

Disclosure: Psychology Changes Everything

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Annu. Rev. Econ. 2014. 6:391–419

First published online as a Review in Advance on March 6, 2014

The *Annual Review of Economics* is online at economics.annualreviews.org

This article's doi:
10.1146/annurev-economics-080213-041341

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JEL codes: D03, D18, D82, D83, L51

Keywords

mandatory disclosure, regulation, behavioral economics, nudges, telltale heart effect, moral licensing

Abstract

We review literature examining the effects of laws and regulations that require public disclosure of information. These requirements are most sensibly imposed in situations characterized by misaligned incentives and asymmetric information between, for example, a buyer and seller or an advisor and advisee. We review the economic literature relevant to such disclosure and then discuss how different psychological factors complicate, and in some cases radically change, the economic predictions. For example, limited attention, motivated attention, and biased assessments of probability on the part of information recipients can significantly diminish, or even reverse, the intended effects of disclosure requirements. In many cases, disclosure does not much affect the recipients of the information but does significantly affect the behavior of the providers, sometimes for the better and sometimes for the worse. We review research suggesting that simplified disclosure, standardized disclosure, vivid disclosure, and social comparison information can all be used to enhance the effectiveness of disclosure policies.

1. INTRODUCTION

Mandatory disclosure of information, targeted transparency (Weil et al. 2013), is among the most ubiquitous and least controversial elements of public policy, often promoted as an attractive alternative to so-called hard forms of regulation. Who can oppose low-cost policies designed to provide health and safety warnings to workers, energy-efficiency information to consumers, privacy information to those giving personal data to companies over the Internet, or disclosure of the financial risks associated with investments, home mortgages, credit cards, and auto loans? Despite a paucity of data supporting the efficacy of such policies, information disclosure has been broadly advocated as an appropriate response to a wide range of social and economic problems (e.g., Bebchuk & Jackson 2013, Guttentag 2004, Kleindorfer & Orts 1998, Lansky 2002, Sage 1999).

An important advantage of disclosure requirements, as opposed to harder forms of regulation, is their flexibility and respect for the operation of free markets. Regulatory mandates are blunt swords; they tend to neglect heterogeneity and may have serious unintended adverse effects. For example, energy-efficiency requirements for appliances may produce goods that work less well or that have characteristics that consumers do not want (Allcott & Greenstone 2012). Information provision, by contrast, respects freedom of choice. If restaurant patrons are informed of the calories in their meals, those who want to lose weight can make use of the information, leaving those who are unconcerned about calories unaffected. If automobile manufacturers are required to measure and publicize the safety characteristics of cars, potential car purchasers can trade safety concerns against other attributes, such as price and styling. Disclosure does not interfere with, and should even promote, the autonomy (and quality) of individual decision making. If properly designed, it should also increase efficiency, helping to avoid cases of market failure resulting from incomplete and asymmetric information coupled with misaligned incentives (e.g., Akerlof 1970, Ross 1973).

Standard economic theory offers several explanations for why the provision of information occurring naturally, as a function of market forces, may be suboptimal. Information about consumer products is typically provided by sellers, who advertise their products to attract consumers. Sellers in effect subsidize the provision of information that complements their products. However, when sellers possess information indicating the low quality of their products, they may not voluntarily choose to release this information. This information is still valuable to consumers, and in some cases, there is an active market for product quality information (e.g., provided by *Consumer Reports* magazine). Often, however, this information can be viewed as a quasi-public good that, because of the free-rider problem, may be underprovided relative to the social optimum. The problem is that one consumer may pay for valuable information that he or she uses to avoid purchasing a low-quality product, but other consumers can then gain this information by observing his or her decision not to purchase the product. The market for information fails. For this reason, much, and perhaps most, of the information provided in mandatory disclosures (e.g., product risk warnings, financial disclosures, or nutrition fact labels) would not be provided by free markets.

The cost of providing such information (including the cost of enforcing disclosure regulations) is of course a legitimate consideration (Jovanovic 1982). Mandatory disclosure can be justified by an efficiency argument when the societal gains from information provision outweigh the societal costs (Coffee 1984). A comprehensive accounting of costs, moreover, should include the time that people need to process the information; the opportunity costs of distracting attention from existing information; and even, in some cases, the emotional costs of dealing with the information. Graphic cigarette warning labels, for example, might seem to be low cost, but they may well reduce the utility of people who continue to smoke (Loewenstein & O'Donoghue 2006), and at least in principle, that loss should be taken into account. The same

is true of requirements to disclose the caloric content of food, which will have negative hedonic consequences for those who continue to eat high-calorie foods.

Given the potential benefits and the often low cost of information disclosure, it should come as no surprise that disclosure policies have proved highly attractive to legislators and regulators (Sunstein 1999). The Credit Card Accountability Responsibility and Disclosure (CARD) Act of 2009, the Affordable Care Act, and the Dodd-Frank Wall Street Reform and Consumer Protection Act are all packed with disclosure requirements (on the CARD Act in particular, see Agarwal et al. 2013). The same is true of the Sarbanes-Oxley Act (implemented in the aftermath of highly publicized accounting irregularities following the failure of companies such as Enron and WorldCom), as Ripken (2006) notes in an insightful article. In several of its sections, the act does not ban or require specific corporate or auditor practices but instead mandates disclosure. For example, it does not require corporations to include financial experts on their boards of directors but requires firms to disclose whether they have, and, if not, to explain why not. Similarly, it does not require corporations to adopt a code of ethics for senior financial officers but, if no ethics code is adopted, requires corporations to disclose why they failed to do so.

The ubiquity of disclosure is documented forcefully and amusingly in a paper by Ben-Shahar & Schneider (2010) titled, provocatively, “The Failure of Mandated Disclosure.” The authors devote 12 pages to listing some of the numerous and sometimes absurd disclosure requirements embedded in federal and state statutes, administrative regulations, and court rulings, and applying to virtually all types of loans, bank accounts, mutual funds, credit cards, securities brokers, credit-reporting agencies, investment advisors, ATMs, pawnshops, payday loans, rent-to-own contracts, installment sales, all types of insurance contracts, vehicle rentals, self-storage facilities, car towing companies, car repair shops, and much more. Perhaps the most amusing (if somewhat macabre) example is the requirement that funeral operators in California disclose to casket purchasers that “there is no scientific or other evidence that any casket with a sealing device will preserve human remains.”¹

Perusal of this list suggests a common pattern in situations in which mandatory disclosure requirements are imposed. In general, such requirements are applied when less informed consumers interact with better informed sellers and when the incentives of the consumers and sellers are at least arguably misaligned. These features characterize situations such as the following:

- Interactions between an automobile seller and a potential customer. The seller has better information about the safety of the cars he or she sells, but the customer may have a greater interest in driving a safe car.
- Interactions between a chain restaurant and its patrons. The restaurant has better information about the nutritional properties of the food it sells, but the customer may have a greater interest in eating nutritious food.
- Interactions between a physician and a patient. The physician has better information about the appropriateness of different tests and treatments but may also have incentives to recommend specific tests, drugs, or services (e.g., surgery) that may not be in the patient’s best interest.
- Interactions between manufacturers who outsource production to establishments that mistreat workers or engage in environmentally destructive patterns of behavior and

¹Similarly skeptical, Davidoff & Hill (2013) argue that disclosure requirements have limited impact, based largely on the failure of the extensive disclosures that were in place prior to 2008 to deter even sophisticated institutional investors from engaging in the risky transactions that led to the 2008 financial crisis. Guttentag et al. (2008, p. 241), in contrast, dismiss analyses of this type on the grounds that “case studies are of limited effectiveness in revealing systemic patterns or in disentangling cause and effect” and present findings from a stylized experiment that, they claim, provides evidence that disclosures can deter corporate fraud.

consumers. Firms have better information about their production practices, but consumers, although they undoubtedly appreciate low prices, may have a desire to consume so-called green or socially conscientious products.

In what follows, we focus on these types of situations, characterized by misaligned incentives and asymmetric information, often referring to the consumers and sellers as the demand side and supply side of the interaction, respectively.

In addition to situations in which disclosure addresses standard economic market failures created by asymmetric information and misaligned incentives, we examine situations in which disclosure serves the purpose of helping to protect consumers against their own propensity to err. Psychology and behavioral economics provide a new rationale for regulation that supplements traditional economic accounts (Camerer et al. 2003, Sunstein & Thaler 2003). The new rationale involves what might be called behavioral market failures (Sunstein 2014). Among other things, behavioral economics enlarges the potential scope of justifiable regulation by introducing the concept of internalities, analogous to the concept of externalities in standard economics but taking the form of costs that individuals impose on themselves and fail to internalize at the time of decision (Gruber & Koszegi 2001, Herrnstein et al. 1993).

