*.²⁶⁷ Eisenberg argues that the standard economic account of contracting assumes that consumers have the ability to weigh the costs and benefits of contract terms and to make a rational choice that will maximize their utility. He then reviews the literature on three major cognitive biases or heuristics that may limit the ability of consumers to act in this rational manner. First, consumers are subject to bounded rationality: They cannot process all available information as a computer would, but must instead selectively attend to and incorporate information into their decisions.²⁶⁸ Second, consumers are subject to optimism biases. In general, psychological studies have shown that adults are systematically over-optimistic and tend to downplay (or misplay) the likelihood of negative future events.²⁶⁹ Third, consumers are subject to what is known as the availability heuristic.²⁷⁰ This leads them to place disproportionate weight on easily available information when making decisions and to underemphasize less available—but perhaps more relevant—information.²⁷¹ Thus, consumers may ignore low-probability risks and give too little weight to future costs and benefits as compared to present costs and benefits.²⁷²

Using this bounded rationality research as a foundation, Eisenberg argued that judicial intervention may be justified in cases like *Williams v. Walker-Thomas*

266. See Horton, *supra* note 176, at 1691–92 (reviewing behavioral justifications for intervention in standard form contracts).

267. Eisenberg, *supra* note 28.

268. See *id.* at 214 (“[H]uman rationality is normally bounded by limited information and limited information processing.”).

269. See, e.g., Neil D. Weinstein, *Unrealistic Optimism About Future Life Events*, 39 J. PERSONALITY & SOC. PSYCHOL. 806, 810 (1980).

270. See Eisenberg, *supra* note 28, at 220 (“When an actor must make a decision that requires a judgment about the probability of an event, he commonly judges that probability on the basis of comparable data and scenarios that are readily available to his memory or imagination.”).

271. See Amos Tversky & Daniel Kahneman, *Availability: A Heuristic for Judging Frequency and Probability*, in JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 163, 166 (Kahneman et al. eds., 1982).

272. See Jeremy A. Blumenthal, *Emotional Paternalism*, 35 FLA. ST. U. L. REV. 1, 25 (2007) (“[B]ecause breach of contract tends overall to be atypical, contracting parties might be vulnerable to the heuristic and misplay the likelihood of breach . . .”).

*Furniture Co.*²⁷³ He recognized that it might be rational for a consumer like Ms. Williams to ignore a standard form contract. The costs of reading the contract are high, as are the costs of trying to understand its terms; the potential benefits are low; the risks of actually needing to fall back on the contract are—or seem—very low.²⁷⁴ “Rational ignorance” may therefore prevail, because consumers have limited information processing ability and must make choices about where to invest their attention and cognition.²⁷⁵

Other contract scholars have followed Eisenberg’s line of inquiry. Russell Korobkin, for example, similarly argues that “the reason form terms deserve scrutiny is that buyers are not fully rational, but rather make decisions in a boundedly rational manner”²⁷⁶ Korobkin focuses on the psychological finding that people often focus on salient information at the expense of less salient, but relevant, information. In the standard form contract context, he argues that consumers may focus heavily on more salient terms—such as price—while ignoring other less salient terms—such as boilerplate arbitration clauses or financing terms.²⁷⁷ Sellers can therefore include inefficient and self-serving boilerplate terms, because consumers will ignore them.²⁷⁸ Korobkin argues that procedural unconscionability analysis should analyze a term’s salience, thereby seeking to counteract this effect.

Like Eisenberg, Korobkin also applies his theory to *Williams v. Walker-Thomas*.²⁷⁹ He argues that buyers like Ms. Williams are neither able to factor all of the various terms in a standard form contract into their decisionmaking nor able to compare all of those variables against competing terms from other sellers. Thus, there is little competitive pressure on sellers to include only efficient and reasonable terms, and there is no reason to assume that such consumer contracts are welfare maximizing.²⁸⁰ In addition, like Eisenberg, Korobkin considers the effect of optimism biases and overconfidence. He argues

273. 350 F.2d 445 (D.C. Cir. 1965).

274. See Eisenberg, *supra* note 28, at 243–44.

275. See *id.* at 214–16.

276. See Korobkin, *supra* note 28, at 1207 (“[T]he reason form terms deserve scrutiny is that buyers are not fully rational, but rather make decisions in a boundedly rational manner, and . . . this provides sellers with an incentive to draft non-salient contract terms to their own advantage, whether or not such terms are efficient.”).

