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# The Irrelevance of Information Overload: An Analysis of Search and Disclosure

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# THE IRRELEVANCE OF INFORMATION OVERLOAD: AN ANALYSIS OF SEARCH AND DISCLOSURE

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This paper deals with a small part of a large subject. The subject is market failure as a result of imperfect information. Broadly speaking, such market failure can occur in two ways: as a result of problems that exist "in the world" and as a result of problems that exist in consumers' heads. Respecting the former source of failure, consumers may process information perfectly but acquire too little information to permit optimal choices. This could occur because (a) information is a public good; consequently, firms may supply insufficient information about their products or contracts to enable consumers to choose optimally; (b) consumers may observe the offerings of too few firms to make an optimal choice among products because consumers correctly perceive the costs of making interfirm comparisons to be too high in relation to the gains; or (c) consumers may not observe relevant attributes of particular products or contracts if the observation of them requires special skills, the acquiring of which is not worth the investment.

Market failure as a result of imperfect information also may occur because consumers sometimes poorly process the information that markets actually produce. For example, many studies show that consumers systematically ignore base rate data in favor of information that is less

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probative but more vivid—more easily summoned to mind; and consumers also have been shown to overestimate the likelihood of conjoint events but to underestimate the likelihood of disjoint events. Such information processing failures could cause consumers to make suboptimal choices. For example, they may err respecting the amount of contractual protection they need against the risk of defective products or about the amount of credit they can comfortably assume.<sup>1</sup> In addition to problems like these, some believe that consumers make incorrect decisions when they are required to process too much information. The idea here is that consumers do well with moderate amounts of data but poorly when data sets become large. In the words of a leading advocate of this view, consumers' "limited processing capacity can become cognitively overloaded if they attempt to process 'too much' information in a limited time, and this can result in confusion, cognitive strain, and other dysfunctional consequences," including "poorer decisionmaking."<sup>2</sup> This phenomenon has a name, "information overload," and it is our subject.

If information overload really exists, it would be relevant to market failure problems in two related ways. First, to cure the problem that consumers receive too little information to process, the state can produce or require firms to produce more information. But these strategies risk self-defeat because they can result in consumers being given so much information that the consumers "overload." If this would occur, market failure is inevitable: too little information exists for correct choice but correct choice could not be made were more information supplied. Second, these pathological cases may sometimes occur spontaneously as it were: a market is generating enough information for optimal choice, but consumers overload in the face of it. Should this situation occur, some form of regulatory response could be necessary.<sup>3</sup>

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1. The psychological literature to which the text refers is summarized and some of its legal implications are explored in Jackson, *The Fresh Start Policy In Bankruptcy Law*, 98 HARV. L. REV. 1393 (1985); Schwartz & Wilde, *Imperfect Information in Markets for Contract Terms: The Examples of Warranties and Security Interests*, 69 VA. L. REV. 1387 (1983).

2. Malhotra, *Reflections on the Information Overload Paradigm in Consumer Decision Making*, 10 J. CONSUMER RESEARCH 436, 437 (1984); Malhotra, *Information Load and Consumer Decision Making*, 8 J. CONSUMER RESEARCH 419 (1982) [hereinafter *Information Load*].

3. As examples of claims for the legal relevance of information overload, the Supreme Court stated, "*Meaningful disclosure does not mean more disclosure. Rather, it describes a balance between 'competing considerations of complete disclosure . . . and the need to avoid . . . [informational overload]'. . . . And striking the appropriate balance is an empirical process that entails investigation into consumer psychology . . . ."* Ford Motor Credit Co. v. Milhollin, 444 U.S. 555, 568 (1980) (brackets and emphasis in original; citations omitted). The Senate Report to accompany the Truth in Lending Simplification and Reform Act also recited:

Both legal implications of the information overload phenomenon, we argue here, must be rejected because consumers in fact do not "overload." Ratner, when the information environment becomes very rich or the decision task becomes very complex relative to the consumer's available time or expertise, the consumer satisfices. To optimize is to choose the best from the full set of market choices; to satisfice is to do as well as one can, given the circumstances. That consumers satisfice makes different normative questions germane. For example, if consumers would satisfice as the result of a disclosure requirement meant to cure the problem that too little information exists, would consumers still be doing better than they had done before the state's intervention? Is the satisficing that accompanies product search amenable to regulatory solution? Is the gap between satisficing and optimizing—how well consumers actually do in contrast to the ideal—often large enough to justify regulatory concern? These questions are taken up below.

Part I uses one of the information processing literatures to describe how consumers search for and choose products on the basis of product quality. It then attempts, in light of what consumers actually do, to relate the information overload idea to the question of when a disclosure requirement should be imposed. Part II discusses the forms that satisficing apparently takes in consumer markets and the functions that disclosure can serve given the strategies that consumers use. Consumers satisfice by (a) failing to choose the best when considerable product diversity exists, because the costs of *acquiring* information preclude consumers from inspecting the full market choice set; or (b) failing to choose the best when the costs of *processing* information preclude consumers from fully exploiting an optimal search strategy. We sometimes refer to this second phenomenon as satisficing because of task complexity. The

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During its hearings the Consumer Affairs Subcommittee heard testimony from a leading psychologist who has studied the problem of "informational overload." The subcommittee learned that judging from consumer tests in other areas, the typical disclosure statement utilized today by creditors is not an effective communication device . . .

. . . .  
 The Committee has adopted . . . suggestions to simplify the typical truth in lending disclosure statement. The number of disclosures given the consumer would be reduced . . . ."

S. REP. NO. 73, 96th Cong., 2d Sess. 3, *reprinted in* 1980 U.S. CODE CONG. & AD. NEWS 280, 281-82.

For a typical academic statement, see Davis, *Protecting Consumers from Overdisclosure and Gobbledygook: An Empirical Look at the Simplification of Consumer Credit Contracts*, 63 VA. L. REV. 841, 847-50 (1977). The information overload idea is distinct from a cost-benefit objection to a disclosure requirement—that too few consumers care about a subject, or care enough about a subject, to justify requiring firms to make disclosures respecting it. When the cost-benefit objection holds, disclosure is at best pointless; when the information overload objection holds, disclosure actually worsens the consumers' lot.

former type of satisficing is partly responsive to disclosure that reduces the costs of acquiring information but it is not otherwise amenable to regulatory initiatives. The evidence suggests that satisficing of the latter type does not seriously disadvantage consumers. This position is partly based on a set of experiments that two of the authors, Grether and Wilde, recently conducted.<sup>4</sup> Part III reviews the information overload literature to show that what is called overload actually decomposes into the two forms of satisficing just described. Part III also uses the overload literature to claim that consumers make actual purchase choices well enough to make questionable the view that regulatory initiatives are desirable because information environments currently are too rich. This Part makes use of a different set of experiments conducted by Grether and Wilde.<sup>5</sup>

It is appropriate before beginning to indicate a presupposition relating to the use of social science in normative analysis. The literatures referred to above are relatively new and are flawed by the absence of a tenable psychological theory relating task complexity to task performance. Policy positions based on these literatures thus must be held tentatively. On the other hand, the information overload idea as commonly expressed rests on questionable experiments that their principal investigator now cautions decisionmakers not to take literally.<sup>6</sup> The social science of the question, that is, is in flux. Decisionmakers, however, must act. We assume that they should not ask what is ultimately true but rather what is sensible now to believe, and rest this paper's conclusions on answers to the latter question.