We note that cognitive or motivational errors and internalities alone do not provide a rationale for mandatory disclosure regulations; at least some kind of misalignment of incentives is important in such cases as well. Suppose that at time 1, a consumer is making a decision that will harm himself or herself at time 2, with the long-run cost exceeding the short-term benefit. If the seller's incentives are aligned with the consumer's long-term interests, the seller will provide information or products intended to reduce or eliminate the internality. For obvious reasons, this is rarely the case. If fast-food customers fail to take account of the health consequences of excessive calories, for example, then fast-food restaurants can exploit this failure by offering enticing but unhealthy menu options that are cheap to produce. Likewise, if car purchasers pay insufficient attention to fuel costs, then car manufacturers can offer gas guzzlers that are cheaper to produce and more attractive with respect to the attributes to which consumers attend. And if credit card users are unrealistically optimistic or prone to procrastination and inattention, financial institutions can offer cards with generally favorable terms but also with high late and overuse fees.

Information disclosure can take a variety of forms (see, e.g., Teisl & Roe 1998, Worsfold & Worsfold 2007). The most appropriate form depends on the situation in which a market failure arises. It is important to distinguish between situations in which information is verifiable (and misinformation can be punished) and those in which information is unverifiable. The calorie claims of a fast-food restaurant and the fuel economy claims of an automobile manufacturer, for example, can be scientifically validated. But if a doctor expresses the view that a patient is ideally suited for a clinical trial, there is no realistic way to verify that he or she really believes that, or is conveying it because he or she will benefit by receiving a referral fee.

When information is verifiable, disclosure can focus on rectifying an information asymmetry—on providing information to the less informed buyer or advice recipient to level the informational playing field. When a drug company is required to include a warning label with a prescription drug, for example, the warning is designed to mitigate the asymmetry in information between the manufacturer of the drug, who has access to potential side effects, and the patient, who, in the absence of the disclosure, would not. The same is true when an automobile company is required to include a label with the fuel economy of cars (Sunstein 2013).

When information is unverifiable, however, mandatory disclosure attacking the information asymmetry would be useless because there would be no way to know if the disclosed information is accurate.² In this case (as well as in the case of verifiable information), the informed party could still be required to disclose the misalignment of incentives. In New York State, for example, prospective home buyers and sellers are required to sign (to verify that they have been shown) a disclosure form designed to inform “potential buyers or sellers with whom [real estate licensees work] of their agency relationship and the rights and obligations it creates. This disclosure will help you to make informed choices about your relationship with the real estate broker and its sales agents.”

One might think it should be obvious to disclosesees when interests are misaligned, making disclosure unnecessary, but existing research suggests that many recipients of advice are not aware of misalignments, or at least behave as if they are not, taking advice from conflicted sources at face value (e.g., Malmendier & Shanthikumar 2007). Beyond suggesting to information recipients that they should perhaps mistrust information coming from advisors with misaligned incentives, awareness of the misalignment could also encourage advisees to seek out advisors with competing interests to hear both sides of an argument (Krishna & Morgan 2001). However, disclosure of the misaligned incentives could actually be harmful, too. People might overreact to disclosure, which might prevent an individual from getting good advice [see also Li & Madarász (2008), who find that this can occur even without overreaction], as would be the case if, for example, a sick patient avoided the doctor altogether upon learning of his or her conflict of interest. And when advisors are ethically motivated to provide unbiased advice, disclosure of misaligned incentives can potentially undermine this motivation (a moral licensing effect that is discussed in more detail in Section 3).

Disclosures can also be delivered in various ways. For example, disclosure of a potential conflict of interest could come directly from a physician during the doctor-patient interaction or could be provided in a less personal fashion (e.g., via printed information given to the patient by the receptionist in the waiting room). Disclosure can also be accompanied by greater or lesser efforts to ensure that consumers actually pay attention to it. For example, chain restaurants might be required merely to make nutritional information available to those who request it or, as the Affordable Care Act mandates, to post the information on menu boards. From an economic perspective, some of these details might appear inconsequential, but in reality, as we show below, they can matter profoundly.

All three of the authors of this review are strong proponents of information disclosure and transparency. Indeed, Sunstein worked to promote information disclosure in his capacity as Administrator of the White House Office of Information and Regulatory Affairs in the first term of the Obama administration (and also called for increased disclosure as a member of the President’s Review Group on Intelligence and Communications Technologies). Loewenstein coauthored a dissent on a National Academy of Science report in which he and his codissenters advocated broader disclosures of conflicts of interest than those proposed in the report itself (Bero et al. 2009). Nonetheless, we believe that important and reasonable questions have been raised about the efficacy of disclosure requirements. In this review, we provide a, hopefully fresh, perspective on the costs and benefits of mandatory disclosure, with an emphasis on psychological insights, and we use those insights to explore when disclosure is least and most likely to achieve its intended purposes, as well as how disclosure can be changed to enhance its efficacy.

In Section 2, we provide a brief review of the standard (but surprisingly undeveloped) economic perspective on information disclosure. We show that the implications of economic theory for

²Even when information cannot be verified, some honest communication can occur (see Crawford & Sobel 1982, Farrell & Rabin 1996).

mandatory disclosure are highly dependent on special assumptions and that some of those implications are surprising.

In Section 3, we discuss several psychological phenomena that qualify the predictions and implications of the conventional economic analysis. Consistent with our title, we show that even a modest enrichment in our understanding of the psychology of disclosers and/or recipients of disclosure can have dramatic consequences for the types of effects we should expect to, and in fact do, observe, as well as profound implications for policy. For example, limited attention, motivated attention, and biased assessments of probability can undermine the goal of promoting informed consumer choice, potentially rendering disclosure ineffective. At the same time, disclosure requirements can have surprising large effects on providers as a result of what we call the telltale heart effect. In the domain of labor law, for example, one of the most significant applications of targeted transparency is the Occupational Safety and Health Administration's Hazardous Communication Standard (HCS), which does not ban worker exposure to hazardous materials but seeks "to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees." As Estlund (2011, p. 377) notes, "the HCS appears to have greater impact on employers' than on employees' decisions, and greater impact where there is a union that can interpret and act on the rather complex information involved." (We return to the important role played by intermediaries in Section 4.) Similarly, whether disclosure of conflicts of interest by doctors, accountants, or investment professionals mitigates or exacerbates the problems caused by these conflicts may well depend less on the reactions of recipients than on the reactions of disclosers, who might respond by scaling back those conflicts or might instead feel licensed by the disclosure to pursue their own interests at the expense of their clients. Likewise, on the basis of existing evidence, it is reasonable to predict that calorie labeling requirements will have a larger impact on producers than consumers. Thus, we argue, when disclosure requirements do have a beneficial effect, the cause is often not the changes in consumer behavior that many advocates of disclosure view as the primary causal mechanism, but rather changes in the behavior of producers.

In Section 4, we discuss the implications of research in psychology for when and how mandatory disclosure policies should be implemented to maximize benefits and minimize costs and unintended consequences. As we discuss, disclosure could be far more effective if it were simplified, standardized, or aided by intermediaries who could serve these functions. Section 5 offers a summary and directions for future research. Section 6 concludes.

2. THE STANDARD ECONOMIC ACCOUNT OF DISCLOSURE

Economists have tended not to address the benefits and costs of mandatory disclosure regulations head on but to focus instead on situations in which market failures may arise. Market failures can result from the absence of information, and hence can potentially be rectified by its provision, when the social value of the information differs from its private value or when there are misaligned incentives between those with greater and lesser access to information (e.g., Akerlof 1970, Ross 1973).

We have noted that information, as a public good, may have more social value than private value and hence be underprovided relative to the social optimum. When significant private costs are associated with (acquiring or) disclosing information, but benefits are spread among a large population (so that in the aggregate the information is socially valuable, but no firm or private party can extract this value), no one has an incentive to procure or supply the information. In this case, mandatory disclosure may serve to promote the distribution of socially valuable information (Coffee 1984).