277. See *id.* at 1206. But see Klick, *supra* note 163, at 560–64 (critiquing Korobkin, and offering an alternative hypothesis that standard form contracts serve as a price discrimination mechanism).

278. See Korobkin, *supra* note 28, at 1230.

279. See *id.*

280. See Korobkin, *supra* note 234, at 460.

that, at the time of contracting, Ms. Williams likely underestimated the risk of future default and overestimated her ability to control that risk going forward.²⁸¹ Again, such biased reasoning would lead Ms. Williams to discount the importance of the cross-collateralization clause, thus opening the door for the seller to include the seemingly oppressive term.

Oren Bar-Gill has likewise argued that optimism biases may undermine contractual capacity:

The force of the freedom of contract argument . . . is significantly reduced when one (or both) of the parties to the contract holds inaccurate perceptions of the future. The freedom of contract paradigm is based on the presumption that contracting parties correctly anticipate their future actions and thus the future consequences of the contract they have signed. Without an accurate perception of the future, freedom of contract cannot defend future-oriented contracts.²⁸²

He focuses on consumer credit card transactions²⁸³ and argues that consumers' overoptimism leads them to underestimate the likelihood of negative future events related to their credit. As a result, consumers ignore oppressive boilerplate terms in credit card contracts that address adverse future contingencies in the event that a consumer fails to pay.²⁸⁴ Credit card companies take advantage of this imperfect decisionmaking by including oppressive long-term rates and fees—which consumers ignore—and attract consumers with consumer-friendly short-term pricing, such as teaser rates.²⁸⁵

Like Eisenberg and Korobkin, Bar-Gill considers the implications of his theory for *Williams v. Walker-Thomas*. His account differs somewhat:

Even if Williams read the relevant term and understood its formal implications, she might still have underestimated the practical importance of this clause. Williams, when making the early purchases, may have underestimated the likelihood of purchasing additional items

281. See *id.* at 461.

282. Bar-Gill, *supra* note 263, at 1415.

283. Cognitive biases have also been used to justify intervention in employment contracts, such as at-will and arbitration provisions. See, e.g., Samuel Issacharoff, *Contracting for Employment: The Limited Return of the Common Law*, 74 TEX. L. REV. 1783, 1800 (1996) (arguing that employees underestimate the importance of severance agreements); Rena Mara Samole, *Real Employees: Cognitive Psychology and the Adjudication of Non-Competition Agreements*, 4 WASH. U. J.L. & POL'Y 289, 320 (2000) (arguing that limitations of human cognition justify judicial intervention in noncompete clauses).

284. See also Mann, *supra* note 263 (discussing behavioral biases such as salience in the credit card context).

285. Bar-Gill, *supra* note 263, at 1376.

from the same seller, or she may have naively believed that she would never miss a payment. Due to the underestimation bias, Williams may have been insufficiently sensitive to the inclusion of the repossession clause.²⁸⁶

Thus, the underestimation bias allowed the Walker-Thomas Furniture Company to include an oppressive term related to future repossession because Williams—like most consumers—was likely to underestimate the importance of that term.²⁸⁷

B. Two Effects of Augmented Reality on Bounded Rationality Arguments

These arguments based in behavioral law and economics are powerful, and they have captured the imaginations of contracts scholars for the last decade. They seem to justify intervention in consumer contracts from within economics by calling into question the basic economic premise that contracting parties can rationally assess their contractual opportunities and make welfare-maximizing decisions. How do these bounded rationality arguments fare in an augmented reality? There are two primary consequences of an augmented reality to consider here: the possibility that the ubiquitous availability of information will indirectly debias consumers, and the possibility of using augmented reality technologies to purposefully and directly debias contracting consumers. I consider each in turn below.

1. Sorting and Debiasing: General Debiasing Through Increased Information

On the one hand, it is doubtful that augmented reality technologies will contribute to a general debiasing of consumers.²⁸⁸ Many of these biases are difficult to correct.²⁸⁹ For example, simply explaining the overconfidence bias

286. *Id.* at 1432.