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4. See Grether & Wilde, *An Analysis of Conjunctive Choice: Theory and Experiments*, 10 J. CONSUMER RESEARCH 373 (1984).

5. See Grether & Wilde, *Consumer Choice and Information: New Experimental Evidence*, 1 J. INFORMATION ECON. & POL'Y 115 (1983).

6. These experiments were conducted by Professor Jacoby and his colleagues. Representative criticisms of them are summarized in Schwartz & Wilde, *Intervening in Markets on the Basis of Imperfect Information: A Legal and Economic Analysis*, 127 U. PA. L. REV. 630, 675 n.100. Jacoby himself recently stated: "[T]he information overload research paradigm had limited ability to provide a suitable basis for real-world managerial and policy decisions." Jacoby, *Perspectives On Information Overload*, 10 J. CONSUMER RESEARCH 432, 432 (1984) (citation omitted). This, he says, is because consumers will not let themselves be overloaded in the sense of attempting to use too much information; rather, they will just ignore information. The real danger, Jacoby now believes, is that the discarded information may sometimes be relevant. *Id.* For a contrary view of the normative implications of the overload idea, see Malhotra, *supra* note 2; authorities cited *supra* note 3.

## I. INFORMATION OVERLOAD AND DISCLOSURE REQUIREMENTS

### A. HOW CONSUMERS DECIDE

To understand the issues involved in deciding whether to impose a disclosure requirement, it is useful to review the literature concerning how consumers search for product attributes. Though this literature does not fully characterize consumer choice, a fair degree of consensus exists respecting our subject.

In this literature, a product is taken to be a set of attributes such as color, durability, and ease of use. Consumers supposedly attempt to choose their most preferred attribute bundle when they purchase, and thus search over product attributes. This search is conducted using one or both of two distinct choice strategies.<sup>7</sup> One such strategy is called "noncompensatory" choice, and its most common variant is "conjunctive" choice. A consumer who searches pursuant to the conjunctive choice strategy first identifies those product attributes that are very important to him. He then decides how high a product must score on each of these attributes to be acceptable, a process referred to as setting cutoff levels for attributes. Then the consumer inspects a number of alternatives (i.e., a set of toasters) and rejects those that fail to score above cutoff levels. A consumer who makes a purchase decision using only the conjunctive choice strategy is assumed to choose the first product found all of whose attributes have acceptably high scores. Consumers, however, are now thought to use conjunctive choice to select subsets of products for final consideration. In this event, attributes used at the conjunctive stage are "screening" attributes. Consumers use fewer attributes to screen—often no more than two—than they use when making final

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7. The text speaks mainly of search for products because the literature discusses products, but its analysis extends to contract terms. A contract can be regarded as another product attribute or as a product that has several attributes (i.e., different terms). Researchers sometimes treat price as a product attribute but seldom focus on other aspects of the contract. The discussion in this paragraph and the next two rests largely on Johnson & Russo, *Product Familiarity and Learning New Information*, 11 J. CONSUMER RESEARCH 542 (1984); Lussier & Olshavsky, *Task Complexity and Contingent Processing in Brand Choice*, 6 J. CONSUMER RESEARCH 154 (1979); Olshavsky, *Task Complexity and Contingent Processing in Decision Making: A Replication and Extension*, 24 ORGANIZATIONAL BEHAV. & HUM. PERFORMANCE 300 (1979); Park, *The Effect of Individual and Situation-Related Factors on Consumer Selection of Judgmental Models*, 13 J. MARKET RESEARCH 144 (1976). These studies discuss how consumers search within a specific product class. For an interesting analysis of how consumers choose between products in different classes, see Johnson, *Consumer Choice Strategies for Comparing Noncomparable Alternatives*, 11 J. CONSUMER RESEARCH 741 (1984) (televisions and stereos).

choices.<sup>8</sup>

Decision at the final stage, whether made after a conjunctive choice screen or directly from a relatively small product set, is pursuant to a "compensatory" choice strategy. Under compensatory choice, the consumer considers *all* salient attributes. This choice strategy is called compensatory because it permits good scores on some attributes to compensate for bad scores on others. Thus, a consumer could choose a product that scores low on one attribute if the other attribute scores are high enough.

Consumers are believed to use only the compensatory choice strategy for products that are purchased frequently. In this case, consumers know what the market offers and focus directly on the subset of market options—"the evoked set"<sup>9</sup>—that is most likely to yield a satisfactory product. They then select from this set compensatorily. Consumers know that more search is needed for infrequently purchased items—say a car or television—or for the first few purchases from a product class new to them; in these circumstances, they are thought to use noncompensatory strategies such as conjunctive choice to reduce the final choice set to manageable proportions. Then they switch to compensatory choice. This view of consumer search behavior implies that experimental subjects can be made to switch between compensatory and noncompensatory strategies by induced changes in the set of potentially satisfactory options they face. The evidence is consistent with this prediction,<sup>10</sup> and thus is taken to confirm the view that consumers use noncompensatory strategies when they regard themselves as facing large choice sets and compensatory strategies when they regard themselves as facing small choice sets.

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8. For example, the Lussier and Olshavsky subjects used one or two attributes to screen (three at most) but used three or four attributes when making a final decision. See Lussier & Olshavsky, *supra* note 7.

9. The notion of the evoked set seems first to have been used in Urban, *Perceptor: A Model For Product Positioning*, 21 MGMT. SCI. 858 (1975). Urban found the usual evoked set to contain five or fewer members and concluded that "the evoked set seems to be small in many actual cases . . . ." *Id.* at 870.

10. See Johnson & Meyer, *Compensatory Choice Models of Noncompensatory Processes: The Effect of Varying Context*, 11 J. CONSUMER RESEARCH 528 (1984); Lussier & Olshavsky, *supra* note 7. The latter researchers found that experimental subjects who saw more than three brands used a noncompensatory choice process; with three brands or less, they went directly to full comparisons on all salient dimensions.

## B. THE PROBLEM OF DISCLOSURE

Market failure may occur when consumers do not observe a particular product attribute or observe too few products containing the attribute to force firms to compete in the supply of it. Consumers who choose in the fashion described in section I(A) would then be helped by disclosure that reduced the costs to them of searching over product attributes. For example, were food labels to contain no nutritional information, a consumer who wished to observe the attribute "nutrition" would have to do library research or test the product. Labels that concisely list product ingredients and their nutritional content greatly reduce the cost of observing the attribute nutrition. Disclosure thus is helpful when a substantial number of consumers would want to make an attribute relevant to choice but cannot because it is too expensive to observe. These consumers must then choose on the basis of other attributes that they care less about or regard as proxies for the "hidden" attribute. As in the nutrition example, disclosure would permit consumers to substitute the preferred attribute that has become convenient to observe for a less desirable attribute, either at the screening or compensatory stage, or to add it to the attribute set previously considered. Either change would make consumers better off and also would help to cure or ameliorate market failure.

We call disclosure that yields these happy consequences "ideal," but for a variety of reasons firms cannot always make ideal disclosure. These reasons trace to three sources: the irreducible ambiguity of words, the intractable complexity of some choice tasks relative to the ability of the average consumer, and the diversity of consumer preferences. As will appear, only the third relates to the *quantity* of information that must be disclosed—the information overload concern.