Perhaps the paradigmatic situation in which asymmetric information and misaligned incentives can cause harm, and in which disclosure might seem likely to be helpful, arises in markets for consumer goods. Sellers and consumers clearly have different incentives: The seller is generally interested in making a profit by selling products that are cheap to produce at high prices, whereas consumers are interested in obtaining high-quality products at low prices. Sellers also naturally know more about the products they market than do consumers. Two problems can arise. First, because of the asymmetric information, consumers may be unable to identify, and hence purchase, the products that are best for them. Individuals in the market for a credit card, for example, might be tempted by a teaser rate, even if they would end up paying lower interest with a card that had a lower fixed rate. Second, because of the misaligned incentives, sellers may not produce high-quality products (those that could generate more consumer surplus). The reason is that, as a result of the information asymmetry, consumers would not reward them with purchases if they did. Sellers have an incentive to develop products that are strong in attributes that consumers can observe and weak in attributes to which they cannot or do not attend (Holmström 1979). Mandatory disclosure of all relevant attributes would, in theory, address this problem. By reducing the information asymmetry between the buyer and seller, mandatory disclosure could potentially align the incentives of sellers with those of consumers (Mahoney 1995), leading both to favor a product characterized by overall high quality.³

Although mandatory disclosure of information might be helpful in this situation, there are reasons why it might be unnecessary (Easterbrook & Fischel 1984). First, one might expect market forces to lead to the voluntary provision of information, as firms compete with one another to advertise to consumers the strength of their own products, and the weakness of their competitors' products. For various reasons, however, competition may not be sufficient (Gabaix & Laibson 2006, Milgrom & Roberts 1986), perhaps because of the public good problem sketched above, perhaps because the relevant attributes of the products are shrouded and difficult to make visible and salient (Gabaix & Laibson 2006), or perhaps because competitors' interests might be more aligned with one another than with those of consumers, even in a highly competitive market (Heidhues et al. 2012). For example, a competitor selling a relatively safer product (e.g., lower-nicotine cigarettes) may prefer not to scare off consumers with a warning about more dangerous products in the marketplace.

Second, mandatory disclosure might not be necessary because consumers' skepticism could in principle force firms to disclose all information about their products, including adverse information. A sophisticated consumer, aware of the seller's incentives and ability to reveal information, can assume the worst about any information that is not revealed, which would force the seller to reveal everything (Milgrom 1981, Grossman 1981).⁴ In this case, it might be necessary only to disclose the misaligned incentives to consumers so that they can adopt the appropriate skeptical attitude. The assumptions about consumer information and sophistication underlying this scenario, however, seem unrealistic. To use the strategy of skepticism, individuals must be aware of what information can be revealed, and hence what information is not being revealed (Dye 1985, Milgrom 2008, Shin 2003), and they must also draw the logical conclusion that such missing information is unfavorable (see also Fishman & Hagerty 2003). If consumers lack such awareness or fail to draw the logical conclusion (as discussed in the next section), then voluntary disclosure

³There are, however, some obscure situations in which mandatory disclosure could worsen the problem of misaligned incentives (see Prat 2005).

⁴Consumer skepticism may not force sellers to voluntarily share their information if doing so would entail strategic costs (Board 2009, Hotz & Xiao 2013). Mandatory disclosure would be warranted in these cases.

may not occur, and mandatory full disclosure can once again be justified (Dranove & Jin 2010, Sunstein 2014).

3. INSIGHTS FROM PSYCHOLOGY

In this section, we discuss a series of psychological mechanisms that influence the judgments and behaviors of disclosers and discloseses. A pervasive theme is that disclosure may have little effect on recipients but large effects on providers.

3.1. A Note on Evidence

In light of the diversity of empirical research methods employed by psychologists and behavioral economists (who apply psychological insights to economic problems, typically using economic methods), it will be useful to discuss some of the differences among varying methodologies. The studies we review can roughly be classified along two dimensions, depicted in **Table 1**. Given that demand- and supply-side responses to disclosure often interact in subtle ways, studies in the right-hand column of the table—those that examine interactions between the demand and supply sides—should probably be considered the gold standard when it comes to understanding the impact of information disclosure regulations. Likewise, the quality of studies tends to improve as one moves toward the bottom rows of the table, given that studies involving real consequences for participants (and those conducted in the field examining the behavior of the types of people who are actually likely to be affected by the regulations) tend to have greater external validity.

By the same token, studies become more costly and difficult to conduct as one moves from the top left to the bottom right of the table. We are in fact not aware of a single field experiment examining the interaction between the demand and supply sides (i.e., a study that falls into cell XII).⁵

One other methodological point is worth making. Many of the studies reported in the literature fall into cell I of **Table 1**—i.e., address hypothetical choices made by research subjects provided with information disclosure. Such studies are likely to overstate behavioral reactions to the disclosure, in part because it is easier to say that one will take some kind of protective action than actually to take it and in part because the disclosures in such studies tend to be much more salient than they typically are in real-world settings. The problem is compounded when subjects are given multiple decisions that differ only (or mainly) on disclosures because the variation of disclosures against an otherwise constant background will artificially increase their salience.

3.2. Limited Attention and Awareness

A growing body of research in economics (e.g., Sims 2003) formalizes what psychologists (e.g., Broadbent 1958) have known and studied for decades: There are serious limitations on the amount

⁵There is an especially pressing need for more studies falling into the right-hand, and particularly the lower right-hand, column of **Table 1**, because market-level interactions between the supply side and the demand side of disclosure can have important consequences, in some cases resulting in a redistribution of resources, or even undoing the benefits of disclosure. Suppose, for example, that a disclosure intervention drives many people who were previously choosing highly suboptimal, low-deductible health insurance plans toward more optimal, high-deductible plans. If nothing else changes, consumers would all be better off than they would be without disclosure. Owing to competitive market forces, however, the lower health costs these individuals pay could be partly offset by higher premiums for everyone else, and those who had previously been making optimal choices with respect to premiums would see their aggregate health costs increase. Disclosure, if effective in this situation, will generate no aggregate benefit to consumers but only a transfer of resources from the more sophisticated to the less sophisticated consumers.

Table 1 Taxonomy of information disclosure research methodologies

| Method | Study focus | | |
|--|-------------|-------------|------------------------|
| | Demand side | Supply side | Demand and supply side |
| Hypothetical choice | I | II | III |
| Laboratory experiments with real payoffs | IV | V | VI |
| Case studies | VII | VIII | IX |
| Field experiments | X | XI | XII |

of information to which people can attend at any point in time (see Simon 1955 for an early treatment in economics). Bounded attention renders many disclosures useless because consumers ignore them.⁶ For example, Jensen et al. (2005) find that fewer than 3% of consumers read the privacy disclosures that are so ubiquitous on websites and that 75% of consumers think that the existence of a privacy policy implies privacy protection (Turow et al. 2008), even though the actual thrust of such policies is often the opposite—to secure the consumer’s acquiescence in relinquishing privacy.

The standard economic account would emphasize that attention is a scarce resource and would suggest that people make rational (even if fairly rapid) decisions about how to allocate it. This account implies not merely that too much disclosure can be a nuisance, but also that it can be affirmatively counterproductive when it distracts from other, possibly more important, information. Because it is a scarce resource, people’s lack of attention, and their resulting misconceptions, should come as no surprise. It has been estimated that 54% of privacy policies are beyond the grasp of 57% of the Internet population (Jensen & Potts 2004) and, somewhat amusingly, that the aggregate dollar value of the time it would take for US consumers actually to read privacy policies would be \$652 billion per year (McDonald & Cranor 2008). Disclosures are so ubiquitous that we tend to be unaware of them, and when the implicit is made explicit, one cannot help but be struck that it would be impossible for people to attend to even a fraction of the disclosures to which they are exposed.

One of the most common, and obviously important, forms of disclosure involves product warning labels. Summarizing results from approximately 400 articles dealing with on-product warning labels, McCarthy et al. (1984) conclude that “on-product warnings have no measurable impact on user behavior and product safety.” When disclosure requirements turn out to be ineffective, it might be worthwhile to consider improved approaches that nonetheless involve information (see Section 4) or other regulatory approaches, including default rules (Thaler & Sunstein 2008).

Whereas the standard economic account suggests that inattention may be rational, at least ex ante, research in psychology suggests that people have only limited volitional control over how they allocate attention. Because of the wide variety of factors affecting the subjective salience of information, certain items capture attention while others disappear into the background, even if they are exceedingly important, and even if it would be rational to focus on them. For example, consumers applying for a credit card may not attend to fees and rate hikes associated with late payments, even if they have made late payments in the past and are at risk for incurring significant

⁶Other research shows that the impact of disclosures can be severely reduced by the introduction of even a short delay, or distraction, between the delivery of a disclosure and a disclosure-relevant decision (Adjerid et al. 2013).

costs in the future. A common case that we would attribute to context rather than rational choice involves inattention to missing (but significant) information.

