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

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This Article argues that freedom of contract will take on different meaning in a world in which ubiquitous information about places, goods, people, firms and contract terms is available to contracting parties anywhere, any time. In particular, our increasingly “augmented reality” calls into question leading justifications for distrusting consumer contracts—and thereby strengthens traditional understandings of freedom of contract as enforcing contracts as written. This is largely a descriptive and predictive argument: the 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.”1

-- Nobel Prize winner George Akerlof

“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.”2

-- www.lemoncheck.com

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 will for

1 George A. Akerlof, The Market for ‘Lemons’: Quality Uncertainty and the Market
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. See Andrew Charlesworth, The Ascent
of Smartphone, 4 ENG. & TECH. 32, 33-34 (Feb. 14, 2009) (discussing the definition of
“smartphone”).
4 See Aaron Smith, 35% of American Adults Own a Smartphone, PEW INTERNET & AM. LIFE
PROJECT (Jul. 11, 2011) (providing statistics). See also Mike Isaac, Smartphones Dominate
5 See Smith, supra note __ at 2 (reporting high adoption rates among African Americans and
Latinos, and among those younger than 29 in lower income households).
the first time be greater than personal computer sales,\textsuperscript{7} and by the second quarter of 2012, analysts predict that a majority of American adults will own a smartphone.\textsuperscript{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,” 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.\textsuperscript{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 other consumers’ reviews.\textsuperscript{11} Enter a merchant’s name or enable your smartphone’s location capabilities, and the 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


\textsuperscript{7} See Jake Mintz, When the Web Meets the Real World, FORBES (Aug. 4, 2011) (providing statistics and describing a new wave of mobile Internet applications).

\textsuperscript{8} See Horace Dediu, Phone Tipping Point Countdown Reset, http://www.asymco.com (May 7, 2011) (last visited July 5, 2011) (reporting that smartphone adoption is increasing by 1.3 percent per month).

\textsuperscript{9} I will generally use the term “augmented reality” 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 Tom P. Caudell & David W. Mizell, Augmented Reality: An Application of Heads Up Display Technology to Manual Manufacturing Processes, PROCEEDINGS OF IEEE 659 (1992). Augmented reality is often defined as augmenting the physical senses—particularly visual—with digital information. See, e.g., Paul Milgram & Fumio Kishino, A Taxonomy of Mixed Reality Visual Displays, IEICE TRANSACTIONS ON INFO. & SYS. 1321, 1322 (1994) (defining augmented reality as “all cases in which the display of an otherwise real environment is augmented by means of virtual (computer graphic) objects”); Ronald T. Azuma, A Survey of Augmented Reality in PRESENCE: TELEOPERATORS AND VIRTUAL ENVIRONMENTS 355 (1997) (“AR allows the user to see the real world, with virtual objects superimposed upon or composited with the real world.”). 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 together. Other candidates include ubiquitous computing, pervasive computing, physical computing, tangible media, ambient informatics, “wearware” and “everyware.” See generally ADAM GREENFIELD, EVERYWARE: THE DAWNING AGE OF UBQUITOUS COMPUTING 1 (2006) (reviewing various terminology); WOODROW BARFIELD & THOMAS CAUDELL, FUNDAMENTALS OF WEARABLE COMPUTERS AND AUGMENTED REALITY xii (2001) (same).

\textsuperscript{10} Google Goggles is an image-based search service. See http://www.google.com/mobile/goggles/#text (last visited July 7, 2011).

which merchants have received a Better Business Bureau accreditation.\textsuperscript{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.\textsuperscript{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, the privacy economist Allessandro 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,\textsuperscript{14} and, if a match were found, guess the person’s name and the first five digits of their Social Security number.\textsuperscript{15} The application succeeds a staggering thirty percent of the time.\textsuperscript{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.”\textsuperscript{17} Although privacy scholars have considered the implications of facial recognition technologies,\textsuperscript{18} what might these technologies imply for contract? What will it mean when merchants can identify each consumer, search for information about that consumer, and tailor the shopping experience or their standard form contract based on that consumer’s characteristics?\textsuperscript{19}

This Article considers the implications of these recent developments\textsuperscript{20} for contract law, and, particularly, for freedom of contract.

\textsuperscript{12} See http://www.bbb.org (last visited July 5, 2011).
\textsuperscript{13} See supra note ___ (quoting CarFax’s “LemonCheck” service).
\textsuperscript{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 http://www.facebook.com (last visited July 1, 2011).
\textsuperscript{15} See Allessandro 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) (describing Acquisti’s study).
\textsuperscript{16} See Acquisti et al., supra note ___ at 5.
\textsuperscript{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) (“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. See id.
\textsuperscript{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).
\textsuperscript{19} See Part III(B), infra.
\textsuperscript{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 app launched on May 11, 2011 and integrated Carfax.com vehicle reports on August 1, 2011. See http://www.itunes.com (providing launch dates). Although to avoid tedium I do not catalog this throughout the
Consider the classic case Williams v. Walker-Thomas Furniture Co.,\textsuperscript{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.”\textsuperscript{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 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.

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?\textsuperscript{23} What if she had used the Pissed Consumer app on her iPhone to learn that the furniture store had received five “Red Stars” indicating a high volume of consumer complaints about its contracts,\textsuperscript{24} 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? What if her social network used Facebook Places or Foursquare,\textsuperscript{25} and had left location-based electronic notes warning her about the store’s practices? What if the written contract itself had contained a “quick response” or QR code (see Figure 1) in the margins next to the collateralization clause that, when scanned by her phone’s camera, played a short video explaining the

\textsuperscript{21} 350 F.2d 445 (C.A. D.C. 1965).
\textsuperscript{22} Williams, 350 F.2d. at 449. See also Arthur Alan Leff, Unconscionability and the Code—The Emperor’s New Clause, 115 U. PA. L. REV. 485, 550 (1967) (drawing the distinction between procedural and substantive unconscionability).
\textsuperscript{23} 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 A1 (Apr. 3, 1988) (noting that the Walker-Thomas Furniture Co. was targeted by looters during the 1968 riots as revenge for its well-known business practices).
\textsuperscript{24} Pissedconsumer.com is a popular web site that allows consumer to review products and merchants; it also provides a mobile application for use on smartphones. See http://www.pissedconsumer.com (last visited July 5, 2011). A search of PissedConsumer reveals hundreds of reviews regarding credit-related repossessions, like those at issue in Walker-Thomas. See, e.g., http://americredit.pissedconsumer.com (last visited July 5, 2011) (providing 155 complaints about the repossession tactics of AmeriCredit). See also Part I(B), infra (discussing this and other consumer review services).
clause to Ms. Williams in laymen’s terms? 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

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 decades contract scholars have argued extensively about freedom of contract in this context. It is part of a nascent body of legal scholarship grappling with the profound impact of information technology developments on markets, law, and society. Traces of this thought can be found in information privacy scholarship, information technology writings, and legal literature.