The initial two difficulties are best explained by example. Regarding the first, consider the attribute "propensity to cause irritation to the skin." A set of cosmetic products will generate a probability distribution along this attribute: that is, some products are more likely to cause harm than others, and the harm is likely to be more serious from some than from others. To communicate accurately a given product's rank in the distribution, a firm would have to provide the distribution itself, but it is difficult for firms to acquire detailed information from all other firms. Hence, each firm must make disclosure in words, and these can capture only the roughest distinctions ("dangerous for sensitive skin," "may cause irritation," and the like). Should decisionmakers regard such language as insufficiently evocative given a particular product's potential for

harm, disclosure may not work, for firms cannot do better.<sup>11</sup> The complexity problem is illustrated by the struggle to communicate to consumers the financial consequences of prepaying loans. These consequences can be shown accurately only by giving consumers the appropriate mathematical formula so they can insert the variables that characterize their own situation, but few consumers could use the formula. Therefore, firms, to the Federal Reserve Board's knowledge, make almost completely unilluminating "disclosure" respecting rebates.<sup>12</sup> Disclosure solutions obviously are unsatisfactory when ambiguity and complexity problems cannot be solved, but these problems are *not* the result of the quantity of information that ideally should be disclosed; probability distributions and mathematical formulae are more concise than the words that now substitute for them.

In contrast, the preference diversity problem is related to quantity. We will later see that consumers often are interested in different subsets of the attributes of multi-attribute products. Consequently, required disclosure might reduce the costs of observing an attribute in which at least some consumers have no interest. This seemingly could not cause harm because such consumers could continue not to observe the "disclosed" attribute. For example, a substantial minority of consumers report themselves as not using nutrition labels;<sup>13</sup> the labeling requirement hurts them only insofar as it (slightly) raises product prices. Put simply, disclosure over attributes that consumers ignore apparently has no influence on choice and so cannot reduce choice efficacy.

This conclusion unfortunately is too simple because the presence of irrelevant information conceivably could create difficulties. The view that irrelevant information is actually harmful can support three possible objections to disclosure solutions, but two follow from factual premises that have been shown to be erroneous. The first such objection is that a state induced reduction in the cost of observing an attribute that at least

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11. The legal controversy to which this difficulty is most germane is whether or when manufacturer warnings should be exculpatory in products liability law. This is a very hard question. An interesting recent study suggested that warnings cast in qualitative terms but that provide clearly described new data will cause persons "to update their probabilistic beliefs in a manner that is broadly consistent with Bayesian analysis." Viscusi & O'Connor, *Adaptive Responses to Chemical Labeling: Are Workers Bayesian Decision Makers?*, 74 AM. ECON. REV. 942, 943 (1984).

12. See Regulation Z, 12 C.F.R. § 226.18(k)(2) (1985). Compare 12 C.F.R. § 226 app. F with 12 C.F.R. § 226 app. G (detailing annual percentage rate computations and providing model forms for open-end credit plans).

13. See Klopp & MacDonald, *Nutrition Labels: An Exploratory Study of Consumer Reasons For Nonuse*, 15 J. CONSUMER AFF. 301 (1981) (40% of consumers in survey reported themselves as nonusers of nutritional information on labels; only 11% of the nonusers were critical of the form of labels currently in use).

some consumers would otherwise ignore will cause those consumers to become confused; they may inadvertently or erroneously devote time to observing this attribute that they would have devoted to observing the things that do concern them, and thereby make some wrong decisions. This objection is plausible only if consumers cannot ignore irrelevant information. No evidence supports this view. Indeed, the pervasiveness of the conjunctive choice strategy is strong evidence to the contrary. This strategy, recall, entails evaluating products on a very few attributes, ignoring others that are regarded as irrelevant to decision at an early stage. Further, the experiments summarized in Part III show that persons can ignore irrelevant information.<sup>14</sup>

A second way in which the presence of irrelevant information conceivably could cause harm is that the process of deciding what to ignore—of reading a bigger label—will make consumers feel frustrated or dissatisfied. This objection responds to early psychological definitions of information overload<sup>15</sup> but not to the definition of current overload proponents, for the objection posits not that consumers will make worse decisions but that they will be less happy when making correct decisions than before the state intervened. This objection seems implausible since ideal disclosure actually increases consumer choice by enabling consumers to observe more attributes than previously. That some consumers do not use the information should not generate unhappiness; lowering fares to a place one does not want to go should produce no emotion or the pleasant thought that if one's preferences change, one can satisfy the new preferences more easily. And a common finding is that consumers report more satisfaction with purchase choices when they perceive themselves as having more information on which to base those choices, whether all of the information is used or not.<sup>16</sup> Therefore, an objection

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14. These experiments are reported in Grether & Wilde, *supra* note 4. Similar conclusions in this respect are found in Shocker & Srinivasan, *A Consumer-Based Methodology for the Identification of New Product Ideas*, 20 *MGMT. SCI.* 921, 926 (1974) (“[R]esearch . . . provides evidence that individuals consider relatively few aspects of stimuli in making their evaluations . . . Irrelevant attributes are likely to have near zero saliences . . .”); see also Lorch, Anderson & Well, *Effects of Irrelevant Information on Speeded Classification Tasks: Interference Is Reduced by Habituation*, 10 *J. EXPERIMENTAL PSYCHOLOGY: HUM. PERCEPTION & PERFORMANCE* 850 (1984) (persons can learn to avoid irrelevant information).

15. According to these definitions, people are not overloaded unless they feel overloaded, that is, stressed and harried. See, e.g., Milord & Perry, *A Methodological Study of Overload*, 97 *J. GEN. PSYCHOLOGY* 131 (1977).

16. See, e.g., Patton, *Quantity of Information and Information Display Type as Predictors of Consumer Choice of Product Brands*, 15 *J. CONSUMER AFF.* 92 (1981); see also McCullough & Best, *Consumer Preferences for Food Label Information: A Basis for Segmentation*, 14 *J. CONSUMER AFF.* 180 (1980) (65% of respondents wanted a great deal of information, including a list of ingredients and nutritional data, on bread labels).

that disclosure requirements reduce consumer satisfaction is both implausible and unsupported by the data.

The presence of irrelevant information can be harmful to consumers, however, if it raises the costs to them of observing attributes in which they are interested. To see how this could occur, suppose that some consumers of product *J* want to search only its attributes *a*, *b*, and *c*, and firms respond by disclosing information relevant to these attributes. The state then requires firms also to disclose information relevant to *J*'s attributes *d*, *e*, and *f*. Each firm then puts out a pamphlet containing information on all six attributes. Although the search cost to those consumers who want to observe *d*, *e*, and *f* is reduced, the search cost to the former set of consumers in observing *a*, *b*, and *c* has increased, for they now must read through the pamphlet to find the parts relevant to them. If the cost of *their* search increases sufficiently, they may cease to observe all of *a*, *b*, and *c*, and the state will then have produced market failure in the service of curing it.