3.3. Inattention to Missing Information

As discussed in Section 2, a key assumption of the economic analysis (potentially leading to the conclusion that disclosure is unnecessary when disclosed information is verifiable) is that people are aware not only of information that is presented but also of information that could be presented, but is not. More specifically, the standard economic analysis assumes that when companies provide individuals with selected information, people fill in the blanks with unfavorable (and perhaps the worst possible) values, assuming that if the information were favorable it would be disclosed. Research in psychology suggests that this key assumption is unlikely to be true. Above we discussed research showing that people have only limited capacity to attend to information with which they are presented; other research (summarized in Nisbett & Ross 1980) shows that people typically pay even less attention to the absence of information than to its presence, even when both are equally informative.

Dramatic evidence of inattention to missing information in a real-world market context (cell IX in **Table 1**) comes from research examining the cold release of movies (i.e., the release of a movie to consumers without first giving access to reviewers). Studios cold release movies when they are confident that the reviews will be unfavorable, and consumers should ideally draw the logical inference from the release of movies with no prior reviewer coverage. However, Brown et al. (2012, 2013) find that cold-released movies in fact initially do better than movies that are prereleased to critics only to receive predominantly negative reviews. It is noteworthy that by cold releasing movies, studios respond rationally to consumers' bounded rationality—a very different phenomenon from the telltale heart effect, discussed below.

One consequence of people's inattention to missing information is that purely voluntary disclosure policies may be ineffective. If, for example, physicians could sign up for a clean conflict of interest certification, patients might infer from the lack of such a certification that a doctor must be conflicted. But if patients systematically fail to notice the absence of the certification, then doctors would be commensurately less motivated to eschew conflicts (Sah & Loewenstein 2014). We note that before the enactment of the Nutritional Labeling and Education Act, makers of salad dressings with higher fat content chose not to label these products voluntarily, and with mandatory disclosure, their sales declined (Mathios 2000).

3.4. Motivated Attention

Even when people have the cognitive capacity to attend to the information provided by a disclosure, they do not always do so. Information is not only an input into decision making; it is also a source of utility (whether positive or negative) in its own right (e.g., Brunnermeier & Parker 2005, Caplin & Leahy 2001, Golman & Loewenstein 2013, Kőszegi 2010, Loewenstein 1987, Schelling 1987). When information is unpleasant to deal with, people often fail to attend to it because attention imposes a welfare loss. Research on investor log-ins, for example, shows that investors tend to log in and look up the value of their portfolios after a rise in the market, but put their heads in the sand after the market declines (Karlsson et al. 2009, Sichertman et al. 2013). Research on medical testing for conditions such as HIV finds that the people who are most at risk often do not get tested because the prospect of the disease is too scary to think about or because they are afraid to expose themselves to the risk of getting bad news (Thornton 2008).

One such study examines the decisions of individuals at risk for Huntington's disease about whether to get tested (Oster et al. 2013). Even though knowing whether one had the disease should be an enormously valuable input into decisions (e.g., whether to have children), many people chose not to get tested until they started experiencing symptoms. Even more interestingly, those who did not get tested made life decisions, such as whether to have children, that did not differ from those of people who were tested and discovered they did not have the disease. For purposes of decision making, people appeared to treat the absence of testing results as tantamount to the absence of the disease—a clear case of having their heads in the sand.

For mandatory disclosure policies, the most obvious implication of motivated attention is that disturbing messages might well be ignored or downplayed. Research on the impact of emotional health warnings, so-called fear appeals, does in fact show that scary warnings unaccompanied by immediate options for remediating action can backfire, apparently because people are deterred by fear from thinking about, and hence become less likely to respond to, the risks (Leventhal 1971, Loeber et al. 2011, Rogers 1975). In a similar phenomenon, people have been shown to suffer from unrealistic optimism, especially with respect to personal risks (Sharot 2011), and unrealistic optimism could well weaken the effects of disclosure. A particular problem is that people are more likely to update their beliefs in response to good news than in response to bad news (Eil & Rao 2011), a form of selective updating that has been documented for health risks in particular (Sharot et al. 2012). To the extent that this is so, disclosure of such risks (and other bad news) may be ineffective.

A more subtle implication is that disclosure policies intended to mitigate selective provision of information by firms may not work nearly as well as might be expected. Even if companies do not engage in selective withholding of information (whether voluntarily or owing to disclosure regulations), consumers may in effect take up the slack by paying attention to information that supports decisions that they may have already decided to make and ignoring or downplaying that which does not (Sharot et al. 2012). If ice cream parlors would prefer not to post calorie information, but are forced to do so by regulations, consumers who like ice cream may take over the editing role that regulations prevent the parlors from implementing, by ignoring information that, if attended to, would reduce their pleasure.

3.5. Biased Probability Judgments

Although standard economics allows for the idea that probability judgments might incorporate random error, the conventional assumption is that people do not display systematic biases—that, on average, people estimate things correctly. For a variety of reasons, this is not the case (see, e.g., Kahneman et al. 1982). Research has found that people have systematically biased beliefs about, for example, food calorie content (Bollinger et al. 2011), returns to schooling (Jensen 2010), and the impact on energy consumption of driving cars differing in fuel economy (Allcott 2011).

Misestimates of probabilities can have important implications for disclosure. For example, providing information about the health consequences of smoking is intended to deter people from smoking, and calorie information is intended to help people cut down their calorie intake. But these effects are likely to occur only if, prior to disclosure, people are systematically biased in a direction that promotes the undesirable behavior, which may not be the case. Research by Viscusi (1990), for example, finds that both smokers and nonsmokers tend to overestimate the health risks of smoking [for a contrary perspective, see Slovic (2000), who finds underestimates of personal risk, even in the face of accurate estimates or overestimates of statistical risks]. If Viscusi is correct, then disclosure of the true risks of smoking could end up promoting smoking. (Note that this research is controversial, not only because of the conclusion, but also because Viscusi is a paid consultant to cigarette companies.)

3.6. Moral Licensing

There is by now a large literature in behavioral and experimental economics demonstrating what people outside the profession might find obvious: People are powerfully driven by other-regarding motivations such as altruism, fairness, and a desire to perceive themselves as good people. All else held equal, people prefer to tell the truth (Gneezy 2005) and also expect others to do so (e.g., Valley et al. 2002). These motivations can be important in the types of misaligned relationships that are the common focus of disclosure policies because they can motivate sellers to behave in the interests of buyers, even when they have material incentives not to do so.⁷

That people are intrinsically motivated to provide unbiased advice and high-quality products (even when they could pass off inferior ones to naïve consumers) is important because disclosures of conflicts of interest can, in some cases, undermine such motivation, a phenomenon that Cain et al. (2005) dub moral licensing. Moral licensing occurs when the perception that an advisee has been warned, via disclosure, of an advisor's potential bias makes the advisor feel less responsible for giving unbiased advice. In a study demonstrating the phenomenon, Cain et al. (2011) asked survey respondents to imagine that they were participating in an experiment in which they played the role of advisor and gave advice to another person (the estimator), who would make money by accurately estimating how many jelly beans were in a jar that was depicted in a photo. All participants were given a (hypothetical) conflict of interest: "Suppose that you are paid a \$50 bonus if the estimator overestimates the number of jelly beans in the jar." Participants were also told that the jar actually contained between 1,900 and 2,900 jelly beans. All participants were asked to rate the ethicality of suggesting "a number above 2,900 (in hopes that the estimator overestimates the number of jelly beans)," but in one condition, advisors were told that "the estimator is unaware of your \$50 incentive," and in the other they were told that "the estimator is aware of your \$50 incentive." Consistent with moral licensing, respondents reported that it would be less unethical to overstate the number when the estimator was aware of the conflict.

In a series of stylized experiments, the same authors showed that moral licensing was sufficiently strong that conflicted advisors were better off, and advice recipients were worse off, when a conflict was disclosed, as compared to the same situation but without disclosure (Cain et al. 2005). These findings were later replicated and extended in an experiment modeling a real-life situation of a homebuyer and a conflicted real estate agent (Cain et al. 2011). These studies (falling into cell VI in Table 1) show that, beyond the problem of information disclosure having little impact, disclosure of misaligned incentives can in some cases backfire, hurting those it is intended to help.

3.7. Social Pressure and Conflict Avoidance

Two additional psychological factors raise further concerns about the potential backfiring effects of disclosure of misaligned incentives. Disclosing that an advisor has a conflict of interest does have the intended consequence of decreasing advisee trust. But perversely it can also increase pressure to comply with the distrusted advice.

The first effect results from the fact that once a conflict of interest has been disclosed, the advisor's interests become common knowledge, and in some situations, advisees may feel pressured

⁷Cognitive biases can, in some situations, have a similar effect. The "curse of knowledge" (Camerer et al. 1989, p. 1245) refers to the fact that people with private information often overestimate the extent to which it is shared. As Camerer et al. (1989) note, "By making better-informed agents think that their knowledge is shared by others, the curse helps alleviate the inefficiencies that result from information asymmetries, bringing outcomes closer to complete information (first-best) outcomes. In such settings, the curse on individuals may actually improve social welfare."

to help advisors satisfy their personal interests. Disclosure thus could turn advisees into “reluctant altruists” (Dana et al. 2006). For example, once doctors disclose that they earn a large referral fee if their patients enroll in a clinical trial, the patients may implicitly feel that they are being asked to help their doctors get the fee.