287. *See id.*

288. Hillman and Rachlinski dismissed the possibility that e-commerce consumers might be less subject to cognitive biases than bricks-and-mortar consumers. *See* Hillman & Rachlinski, *supra* note 32, at 483 (“[A] change in the nature of the contracting environment is not likely to alter these [cognitive] factors.”).

289. *See, e.g.,* Jeffrey J. Rachlinski, *A Positive Psychological Theory of Judging in Hindsight*, 65 U. CHI. L. REV. 571, 586 (1998) (discussing the difficulty of correcting certain biases).

is rarely sufficient to debias consumers.²⁹⁰ Moreover, debiasing research has generally found that merely providing subjects with general information about risks and probabilities does not dampen these behavioral effects.²⁹¹ Therefore, a diffused increase in information about consumer transactions seems unlikely to counteract the overoptimism, availability, and salience biases discussed above.

On the other hand, an augmented reality may help to debias consumers in a somewhat indirect way. As discussed in Parts I and II, in an augmented reality, consumers are likely to have access to increased information about products and sellers at the point of contracting because they can easily access product reviews from other consumers and from intermediaries.²⁹²

The availability of such product and merchant reviews has debiasing implications. Consider the salience problem. Korobkin argues that consumers generally focus on only a few salient characteristics of a product, such as price.²⁹³ They are thus unlikely to attend to the detailed contract terms in a standard form contract. An augmented reality, however, may provide consumers with salient information that simplifies and counteracts this tendency. For example, although consumers may not read a standard form contract and understand all of its terms, they might focus on the fact that the average consumer gave that product only one out of five stars on Amazon. Or, a consumer might pull up mostly negative consumer reviews that highlight problems experienced with the product, thereby making salient the likelihood of needing to depend on the warranty. Finally, having access to consumer review information at the point of sale might bring to the consumer's attention examples of other consumers who had to resort to the contract and discovered its oppressive or one-sided terms.

Part I explored examples of online reviews.²⁹⁴ Consider just one more example in the context of this discussion about salience. On May 5, 2011, a consumer posted a review about Sirius satellite radio on *pissedconsumer.com*. The review highlighted problems with Sirius's contracts:

I signed up for 1 year of sirius [sic] radio in April of 2010. I did not want it to continue, so I let it expire without renewing. The radio

290. See, e.g., Baruch Fischhoff, *Debiasing*, in *JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES*, *supra* note 271, at 422 (discussing debiasing techniques); Emily Pronin et al., *Understanding Misunderstanding: Social Psychological Perspectives*, in *HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT* 636, 660 (Thomas Gilovich et al. eds., 2002).

291. See generally Fischhoff, *supra* note 290.

292. See *supra* Part I.B.4 (discussing these technologies).

293. See *supra* notes 278–280 and accompanying text.

294. See *supra* Part I; *supra* notes 103–107, 111–113, 127–134 and accompanying text.

stops working (makes sense). Then I start getting statements saying I'm past due. . . . Turns out when you sign up for one year of service it's actually open ended! They keep charging, you have to spend a few hours calling . . . to cancel your 1 year contract. Oh, and if you try to cancel early there's an early termination fee. . . . I don't know if a 1 year contract that they decide is open ended is legal, but it's defiantly [sic] unethical and sleazy. . . . Stay away!²⁹⁵

This sort of virulent consumer review is highly salient—certainly more salient than the dry legal language of standard form contracts. If a given product or merchant received a sufficient number of such reviews, an informed consumer would almost certainly take notice.

In addition, mobile applications often aggregate and simplify reviews of consumer products using rating systems, which also counters the availability and salience problems noted by Korobkin and others. Pissed Consumer's mobile application, for example, uses a "Five Red Star" system. The more red stars a product receives from other consumers, the higher the volume of consumer complaints.²⁹⁶ Likewise, the Better Business Bureau's mobile application grades merchants on the standard academic A+-to-F scale. These grades are based on the Bureau's complaint history with the business, the type of business, time in business, availability of background information about the business, licensing or other governmental actions against the business, advertising issues, or failure to honor commitments to the Bureau.²⁹⁷ The Better Business Bureau also accredits merchants, and the mobile application indicates in a very simple—and salient—graphical way which local businesses have received their accreditation.²⁹⁸

These mobile offerings are new—Pissed Consumer and the Better Business Bureau launched their respective mobile applications in the spring of 2011. As these services mature and expand, such ratings systems are likely to become more sophisticated. In particular, they may begin to differentiate between types of complaints, and make it even easier for a consumer to search for complaints about a seller's contract terms as opposed to other aspects of the seller's goods or services. Even in their current form, however, these

295. *Sirius Keeps Billing After Contract Expires!*, PISSED CONSUMER (May 31, 2001), <http://sirius-satellite-radio.pissedconsumer.com/sirius-keeps-billing-after-contract-expires-20110531240638.html>.