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26 *Figure 1* contains the first “quick response” or QR code to be published in a law review. 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, her 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, see [http://lawweb.colorado.edu/events/mediaDetails.jsp?id=2807](http://lawweb.colorado.edu/events/mediaDetails.jsp?id=2807) (last visited Aug. 1, 2011).


considering the impact of new technologies. 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 in the last decade contract scholars have focused extensively on e-commerce and online contracting, online commerce accounts for only seven percent of all U.S. shopping, despite years of rapid growth. An 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 and rational decision-makers will reach efficient, welfare-maximizing contracts in competitive markets. 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. 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

29 See, e.g., OSCAR H. GANDY, JR., THE PANOPTIC SORT: A POLITICAL ECONOMY OF PERSONAL INFORMATION (1993); GREENFIELD, EVERYWARE, supra note __.
32 See Geoffrey A. Fowler, E-Commerce Growth Slows, But Still Out-Paces Retail, WALL ST. J. (Mar. 8, 2010). Estimates assume that e-commerce might increase to eight percent by 2014, and to twenty percent at some point in the future—still a notable minority. See id.
34 See Part II(A) and III(A), infra (discussing these arguments).
consumers are insufficiently rational to do so. Together, these two arguments have justified judicial scrutiny of consumer standard form contracts in the last 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. In particular, changes in information technology have radically lowered the costs of both sorting and signaling—the two economic means by which consumers and firms choose and learn about their contracting partners—and have made new forms of sorting and signaling possible in traditional bricks and mortar transactions. Part I makes this

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35 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 ___ 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 explore the impact of augmented reality on externality and commodification arguments in another essay. See _______.


37 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. Studies 929 (1991) (exploring the example of employers sorting job applicants based on high school graduation as a proxy for perseverance).

38 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 313 (5th ed. 2000). Economists focus on signals that are difficult to fake and thus self-verifying. See, e.g., Diane Coyle, The Soulful Science: What Economists Really Do and Why It Matters 163 (rev. ed. 2010) (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) (banks and law firms spend vast sums on elaborate office buildings to signal their quality and solvency to potential clients). Spence began modern signaling theory 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).

39 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.”).
argument by briefly introducing augmented reality technologies to the legal literature.\textsuperscript{40} It then reviews a typology of the types of information these technologies can deliver to today’s consumers: information about places, goods, people, firms and contract terms.\textsuperscript{41} 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 undermine asymmetric information arguments for distrusting consumer standard form contracts in two ways: (i) 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); and (ii) firms with consumer-friendly contracts can more easily signal this to consumers, thereby creating pressure on other firms to improve their contract terms. When consumers have mobile Internet applications that search over 40 million consumer reviews on over 4 million products from the aggregated web sites of over one thousand retailers and consumer review services—as they do today using the SearchReviews mobile app\textsuperscript{42}—firms are less likely than in the past to use one-sided or oppressive contract terms.\textsuperscript{43} In addition, when consumer-friendly firms can embed video into paper contracts to explain complex terms, this creates market pressure for all firms to improve their standard form contracts.\textsuperscript{44} These two effects make it more likely that standard form consumer contracts will be fair. Courts in an augmented reality are therefore more likely to enforce consumer standard form contracts as written. Part II presents this argument.\textsuperscript{45}

Third, the information available in an augmented reality may help to “debias”\textsuperscript{46} 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.\textsuperscript{47} In particular, augmented reality can provide consumers with highly salient and available information about contractual risks at the point of sale.\textsuperscript{48} This makes it more likely that consumer will evaluate contracting decisions rationally, which in turn suggests that in an

\textsuperscript{40} See Part I(A), infra.
\textsuperscript{41} See Part I(B), infra.
\textsuperscript{42} See http://www.searchreviews.com (last visited July 5, 2011) (providing mobile barcode-based application that searches a massive aggregated data set of consumer reviews).
\textsuperscript{43} See Part II(B)(i), infra (discussing this sorting argument).
\textsuperscript{44} See Part II(B)(ii), infra (discussing this signaling argument).
\textsuperscript{45} See Part II, infra.
\textsuperscript{46} On debiasing generally, see Christine Jolls & Cass R. Sunstein, Debiasing Through Law, 35 J. LEGAL STUD. 199, 210 (2006).
\textsuperscript{47} See Part III, infra (discussing behavioral law and economics arguments about cognitive biases in standard form contracts, and the range of possible debiasing techniques).
\textsuperscript{48} See Part III(B), infra (discussing how such information may counteract optimism and availability effects).
augmented reality courts may more often enforce consumer contracts as written.

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 this context. The 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. 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 Article’s first exploration of how an augmented reality will change contract demonstrates that contract scholars must acknowledge the technological and historical contingency 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” 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. These technologies are everywhere and increasingly powerful. This Part introduces the 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 often unaware of the rapid advances in and deployment of these technologies. It is impossible to consider the

49 For a notable exception, see Katz, supra note ___ (“[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 For an overview, see BARFIELD & CAUDELL, supra note __.
ramifications of augmented reality for contract law without understanding the state and pace of technological innovation in these domains.

This Part then presents a typology of the types of information that augmented reality technologies make available to consumers. This is ultimately more important than which 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 movies and the augmented reality glasses in Minority Report have made for good science fiction, but these technologies are no longer as futuristic as they seemed even a decade ago. 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 for the purposes of this Article, today’s smartphones are sufficiently advanced to raise the doctrinal questions at issue here. 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 science fiction—it is worth briefly exploring the information delivery methods currently available or under development.*

i. A Brief History

Augmented reality has been developing for decades. In 1968, Ivan Sutherland created a working prototype of the first augmented reality system.\(^52\) The system consisted of a helmet with a digital display that the user could wear in order 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.\(^53\)

The goal of early experimental systems was to bring digital information to the user’s experience of the physical world. Experimental

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\(^53\) See STEPHEN CAWOOD & MARK FIALA, AUGMENTED REALITY: A PRACTICAL GUIDE 2 (2007) (explaining the origins of the system’s nickname, the Sword of Damocles).
augmented reality systems included outdoor navigation systems for the visually impaired, various backpack-based systems combining head-worn displays, location awareness and computational ability, and early applications such as guided campus tours using mobile augmented reality and battlefield information augmentation systems. These systems, developed primarily in the 1990s, seem crude today, but they showed the potential for information to augment physical experience.

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

Finally, mobile communications technology simultaneously developed quite independently. The first smartphone was introduced by IBM and BellSouth in 1992—it served as a phone, calculator, address book, fax machine and email device, had one megabyte of memory, and cost nine

59 See Greenfield, supra note __ at 11 (providing history).
hundred dollars. 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.

ii. 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. Our devices know where they are, which direction they are moving, and what is around us. This not only allows instant search for information, but also applications that “push” context-relevant information to us based on our location, proximity to sites or people of interest, social network, or other criterion. Yelp, Junaio, and Layar are all examples of popular early augmented reality platforms. An iPhone, iPad or Droid user can “look” down a street and see which restaurants have good reviews, what digital information is available about local landmarks, and even which houses belong to registered sex offenders.

“Search” is no longer the paradigm. Information technology companies are investing heavily in context-specific augmented reality that increasingly connects the physical to the digital. Google’s Eric Schmidt has emphatically asserted that in the near future, “search” will not be Google’s business—pushing relevant information to users in real time will be more important. (Already, the majority of Google searches originate on mobile

63 See supra notes ___ and accompanying text.
64 See http://www.yelp.com (last visited July 7, 2011); Ben Parr, Easter Egg: Yelp is the iPhone’s First Augmented Reality App, MASHABLE (Aug. 27, 2009).
66 See 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”).
67 See id.
68 See http://www.wikitude.com (last visited July 1, 2011) (providing an AR app that layers point of interest information over a smartphone’s camera display).
70 See Holman W. Jenkins, Jr., Google and the Search for the Future, WALL ST. J. (Aug. 14, 2010) (“[O]ne idea is that more and more searches are done on your behalf without you
Apple’s Steve Jobs recently heralded the rise of mobile computing and the decline of the personal computer, and some expect next generation iPhones to contain radio frequency identification (RFID) scanners to permit an entirely new generation of context-sensitive smart phone applications. Qualcomm—a leading maker of mobile computing chips—has invested heavily in augmented reality technologies, and expects these applications to drive smart phone sales over the next few years. 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 in providing consumers with relevant information in real-time—information that in many cases has never been available before without incurring significant costs.

iii. 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.” Suddenly, augmented reality has moved out of the laboratory and into the market.