A second effect, produced by a mechanism termed insinuation anxiety, arises from the advisees’ fear that rejecting advice (once they learn about a conflict of interest) sends a negative signal that they believe the advice is biased and that the advisor is corrupt. Disclosure makes the conflict of interest salient, so rejecting advice might then be seen as rejecting the advisor. Insinuation anxiety reflects a natural concern to avoid such a conflict. Without disclosure, for example, an investor might not want to invest in a new mutual fund recommended by a financial advisor as a result of risk aversion or satisfaction with current investments. However, after the investment advisor has disclosed that he or she will receive a financial benefit if investors buy into the new fund, customers may fear that their failure to follow the advisor’s recommendation is likely to be interpreted as a signal of distrust—an indication that they doubt the advisor’s ability to transcend the conflict.

In a pair of papers, Sah et al. (2012, 2013) report on the results of laboratory studies involving hypothetical and real outcomes, as well as field studies in which conflicted advisors interacted with advisees who either were or were not informed of the conflict. In all experiments, disclosure increased distrust in advice but, because of these twin psychological effects, also increased advisees’ feelings of pressure to comply with it. In several of the experiments, moreover, the influence of these mechanisms was sufficiently strong that advisees ended up being more likely to comply with the advice, even though they trusted it less.

3.8. The Spotlight and the Telltale Heart Effect

Psychology does not always work against the effectiveness of disclosure. Consider the telltale heart effect, a term inspired by Edgar Allen Poe’s 1843 short story “The Telltale Heart” in which the murderer protagonist confesses his crime because he imagines that the police can hear the heartbeat of the man he has killed and buried beneath the floorboards of his apartment. That effect suggests that psychological factors may increase the effectiveness of disclosure when, from an economic standpoint, it might be expected to be superfluous. In the classic account of how disclosure works (e.g., Fung et al. 2007), mandated disclosure leads to changes in the behavior of disclosers, which in turn cause disclosers to clean up their act. In a case often cited as a paradigm for successful disclosure, for example, hygiene ratings of restaurants in Los Angeles affected patronage patterns, which then motivated restaurants to improve their sanitation practices (see, e.g., Jin & Leslie 2003).⁸ But in many situations (to some extent including the case of restaurant hygiene ratings), an industry response can be found amid little evidence of a consumer response.

For example, most current evidence (though not all; see Bollinger et al. 2011) seems to suggest either a modest effect or no effect, on consumers, from calorie labeling (e.g., Harnack et al. 2008).⁹ But in a study that provides evidence suggestive of a telltale heart effect, Namba et al. (2013) combed an archive of publicly accessible web pages for changes in posted menu offerings at fast-food restaurants between 2005 and 2011, a period during which several municipalities introduced calorie posting. Menus from five fast-food chains with outlets in areas subject to menu-labeling laws were compared with menus from four chains operating in areas not requiring labeling.

⁸Jin & Leslie (2003) also obtain evidence that mandatory disclosure was more effective than voluntary disclosure and that although the grade cards did lead to real improvements in hygiene, they also led inspectors to distort their ratings.

⁹Notably, Bollinger et al. (2011) do find a nontrivial effect on consumer choices at Starbucks.

Although the overall prevalence of healthier food options remained low over the period, restaurants located in areas that implemented calorie labeling increased their healthier entrée options.¹⁰

Increasing the number of healthy options does not, however, mean that consumers will necessarily choose them. In a study showing that a greater prevalence of healthy options can end up backfiring by creating a halo effect, Chandon & Wansink (2007) find that consumers significantly underestimate the calories in an ostensibly healthier meal from Subway than for a comparable meal from McDonald's. The same study also finds that health claims can lead consumers to order sides and beverages that contain more calories, a kind of substitution effect also observed in a field experiment conducted at Subway, in which consumers were nudged toward lower calorie entrees via a convenience menu that included only low-calorie sandwiches (Wisdom et al. 2009).

Additional evidence suggestive of a telltale heart effect comes from the literature on appliance purchases, which to date provides relatively weak evidence of consumer responsiveness to energy-efficiency labeling, but much stronger evidence of manufacturer responsiveness. Newell et al. (1999), for example, find that after energy-efficiency labeling was mandated in the United States, the responsiveness of energy-efficient innovation in appliances to energy price changes increased substantially. Waide (2004) documents a trend toward more efficient products in the European Union that began right after the onset of labeling and that was so strong that market saturation of certain appliances with an A rating led regulators in the European Union to create A+ and A++ ratings to encourage greater efficiency through product differentiation.

One situation in which a telltale heart effect may be especially effective involves corporate ethics and socially responsible behavior. Writing not only about corporations' concern for their public image, but also about consequent potential benefits of information disclosure regulations, Estlund (2011, p. 378) contends that

the lengths to which leading firms go to advertise their virtuous performance on matters of sustainability, diversity, ethics, and overall social responsibility suggest that more is at work than ordinary labor market or product market competition. . . . Mandatory disclosure of accurate information about socially salient conditions of employment (as well as other objects of CSR claims), would help to ensure that there is a factual basis for firms' claims of social responsibility, and that firms cannot easily buff up their reputation for good citizenship without improving their actual practices.

The telltale heart effect might well be playing a role here.

This pattern raises an obvious question: Why are providers changing their products in response to disclosures that their customers are largely ignoring? On the basis of profit considerations alone, consumer inattention should lead producers to do exactly what they were doing before. Evidently some disclosers either have an exaggerated expectation of the likely consumer response or feel guilty about the information disclosed. We suspect that sellers may well have an inflated sense of the public salience of disclosures, in a phenomenon related to the spotlight effect (Gilovich et al. 2000) by which people exaggerate how much other people are looking at them. If this is indeed the underlying mechanism, it raises the question of whether the effect will persist once sellers likely come to recognize the limited impact of disclosures on consumers.

¹⁰However, the average calorie content for entrée items showed no difference in changes across the two groups of restaurants (presumably because, with calorie labeling, the highest-calorie options increased in calories at the same time as the healthier options were unveiled).

4. MAKING DISCLOSURE WORK

The research just reviewed has implications not only for when and why disclosure is likely to work or backfire, but also for potential improvements of disclosure policies.

4.1. Simplification

Given the limits of human attention, perhaps the most obvious way to improve the effectiveness of disclosures is to simplify them. As Ripken (2006) writes, “In order for a disclosure system to be effective, not only must the information that is supplied be disclosed completely, clearly, and accurately, but it must also be read and comprehended by the consumer. Here is where disclosure today fails in its purpose.” Her paper focuses on financial disclosure, for which the problem is especially acute, as corporate disclosure documents tend to be packed with abstruse text written to protect companies from liability rather than to provide investors with comprehensible information. But the point is broadly applicable.

Bhargava & Manoli (2014) provide evidence for the benefits of simplification. In a field experiment testing different interventions to increase take-up of the Earned Income Tax Credit (EITC) using mailed communications, they find that decreasing the complexity relative to a baseline notice (which itself produced take-up of 14%) increased take-up by 6 percentage points. Also consistent with an important role for simplicity, increasing complexity decreased take-up by 4 percentage points. Another field experiment found that a flyer with simplified information about the employer’s 401(k) plan, and about the value of contributions compounding over a career, had a significant effect on participation rates, especially among younger workers (Clark et al. 2013).

Above we referred to the CARD Act, enacted in 2009. Among its provisions is a modest disclosure requirement, designed to ensure simplicity and clarity: Every month, companies must prominently disclose the interest savings from paying off the full balance within 36 months, instead of making only minimum payments every month. The goal of the requirement is to show consumers that if they keep making only the minimum payments, they might well lose a significant amount of money.

Working with a panel data set of 150 million credit card accounts, Agarwal et al. (2013) find that the consequence of the disclosure requirement is to reduce interest payments by \$74 million a year. In the scheme of things, that is a fairly modest impact. For the 3 million or so borrowers who changed their behavior, the annual savings were only approximately \$24 each. More dramatically, however, the same study finds that a series of requirements in the CARD Act, including several provisions designed to promote simplified disclosure, has produced substantial decreases in both overlimit fees and late fees, thus saving US credit card users \$20.8 billion annually. Notably, cardholders with low credit scores appear to be the largest beneficiaries of the CARD Act. Agarwal et al. find that overall borrowing costs were reduced by an annualized 2.8% of average daily balances, rising to more than 10% for cardholders with especially low FICO scores; most of that decline came from reductions in late and overlimit fees. The authors do not, however, disaggregate the effects of various provisions of the act, so we do not know what amount of the \$20.8 billion comes from disclosure requirements as such.