296. See *supra* Part I.B.4 (discussing pissedconsumer.com).

297. See *Overview of BBB Grade*, BETTER BUSINESS BUREAU, <http://www.bbb.org/business-reviews/ratings> (last visited Aug. 1, 2011) (explaining its grading methodology).

298. See *id.*

simplified ratings services may serve to counteract bounded rationality in consumer purchasing decisions by producing highly salient information that consumers can easily digest.²⁹⁹

In addition to ameliorating salience effects, an augmented reality may also counteract consumers' overconfidence about the future and apparent tendency to underestimate the probability of negative future events. Reading online consumer reviews highlights the obvious but important fact that sheer volume of experience uncovers even very low-probability contingencies. When thousands of consumers have experience with a product or merchant, tens or hundreds will stumble into the unlikely, but inevitable, contingencies. If the seller's standard form contract took advantage of the fact that consumers were unlikely to think about such low probability contingencies *ex ante*—by including a one-sided term about such contingencies—*ex post* that one-sidedness will be discovered as it is triggered by a given consumer's experience. Later consumers reading an online review will therefore be on notice of that possible contingency and will likely factor it into their calculus about whether to purchase the product or service in question. Even if a given consumer chooses not to read every online review—and thus fails to learn about all of the discovered contingencies—feedback about such low probability events gets factored into the aggregated ratings on these websites. This creates a sorting proxy that may counter the availability heuristic. Consumers may not need to factor future contingencies into their *ex ante* evaluation of a product or contract if the electronic market of reviews does this for them.

At one level, this suggests that newer products and consumer contracts deserve greater judicial scrutiny than their more established counterparts. Early adopters who purchase without the benefit of this electronic hindsight may stumble into one-sided terms. Later consumers should not—or, at least, they should be on notice and able to factor the costs and benefits of such terms into their decisions.

At another level, in an augmented reality, sellers should begin to anticipate these effects and realize that online information exchange will warn consumers away from one-sided contracts. As the standard law and economics model predicts, they should therefore avoid including one-sided terms to begin with.

299. As mentioned in Part I, mobile technology also allows consumers to create simplified product reviews during bricks-and-mortar shopping experiences. Research suggests that consumers prefer simplified "star rating" type systems for creating such reviews quickly. *See, e.g.,* Felix von Reischach et al., *A Mobile Product Recommendation System Interacting With Tagged Products*, PERCOM 2009, Mar. 2009 (reviewing research on mobile recommendation systems).

2. Signaling and Debiasing: Targeted Debiasing by Firms or Regulators

In addition to bringing contract-relevant information to the point of sale, augmented reality technologies allow firms and regulators to purposefully try to debias consumers. In high-value transactions, sellers may want to address bounded rationality problems directly to insulate their standard form contracts from later judicial attack. Alternatively, regulators may want to use augmented reality technologies to reach consumers at the point of sale and to nudge them to make better decisions.³⁰⁰ Consider this second mitigating effect on the bounded rationality justification.

Targeted information can, in some circumstances, help to debias consumers.³⁰¹ As Linda Babcock has noted, “In the literature on debiasing, one type of intervention stands out as effective against a wide range of biases. This involves having subjects question their own judgment by explicitly considering counterarguments to their own thinking.”³⁰² Warning labels on cigarettes and alcohol are an example, as are risk disclosures to consumers prior to entering into credit or other sensitive transactions.³⁰³ In general, requiring subjects to consider contrary evidence has had greater success in countering overoptimism biases than merely providing generalized information about the biases themselves.³⁰⁴

Christine Jolls and Cass R. Sunstein argue that debiasing efforts can use one aspect of bounded rationality—the availability heuristic—to counteract another—overoptimism. “[B]ecause making an occurrence available to individuals will increase their estimates of the likelihood of the occurrence, availability is a promising strategy for debiasing those who suffer from excessive optimism.”³⁰⁵ The key is to expose subjects to a “concrete instance of the

300. See generally RICHARD H. THALER & CASS R. SUNSTEIN, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* (2008).

301. See, e.g., Linda Babcock et al., *Creating Convergence: Debiasing Biased Litigants*, 22 *LAW & SOC. INQUIRY* 913, 917 (1999) (finding that explaining the overconfidence bias to mock litigants and urging them to consider the weaknesses of their case helped to mitigate self-serving biases).