This concern is not fanciful but should infrequently weigh against a disclosure requirement. It is inapplicable to simple, inexpensive products because such products have few salient dimensions. Consumers devote considerable time to searching for complex, expensive products.<sup>17</sup> In response, firms now supply extensive information about many aspects of such products as cars and stereos which they would be unlikely to do if consumers failed to use the data. Were new data required to be disclosed, firms could make even greater use of such search cost reducing devices as tables of contents, indices, key words, underlining, and the like. Because consumers tend to search intensively for complex products anyway, the presence of some state-required irrelevant information in connection with the sale of these products should seldom cause consumers to truncate search over attributes they care about. In addition, if decisionmakers limit required disclosure to attributes that concern a substantial number of consumers, as they generally should do, such disclosure probably will be cost reducing on average.

In summary, objections to disclosure requirements on the basis of information overload must be rejected. Indeed, the popularity of the information overload idea among legal commentators seemingly rests on a misconception. The common reasoning is that persons will overload if they are given too much information, and disclosure requirements sometimes provide persons with much more information than they previously

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17. See Schwartz & Wilde, *supra* note 1, at 1431-34.

had. Disclosure, however, should and often does reduce the costs to consumers of observing attributes of products or contracts that consumers had wanted to observe but could not because inspection costs were too high. Hence, even if "overload" were to exist, the information overload objection to disclosure solutions is not an objection against disclosure itself, but rather against disclosure that increases search costs rather than reduces them. While decisionmakers should be sensitive to this possibility, it is the unusual case in which disclosure will actually be cost increasing for a substantial number of consumers.

## II. SATISFICING IN SEARCH STRATEGIES AND ADDITIONAL FUNCTIONS FOR DISCLOSURE

The consumer search strategies described above imply that consumers may satisfice rather than optimize when making purchase choices. This is interesting normatively because the choice between disclosure and regulation should be influenced by the extent to which consumers can optimize on their own. Consequently, Part II describes the forms that satisficing may take and the legal reforms, if any, that these forms imply. Part III relates satisficing to the information overload idea.

To satisfice rather than optimize is to fail to choose the most preferred—the "best"—from among a set of choices. Consumers could fail to choose the best because of high costs of acquiring information about market choices ("external costs") or because of high costs of processing information about market choices ("internal costs"). Regarding the first, when considerable product diversity exists, it may be too costly for consumers to inspect every market alternative. As we have seen, consumers respond to this difficulty by using a conjunctive choice strategy to screen. This could prevent them from locating their most preferred product in the set of existing products. To see more clearly how this could occur, recall that a consumer screens by reference to less than all attributes that figure in final choice. As a result, a consumer could assemble a final choice set, from products that score above cutoff levels on screening attributes, that fails to include the consumer's most preferred product—the one which would be chosen if every product in the market were inspected. The consumer will choose the best from the reduced set but miss the global best.<sup>18</sup> This form of satisficing results from the existence of product diversity, not from any inability on the consumer's part to

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18. The definition of satisficing—failing to choose the best—is now standard, see J. MARCH & M. SIMON, ORGANIZATIONS 140-41 (1958), but may be misleading. As the text states, when the cost of assembling alternatives from which to choose is high, the search strategy may be satisfactory with

behave optimally; the consumer actually is maximizing net expected utility given that the costs of acquiring information are positive. In contrast, the second form of satisficing that could occur results from the consumer's limited ability to make decisions—the information processing cost concern. As we will see, consumers must solve fairly complex problems to use a conjunctive choice strategy optimally. If they are unable to solve all of these problems, again they may fail to choose their global bests. We shall discuss these two forms of satisficing separately because they pose different problems for regulators.

The effect of satisficing as a result of high information acquisition costs is partly responsive to ideal disclosure. Such disclosure reduces the costs to consumers of observing product attributes. Consequently, consumers will be more selective at the conjunctive choice stage; when the cost of inspecting an attribute declines, consumers will screen more products on this attribute. Thus, ideal disclosure will generate final choice sets for consumers that are more likely to include products close to or which indeed are their global bests. Even ideal disclosure, however, cannot completely eliminate this sort of satisficing effect.

The state should ignore what remains because the only other remedy, a required shrinking of the full market choice set, is likely to make matters worse. To see why, consider a product with ten possible attributes, only three of which are relevant to any given consumer. If different consumers each regard a different attribute set as important (e.g., some consider price, color, and availability, while others consider durability, safety, and size), there could be as many as 120 different ways of combining the various attributes.<sup>19</sup> If the decisionmaker knew which combinations were most preferred, he could shrink the market to the subset of

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respect to the alternative ultimately selected but optimal with respect to the net expected value of search.

19. Regarding this example, surveys of groups of experimental subjects commonly reveal larger sets of product attributes that figure in a decision than the subjects actually report themselves as using. For example, in one experiment, a free form discussion elicited twenty salient attributes of drip coffeemakers, but each consumer made only three significant to decision. See Smead, Wilcox & Wilkes, *How Valid Are Product Descriptions and Protocols in Choice Experiments?*, 8 J. CONSUMER RESEARCH 37, 39-40 (1981); see also Alpert, *Identification of Determinant Attributes: A Comparison of Methods*, 8 J. MARKETING RESEARCH 184, 185-88 (1971); Moore & Holbrook, *On the Predictive Validity of Joint-Space Models in Consumer Evaluation of New Concepts*, 9 J. CONSUMER RESEARCH 206, 207-10 (1982). Also, consumers regard some attributes as more important to them than others. See, e.g., Husted, Mayer & Whipple, *Consideration of Context Differences in Product Evaluation and Market Segmentation*, 3 J. ACAD. MARKETING SCI. 34, 37 (1975); Johnson, *Market Segmentation: A Strategic Management Tool*, 8 J. MARKETING RESEARCH 13 (1971); Urban, *supra* note 9. In addition, salient attributes differ across consumers. See, e.g., Boote, *Market Segmentation by Personal Values and Salient Product Attributes*, 21 J. ADVERTISING RESEARCH 29, 30-31, 34-35 (1981).

products that did best on these combinations, thereby enhancing the likelihood that each consumer would get the one wanted most. But if the decisionmaker chose the subset wrongly, he would eliminate many bests from the market, thereby reducing utility.

The gains from shrinking the market choice set are unlikely to exceed the losses for three reasons. First, to choose the correct product subset requires more information about consumer preferences (the most preferred attribute combinations) than decisionmakers are likely to have. This information gap is serious because satisficing of the sort under discussion cannot present problems when markets contain roughly homogeneous products; in this event, the difference between the global best and the best in a choice set will be trivial. The product diversity that causes satisficing, however, exists partly in response to consumer preferences. Consequently, shrinking diversity poses a substantial risk of frustrating those preferences. Second, without regulation consumers are choosing only among products that score above cutoff levels on attributes that the consumers consider important, and so they may not be doing that badly on their own. Third, to limit the number of products that firms could sell or the number of attributes that products could have would require a costly, complex regulatory process. For these reasons, satisficing caused by information acquisition costs in the face of product diversity and that remains after ideal disclosure should be regarded as an unfortunate fact, not a policy problem.

Consumers also could be caused to satisfice by the presence of high information processing costs, which could prevent them from correctly using the optimal conjunctive choice strategy.<sup>20</sup> To see what sort of failures might occur, it is necessary first to characterize the optimal conjunctive strategy. It would have a set of cutoff levels for attributes and an order of inspection of them that maximized the consumer's utility, for the strategy must resolve two issues: the amount of search that should be devoted to an attribute and the order in which attributes are inspected. Respecting the amount of search, an optimal conjunctive strategy has three properties: First, it requires the consumer to raise the cutoff level

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When consumers consider a subset of attributes, the subset differs across consumers and consumers rank attributes differently, the number of possible product/attribute combinations is given by the formula  $N!/(N-R)!R!$ , where the exclamation mark indicates a factorial,  $N$  represents the total number of salient attributes, and  $R$  represents the number of attributes that are salient to each person.