If information simplification is in principle a good thing, exactly how to simplify information is anything but a simple problem, and again some obvious approaches may have unexpected pitfalls. Studies conducted both in the United States and abroad have shown that using categorical labels, such as stars or letter grades, rather than a continuous scale leads to better comprehension, a faster grasp of label information, and greater ease of use (Thorne & Egan 2002, Wiel & McMahon 2003). Newell & Siikamäki (2013), for example, find that consumers who were exposed to

different energy-efficiency disclosures and made hypothetical choices among water heaters (in a within-subjects experiment) were more responsive to, and more likely to make cost-efficient decisions after receiving, simple energy-efficiency labels, as compared with more complex ones. Consumers were most influenced by simple information about the monetary value of saving energy; additional information about placing this cost within a range of comparable models did not have significant additional value. Perhaps most importantly, a categorical label leads to increased self-stated motivation on the part of the consumer to consider energy efficiency as part of the purchase decision (FTC 2006, Newell & Siikamäki 2013).¹¹

If simplification is the general goal, perhaps the most obvious change in policy with respect to mandatory disclosure regulations is one that would be most difficult to implement: reduce the number of less important disclosures so as to increase the salience of the most important ones. In today's regulatory environment, the obstacle to such a change is that disclosure regulations arise from a wide range of legislative and regulatory sources at the federal, state, and local levels.

4.2. Standardized and Comparative Information

People are generally able to make more coherent and rational decisions when they have comparative information that allows them to assess relevant trade-offs (see, e.g., Hsee et al. 1999). This point suggests that disclosures providing comparisons, or information in standardized formats that facilitate comparisons, may have the greatest impact and benefit. If information is presented in a way that does not allow comparisons, it may not be meaningful, especially because people might not do the cognitive and other work that would enable them to make such comparisons on their own.

Energy-efficiency labels for automobiles and appliances in the United States are only two examples of many disclosures that do provide comparative information—in such cases about how the operating costs of the car or appliance in question compare to that of others. Another example is the College Scorecard, which is intended to promote better postsecondary education choices. The scorecard provides standardized information that allows prospective college students to compare costs, graduation rates, loan default rates, amounts borrowed, and employment for every degree-granting institution in the country (Sunstein 2013). Similarly, the Financial Aid Shopping Sheet, which the Obama administration rolled out in 2012, is a “standardized form that is designed to simplify the information that prospective students receive about costs and financial aid so that they can easily compare institutions and make informed decisions about where to attend school” (<http://www2.ed.gov/policy/highered/guid/aid-offer/index.html>).

Although (and perhaps because) the benefits of providing standardized information about alternative products appear manifest, there is not a great deal of research that examines whether such information makes a difference. Some evidence does, however, suggest that comparative information along with other interventions might be marginally more effective. In one study (Bertrand & Morse 2011), prospective payday borrowers, already routinely provided with the annual percentage rate (APR) of payday loans (typically around 450%), were also provided comparative information about the cost of other types of loans. In one treatment, the typical APR of a payday loan was contrasted with that of other loans with which consumers were likely to be familiar, such as car loans (typical APR 18%), credit card loans (16%), and subprime mortgage

¹¹However, for 15% of the consumers in this study, the presence of CO₂ information decreased willingness to pay for a lower operating cost. This surprising result may be a product of political reactions to environmental issues and reflects how those reactions may negatively affect energy-efficiency adoption (Gromet et al. 2013).

loans (10%). In another treatment, the dollar cost of payday loans of durations ranging from 2 weeks to 3 months was contrasted with the much lower dollar costs of credit card debt. A third treatment provided information about the (high) fraction of people taking out payday loans who end up renewing the loan. The dollar-cost information condition had the largest, although modest and only marginally significant, impact, both on loan initiation and on loan amount. Note that this was not the only comparative condition, but it was the only condition involving the more meaningful dollar measure (as opposed to percentage information); the dollar measure along with the comparison may have worked together to produce an impact. Indeed, another (albeit hypothetical choice) experiment, examining the choice of investment funds differing in fees by financially illiterate workers (Hastings & Tejada-Ashton 2008), finds a greater impact on the choice of presenting information in dollar, rather than in percentage point, terms. It is reasonable to conclude that dollar information is more helpful than percentage information; it is also reasonable to conclude that dollar information is more helpful still when people are allowed to make comparative judgments (and do not have to search for comparative information on their own).

In a randomized field experiment, some senior citizens choosing between Medicare drug plans were randomly selected to receive a letter with personalized, standardized, comparative cost information (Kling et al. 2012). Plan switching was 28% in the intervention group, but only 17% in the comparison group, and the intervention caused an average decline in predicted consumer cost of about \$100 a year among letter recipients. Note, however, that this intervention combined a number of different features (comparative and personalized information), so we cannot isolate a single mechanism that explains its effectiveness (a point to which we return in the next subsection).

Other research suggests that merely providing comparative information is insufficient to enhance choice; it is important how information is sorted. In a study of the impact of the US News & World Report college rankings, Luca & Smith (2013) exploit a natural experiment that resulted from a change in how universities were listed. From 1989 to 1994, the top 50 universities were listed with the top 25 universities in order of rank but the next 25 ordered alphabetically (though reporting rank). In 1995, US News began listing all of the top 50 universities in order of rank. The authors found that a change in rank for universities in the bottom half of the 1–50 range had a significant impact when all 50 were ordered by rank (high salience) but no impact when the focal universities were ordered alphabetically (even though rank was reported).¹² The evident reason is that with the alphabetical listing, some cognitive work had to be done to ascertain ranking, and even though that work was modest, people declined to do it.

A different study examines the impact of simplified school-level academic performance information on the school choices of parents in the Charlotte-Mecklenburg Public School District (Hastings & Weinstein 2008). The study produced less encouraging results, both for simplification and for ordering. In a randomized field experiment (one of two studies that the authors report), parents of children in randomly selected schools who were provided with statistics on, and sorted by, different schools' academic achievements did not make better school choices than those who did not receive the information.¹³

¹²Similarly, Pope (2009) finds that changes in the ranking of hospitals (and specialties within hospitals) have a major impact on patient volume, even though the continuous score on which the rankings are based (which is arguably a finer-grained measure of the same thing) has no significant additional impact.

¹³The natural experiment did, however, provide support for the idea that mailing parents (albeit somewhat complicated) information about school performance did improve their school choice decisions.

A laboratory experiment on mutual fund choice also finds that even simplified, comparative information (a cheat sheet summarizing funds' fees and expenses or a page of answers to frequently asked questions about S&P 500 index funds) had only a small effect on portfolio allocations between index funds that were designed to perform similarly except for differences in their fees and expenses (Choi et al. 2010). Even with the information, most subjects still failed to minimize fees. Their choices could perhaps be attributed to low financial literacy, which was measured directly and was found to correlate with fees paid. Another laboratory experiment similarly finds that simplifying mutual fund disclosures (replacing the old prospectus full of fine print and legalese with a summary prospectus) had no measurable impact on individuals' portfolio choices (Beshears et al. 2010). These findings suggest that making disclosure simple and accessible may provide insufficient help to consumers who lack the tools to process that information.

4.3. Social Comparison Information

Media mogul Ted Turner once complained that *Forbes* published a list of the wealthiest Americans but not the most generous, an omission that was later corrected by *Slate*. Research suggests that such social competition can encourage generosity.¹⁴ Social comparison information can operate through a variety of channels. Beyond playing on the natural human desire to be above average on almost anything that can be measured, social comparison information can potentially establish descriptive norms that often convert into injunctive ones (Schultz et al. 2007).

Perhaps the most carefully studied intervention provides homeowners with information about how their energy use compares with that of their neighbors. Opower, a company based in Virginia, works with utilities to send people a personalized home energy report, which includes a comparison to their neighbors (e.g., "great," "good," and "more than average") and is accompanied by energy saving tips, such as "move your thermometer up 2 degrees," and "when you're away, set it higher." Evaluations of the Opower intervention have found that when people learn that they are using more energy than similarly situated others and are provided with tips on how to reduce energy use, their energy use declines significantly (Allcott 2011, Allcott & Rogers 2013). Although the effects are not large (approximately a 2% reduction), the cost-effectiveness of the intervention compares favorably to that of other, more standard programs designed to promote energy conservation.