302. *Id.* at 916.

303. See Bar-Gill, *supra* note 263, at 1420 (arguing that “[i]nformation-based intervention has been proven feasible and effective in other contexts [besides credit cards],” and citing smoking disclosures and anti-drug advertising campaigns as examples).

304. See, e.g., Richard P. Larrick, *Debiasing*, in *BLACKWELL HANDBOOK OF JUDGMENT AND DECISION MAKING* 316, 323–24 (Derek J. Koehler & Nigel Harvey eds., 2004) (reviewing “consider the opposite” debiasing strategies); Gregory Mitchell, *Libertarian Paternalism Is an Oxymoron*, 99 *NW. U. L. REV.* 1245, 1277 (2005) (reviewing literature on successful debiasing).

305. Jolls & Sunstein, *supra* note 47, at 210.

occurrence.”³⁰⁶ This tends to “render the incident in question available in a way that can successfully counteract optimism bias.”³⁰⁷ In a classic study, for example, Weinstein attempted to counteract the fact that due to overoptimism, people tend to underestimate their likelihood of getting cancer. When Weinstein told subjects a detailed story about a similar person—of their age and in their circumstances—getting cancer, the subjects’ probability estimates became more accurate.³⁰⁸

Jolls and Sunstein argue that one could use the law to debias consumers by requiring manufacturers to provide examples of the consequences of harm-producing uses of their products, rather than merely providing statistics or a generic warning label: “[I]n the consumer safety context the law might require that the real-life story of an accident or injury be printed in large type and displayed prominently so that consumers would be reasonably likely to see and read it before using the product.”³⁰⁹ This is targeted debiasing: trying to influence a consumer’s decision by exposing the consumer to particularized information intended to change the consumer’s probability assessments.

Augmented reality offers novel methods for such debiasing. As discussed in Part II, augmented reality is rapidly lowering the cost of distributing videos, for example, as well as images and audio. This makes it possible to create very vivid messages and deliver them to consumers prior to contracting.

Computer scientists are already exploring various methods of nudging consumers using mobile technology. Researchers have, for example, used ambient display installations to influence workers’ decisions about whether to use stairs or elevators, leading to healthier choices often without workers’ conscious awareness that their behaviors are changing.³¹⁰ Similarly, the “Augmented Shopping Cart” includes an ambient handlebar display connected to a bar code scanner: When a shopper scans an item before putting it in the cart, the cart’s handlebar changes colors to communicate nonobvious environmental, nutritional, or other information to the shopper.³¹¹ This can alter

306. *Id.*

307. *Id.*

308. See Weinstein, *supra* note 269; see also Neil D. Weinstein & William M. Klein, *Unrealistic Optimism: Present and Future*, 15 J. SOC. & CLINICAL PSYCHOL. 1 (1996) (reviewing studies).

309. Jolls & Sunstein, *supra* note 47, at 213.

310. See Yvonne Rogers et al., *Ambient Influence: Can Twinkly Lights Lure and Abstract Representations Trigger Behavioral Change?*, UBICOMP 2010, Sept. 2010, at 261.

311. See Jon Bird et al., *The Augmented Shopping Trolley: An Ambient Display to Provide Shoppers With Non-Obvious Product Information*, PINC 2011, May 8, 2011 (describing project); Vaiva Kalnikaite et al., *How to Nudge In Situ: Designing Lumbent Devices to Deliver Salient Information in*

the consumer's decisionmaking.³¹² Mobile phone-based applications have been used to promote smoking cessation,³¹³ dieting, exercise, medication management, environmentally-friendly transportation choices, and other desired social practices.³¹⁴

Consider consumer credit card contracts. Ronald Mann has argued persuasively that debiasing interventions are both necessary and possible in the credit card sector.³¹⁵ To make such interventions succeed, Mann focuses on the need to provide simple, powerful information to consumers at the point of contracting.³¹⁶ This is much easier to do in an augmented reality. Messages can be communicated directly to consumers at the point of sale and displayed in vivid graphics or in other formats likely to resonate with consumers. If any debiasing is going to succeed, AR-enabled interventions seem the most likely.