As discussed above, 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.
Various display technologies under development offer promise for integrating 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.78 Similarly, Toyota is developing car windows that give backseat passengers (e.g., children) the ability to interact with the passing outside world by drawing on and querying the window with one’s finger.79 A child can touch a passing tree, for example, and the window might display the word “tree” to teach reading, or touch a passing building to query the window for the building’s distance from the car.

Wearable displays are also in development. One can currently purchase ski goggles that project GPS and weather information directly to the skier,80 and somewhat odd-looking sunglasses with embedded AR display capabilities.81 Various firms are working to develop regular eyeglasses that can project digital information to their wearer,82 and researchers are even trying to embed display technologies in contact lenses.83 The ability to access digital information directly through one’s eyeglasses would obviously bring augmented reality to a dramatically different level than being forced to use one’s smartphone. Although early prototypes are available, this technology remains in the future.84

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 “Sixth Sense” project.85 Sixth Sense

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78 See http://www.microvision.com/vehicle_displays/head_up_displays.html (last visited July 7, 2011) (demonstrating Microvision’s proposed consumer heads up display system).
80 See http://www.zealoptics.com/transcend (last visited July 1, 2011) (selling the “world’s first GPS enabled goggle”).
82 Early versions of eyeglass displays are available now; prototypes of future systems show the direction that leading firms are exploring. See http://www.microvision.com/wearable_displays/mobile.html (last visited July 7, 2011) (providing examples of eyewear prototypes); http://www.nttdocomo.com/technologies/future/3D/index.html (last visited July 7, 2011) (providing examples of Docomo’s eyeglass prototypes).
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 projects text and images onto the user’s physical environment, with which the user can then interact through hand gestures that the camera detects and the smartphone processes. In combination, these simple technologies allow Sixth Sense to create stunning applications. If a user picks up a book in a bookstore, Sixth Sense 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.86 Similarly, if a user holds a product in a grocery store—such as a roll of paper towels—Sixth Sense can augment that physical object with information about its environmental qualities (e.g., projecting onto the paper towels a red, yellow or green icon indicating how “green” the towels are).87 The system can identify people using facial recognition and project a digital nametag onto a person’s chest as they approach. Finally, Sixth Sense 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.88

The digital “magic wand” or “point to discover” (P2D) project provides another example.89 P2D is a handheld device that connects wirelessly to one’s 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, one might point at a restaurant and immediately retrieve information about and ratings of that restaurant; point at a bus stop to learn when the next bus would arrive; or point at a building to learn its history. The goal, as with 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 Section categorizes the types of information they can deliver to consumers. In other words, rather than reviewing the technologies themselves—the glasses or

86 See id.
87 See id.
88 See id.
89 See http://p2d.ftw.at (explaining the Point-to-Discover research project). For an overview of such developments, see Peter Frohlich et al., On the Move: Wirelessly Connected to the World, 54 COMMUN. OF THE ACM 132 (Jan. 2011) (discussing mobile spatial interaction research).
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 firm to sort and signal each other as they contract.

i. **Places**

In the last year, location-based applications have proliferated for smartphones. These devices increasingly contain GPS technology to provide location awareness, and with Internet connectivity this permits such devices 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, ATM machines, or the nearest Apple store. But location-sensitive information can also have more profound implications for contracting. The popular website Zillow, for example, aggregates publicly-available information to display housing price information about almost every home in the United States; this information is now available on one’s smartphone as well (e.g., point your iPhone down a street and “see” prices overlaid on each house). Various companies are layering more and more information into such maps. This could include displays of criminal activity in the area or the quality ratings of neighborhood schools. This sort of information could be of obvious import in real estate transactions.

In addition, as discussed above in the context of **Walker-Thomas**, consumers can now easily augment physical locations with digital information. Foursquare, for example, allows users to review retailers, restaurants, or other bricks and mortar locations and to share those reviews with other users, and Google has recently acquired patents on location-
These technologies allow consumers to communicate with and learn from each other in entirely new ways. In the analog world, one 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, one can now learn from one’s social network or from the universe of strangers who have visited that retailer, just by visiting the location and pulling up information tagged to that location. This makes a merchant’s entire reputation available to each consumer that enters that merchant’s store, thereby making it far lower 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 little way to search for information about a given merchant. “Dot’s Diner” knew its quality and record of health code violations, but a potential customer standing on the sidewalk outside could not. As with all sorting problems, 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, however, consumers can access consumer reviews indexed by location, giving consumers entirely new ways to sort their contracting partners.

ii. Goods

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

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

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98 See supra notes __ and accompanying text.

99 See KUNIAVSKY, supra note __ at 72 (“The digitally accessible information about an object can be called its information shadow.”).
Goods have always had such a shadow, but in an analog world it was cost-prohibitive to search for and use such information. One might talk 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.”

Even at the start of the digital era, goods have 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.”

Mobile computing increasingly makes a good’s information shadow instantly accessible 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 complete nutritional information about that food. Almost half of Android and iPhone users have scanned a barcode with their phones; a quarter have scanned an image of a product to search for information about that product. As databases of information about goods become more organized, complete, and available, consumers will increasingly have access to the information shadows of the objects they interact with or wish to purchase in the physical world.

Second, and as important, in addition to consumers being able to sort high-quality from low-quality goods by accessing digital information, goods can now signal to consumers in entirely new ways. Shoes, refrigerators, wine bottles, car tires, and even cattle can now “learn” about themselves, record relevant data, and report such data electronically to consumers. This is the “Internet of Things” — a

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100 Id. at 72.
101 Id.
102 See www.fooducate.com (last visited July 14, 2011).
105 See Suzanne Kantra, Are You Ready For a Smart Fridge?, http://digitallife.today.com (May 2, 2011) (discussing refrigerator models capable to detecting the food inside and monitoring food “sell by” dates).
109 See GREENFIELD, supra note ___ at ___ (providing examples of digitally-connected objects).
connected web of “smart” objects capable of generating data on themselves and transmitting that data. Consider these startling statistics: in 2008, there were more objects connected to the Internet than there were people on Earth; by 2020, there will be 50 billion Internet-enabled objects; in 2011, just twenty typical American households will generate as much Internet traffic as the entire Internet in 2008, in part because of the increasing number of connected devices.\footnote{The term “Internet of Things” was coined at the MIT Auto-ID Center in 1999. \textit{See} Kuniavsky, \textit{supra} note \__ at 79.}

The ability for goods to share information with consumers is, again, a radical change. Essentially, it allows goods—or, more precisely, their manufacturers—to signal quality to consumers in new ways. Consider automobiles. Cars have long had Vehicle Identification Numbers (VIN)—a identifier unique to each vehicle. Until recently, however, searching for information based on a VIN was relatively difficult. Today, Carfax\textsuperscript{112} 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.\footnote{See \textit{http://www.carfax.com} (last visited May 13, 2011).}