It is important to emphasize, however, that the causal mechanisms are not yet well identified because the program combines comparative information with tips (sometimes described as channel factors in the psychological literature), and existing designs cannot exclude the possibility that the effects result from an increase in energy awareness on the part of the consumer as a consequence of receiving the report, regardless of its specific content (see Schwartz et al. 2013). We also note that several studies (e.g., Beshears et al. 2012) find little or no impact of social comparison information, and at least one study (Bhargava & Manoli 2014) actually finds that social comparison information had a perverse effect, decreasing take-up of the EITC by 4.4%. By contrast, studies of tax compliance find a significant effect from social comparisons, with letters explaining that most people in their local area had already paid their taxes, boosting repayment rates by around 15 percentage points (Behav. Insights Team 2011).

¹⁴In a clever experiment, Duffy & Kornienko (2010) find that subjects who played a sequential dictator game gave more when placed in a generosity tournament (in which subjects were publicly ranked from most to least generous) as compared with an earnings tournament in which subjects were ranked according to how much they kept, even though there was no award associated with winning the tournament.

Public ratings of corporations and other institutions have also been found to influence the behavior of those institutions. One paper, for example, examines the impact on firm behavior (the release of toxic chemicals, as reported to the US Environmental Protection Agency's Toxics Release Inventory) of being suddenly included among the ranks of firms whose relative performance was publicly graded (Chatterji & Toffel 2010). The researchers find that firms that initially rated poorly subsequently improved their performance, as compared to firms that were never rated or rated more favorably. Other studies of the same program also find significant effects, which they attribute to a fear of "environmental blacklisting" (Fung & O'Rourke 2000, Hamilton 2005, Konar & Cohen 1997).

Social comparison information may have also played a role in progress made in reducing certain types of conflicts of interests in academic medical centers (those associated with gifts to physicians from pharmaceutical companies and device manufacturers). The American Medical Student Association PharmFree Scorecard, which grades conflict of interest policies at US academic medical centers (see <http://www.amsascorecard.org>), appears to have been successful in encouraging many academic medical centers to implement stronger conflict of interest policies. Similarly, mandatory disclosure of marketing costs for prescription drugs in the District of Columbia produced a downward trend in marketing expenditures by pharmaceutical companies, including gifts to physicians, from 2007 to 2010, and the announcement of the names and amounts received from industry by the top eight physician speakers in 2009 resulted in a significant drop in the amounts received by this group in the subsequent year compared to a comparison group (the next eight speakers whose names and industry amounts were not disclosed) (George Wash. Univ. Sch. Public Health Health Serv. 2012).

Although these and many other examples suggest that regulation by shaming can be an effective strategy for improving the performance of firms and other organizations (Graham 2000), it is important to note that in some situations, it can produce perverse effects. Rankings of schools by the media can produce a kind of self-reinforcing dynamic, whereby low ratings lead to a drying up of resources and decline in the quality of students, making it difficult, if not impossible, for schools to rectify problems identified by their rankings (Espeland & Sauder 2007). Moreover, social comparison information does not always lead to a desire to improve, at least on the intended dimension. In the case of Opower, providing the social comparison information does seem to lead to an average net decrease in electricity usage, but some studies have documented so-called boomerang effects in which those discovering that they are consuming less than average actually increase their usage [Schultz et al. 2007; see also Costa & Kahn (2013), who find that Republicans increased their energy usage, but see Allcott (2011), who find no such effect]. Likewise, there is some evidence that strengthened regulations mandating disclosure of executive salaries in publicly traded companies, ostensibly intended to rein in salaries, have had the opposite effect, as many boards of directors seem to have the collectively impossible goal of making their executive salaries competitive (i.e., above the median for comparable organizations), and the public availability of the information has encouraged a kind of arms race (see, e.g., Davidoff & Hill 2013).

4.4. Personalized Information

Another seemingly promising strategy for improving the impact of information is to tailor it to the individual receiving it. This strategy might involve, for example, adjusting the presentation to take account of the receiver's interests, needs, numeracy, or format preferences (e.g., tables versus graphs), or it might involve making a guess about what the receiver already knows, and attempting to provide information that is genuinely informative (i.e., not redundant with existing knowledge). It is difficult to argue against any of these approaches, and electronic technologies, most obviously

the Internet, introduce many new opportunities for personalization, although they also introduce new issues revolving around the protection of privacy. Hawkins et al. (2008) provide a taxonomy for classifying different approaches to the tailoring of health communications.¹⁵

The arguments favoring personalization seem compelling, and more undoubtedly will be learned in coming years, but the limited research to date that has examined effects of personalization has not yielded especially encouraging results. Although several states and countries have implemented programs to combat childhood obesity in which parents are presented with BMI report cards, a systematic review of evaluations of such programs (Nihiser et al. 2009) concludes that insufficient evidence exists to make a recommendation about such programs. A large and especially careful field experiment that examines the impact of providing parents in Mexico with information about their children's weight (Prina & Royer 2013), including experimental conditions that also presented social comparison and health risk information, observes substantial effects on the accuracy of parents' perceptions of their children's weight but no significant effects on diverse behavioral measures. Another study that systematically compares tailored and untailored text messages delivered to young smokers (Skov-Ettrup et al. 2014) observes no statistically significant differences in smoking cessation rates, despite the fact that tailored messages were delivered with greater frequency. A limitation of many existing studies is that they examine the impact of personalization in situations in which nonpersonalized interventions have limited or null effects, so it is hard to distinguish the ineffectiveness of personalization from the ineffectiveness of disclosure generally in these situations. It would be interesting to test whether personalization enhances the impact of interventions that, in the absence of personalization, have significant effects.

4.5. Vividness

It is well understood that vivid displays may have a larger impact than dry, statistical information (see, e.g., Nisbett & Ross 1980), and this point has significant lessons for disclosure policies. In the context of smoking, for example, many studies indicate that warnings that combine pictures and text are more effective than text alone in decreasing demand for cigarettes—perhaps by triggering strong emotions, perhaps by increasing awareness of risks, and perhaps by promoting thoughts about quitting (see Borland et al. 2009, Hammond et al. 2006, O'Hegarty et al. 2006, Thrasher et al. 2011). In that context, the relevant pictures can be gruesome or shocking, such as images of diseased organs, and these images have been found to have a greater impact on smokers than words suggesting more abstract injury (Sobani et al. 2010). As discussed in Section 3.4, however, there is some danger that the use of pictorial warnings could backfire; consumers might direct their attention away from the gruesome pictures and thus insulate themselves from the warning information (e.g., Loeber et al. 2011).

4.6. Smart Disclosure and the Role of Intermediaries

In some situations, exemplified by the abstruse legalistic disclosures accompanying securities transactions, the language or underlying information is far too complex for a layperson to digest.

¹⁵One common approach is to elicit importance weights from people and then provide them with rankings or ratings of choice objects based on their own weighting of attributes (see, e.g., <http://www.oecdbetterlifeindex.org/>, an OECD website that ranks cities' quality of life based on user-inputted importance weights for city attributes). However, eliciting and interpreting importance weights are more tricky than they might seem (see, e.g., Goldstein & Beattie 1991), and changes in decision weights rarely have a large impact on rankings or ratings (Dawes 1979).

In other situations, exemplified by the privacy notifications that no one reads on Internet sites, the volume of information is overwhelming and not worth the investment one must make to read it. In still other situations, exemplified by conflict of interest disclosures, the disclosures are neither complicated nor long, but their implications for behavior are difficult to assess. If a doctor informs a patient that he or she will receive a referral fee if the patient enters a clinical trial the doctor recommends, should the patient decline to enroll? Making this determination requires a difficult judgment about whether the doctor's recommendation has been colored by the disclosed conflicts.

In all these situations, unsophisticated recipients of advice could benefit from the intervention of more savvy intermediaries to help them make sense of the information. Many nonprofit organizations, such as the Consumers' CHECKBOOK (<http://www.checkbook.org/>), perform this function. Instead of attempting to provide information directly to consumers, disclosure requirements could make information available in standardized formats so that intermediaries can arise to process it, make sense of it, and (perhaps for a fee) provide it in a form that is usable to its end users. Such an approach might well yield benefits beyond those contemplated by its implementers. Consider GPS information, which is used in creative and useful ways that early proponents of its release could never have anticipated. Consistent with this goal, the smart disclosure initiative, undertaken by the Obama administration (Sunstein 2013), is designed to encourage providers to disclose downloadable, machine-readable information, in part so that intermediaries can help consumers of, for example, energy and health care to learn about their own behaviors and, as a result, make more informed choices.