20. The analysis in this paragraph is based largely on L. Wilde, *Optimal and Nonoptimal Satisficing I: A Model of Satisfactory Choice* (1982) (California Institute of Technology Social Science Working Paper #363). Wilde assumes that consumer preferences over attributes are independent. For example, persons for whom car color is salient do not necessarily care about car speed.

for an attribute when the cost of inspecting the attribute declines. To raise a cutoff level is to increase the probability that any particular product will be rejected because it falls below the cutoff. Hence, this property actually holds that search over attributes should increase when search costs decline, because the consumer should screen more products. Second, holding inspection costs constant, an optimal conjunctive strategy requires the consumer to set lower cutoff levels for later attributes. To lower a cutoff level is to increase the probability that a particular product will score acceptably on the attribute; thus, to set lower cutoff levels on later attributes is to search less for them. This is optimal because rejecting on the basis of later attributes "wastes" more search costs: the consumer must start again and search a new product up to the later attributes. Simply, it is cheaper to reject early in the game. Third, if costs to inspect later attributes rise, an optimal conjunctive strategy requires the consumer to set higher cutoff levels for early attributes. The resultant increased search at early stages will raise the quality of products considered at later stages, which is wise because the rise in inspection costs for later attributes implies that fewer products can be rejected late. If one *must* take from a choice set, one wants the choice set to contain as many good things as possible.

An optimal conjunctive choice strategy would have two properties govern the order in which attributes are inspected. First, low inspection cost attributes should be searched first. The rationale for this is the same as for property three above: increased search at early stages increases the quality of products considered at later stages, when rejection is less likely. Second, attributes on the basis of which the consumer is more likely to reject should be searched first. This again is because it is less costly to reject early than late.

Grether and Wilde attempted to test this model in the laboratory, but before discussing their results it is useful to consider what such a test could show. The model assumes that internal processing costs are zero; the actors in it can costlessly make all requisite calculations. This assumption seems strong because some aspects of the optimal conjunctive strategy appear hard to satisfy. For example, correlating changes in inspection costs on some attributes with the appropriate cutoff levels for others (property three of the amount of search aspect) can require sophisticated calculations. If an experiment validates *all* of the model's predictions, then it is correct to claim that such internal processing costs did not prevent the experimental subjects from using an optimal conjunctive choice strategy and may not prevent real consumers from doing so as

well. On the other hand, if certain predictions are not validated, and if the subjects' failures apparently occur when the costs to them of processing information are high, it is plausible to claim that internal costs prevent consumers from doing as well as can be done with conjunctive choice. In this latter case, though, persons still could be acting optimally given that the costs to them of acquiring *and* processing information are positive; that is, persons could be choosing that amount of information to acquire and that amount of processing in which to engage that maximizes net expected utility. The Grether and Wilde experiments explicitly incorporated information acquisition costs: subjects had to pay fees to inspect attributes. They did not incorporate information processing costs because no metric exists by which to measure them. Hence, the Grether and Wilde experiments should be interpreted as follows: (a) If the model's predictions are confirmed, processing costs did not prevent subjects, and may not prevent consumers, from using an optimal conjunctive choice strategy; (b) to the extent the model's predictions are not borne out, processing costs are likely to be the cause; (c) but if (b) occurs, it is incorrect to claim that the subjects were not acting optimally, given all costs they faced; the experiments could not settle this latter issue.<sup>21</sup>

To understand the experiments' results, it is helpful to describe the experiments briefly.<sup>22</sup> Subjects were told that they had to search for and purchase "products," some of which had two attributes while others had three attributes. An "attribute" in these experiments actually was a sum of money, and a "product" was a set of such sums, or attributes. For example, the experimenters would tell subjects that attribute one of an experimental product was on the interval between \$1 and \$11. To search each product over attribute one, the subject had to pay a cost per product searched, which ranged from \$.25 to \$2.00. After the cost was paid, a bingo cage containing numbered balls was spun and the level the particular product had for attribute one was revealed by a blind drawing. Let the ball chosen be a five. Were the subject to buy this product, attribute one would be worth \$5 to him. The subject, before searching in this way, was required to set a cutoff level for attribute one. Suppose this level was \$3; then the subject had to reject any product that scored below \$3 on

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21. That consumers may be optimizing against internal as well as external costs is now becoming a common observation. Michael Johnson, in his paper on noncomparable comparisons, states:

At least two goals influence [purchase] strategy selection. While striving to choose the best possible alternative, consumers put forth as little effort as possible. In other words, consumers try to minimize both error and effort when selecting a strategy. Because error and effort reduction are often incompatible goals, consumers trade off error for effort.

Johnson, *supra* note 7, at 742 (citations omitted).

22. See Grether and Wilde, *supra* note 4, for a full description of these experiments.

this attribute. If a product was rejected on the basis of the first attribute searched, the subject had to pay the search cost again and see what the bingo cage revealed. In this example, the product scored above the cutoff level— $\$5 > \$3$ —so the subject could go on to search the second attribute. There too, search was conducted at a cost, from among points on an interval and by means of a bingo cage. In some experimental tasks, subjects had to choose among two attribute “products” while in others they had to choose among three attribute “products.” Each subject could earn the sum of attributes above his cutoff levels (the  $\$5$  above) less the cost he incurred to inspect attributes. By varying search costs for attributes and by varying attribute amounts and attribute intervals (say from  $\$1$  to  $\$11$  or  $\$3$  to  $\$8$ ), the experimenters could test the various predictions of the optimal conjunctive choice model.

Before discussing the results, it is useful to look again at the experimental task. This task was different in its level of abstraction from one that people are likely to perform in life—choosing sums of money rather than actual product attributes; in the evident necessity to do mathematical calculations—considering probabilities; and in the time in which to choose—the experiments took about an hour each and included search for several “products.” The nature of the experiments permitted a pure test of the model, in that no confounding effects traceable to familiarity with real products could take place, but it seemingly made the optimal conjunctive choice strategy more difficult to pursue.

The model of optimal conjunctive choice nevertheless predicted well. Respecting the extent of search, subjects raised cutoff levels when inspection costs declined (property one) and set lower cutoff levels for later searched attributes (property two) but did not systematically set higher cutoff levels for earlier attributes when inspection costs rose on later ones (property three). Respecting the order of search, subjects searched low inspection cost attributes first (property one) but did not systematically inspect high rejection probability attributes first (property two). In essence, the subjects’ behavior conformed to the model’s predictions in those aspects that intuitively appear to involve relatively simple calculations, and deviated from the model’s predictions where the aspects involved seemingly require more complex calculations. For example, consumers did less well when they had to relate changes in the cost of observing one attribute to the maximizing amount of search over others; this is a difficult task.

These results are normatively germane in three ways. First, they suggest that actual consumers come fairly close to using an optimal conjunctive choice strategy correctly. Laboratory subjects did considerable optimizing in an unfamiliar environment. Real world actors have more time in which to make decisions and more familiarity with the choice task; thus they can be expected to cope more successfully with internal processing costs than the experimental subjects did.