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 near field communication capabilities.\footnote{See \textit{Adam Blum, NFC and the Internet of Things}, \textit{http://venturebeat.com} (Jun. 21, 2011) (last visited July 30, 2011) (“[A]ll cars will have NFC tags embedded, containing specifications, statistics and web links for more information on the vehicle.”).} Already, however, manufacturers are realizing the power of allowing cars to “speak for themselves.” Nissan, for example, has begun labeling cars with QR codes to permit consumers to scan any vehicle and access information about its make, model, and features. As these signaling technologies evolve, goods will be able to share far more information about themselves—including such difficult-to-fake signals of quality 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 interaction with the physical world.
iii. People & 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.\textsuperscript{115} Moreover, the Internet has generated new user-generated reputation ranking systems. For example, eBay uses reputational measures of honesty for buyer and seller.\textsuperscript{116} Firms, too, have discovered that their virtual reputations are as, or more, important as traditional word-of-mouth.\textsuperscript{117} Public “report cards” for doctors and hospitals are being touted as a means to correct an ailing health care system.\textsuperscript{118} And rating sites, in which homeowners rate contractors, electricians, or plumbers,\textsuperscript{119} clients rate lawyers,\textsuperscript{120} students rate professors,\textsuperscript{121} tenants rate landlords,\textsuperscript{122} and consumers rate brands and manufacturers\textsuperscript{123} 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,”\textsuperscript{124} and argues that these technologies will create profound change in public law and policy. In particular, Strahilevitz focuses on the ways in which reputational technologies can influence our regulation of discriminatory practices.\textsuperscript{125} In addition to these social or policy implications, digital reputations play a role in contracting as well, 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 section—on contract terms—provides more evidence of the ways in which such information changes the sorting process for consumers. Augmented reality changes sorting and signaling for both consumers and firms, however, not merely for consumers. Consumers can learn more about firms, but firms can also learn more about consumers. As already discussed, facial recognition technologies are now available, rather than just being the stuff of science fiction.\textsuperscript{126} We can also increasingly recognize others by the

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\textsuperscript{115} See, e.g., Diane Coutu, \textit{We Googled You: Should Fred Hire Mimi despite her online history?}, \textsc{Harvard Business Review} (June 2007).
\textsuperscript{116} See http://www.ebay.com.
\textsuperscript{117} See, e.g., Nicholas Thompson, \textit{More Companies Pay Heed to Their ‘Word of Mouse’ Reputation}, \textsc{New York Times} (June 23, 2003).
\textsuperscript{118} See the Health Grades system, http://www.healthgrades.com.
\textsuperscript{119} See http://www.angieslist.com.
\textsuperscript{120} See http://www.avvo.com; http.martindale.com.
\textsuperscript{121} See http://www.ratemyprofessor.com.
\textsuperscript{123} See http://www.epinions.com.
\textsuperscript{124} See Strahilevitz, \textit{Reputation Nation}, supra note ___ at 5.
\textsuperscript{125} See Strahilevitz, \textit{How’s My Driving}, supra note ___ at ___.
\textsuperscript{126} See supra notes ____ and accompanying text.
\end{footnotesize}
AUGMENTED REALITY

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.”

Beyond 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. 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 a lifetime. In a world in which firms can identify consumers—as Acquisti’s study shows they increasingly can—the 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.

iv. Contract Terms

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

Various web sites 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

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128 Kang & Cuff, supra note ___ at 110.
130 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).
131 See supra notes ___ and accompanying text.
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 they want to. WHAT???? I cannot find my original contract to dispute this but this is a shady underhanded way of strong arming extra money out of their customers who are stuck in a contract! … DO NOT EVER sign a contract with Dish TV …”\(^{132}\)

Or consider this May 28\(^{th}\), 2011 review titled “Beware of Contract Fine Print”:

“MassageEnvy—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 MassageEnvy spa exactly 30 days before the end of your membership or otherwise you get charged another monthly credit.”\(^{133}\)

Thousands of similar reviews contain exerted complaints about being locked into contracts for longer than expected,\(^{134}\) excessive cancellation fees,\(^{135}\) and contract terms that mislead consumers about expected benefits or coverage of a contract.\(^{136}\)

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.\(^{137}\) A search for “Anytime fitness contract complaints” brings up complaints posted on

\(^{137}\) See http://www.google.com (search terms “Anytime Fitness”).
pissedconsumer.com, complaintsboard.com, riptoffreport.com, consumercomplaints.com, my3cents.com, scamfound.com, the Better Business Bureau, and a variety of geographically local consumer complaint sites. A search for the same terms just on pissedconsumer.com returns 180 negative reviews, which have been viewed thousands of times by searching consumers. Pissedconsumer indexes and sorts these reviews, as well as aggregates the ratings to give Anytime Fitness a “Five Red Star” score.

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

It is difficult to judge the quality of such consumer and intermediary reviews, but it is easy to assess the quantity: the last few years have witnessed an explosion of contract-related information on such 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.

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

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138 See http://www.google.com (search terms “Anytime Fitness contract complaints”).
140 See id.
143 See, e.g., http://www.webflyer.com (last visited July 1, 2011).
144 See http://www.cars.com (last visited July 1, 2011).
146 See, e.g., http://www.bbb.org (last visited July 5, 2011) (providing reviews of local businesses based on location information).
147 See http://www.searchreviews.com (last visited July 5, 2011) (aggregating 40 million reviews from over a thousand web sites).
In addition, mobile computing technologies make the supply of such information far easier on consumers. The popular website The Consumerist, for example, built a “Consumer Tipster” feature into its mobile application for the iPhone. 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.” The Better Business Bureau’s mobile application has a similar feedback feature, as does PissedConsumer’s iPhone platform.

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 these types of information—about places, goods, people, firms and contract terms—has been available before, but often only at significant cost. Today, these data are more accessible, more often, to more people. The information infrastructure of the economy has shifted underneath the feet of contract doctrine. We now turn to considering 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. This Part

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149 Id.
152 See supra notes __-__ and accompanying text.


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.
focuses on the first 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.\textsuperscript{153} In these cases, we distrust that individual choice will maximize welfare and therefore intervene to police contracts.\textsuperscript{154} Standard form contracts between firms and consumers—like those at issue in \textit{Walker-Thomas}—are the best example.

After reviewing the arguments for and against judicial distrust of consumer contracts, this Part considers two primary effects that augmented reality will have on this debate. Ultimately, it concludes that an augmented reality will 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 other augmented reality device) may be—or become—an important element in determining that party’s contractual rights and obligations.

A. INFORMATION ASYMMETRIES & 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.\textsuperscript{155} This aligned with basic welfare

The normative valence of this argument is unclear. On the one hand, contracts may become more simple and easy 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.


\textsuperscript{154} \textit{See Hermalin, Katz & Craswell, supra note ___ at § 2.3.2 (discussing asymmetric information as a justification for limiting freedom of contract).

economics, which posits that informed parties will reach efficient agreements under optimal conditions. Over the last century, however, the traditional tendency to enforce contracts as written has been under attack in the context of standard form consumer contracts. Courts and consumer advocates are suspicious of such “adhesion contracts,” assuming that they contain one-sided, pro-seller terms harmful to consumers. As a result, modern courts are more likely than their classical predecessors to question, alter, or reject a contract’s written terms on grounds of unconscionability or unfair surprise.

i. The Law & 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 we enter daily would be overly cumbersome. 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

(definition of 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”).

See supra notes __ and accompanying text.

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 ch. 4 (1997) (exploring the history of contextualist reforms in contract law).


See, e.g., F.H. Buckley, The Fall and Rise of Freedom of Contract 8-9 (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.”); 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.”); 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.”).

See Cooter & Ulen, supra note __ at 302 (explaining these justifications).
contracts. So long as this informed minority creates competitive pressure, merchants will offer consumers efficient terms because failure to do so will result in consumers going elsewhere. 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 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.”