4.7. Promise and Pitfalls of In-Person Disclosures

Given that many disclosures have little impact because they fail to stand out among the onslaught of competing disclosures, it is reasonable to expect that in-person disclosure would be a good thing, in part because it might increase salience. There is, however, very little evidence to support (or refute) this prediction. One field experiment conducted by Chetty & Saez (2013) finds no impact on earnings in the year following a two-minute tutorial on the financial consequences of the EITC delivered in person by tax preparers to low-income clients. However, the lack of response may well have reflected the complexity of the incentives and the subtlety of behavioral adjustments that individuals would have had to make to respond to incentives.

Although in-person disclosure might well increase salience, it also has demonstrated pitfalls. In a series of follow-up experiments to the studies by Sah et al. (2012, 2013) described above, the authors test different remedies for the adverse effects of insinuation anxiety and social pressure. These studies reveal that advisees who received the conflict of interest disclosure from an external source (i.e., not directly from the individual with the conflict), who could make their choices privately, or who could change their minds afterward were less likely to follow biased advice than those who were informed of the conflict of interest by the advisor and had to make their final choice in his or her presence. These results suggest the possibility that people should not make significant decisions until they have had time to think on their own (away from their advisors) or unless a cooling-off period is available in which clients have the opportunity to cancel or change their minds without consequence. Applied to medicine, for example, the research points to the prescription for policy that patients should decide whether to follow recommended treatments only after leaving the pressures of the doctor's office.¹⁶

¹⁶Admittedly, such a policy could have its own unintended consequences, for example, exacerbating the already severe propensity of many patients to procrastinate in obtaining beneficial medical services.

4.8. Disclosure Versus Other Policies

As shown above, disclosure holds considerable promise as a tool of public policy, especially as a means of altering the behavior of disclosers as opposed to disclosees. However, it also has severe limitations and can backfire in certain situations, damaging the interests of those it is intended to help. Given these limitations, and the always present temptation of taking the path of least resistance, policy makers need to be vigilant against the risk that mandatory information disclosure policies will be implemented as a substitute for other, often more effective, regulatory interventions (see Loewenstein & Ubel 2010).

5. FURTHER DIRECTIONS

5.1. Other Domains of Disclosure

Although we chose to restrict our review to a relatively narrow range of situations—specifically interactions between buyers and sellers characterized by asymmetric information and misaligned incentives—disclosure is an enormous topic and could potentially encompass a very wide range of phenomena. For example, there is a burgeoning literature on the economics (and behavioral economics) of privacy (Acquisti & Taylor 2014) that looks at the issue of information disclosure from a very different perspective—that of individuals disclosing information to others, for example, on social media. Although different in its focus, this research has also highlighted the importance of psychology by demonstrating a range of psychological mechanisms that lead people to divulge information when it might not be in their interest to do so but to clam up when the costs of disclosure are low or benefits are high (e.g., Acquisti et al. 2013).

Perhaps the most closely related, and in-depth, research that we do not discuss in this review is reported in the large literature dealing with transparency and accountability initiatives applied to (and coming from) government. In the United States, statutes originating in the 1966 Freedom of Information Act and extending to the Obama administration's open government initiative, largely oriented to making the data routinely collected by the federal government easier to access and parse, have been discussed at some length (Sunstein 2013), as have similar initiatives in countries as diverse as the United Kingdom, Mexico, India, and China (e.g., McGee & Gaventa 2011; see also the international Open Government Partnership, <http://www.opengovpartnership.org>). A great deal remains to be learned, but funding to study such initiatives, provided by several foundations, has resulted in early findings and insights, many parallel to those reported in this article. One of the important claims from the literature on open government initiatives is that transparency alone may not be sufficient to produce beneficial social change; for change to occur, it has been suggested that transparency has to be accompanied by accountability. Information provision may not have much impact in the absence of institutions and mechanisms that have the capacity to channel the information into concrete action (see, e.g., Fox 2007).

5.2. Need for Further Research

Although calls for further research in academic reviews are almost pro forma, the need for further research on the effects of disclosure requirements is evident from both the ubiquity of such requirements and the paucity of research that seeks to understand when, why, and how they work.¹⁷ There is, first of all, a need for qualitative research examining how individuals and firms

¹⁷There is, for example, little evidence about the impact of personalizing information. Kling et al. (2012) and Bettinger et al. (2012) study treatments involving personalized information along with other interventions, but the independent effect of personalization remains an open question.

respond, or fail to respond, to disclosure. Regulators may fail to appreciate the nature and the extent of differences between their own goals and values and those of the people who are most affected by the disclosures. For example, proponents of calorie posting hold an implicit assumption, which is that the people whose health would benefit from calorie reduction will want to cut calories. This assumption undoubtedly holds for many of the recipients of the information, but for many others, it may be an example of the common tendency to assume that other people's goals are similar to one's own (see, e.g., Neale & Bazerman 1983).

People who are overweight are disproportionately poor, and many poor people are as likely to want to save money as to lose weight. One way to save money is to maximize the bang for the buck (i.e., calories per dollar), which the calorie information, combined with price information, can help a fast-food patron to do, potentially leading to a consequence opposite of the intended one. Although quantitative researchers rarely do more than pay lip service to the benefits of qualitative research, disclosure regulation is a domain in which the need for qualitative research is especially pressing. The implementation and use by end users of disclosures can bear little resemblance to what the originators had in mind.

The second pressing need is for additional randomized controlled trials and field experiments. Sometimes public policies get ahead of the data justifying their implementation. In light of the complex economic and psychological mechanisms at play in the real world, one of the major themes of this article is the difficulty of anticipating demand-side reactions to disclosure requirements. This is precisely why experimentation is so important. Ideally, new proposed disclosures should be tested on a limited scale, via randomized field experiments, before they are rolled out to the general public (Greenstone 2009). It must be acknowledged, however, that such studies are unlikely to provide much evidence on likely supply-side reactions, such as those reflected in the telltale heart effect.

Such limited-scale experiments should allow for more in-depth analyses of effects than have generally been conducted. For example, studies examining the impact of calorie labeling have tended to focus on the impact of labeling on a single meal. However, even if calorie labeling does change people's selections at a restaurant, any benefit could easily be undone if, after eating a low-calorie lunch, people end up snacking more later in the day. In a study that examines the impact of nudges and nutrition information on meal choice, for example, the calorie reduction benefits of a nudge toward lower-calorie sandwiches were undone because those so nudged were more likely to choose high-calorie side orders and drinks (Wisdom et al. 2009).

Another way in which smaller-scale experimental studies could go in more depth would be to follow consumers over time to distinguish between short-term and long-term effects. On the one hand, one might expect effects to persist in the long term if short-term changes result in changed habits, or if the information is learned and the learning results in sustained changes in behavior. In fact, some studies do find such effects (e.g., Allcott & Rogers 2013). On the other hand, there is a risk that information disclosures will tend to lose impact over time as the information enters into the background of the consumer's awareness and ultimately becomes ignored.

6. CONCLUSIONS

Psychological factors severely complicate the standard arguments for the efficacy of disclosure requirements. Because attention is both limited and motivated, disclosures may be ignored, especially if they are complex and provide unwelcome news, and new disclosures, even of valid information, may turn out to distract attention from older and possibly more important ones. As a result of limited attention and the other psychological factors discussed in Section 3, disclosure requirements appear to have been less effective in changing recipient behavior than their proponents seem to assume.

At the same time, disclosure may have large effects on producers, which presents an independent puzzle: If consumers are unaffected by disclosure requirements, why would producers change their behavior? We suggest that the telltale heart effect provides a large part of the answer. Providers of information may well overestimate the likely effect of the disclosure on consumers, partly because that disclosure seems so salient to providers. As a result of the telltale heart effect, information disclosure can have beneficial effects, even when it fails to change consumer behavior.

Unfortunately, disclosure of misaligned incentives can have perverse effects on the producer side of the equation. Specifically, advisors who would have otherwise been intrinsically motivated to provide unbiased advice can feel morally licensed to provide biased advice once a conflict of interest has been disclosed. And because of insinuation anxiety, advice recipients may feel greater pressure, with this disclosure, to follow the now less trusted advice.

Above we suggested a set of psychologically informed strategies that might make disclosure more effective, including simplification, standardization, and the use of social comparisons. Clearly, further research is needed to gain a better understanding of when, why, and how disclosure policies have intended or unintended consequences, as well as how such policies can be improved, but one thing is clear: Psychology changes everything.

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

ACKNOWLEDGMENTS

We thank Saurabh Bhargava, Cynthia Estlund, Jonathan Fox, David Laibson, Lindsay Page, Daniel Schwartz, and Eric VanEpps for helpful comments and Jacob Reisberg and Spencer Baugh for superb research assistance.

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