This approach aligns with what Colin Camerer and his colleagues have called "asymmetric paternalism"—interventions that assist uninformed consumers without imposing costs on the informed.³¹⁷ They cite as an example the disclosure that creditors must make to mortgage applicants under the Federal Truth in Lending Act:³¹⁸

The Act provides potentially substantial benefits to those who are less than rational; it may save some consumers, otherwise uninformed,

Supermarkets, UBICOMP 2011, Sept. 2011 (finding that the augmented "shopping handle generated a significant nudge effect, influencing what products people chose and placed in their shopping trolleys").

312. See, e.g., Jasminko Novak, *Ubiquitous Computing and the Socially-Aware Consumer—Support Systems in the Augmented Supermarket*, PROC. OF THE FIRST INT'L WORKSHOP ON SOC. IMPLEMENTATION OF UBIQUITOUS COMPUTING (2005) (examining use of technology to nudge consumers toward socially desired decisions).
313. See Robyn Whittaker et al., *Mobile Phone-Based Interventions for Smoking Cessation*, 4 COCHRANE LIBRARY (2009) (reviewing literature).
314. See, e.g., Parisa Eslambolchilar et al., *Nudge & Influence Through Mobile Devices*, MOBILEHCI 2010, Sept. 2010, at 527 (reviewing literature, and noting that "[t]he use of digital technology is central to make behavioral changes").
315. See Mann, *supra* note 263, at 921 ("One approach would rely on information campaigns designed to respond to the availability heuristic, making consumers more cognizant of the effects of excessive borrowing by telling consumers about them.").
316. See *id.* ("[I]f the point of contracting is not a salient point in the psyche of the consumer, a regime altering the information available at the points of purchase . . . could be productive."); see also RONALD J. MANN, CHARGING AHEAD: THE GROWTH AND REGULATION OF PAYMENT CARD MARKETS 160 (2006) (arguing that "the most obvious point to focus a disclosure would be at the point of borrowing" and that "a judicious response would settle for the disclosure of information that is sufficiently simple to be understood by a typical cardholder and to be implemented by an issuer relatively cheaply").
317. See Camerer et al., *supra* note 263, at 1213 (discussing asymmetric paternalism).
318. 15 U.S.C. §§ 1601–1667f (2006).

from possible catastrophic outcomes, such as losing their homes. These benefits are obtained at minimal cost to both informed consumers and providers. Educated consumers essentially ignore the mandated disclosures while uneducated consumers could potentially reap the positive benefits of additional information. As for [mortgage] providers, . . . [a]ny early costs incurred with the initial creation of the disclosure . . . appear minimal when amortized.³¹⁹

The disclosure states: “If you obtain this loan, the lender will have a mortgage on your home. You could lose your home, and any money you have put into it, if you do not meet your obligations under the loan.”³²⁰ Informed consumers who already understand this risk will ignore such warnings; uninformed consumers may take notice.³²¹

In an augmented reality, tailoring such disclosures or debiasing interventions to the uninformed becomes easier. Consumers might be permitted to choose whether to watch a given video presentation, for example, if they met certain criteria, such as education, income, or other relevant thresholds. Otherwise, reviewing the presented information might become required. This sort of regulatory tailoring is far more difficult in an analog environment; an augmented reality opens new regulatory options. Sellers might also choose to require exposure to certain information. In a world with facial recognition and other biometric identification technologies, sellers are likely to know the identity of consumers even in bricks-and-mortar transactions. Sellers will therefore have the ability to tailor debiasing interventions to the characteristics of individual consumers.

For our purposes, it does not much matter whether such debiasing strategies are designed by regulators or sellers. Augmented reality technologies might make such debiasing interventions more effective than debiasing efforts in an analog economy.