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

“New formalism” or neoformalism thus uses law and economics to re-justify enforcing contracts as written. Some neoformalists have contained their arguments to commercial contracting contexts, but many law and economics scholars also doubt judicial policing of consumer

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164 See Cooter & Ulen, supra note __ 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.”).
165 TREBILCOCK, supra note __ at 120.
166 See Alan Schwartz, How Much Irrationality Does the Market Permit?, 37 J. LEGAL STUD. 131, 136 (2008) (arguing that suppliers will provide efficient terms when consumers are informed).
168 See Katz, supra note __ at 500 (discussing new formalism).
169 See, e.g., Schwartz & Scott, supra note __ at 543 (limiting their theory to contracts between relatively sophisticated firms); Geoffrey P. Miller, Bargains Bicoastal: New Light on Contract Theory, 31 CARDOZO L. REV. 1475 (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).
contracts. Economically, such intervention is only justified when one of two conditions holds: either the seller has monopoly power and thus the ability to impose burdensome and inefficient terms, or there is no likelihood that consumers can inform themselves about such terms in a standard form contract. Absent some such market failure, judicial intervention—for unconscionability or even fraud—is unjustified. So long as markets and parties are reasonably informed, freedom of contract should prevail. 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.”

This argument’s force, of course, turns on the empirical claim that a sufficient number of consumers can and will inform themselves enough to police standard form contracts and create market discipline. The debate


171 See Richard Craswell, Freedom of Contract, in CHICAGO LECTURES IN LAW AND ECONOMICS 81, 88 (Eric A. Posner, ed., 2000) (“[M]ost economists conclude that contracts should be overridden only if there is some market failure which prevents [an efficient] outcome from being realized.”); Richard Craswell, Property Rules and Liability Rules in Unconscionability and Related Doctrines, 60 U. CHI. L. REV. 1, 49 (1993) (arguing that courts should intervene in imperfect markets only when they are in a better position to select efficient terms).

172 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) (explaining this argument). 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 __ at 597 (“Deception is … most likely to involve credence qualities, or experience qualities of infrequently purchased goods.”). Thus, as increased information should lead to less unconscionable terms, increased information should lead to less fraud.

173 See ROBERT COOTER & THOMAS ULEN, LAW AND 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.”).

174 Richard A. Posner, Economic Analysis of Law 116 (7th ed.). For a different argument—that standard form contracts may be efficient even if they contain one-sided pro-seller terms, see Johnson, Return of Bargain, supra note __ 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 David Gilo & Ariel Porat, Viewing Unconscionability Through a Market Lens, 52 WILLIAM & MARY L. REV. 133, 140 (arguing that if competition exists, contracts should be enforced even if information gaps exist between firms and consumers).

turns on information. 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.

Over the last decades, many have doubted that consumers can or will inform themselves about standard form contract terms. In most transactions, a consumer has no incentive to read and try to understand a standard form contract: the consumer most likely will not understand the legal language anyway, and the consumer knows that the risk of the contract mattering to her is very low. Moreover, even a small cadre of informed buyers may not appear, because the benefits of processing complex contract terms may not justify the costs. 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.

ii. 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, as in the asymmetric information debate about offline contracting, do consumers read electronic standard form agreements any more than paper contracts? Second, even if not, do consumers have access to other sources of information?

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176 See Cooter & Ulen, supra note __ at 304 (“The real problem with this kind of contract is the buyer’s ignorance, not the absence of bargaining.”); See Russell Korobkin, Bounded Rationality, Standard Form Contracts, and Unconscionability, 70 U. Chi. L. Rev. 1203, 1217 (2003) (“In other words, the principal problem is one of information acquisition.”).

177 See Epstein, Neoclassical Economics, supra note __ 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”); Howard Beales, Richard Craswell & Steven C. Salop, The Efficient Regulation of Consumer Information, 24 J. L. & Econ. 491, 501-502 (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).

178 See, e.g., Meyerson, supra note __ at 596 (“It is particularly inappropriate to make an assumption of perfect consumer knowledge.”)


181 See Hillman, Online Boilerplate, supra note __ at 853 (noting that watchdog groups “may be insufficient to deter businesses from drafting marginal terms that may not cause significant reputational concerns but would harm consumers just the same”).
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, Hillman and Rachlinski saw that “[t]he ease with which consumers can compare business practices, including the content of standard forms, suggests that consumers do not need judicial intervention to protect themselves from business abuse.”182 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: “courts cannot simply assume that the new tools available to e-consumers will suffice to protect them against exploitation.”183 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.184

Part I illustrated, however, that since Hillman and Rachlinksi’s seminal essay we have witnessed the spread of technologies permitting mass consumer-to-consumer and intermediary reviewing of products, brands, and merchants.185 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 may be less justified in the e-commerce environment:

“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 on 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 the

182 Hillman & Rachlinksi, supra note __ at 478.
183 Id. at 492.
185 See supra notes __-__ and accompanying text.
consumer lack bargaining power, or just fail to access a cheap and readily available source?”

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-purchase, if the Internet aggregates sufficient information about those goods from multiple consumers or watchdog intermediaries.

Becher and Zarsky, for example, have recently argued that “the online realm creates market conditions and information flows that may allow market forces to assure balanced [standard form contracts].” 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 the firm’s web site and that there is heavy consumer-to-consumer information flow. 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 set of more onerous terms to the majority of uniformed consumers, or tampers with information exchange between consumers, such actions might justify judicial intervention.

This line of inquiry is new, and certainly not settled. Its implications, however, are clear: such secondary sources of information may

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187 For discussion of these different types of goods, see Phillip Nelson, *Information and Consumer Behavior*, 78 J. POL. ECON. 311 (1970) (drawing distinctions between search, experience and credence goods).
189 See id. at 359.
190 See id. at 359-60.
191 See, e.g., Nishanth V. Chari, *Note: Disciplining Standard Form Contract Terms Through Online Information Flows: An Empirical Study*, 85 N.Y.U. L. REV. 1618 (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 (e.g., 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 shows that consumers are now sharing information about contract terms much more directly, through particularized consumer reviews that discuss contract terms specifically.
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 two distinct transactional spheres: a set of contracting experiences that occur in the physical world and a separate set of on-line 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 and thereby lessen 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 two ways. First, 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 pre-contract. 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. Second, in an augmented reality, sellers have greater ability to inform consumers about contract terms at very low cost. Firms may begin to do so to signal their product’s or brand’s quality. As those firms with the “best” contract terms create such signals to differentiate themselves in the markets, other firms may be forced to follow, thereby creating increased market pressure to make standard form contract terms more consumer-friendly. This will also support arguments for respecting consumer contracts as written.

The argument in this Section has certain limited parallels with Fairfield’s recent “search theory” of contract. See 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 is primarily on the benefits of standardization, however, see Joshua Fairfield, The Cost of Consent: Optimal Standardization in the Law of Contract, 58 EMORY L.J. 1401 (2009), whereas my focus is on showing how technology is decreasing transaction costs—particularly sorting and signaling costs—and thereby changing asymmetric information arguments for distrust of consumer contracts.
i. 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 their local car dealership—has access to the same information about the goods arrayed in front of her as might a consumer 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 consumers suffered from an information deficit during the transaction.

The relevant question may not be whether consumers—or 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 should 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.\(^\text{193}\) Approximately 35 percent of Americans own a smartphone.\(^\text{194}\) Of those, 68 percent use the smartphone to browse the Internet daily; approximately one quarter use it as their primary vehicle for online browsing.\(^\text{195}\)

Smartphone ownership is predictably greater among the affluent. Those earning $150,000 or more in annual household income are more than three and a half times more likely to own a smartphone than those in the lowest income bracket of $10,000 or less.\(^\text{196}\) Put slightly differently, roughly three quarters of high income earners own a smartphone; less than twenty percent of low income earners do.\(^\text{197}\) (More than half of those with household incomes above $75,000 own smartphones.) Smartphone ownership also correlates with education level: those with college degrees are more likely to own a smartphone than those without.\(^\text{198}\) And with race:

\(^{194}\) See Aaron Smith, 35% of American Adults Own a Smartphone, PEW INTERNET & AM. LIFE PROJECT (Jul. 11, 2011) (providing statistics).
\(^{195}\) See id.
\(^{196}\) See id. at 7 (“Smartphone ownership is highly correlated with household income.”).
\(^{197}\) See id.
\(^{198}\) See id.
AUGMENTED REALITY

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. Finally, smartphone ownership correlates strongly with age. Even among those with lower household incomes, for example, 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—this is roughly equivalent to the national average. By comparison, smartphone ownership among low-income seniors is very low: roughly 4 percent.