The second normative implication is that ideal disclosure is not necessarily neutral towards consumer choice but may have substantive effects. An optimal conjunctive strategy requires consumers to raise cutoff levels when inspection costs decline, and this behavior was observed in the laboratory. To raise a cutoff level is to insist on obtaining a product more closely resembling one's ideal. Suppose, then, that a decisionmaker does not want to ban a potentially useful product but does want persons to be more sensitive to the existence of carcinogens in it than they had been. The decisionmaker can reduce the costs to consumers of inspecting the product for carcinogenicity. Consumers who use this attribute at the conjunctive choice stage will raise their cutoff levels for it and thereby reject more products as potentially cancer causing than before the intervention. Hence, ideal disclosure can cause consumers who have at least some concern for an attribute to insist on obtaining higher levels of it.<sup>23</sup>

Finally, the analysis suggests an additional function for disclosure—to change the task consumers face when high information processing costs could otherwise preclude optimal behavior. For example, before the Truth in Lending Law, information concerning interest rates was disclosed in a variety of ways, so that consumers could not compare different creditors' charges unless they converted different disclosure methods to a common metric; this required complex calculations. Required disclosure of the Annual Percentage Rate lowered such information processing costs because it changed the choice task; after the law was

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23. A recent overload experiment is instructive in this regard. The researcher, asking whether consumers could be made to overload in an actual marketing environment, put signs in grocery stores with varying amounts of information respecting the nutritional content of common food products. No overload effect was established. The signs, however, reduced the costs to consumers of observing nutritional information, as they were placed in prominent locations and written clearly. A slight but statistically significant shift toward brands with higher nutritional content occurred. See Muller, *Buyer Response to Variations in Product Information Load*, 69 J. APPLIED PSYCHOLOGY 300, 301-05 (1984). This result is consistent with the prediction made above. Disclosure also could affect consumers' choices if consumers inferred the importance of attributes from the product's disclosure requirements. This outcome differs from the one discussed above in that it would occur by chance; in contrast, the substantive outcome above is an inevitable aspect of optimizing behavior.

passed, consumers could make interfirm comparisons merely by observing simple numbers. Hence, disclosure not only can reduce the costs to consumers of acquiring information and influence their substantive choices but also, by altering the tasks they face, may reduce the costs to consumers of processing information as well.

To summarize, that consumers use conjunctive choice implies that they sometimes satisfice rather than optimize. One form of satisficing entails risking the failure to choose one's global best because information acquisition costs preclude inspecting the full set of products that a market may offer. Ideal disclosure can partly ameliorate this difficulty by reducing the cost of search. The second form of satisficing entails not applying the optimal conjunctive choice strategy correctly because internal processing costs are too high. The only experiments that directly explore this problem, however, suggest that task difficulty satisficing should seldom cause consumers to buy products that are very far from their ideal. Further experiments obviously could alter this conclusion, but until they are done this second possible form of satisficing should not be thought to justify regulatory interventions. Finally, disclosure that ostensibly only reduces the costs to consumers of observing product attributes may serve additional functions that are not widely recognized. Decisionmakers sometimes can use disclosure together with the conjunctive aspects of consumer search strategies to influence consumer choice directly rather than just facilitate it. Also, disclosure can ameliorate the effects of satisficing as a result of high information processing costs by changing the task that consumers must perform to choose optimally.

### III. INFORMATION OVERLOAD IN LABORATORIES AND ITS MEANING

The experimental evidence dealing with information overload fails to demonstrate that consumers "overload" in actual environments. Rather, these experiments show that the information overload idea actually decomposes into the two forms of satisficing described above: satisficing as a result of high external acquisition costs and satisficing as a result of task complexity. Moreover, the experiments show that when choice sets are small or otherwise not complex, people are good at making decisions that are in their own best interests. Since persons often make actual consumption decisions from such choice sets, the best inference from the evidence is that consumers do not experience serious problems as a result of the *amount* of information that markets and the state now generate.

### A. THE EXPERIMENTS

Malhotra conducted the most recent and methodologically sophisticated of the experiments in the usual marketing literature mode.<sup>24</sup> His subjects had to choose their ideal house from a set of hypothetical descriptions of houses. Subjects "constructed" an ideal house by imagining it and indicating desired levels for each of its attributes. Then, the subjects were shown cards, each with a description of a house on it. The experimenter could vary the number of cards—the alternatives in the choice set—and the number of house attributes per card. Subjects were asked to choose their most preferred house from particular choice sets. The correct choice was the house closest to their ideal, and the question was how the likelihood of making correct choices varied with the amount of information presented.

Subjects did well in these experiments. When they were given five alternatives with five attributes per alternative, 83% chose correctly and 100% got their first or second best house. The results were identical when the attribute set was increased to ten. With ten alternatives and five attributes, 58% chose correctly and 83% got their first or second best. When the attribute set was then increased to ten, the probability of choosing correctly dropped to 50% with only 58% getting their first or second best. Oddly enough, with fifteen alternatives and five attributes, 83% chose correctly and 92% got their first or second best; with fifteen alternatives and ten attributes, 75% chose correctly and 100% got their first or second best.

Malhotra seemingly believed that these latter results deserved less weight, for he concluded that the probability of correct choice decreased significantly when the number of alternatives went to ten or more and the number of attributes increased to fifteen or more. Consequently, he claimed that overload occurred when subjects saw ten or more alternatives or information on fifteen or more attributes. According to him, the probability of correct choice did not vary significantly as the number of alternatives increased from ten to fifteen to twenty to twenty-five, or when the number of attributes increased from fifteen to twenty to twenty-five. Malhotra's experimental design assumed that subjects would use a compensatory choice strategy. In explaining why the information overload effect remained constant though the choice set expanded, Malhotra surmised that "the respondents did not make detailed comparisons of all

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24. *Information Load*, *supra* note 2.

the alternatives on all the attributes but adopted some simplifying strategies or heuristics to cope with the ranking task."<sup>25</sup> Another way to put this is that Malhotra's subjects seemingly used noncompensatory search strategies to screen when he increased the size of the choice set. As a consequence, they received their global bests less frequently but chose correctly with an accuracy rate that exceeded chance by a very large amount.

Grether and Wilde conducted a very different test of the overload phenomenon,<sup>26</sup> but their results are broadly consistent with Malhotra's. They had subjects choose among sets of lotteries. In an experiment involving simple lotteries, for example, a subject had to choose one from the set of lotteries: (a) a lottery that would generate a \$5 payoff with probability .28, a \$20 payoff with probability .36 and a \$10 payoff with probability .36; (b) a lottery that paid off \$5 with probability .30, \$20 with probability .30 and \$10 with probability .40; and (c) a lottery that paid off \$5 with probability .20, \$20 with probability .40 and \$10 with probability .40.<sup>27</sup> Since the reward to subjects was keeping the payoff from the lottery they chose, to choose correctly is to pick the "dominant" lottery. A lottery dominates other lotteries if it has the same payoffs as the others but a higher probability of receiving those payoffs or if it has the same probabilities of receiving payoffs as the others but its payoffs are higher. In this example, lottery (c) is the correct choice. It dominates the others because the payoffs are the same in all three lotteries, but there is a .80 probability in (c) of receiving the higher payoffs (\$20 and \$10), while this probability is .72 in lottery (a) and .70 in lottery (b). The experimenters could vary the number of alternatives by varying the number of simple lotteries among which subjects had to pick, and could vary the number of attributes per alternative by varying the number of outcomes per simple lottery. Subjects did well in choosing the dominant lottery from among sets of simple lotteries. With three alternatives and

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25. *Id.* at 427. This explanation is consistent with the results obtained in experiments that explicitly tested whether subjects would abandon the compensatory choice strategy when the choice set became large. See authorities cited *supra* note 10.