Finally, this subsection provides one last comment on debiasing in an augmented reality. There is the risk of information overload if all consumer goods become saturated with digital information. As Camerer puts it, even in the analog world “[w]hen hammers start to sprout warnings of the danger they pose to thumbs, and ladders of the risk of falling, additional information confers ever smaller benefits and can actually backfire if it distracts consumers from more

319. Camerer et al., *supra* note 263, at 1233.

320. *See* 15 U.S.C. § 1639(a)(1)(B).

321. *See* Camerer et al., *supra* note 263, at 1233 (“For the naive consumer, the disclosure can be enormously beneficial, moving her one step closer to educated consumer status.”).

worthy warning messages.”³²² In an augmented reality, this could become comical: If every consumer good has augmented reality video presentations associated with it, consumers will ignore all such information—there is no time to watch an explanatory video about a box of Tic Tacs.

Computer scientists and ambient informatics researchers are already confronting this problem when considering the effects of augmented reality technologies on information flow to consumers. As Yvonne Rogers has put it:

[R]ecent research in cognitive psychology has shown people tend to use simple heuristics . . . when making decisions. . . . We typically ignore most of the available information and rely only on a few important cues. . . . [R]ather than providing ever more information to enable consumers to compare products in minute detail when making a choice, a better strategy is to design technological interventions that provide just *enough* information and in the *right* form to facilitate good choices.³²³

One recent study, for example, examined several modalities—star rating systems, text blocks, and videos—for communicating product review information to consumers via mobile phones.³²⁴ It found that consumers prefer simplified, quick information modalities, such as star ratings, rather than more complex, time-consuming text or video presentations.³²⁵

These are very new problems, and this is preliminary research. Designing appropriate augmented reality technologies that achieve this balance will present both technological and regulatory challenges. Regulatory intervention might become necessary at some point to control the use of augmented reality technologies for debiasing or “warning label” purposes. Consumer protection law should take account of these technologies and begin to consider how to best employ them. This is not a contract law problem per se, but instead a

322. *Id.* at 1235.

323. Yvonne Rogers et al., *Projecting Instant Information In Situ: Can It Help Us Make More Informed Decisions?*, PERVASIVE 2010 WORKSHOP ON PERSONAL PROJECTION, May 2010.

324. See Felix von Reischach et al., *An Evaluation of Product Review Modalities for Mobile Phones*, MOBILEHCI 2010, Sept. 2010.

325. See *id.* at 207 (“[D]evelopers of product-related services on mobile phones should . . . not focus on providing as much information as possible, but rather present precise and well-structured information.”).

A technical literature has developed on how best to glean information from online consumer reviews and incorporate it into mobile recommendation systems. For an overview, see Silvana Aciar et al., *Informed Recommender: Basing Recommendations on Consumer Product Reviews*, 22 INTELLIGENT SYS. 39 (2007) (discussing various studies).

consumer protection problem of how to best use these new methods of information dissemination.

CONCLUSION

Doctrinally, we have come full circle. Traditionally, courts deferred to contracts as written, believing that consumers' consent to those contracts justified enforcement. As standard form contracts proliferated, courts realized that consumers had insufficient information to evaluate those forms, and that firms could therefore include oppressive or one-sided terms. Courts began to distrust standard form consumer contracts and began to police them using doctrines such as unconscionability.

Today, however, we live in a connected digital world. The doctrines born out of judicial distrust for standard form contracts were created before computers, the internet, or wireless technologies—before consumers had constant real-time access to information about the places, goods, people, firms, and contracts around them. In short, critical aspects of contract law were designed to resolve the problems of an economy in which contracting parties knew relatively little about each other, the goods they were trading, or the markets in which they operated. By contrast, today's information technologies increasingly create an augmented reality in which digital and physical spaces are profoundly interwoven, and in which such types of information are ubiquitously available. Consumers can now sort firms and their contracts at lower cost and more efficiently, and firms can now signal their consumer-friendly contract terms to consumers. As our augmented reality develops, courts will—or should—begin to take notice of these changes to the economy that suggest changes to contract doctrine.

Contract theory must also take account of these changes to the economy's basic information infrastructure. Technological development can fundamentally change transaction costs. This may not occur often—indeed, changes profound enough to alter transaction costs in a significant way may occur once in a generation. But we are experiencing such a shift, and this illustrates the importance to contract theory of recognizing how contract doctrine is contingent on underlying technological and economic conditions.