These statistics suggest that courts are likely to begin to differentiate between connected and disconnected consumers—between those with access to digital information about their transactions and those without such access. It may well be that a consumer’s level of connectedness becomes as important for the interpretation and enforcement of their 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 beginnings of augmented reality technologies and the collapse of digital and physical space. Huge amounts of new information is now available to consumers, but it is not perfectly comprehensive. If information about a given product or contract is unavailable, consumers’ 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 bricks and mortar, traditional consumer contracts. That distinction is less and less relevant. The distinction that makes a difference is between those with access to augmented reality technologies and those without.

ii. Sellers Signaling Consumers: Increased Ability to Explain Contract Terms—and Increased Market Pressure to Do So

In addition to consumers being able to sort firms and distinguish good from bad contracts prior to purchase, augmented reality technologies create new low-cost means for consumer-friendly sellers—with consumer-friendly contracts—to signal their quality by informing consumers about the meaning of contract terms. As the transaction costs of signaling in this way decrease, firms may begin to do so to build brand loyalty and to insulate their contracts from later legal attack. Ultimately, this may create

199 See id. at 9.
200 See id. at 9.
201 See id.
202 For discussion of signaling, see supra notes ___ and accompanying text.
competitive pressure on other firms to follow suit. In economic terms, the market for standard form contracts may unravel.

To begin this argument, first consider the importance of explanation in the standard form contracting context. Return to Williams v. Walker-Thomas. The court stressed that the term was not conspicuous—it was “hidden in a maze of fine print.” This suggests, however, that if Walker-Thomas had explained the term to Ms. Williams, perhaps any procedural unconscionability would have been cured. As Korobkin has explained, “[t]o 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.”

Whether contract terms have been explained has long been a factor in unconscionability analysis. As the Uniform Commercial Code puts it, “[t]he principle is one of the prevention of oppression and unfair surprise …” Generally, if the party proposing terms explains those terms to the receiving party, courts will not find a provision procedurally unconscionable. As 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 ….”

This holds across contexts. Consider American General Financial Services, Inc. v. Griffin, 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. Or Caley v. Gulfstream

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204 See Meyerson, supra note __ at 613 (discussing Walker-Thomas and the possibility of a seller explaining complex terms, and arguing that “[a] seller wishing to ensure the enforceability of a subordinate clause should be able to do so by adequately disclosing the meaning and effect of that clause”).
206 See 8 Williston on Contracts § 18:9 (4th ed.) (describing elements of unconscionability, including whether the terms were explained).
207 See U.C.C. § 2-302, Comment 1. See also Leff, supra note __ 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 bargai[ning]” about a term, then courts should not interfere with that term even if it were unconscionable).
208 E. Allan Farnsworth, Farnsworth on Contracts § 4.29a (3d. ed. 2004).
210 Other arbitration-related cases have found the same. See Sammy Enterprises v. O.P.E.N. America, Inc., 144 Wash. App. 1031 (2008) (finding that arbitration in a standard form
Aerospace Corp.,\textsuperscript{211} in which an arbitration agreement was found enforceable, despite an apparent “bargaining disparity” between the corporate employer and its employees, because the employer provided employees with a cover letter to the agreement explaining the terms and the dispute resolution policy’s importance. Or Ryan v. Dan’s Food Stores, Inc.,\textsuperscript{212} in which an employee signed an employment handbook containing an acknowledgement that his employment was at will, and then later attempted to argue that the handbook was unconscionable. The court found that the handbook was not procedurally unconscionable, in part because its terms were explained to the employee by the employer.

In most unconscionability cases, of course, the terms are not explained. But in an augmented reality, the cost of explanation drops, for 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.\textsuperscript{213} 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 explanation. This gives firms control at the corporate level of the explanations given about contracts at the local level. Whereas in an analog world, a corporate legal department might forbid local salespeople from saying too much for fear that local explanations would be incorrect or somehow create liability,\textsuperscript{214} in an augmented reality corporate counsel can control the message “all the way down.” Not only does augmented reality allow a firm to scale explanation; it allows a firm to control that explanation as it scales.

\footnotesize{contract was not unconscionable where cover page clearly stated that disputes would be sent to arbitration).}

\textsuperscript{211}428 F.3d 1359 (11th Cir. 2005).
\textsuperscript{212}972 P.2d 395 (Sup. Ct. of Utah, 1998).
\textsuperscript{213}See, e.g., Hill v. Gateway 2000, Inc., 105 F.3d 1147, 1149, cert. denied 522 U.S. 808 (1997) (“Cashiers cannot be expected to read legal documents to customers before ringing up sales.”).
\textsuperscript{214}See BUCKLEY, supra note ___ at 11 (noting the agency cost problems within a seller of allowing local salespeople to make representations about or change consumer contracts).
Finally, the cost to firms of explanation drops for a third reason: in an augmented reality, firms can give consumers 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, a firm can signal to a consumer that explanatory material is available without forcing that material 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 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 explanation. This can be an important element in an unconscionability analysis. As the court in Weaver v. American Oil Co. 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.” In other words, a seller must be able to prove that a robust explanation of the contract’s terms in fact occurred. Augmented reality facilitates such proof, because digital technologies inherently permit tracking of access. Thus, for example, it would be quite simple to track and record whether a given 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 on that video.

We have now established that contract explanation is doctrinally important, and that the cost of explanation is decreasing rapidly. Now consider how this creates market pressure for firms to improve the consumer-friendliness of their standard form contracts.

Transaction cost economics teaches that as the transaction costs of disclosure drop, an unraveling effect can begin. Firms with the “best” private information (e.g., the best contract terms or product information) will disclose because they seek advantage from informing consumers; firms with slightly less advantageous private information will then disclose in

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215 See supra notes __-__ and accompanying text (providing example and description of QR codes).
216 See Hill v. Gateway 2000, Inc., supra note __ (“And oral recitation would not avoid customers’ assertions … that the clerk did not read term X to them ….”).
217 276 N.E.2d 144 (Ind. 1971). See also Hillman, supra note __ at 140-41 (discussing Weaver).
order to distinguish themselves from even “worse” firms; and so on, until all firms have disclosed.219

This is the core insight of the unraveling effect in economics. Early work by Paul Milgrom220 and Sanford Grossman221 independently explored the unraveling process that occurs as those that can certify their quality do so in order to distinguish themselves from the larger pool of lower-grade labor, products, or services.222 The unraveling effect holds that under conditions of information asymmetry but with verifiable information and penalties for fraud,223 every member of a pool will ultimately reveal its type, even if at first it seems unwise for each to do so. At first the individual with the “best” trait has reason to disclose her type because her trait is better than the average, and thus being lumped together with the rest of the pool is not in her self-interest. Once the best individual has disclosed her type, however, the “average” type remaining in the pool shifts. Now the second best individual has a similar interest in disclosure. The average quality drops again. As the economist Robert Frank puts it, “[t]he 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.224

In the consumer context, economists have long argued that disclosure laws are sometimes unnecessary, if the conditions for unraveling prevail.225 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.226 These firms may begin to include video or other

219 Id. (arguing that in a market where some sellers disclose information, silence will be seen as an indication of inferior products or services).
222 Although Grossman and Milgrom are generally credited with the effect, Kip Viscusi first used the term “unraveling.” 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 86 (1983) (discussing unraveling).
225 Id. (arguing that the unraveling effect makes disclosure laws unnecessary).
226 See Peppet, Unraveling Privacy, supra note ___ at ___ (discussing reduced transaction costs and their impact on the unraveling effect).
augmented explanations alongside their standard form contracts. As they do so, other firms may be forced to follow.