26. See Grether & Wilde, *supra* note 5.

27. Grether and Wilde never gave subjects explicit probabilities because they wanted to avoid confounding effects that could be traced to any associations subjects had with the term "probability." Instead, they used the bingo cage technology: in lottery (c), for example, subjects were told that they would receive \$5 if a random draw from the cage generated an outcome on the interval 1 to 20, \$20 if the draw revealed 21 to 60 and so forth. Subjects, college students at USC, Pasadena City College, California State University at Northridge, California State University at Fullerton, Occidental College, and UCLA, knew that the bingo cage held 100 balls. Since each ball was replaced in the bingo cage after use, subjects could determine that the various probabilities in the experiments were independent of each other.

three attributes, 87% chose correctly; with four alternatives and four attributes, 80% chose correctly; with five alternatives and three attributes, 87% chose correctly.

The experimenters then had subjects choose among compound lotteries to permit a richer set of tests. A compound lottery contains two or more binary lotteries. For example, such a lottery could pay off \$7 with probability .3 or \$5 with probability .7 and \$.25 with probability .4 or \$.10 with probability .6. The number of binary lotteries in a single compound lottery corresponds to the number of attributes a product has and the number of compound lotteries among which subjects have to choose corresponds to the number of product alternatives. The experimenters also introduced a particular concept of salience. In some cases, all but one of the binary lotteries in each compound lottery involved small amounts of money. This is so in the illustration above, where the second binary lottery contained payoffs of only \$.25 or \$.10. Such compound lotteries are said to contain only one salient attribute. In other cases, two or more of the binary lotteries in each compound lottery involved substantial payoffs (\$7 or \$2 and \$5 or \$3, for example). Consequently, the experimenters could test directly for the effect of saliency, in the sense defined, as well as the effect of increasing the information in the choice environment.

The compound lottery experiments yielded three interesting results. First, subjects did well when only one attribute was salient. The percentage of correct choices ranged from 58% with five items and five attributes, to 81% with two items and two attributes. This outcome implies that subjects could filter out much irrelevant information. Second, subjects were reasonably competent at solving two salient attribute problems. They chose correctly approximately 73% of the time when faced with two attribute-two alternative choices, and chose correctly approximately 63% of the time when faced with two attribute-three alternative choices. Third, when the choice task became quite complex—four alternatives and four salient attributes—subjects essentially chose randomly and consequently did as well as chance permitted.

These results show that the amount of product related information in the environment, as measured in "bits" or units of new data, is much less important than the choice task. To test this possibility, the choice task was made unusually difficult. For example, consider a typical experimental choice between two compound lotteries each having two salient attributes. The subjects were shown actual payoffs and probabilities, but in this illustration the problem will be presented in abstract, general

form. Capital letters represent monetary payoffs, greek letters represent probabilities and  $k$ , a constant, takes on varying values measured in money in different experimental tasks.

#### LOTTERY I

$$\frac{L_1}{A_1\lambda} \quad \text{and} \quad \frac{L_2}{B_1\partial}$$

$$A_2(1 - \lambda) \quad \text{and} \quad B_2(1 - \partial)$$

#### LOTTERY II

$$\frac{L_1^*}{(A_1 - k)(\lambda + \nabla)} \quad \text{and} \quad \frac{L_2^*}{(B_1 + k)\partial}$$

$$(A_2 - k)(1 - \lambda - \nabla) \quad \text{and} \quad (B_2 + k)(1 - \partial)$$

In the problem actually presented to subjects,  $A_1 > A_2$ . Consequently, Lottery II dominates Lottery I in the same way that the simple lottery (c) dominated in the problem described above. To see why, first realize that the two compound lotteries have identical payoffs. Lottery  $L_1^*$  subtracts  $k$  from each payoff but Lottery  $L_2^*$  adds  $k$  back; hence, the  $k$ 's cancel. Then consider the four possible payoffs together with the associated probabilities for each lottery.

<i>Payoffs</i>	<i>Lottery I Probabilities</i>	<i>Lottery II Probabilities</i>
$A_1 + B_1$	$\lambda\partial$	$(\lambda + \nabla)\partial$
$A_1 + B_2$	$\lambda(1 - \partial)$	$(\lambda + \nabla)(1 - \partial)$
$A_2 + B_1$	$(1 - \lambda)\partial$	$(1 - \lambda - \nabla)\partial$
$A_2 + B_2$	$(1 - \lambda)(1 - \partial)$	$(1 - \lambda - \nabla)(1 - \partial)$

In Lottery II, the payoffs that include  $A_1$  are more likely to occur and the payoffs that include  $A_2$  are less likely to occur than in Lottery I. Since  $A_1 > A_2$ , Lottery II dominates Lottery I. Put in the terms used above, there is a greater likelihood of receiving the higher payoffs in the second lottery. The subjects seemingly had neither the expertise to solve such problems correctly nor the time to perform the requisite calculations; rather, they appeared to use simplifying strategies, primarily observation. With two alternative-two salient attribute problems, observation often works; hence, approximately 75% chose correctly in this case. With much larger problems, observation is of little help and the subjects were forced to make random choices.

When considerably less than all subjects solve the experimental task, there is a "glass is half empty or half full" problem in interpreting the results. Nevertheless, this set of Grether and Wilde experiments seemingly lends little support to the view that task complexity satisficing creates serious problems for consumers. The Grether and Wilde subjects had to solve unfamiliar problems in an unfamiliar environment, yet when those problems were relatively simple—to choose the dominant simple lottery or the dominant compound lottery from two or three lotteries each having two salient attributes—the subjects did well, despite considerable variation in the amount of information supplied. They did less well when the choice task became complex. Consumers, however, respond to complex problems by trying to use simplifying strategies, and Grether and Wilde's subjects had no such strategies at hand. To better perceive the effect of this lack, recall that when Mallhotra increased the choice set, his subjects could use a noncompensatory strategy that they had employed in life. The Grether and Wilde subjects could have simplified their task only by developing or recalling the appropriate mathematical algorithms, but doing either seemed beyond their competence. Since consumers in actual environments will often be able to use familiar, simplifying strategies, as did Mallhotra's subjects or Grether and Wilde's subjects for the simple tasks, both sets of experiments suggest that task choice satisficing may not be a serious problem in product search.

## B. POLICY IMPLICATIONS

The information overload phenomenon actually decomposes into either of two forms of satisficing, that due to information acquisition costs in the face of product diversity and that due to information processing costs in the face of task complexity. For the reasons given, the state should attempt to respond to the first form only with ideal disclosure. On the basis of the available evidence, the second form seldom seriously hampers consumers in searching for products or contract terms.