This will have several effects. First, such explanations will highlight potentially questionable or difficult to understand terms for consumers, making it easier for consumer-to-consumer reviews or intermediary watchdog groups to focus on those terms. Second, such augmented explanations may somewhat insulate these terms from judicial scrutiny. Cases already exist in which courts have found that a videotaped explanation of a contract can show intent to be bound or significantly reduce or eliminate procedural unconscionability. In Manning v. Brannon, 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. 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.227 Similarly, in Hartung v. J.D. Byrider, Inc., 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.228 Some consumer protection statutes have also incorporated video explanations to protect consumers.229

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 were rich descriptions of questionable terms available to the consumer prior to contracting. This suggests that in the consumer context, courts may find new reasons to enforce contracts as written.

One could certainly object that consumers in an augmented reality are no more likely to watch short videos explaining contractual terms than they are in today’s economy to read lengthy and obtuse legal forms. If consumers remain uninformed despite these additional sources of information, a formalist turn by the judiciary in contract cases will be unwarranted—if consumers remain uninformed then firms will be able to

227 See Manning v. Brannon, 956 P.2d 156 (Cl. of Civ. App. Ok. 1997). In Burd v. KL Shangri-Law Owners, L.P., the court noted that the plaintiff did not have access to video as the plaintiff had in Manning; this supported the court’s finding that the contract term at issue in Burd was insufficiently explained. See Burd v. KL Shangri-La Owners, L.P., 67 P.3d 927 (Ok. Civ. App. 2003).
228 See Hartung v. J.D. Byrider, Inc. (U.S. Dist. Ct., E.D. Calif. 2008). See also Motsinger v. Lithia Rose-FT, Inc., 156 P.3d 156 (Cl. App. Or. 2007) (holding that arbitration clause in employment agreement was not procedurally unconscionable because all employees were shown an explanatory video at the time of employment).
insert exploitative terms into their contracts and then insulate those terms via these augmented reality technologies.

Robert Hillman has recently made a similar argument in the context of mandatory website disclosure of e-commerce contract terms. 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.230 Procedural unconscionability may be difficult to establish if consumers had an opportunity to read the terms prior to contracting.231 He calls this a “legal backfire.”232

Likewise, here courts may backfire if they enforce standard form contracts as written because of embedded augmented reality explanations without inquiring whether consumers really watched those explanations. At the same time, however, the normative response is simple: at what point do we hold consumers responsible for understanding contracts if 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 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.

Before concluding this discussion of standard form consumer contracts, one more small point. If the unraveling effect takes hold and firms begin to include augmented reality explanations in their contracts, courts may emphasize a failure to explain terms as a reason to find a contract unconscionable. In other words, firms may be stigmatized for not signaling quality. Courts have required explanation in some contexts,233 and have also

230 See Robert A. Hillman, Online Boilerplate: Would Mandatory Website Disclosure of E-Standard Terms Backfire?, 104 MICH. L. REV. 837, 840 (2005-2006) (“[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.”).
231 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.”).
232 See id.
233 See, e.g., Johnson v. Mobil Oil Corp, 415 F. Supp. 264 (1976) (holding consequential damages limitation unenforceable in contract between gas station operator and oil company because operator was uneducated, did not understand the contract’s terms, and the contract was not explained); State Farm v. Khoe, 884 F.2d 401 (1989) (finding that conditional receipt
found that the lack of a video explanation can support a finding of unconscionability. As the cost of augmented reality technologies drop and it becomes cheaper for sellers to include video or other AR to explain contract terms, this, in turn, provides justification for a court to require that sellers educate buyers about the meaning of important terms.

III. THE EFFECTS ON BOUNDED RATIONALITY ARGUMENTS FOR Distrusting Consumer Contracts

Let us 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 or have insufficient information 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, increasingly sophisticated mobile applications can now “push” such information to consumers based on 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 to question standard form consumer contracts. The economic theory of contract assumes that parties have the capacity to make rational, informed decisions. If this assumption fails, there is no reason to protect the outcome of the parties’ choices: we can only assume that 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.

clause in health care coverage policy was suspect if inadequately explained to insureds and that explanation was necessary to prevent unconscionability).

234 See Burch v. County of Washoe, 49 P.3d 647, 648 (Sup. Ct. Nev. 2002) (finding that homebuyers warranty was unconscionable even though the contract stated that the homebuyers had watched an explanatory video, because homebuyers had not in fact watched the video).

235 See Cooter & Ulen, supra note __ at 306-307 (“In cases like Williams, the court might require proof that the buyer understood the add-on clause as a condition of enforcing it. The courts would require the contractual process to contain protections against ignorance about add-on clauses.”).

See E. Allan Farnsworth, Farnsworth on Contracts § 4.1 (3d. ed. 2004) (discussing capacity as a limitation); Hermalink, Katz & Craswell, supra note __ at § 2.3.4 (discussing capacity and bounded rationality as justifications for limiting freedom of contract).
Contract doctrine has long protected certain classes of parties due to concerns about capacity. Infirmitiy, minority and intoxication are the traditional examples; lack of sophistication, education, or knowledge are more modern examples. More recently, behavioral law and economics scholars have begun to argue that cognitive heuristics, biases, and errors sometimes lead contracting parties to make faulty choices. Although not fully incapacitated, these justifications for intervening in contractual arrangements rest on a similar argument—that consumers are incapable of fully rational choice 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 will occur 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 dampen directly the effects of bounded rationality in consumer contracting.

A. BOUNDED RATIONALITY & FREEDOM OF CONTRACT

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

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237 See Alan Schwartz, A Reexamination of Nonsubstantive Unconscionability, 63 Va. L. Rev. 1053, 1076 (1977) (discussing the “inferences of incompetence” that courts sometimes make about the poor or undereducated).
238 See, e.g., Shmuel I. Becher, Behavioral Science and Consumer Standard Form Contracts, 68 La. L. Rev. 117 (2007) (“Behavioral insights demonstrate that people sometimes make bad choices even where good information is available.”).
241 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, 76 (2009) (“Behavioral economics represents a frontal assault within economics itself on the simplifying assumptions of neoclassical law and economics.”).
242 See J.D. Trout, Paternalism and Cognitive Bias, 24 Law & Phil. 393 (2005) (connecting paternalism arguments to the behavioral law and economics of contract).
decision-making makes it possible for sellers to include exploitative contract terms in their standard form contracts. 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*. Eisenberg argued that the standard economic account of contracting assumes that consumers have the ability to weight the costs and benefits of contract terms and make a rational choice that will maximize their utility. He then reviewed 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. Second, consumers are subject to optimism biases. In general, psychological studies have shown that adults are systematically over-optimistic and tend to downplay (or mispredict) the likelihood of negative future events. Third, consumers are subject to what is known as the availability heuristic. This leads them to place disproportionate weight on easily available information when making decisions and to underemphasize less available—but perhaps more relevant—information. Thus, consumers may ignore low probability risks and give too little weight to future costs and benefits as compared to present costs and benefits.

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

244 See Eisenberg, * supra note __.
245 See id. at 214 (“[H]uman rationality is normally bounded by limited information and limited information processing.”).
247 See Eisenberg, * supra note __ 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.”).
249 See also Jeremy A. Blumenthal, *Emotional Paternalism*, 35 FLA. ST. L. REV. 1, 25 (2007) (“[B]ecause breach of contract tends overall to be atypical, contracting parties might be vulnerable to the heuristic and mispredict the likelihood of breach ….”).
250 See id. at 243-44.
prevail, because consumers have limited information processing ability and make choices about where to invest their attention and cognition.