Interestingly, the experimental evidence suggests an additional reason for believing that consumers can solve the problems they set for themselves. This evidence shows that when consumers face few alternatives (three to five) and few attributes per alternative (three or four) a very large percentage of consumers make correct choices. A correct choice, recall, is a choice close to one's ideal or a choice that maximizes net expected returns. When consumers purchase products with which they are familiar, they choose from the evoked set, which has three to five product members. When they use noncompensatory strategies to

simplify the choice task, they seemingly shrink the final set to the size of the evoked set. The question how many attributes of these products consumers actually consider is a function of the level of abstraction at which an attribute is defined. For example, the description "easy to use" when applied to a typewriter disaggregates into a variety of task simplifying features. Is each feature an attribute or is the relevant attribute "ease of use"? Marketing researchers who conceive their task as helping firms sell products choose the abstract description, largely because consumers speak in this abstract way when describing desirable product features. Taking consumers at their word, several studies show that the number of salient or determinate product attributes—those considered at the final stage—does not exceed five, and often is less.<sup>28</sup> Thus, the experimental data together with these studies suggest that consumers make final choices among products from manageable information environments. This data also may explain why the accuracy with which Malhotra's subjects chose remained constant or rose after an initial decline, despite increases in the amount of information he supplied: the subjects' use of noncompensatory choice excluded some global bests but the subjects also created for themselves a decision problem—to make a compensatory choice from a small set—that they had the ability to solve.

It also is helpful to relate the analysis here to the question of whether markets supply quality satisfactorily. If each consumer considers relatively few attributes and remains ignorant of the others, it may be thought that firms have an incentive to degrade the quality of the attributes not considered. This qualm is overstated. Though each consumer does not consider many attributes, salient attributes vary across consumers. When consumers consider three attributes each, for example, twenty or more attributes may be salient for the full set of consumers. Firms do not tailor products to individual consumers but rather must produce for substantial consumer segments. Therefore, if a substantial number of consumers shop for attributes in which they are interested, the full set of

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28. Consumer researchers are seldom directly interested in how many attributes consumers consider when deciding to buy; they ask this question as a preliminary to other inquiries. Most commonly, the issue is how best to "position" a new product relative to existing products. This issue is difficult to resolve without knowing what consumers like about existing products, so researchers attempt to find this out. They do not do this by observing consumers in actual purchase situations or by having them make experimental choices where real money is at stake. Instead, researchers ask groups of consumers which attributes have the most salience for them or are "determinate" in their buying attitudes. It seems foolish to put an excessive amount of faith in the results given that researchers are interested in attributes only as a byproduct and learn attribute information in a relatively casual way. Nevertheless, these results are the best we have; also, regardless of the particular researcher's ultimate interest or survey methodology, the results are very consistent with each other. A representative list of studies with products and salient attributes is contained in the Appendix.

salient attributes will be supplied at competitive price-quality levels.<sup>29</sup> Every consumer will receive a product that does as well as can be done with all attributes that a substantial portion of consumers regard as important. Therefore, firms will exploit consumers only with regard to attributes that persons care about but will not shop for or that few care about. The pervasiveness of such firm misbehavior is an empirical issue.

### CONCLUSION

The possibility of information overload is thought to support an objection to disclosure solutions to market failure problems and its existence to justify interventions to protect consumers. Neither view is correct because the information overload idea—that too much information causes disfunction—is a myth. Instead, when choice sets become large or choice tasks complex relative to consumers' time or skill, consumers satisfice rather than optimize. One form of satisficing, which results from high costs of acquiring information, is to risk not choosing the best from the full market choice set but only the best that an unexhaustive search reveals. The unfortunate effects that this form of satisficing creates actually can be ameliorated by disclosure requirements that reduce the costs to consumers of inspecting product attributes. Those effects that remain are not amenable to solution by regulation. A second form of satisficing—task choice complexity—which results from high costs of processing information could in theory create serious problems for consumers. The experimental evidence to date, however, together with what is known about how consumers actually search, implies that consumers do relatively well when making purchase decisions. We therefore claim that the information overload idea should be dropped from legal discourse, in the sense that decisionmakers should not be especially concerned with the amount of information that they or markets might require consumers to process. Instead, attention should focus on the difficulties that actually do attend disclosure solutions, the processing problems traceable to cognitive error or other factors that now are occupying the psychologists, and how markets can be made more competitive given consumer search strategies.

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29. This result is proved in Schwartz & Wilde, *Product Quality and Imperfect Information*, 52 REV. ECON. STUD. 251 (1985); see also Schwartz & Wilde, *Competitive Equilibria In Markets for Heterogeneous Goods Under Imperfect Information*, 13 BELL J. ECON. 181 (1982). More accessible versions of these models are found in Schwartz & Wilde, *supra* note 1, at 1402-24.

APPENDIX  
SALIENT PRODUCT ATTRIBUTES

Glassman and Pieper, *Processing Advertising Information: Deception, Salience and Inferential Belief Formation*, 9 J. Advertising Research 3, 5, 7 (1980) (bread: two attributes—taste and freshness; tires: three—puncture resistance, quality of tire, and the guarantee; gasoline: two—provides good service and has credit cards).

Husted, Mayer and Whipple, *Consideration of Context Differences in Product Evaluation and Market Segmentation*, 3 J. Acad. Marketing Sci. 34, 37-44 (consumer beverages: approximately 75% of the sample used one to three attributes). Researchers collapsed the nine attributes reported to three “dimensions”—maturity, nutrition, and refreshingness. These accounted for 77% of the variance in “product positioning” (the perceived similarity and competitiveness of the products with each other).

Johnson, *Market Segmentation: A Strategic Management Tool*, J. Marketing Research 13, 14-15 (90% of the “discrimination among images” of eight beers could be accounted for on two dimensions: “relative lightness” and “premium quality” contrasted with “popular price”).

Jun and Jolibert, *Revealed Versus Hidden Attributes As Determinants of Perceived Product Quality*, 4 J. Econ. Psychology 263, 266-67 (1983) (batteries: one attribute—durability; envelopes: two—external appearance and specifications; electronic lighters: three—external appearance, performance, and durability).

Lehman and Moore, *Validity of Information Display Boards: An Assessment Using Longitudinal Data*, 17 J. Marketing Research 450, 453-54 (1980) (bread: four attributes—brand name, major grains, physical product, and price\* ).

Moore and Holbrook, *supra* note 19, at 207-09 (pet dogs: three attributes most significant in explaining behavior, which, for the curious, are size, friendliness, and attractiveness).

Myers, *Finding Determinant Buying Attitudes*, 10 J. Advertising Research 9, 10-11 (1970) (scouring powder: three attributes—cleansing, harshness to hands, and price; coffee: two—flavor and price; pet food: one, which, again for the curious, was how the little darling scarfed it up; snack food: one—taste).

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\* Price is not included as an attribute unless explicitly so identified

Rao and Soutar: *Subjective Evaluations for Product Design Decisions*, 6 *Decision Sci.* 120 (1975) (compact cars: two attributes—price and low mileage; typewriters: three—automatic carriage return, length of guarantee on parts, and price; hot combs: three—vibration, drying ability, and price).

Smead, Wilcox and Wilkes, *supra* note 19, at 40-41 (drip coffee makers: three attributes, but two were most significant).

Urban, *supra* note 9, at 864-66 (beer: two “dimensions”—social connotations and taste).