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 …. “251 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—e.g., price—while ignoring other less salient terms—such as boilerplate arbitration clauses or financing terms.252 Sellers can therefore include inefficient and self-serving boilerplate terms, because consumers will ignore them.253 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.254 He argues that buyers like Ms. Williams are unable to factor all of the various terms in a standard form contract into their decision-making, or 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.255 In addition, like Eisenberg, Korobkin considers the effect of optimism biases and overconfidence. He argues that Ms. Williams likely underestimated the risk of future default and overestimated her ability to control that risk going forward.256 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

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251 See Korobkin, Bounded Rationality, supra note __ 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.”).
252 See id. at 1206. For critique of Korobkin’s approach, see Klick, supra note __ at 560-64 (critiquing Korobkin and offering alternative hypothesis about standard form contracts as a price discrimination mechanism).
253 See Korobkin, supra note__ at 1230.
255 See id. at 460.
256 See id. at 461.
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."

He focuses on consumer credit card transactions, 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. Credit card companies take advantage of this imperfect decision-making by including oppressive long-term rates and fees—which consumers ignore—but attracting consumers with consumer-friendly short-term pricing such as teaser rates.

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 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.”

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.

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257 Oren Bar Gill, Seduction by Plastic, supra note 2 at 1415.
258 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 TEXAS 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 non-compete clauses).
259 See also Mann, “Contracting” for Credit, supra note 2 (discussing behavioral biases such as salience in the credit card context).
260 See id. at 1376.
261 Id. at 1432.
262 See id.
B. TWO EFFECTS 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 AR to consider here: the possibility that the ubiquitous availability of information will inherently or indirectly “debias” consumers, and the possibility of using AR technologies to purposefully and directly “debias” contracting consumers. Consider each in turn.

i. Sorting and Debiasing: General Debiasing Through Increased Information

On one hand, it is doubtful that augmented reality technologies will contribute to a “general debiasing” of consumers. Many of these biases are difficult to correct. For example, simply explaining the overconfidence bias is rarely sufficient to debias consumers. Moreover, debiasing research has generally found that merely providing subjects with general information about risks and probabilities does not dampen these behavioral effects. 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.

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.\textsuperscript{267} 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 a consumer may not read a standard form contract and understand all of its terms, she might focus on the fact that the average consumer gave that product only one out of five “stars” on Amazon.\textsuperscript{268} Or, she 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 may 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.\textsuperscript{269} Consider just one more, in the context of this discussion of salience. On May 5, 2011, a consumer posted a review about Sirius satellite radio on www.pissedconsumer.com. The review highlights problems with Sirius’ contracts:

“I signed up for 1 year of Sirius radio in April of 2010. I did not want it to continue, so I let it expire without renewing. The radio 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 definitely unethical and sleazy. … Stay away!”\textsuperscript{270}

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. Pissedconsumer’s mobile application, for example, uses a “Five Red Star” system. The more red stars a product receives from other consumers, the

\textsuperscript{267} See supra notes __-__ and accompanying text.
\textsuperscript{268} See id.
\textsuperscript{269} See Part I, supra notes __-__ and accompanying text.
higher the volume of consumer complaints. 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. 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.

These mobile offerings are new—both Pissedconsumer and the Better Business Bureau launched their 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 simplified ratings services may serve to counteract bounded rationality in consumer purchasing decisions by producing highly salient information that consumers can easily digest.

In addition to ameliorating salience effects, an augmented reality may also counteract consumers’ over-confidence about the future and apparent tendency to underestimate the probability of negative future events. Reading online consumer reviews, one is struck by 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 life experience. A later consumer reading an online review will therefore be on notice of that possible contingency, and will likely factor it into their calculus about purchasing the product or service in question. Even if a given consumer chooses not to read every online review—thereby learning about all of the discovered contingencies—feedback about such low probability events gets factored into the aggregated ratings on these sights. 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.

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271 See Part I(B)(iv), supra (discussing Pissedconsumer.com).
273 See id.
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, 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 one-sided terms to begin with.

ii. **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 in order 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 “nudge” them to make better decisions. Consider this second mitigating effect on the bounded rationality justification.

Targeted information can in some circumstances help to debias consumers.273 As Linda Babcock has noted, “[i]n 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.”276 Warning labels on cigarettes and alcohol are an example, as are risk disclosures to consumers prior to entering into credit or other sensitive transactions.277 In general, requiring subjects to consider contrary evidence has had greater

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

276 Babcock, *supra* note _ at 916.

277 See Oren Bar Gill, *Seduction by Plastic, supra* note _ 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).
success in countering overoptimism biases than merely providing
generalized information about the biases themselves.\textsuperscript{278}

Jolls and Sunstein argue that debiasing efforts can use one aspect of
bounded rationality—the availability heuristic—to counteract another—
over-optimism. “[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.”\textsuperscript{279} The key is to expose subjects to a “concrete instance of the
occurrence.”\textsuperscript{280} This tends to “render the incident in question available in a
way that can successfully counteract optimism bias.”\textsuperscript{281} In a classic study,
for example, Weinstein attempted to counteract the fact that due to over-
optimism, 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.\textsuperscript{282}

Jolls and Sunstein argue that one could use the law to debias
customers 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.”\textsuperscript{283}

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, AR is rapidly lowering the cost of distributing video, 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.

\textsuperscript{278} See, e.g., Richard P. Larrick, \textit{Debiasing}, in \textit{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, \textit{Libertarian Paternalism Is an Oxymoron}, 99 NW. U. L. REV. 1245, 1277 (2005) (reviewing literature on successful
debiasing).

\textsuperscript{279} Jolls & Sunstein, \textit{Debiasing Through Law}, supra note __ at 210.

\textsuperscript{280} Id.

\textsuperscript{281} Id.

\textsuperscript{282} See Neil D. Weinstein, \textit{Unrealistic Optimism About Future Life Events}, 39 J. PERS. & SOC.

\textsuperscript{283} Jolls & Sunstein, \textit{supra} note __ at 213.
Consider consumer credit card contracts. Ronald Mann has argued persuasively that debiasing interventions are both necessary and possible in the credit card sector. To make such interventions succeed, Mann focuses on the need to provide simple, powerful information to consumers at the point of contracting. 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 graphical or 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 Camerer et al. have called “asymmetric paternalism”—interventions that assist uninformed consumers without imposing costs on the informed. They cite as an example the disclosure that creditors must make to mortgage applicants under the Federal Truth in Lending Act:

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

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.”

284 See Mann, Contracting for Credit, supra note __ 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.”).
285 See id. at 921 (“If 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”).
288 Camerer et al., supra note __ at 1233.
consumers who already understand this risk will ignore such warnings; uninformed consumers may take notice.\textsuperscript{290}

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, so long as they met certain criteria (e.g., 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, 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 worthy warning messages.”\textsuperscript{291} 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 TicTacs.

Regulatory intervention might therefore 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 best to employ them. This is not a contract law problem, per se, but instead a consumer protection problem of how best to use these new methods of information dissemination.

\textsuperscript{290} See Camerer et al., \textit{supra} note \_ at 1233 (“For the naïve consumer, the disclosure can be enormously beneficial, moving her one step closer to educated consumer status.”).

\textsuperscript{291} See Camerer et al., \textit{supra} note \_ at 1235.
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 and police standard form consumer contracts 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 of contract theory recognizing how contingent contract doctrine is on these underlying technological and economic conditions.