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More is not always better:

Intuitions about effective public policy can lead to unintended consequences

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Abstract

Public policy decisions often appear based on an assumption that providing more options, more information, and greater decision-making autonomy to consumers will produce better outcomes. We examine reasons why this ‘more-is-better’ approach exists based on the psychological literature. Although better outcomes can result from informed consumer choice, we argue that more options, information, and autonomy can also lead to unintended negative consequences. We use mostly health-related policies and guidelines from the United States and elsewhere as exemplars. We consider various psychological mechanisms that cause these unintended consequences including cognitive overload, affect and anticipated regret, information salience and availability, and trust in governments as authoritative information providers. We also point towards potential solutions based on psychological research that may reduce the negative unintended consequences of a “more-is-better” approach.

Introduction

Public policies often appear to be developed using an assumption that more (of something) will produce better outcomes. Economic theory supports this premise, arguing that, with more choice, individuals should be more likely to find options that suit heterogeneous preferences and confer greater utility (Lancaster, 1990). The sense of independence that comes with having many available options has also been linked to beneficial outcomes (e.g., Williams, Freedman, & Deci, 1998). Outcomes may not always be positive, however. In this paper, we examine evidence that challenges policymakers' assumptions that more choice, more information, and more autonomy are better. We focus particularly on health policies, although the basic ideas apply to other policy domains.

Consistent with economic theory and these policy assumptions, the 2010 coalition government in the United Kingdom (UK) is committed to giving users of public services more choice and to providing more information about the performance of public services in the public domain, an "information revolution" (Maude, 2012). Their idea is not simply economic; it reflects a belief that greater transparency will encourage citizens to pay attention to the quality of services and, if dissatisfied, demand better service. In health care, for example, the UK government allows patients to choose "any qualified provider," and promotes choice of treatment through more information and the provision of personal budgets (Department of Health, 2010a, b). The construction of Medicare Part D in the United States (US) is similarly consistent with this "more-is-better" approach. Medicare Part D is a federal program intended to subsidize the costs of prescription drugs for Medicare beneficiaries (adults aged 65 years and older). In it, many older adults were offered a choice from over 100 plans with various combinations of deductibles, co-payments, drug utilization techniques, and drug tiers (Kaiser Family Foundation, 2007). With so much freedom of choice, what could go wrong?

Assumptions that "more is better" are not limited to policy makers; they also appear to extend to the lay public and their views on many outcomes (e.g., more cancer screening is better). Surveys of UK consumers find that the majority would like to have more choice over where and how they are medically treated (Department of Health, 2011). Nearly half of UK hospital patients reported they would have liked greater involvement in decisions about their care (Rich-

ards & Coulter, 2007). In surveys of the general public, the majority of respondents say they would like to make decisions about their care and treatment themselves or with their doctors (Appleby & Robertson, 2010). We will review evidence, however, that “more” can lead to unintended consequences such as reduced comprehension of information and motivation to choose.

Consumers are enamored with choice, information, and autonomy

The existence of such a “more-is-better” heuristic is not surprising given the wealth of theory and empirical findings showing that people are enamored with choice, information, and autonomy, and react strongly when any of these is threatened. Early work demonstrated that people desire control over their environment (Langer & Rodin, 1976). They also overestimate the extent of their control over outcomes even in cases where outcomes are determined by chance (Langer, 1975), and they tend to believe they are more capable of exerting control than others (Klein & Kunda, 1994). They show reactance when faced with attempts by others to take away their control over outcomes; for example, they are more likely to purchase banned books (even if they had no initial intention to read the book) and to sustain relationships when admonished to dissolve them (Brehm, 1966). Importantly, these perceptions of control have been related to greater mental and physical health (Peterson & Seligman, 1984; Rodin & Langer, 1977). This may be because the more efficacious people feel about a behavior, the more likely they are to engage in that behavior (Bandura, 1986). In fact, helping patients become more self-efficacious improved self-management behaviors in a US sample (Hibbard, Mahoney, Stock, & Tusler, 2007).

People also find having choice inherently rewarding (Leotti and Delgado, 2011) despite the fact that the preference for more choice is often associated with lower rather than higher outcome satisfaction (Botti & Iyengar, 2004). The interest in choice and control extends to the desire for more information in decision-making settings, even when that information has no effect on the decision (e.g., Redelmeier, Shafir, & Aujla, 2001), and even when greater reflection on the parameters of a choice can reduce the quality of that choice (Wilson & Schooler, 1991). Given this array of findings, it is not surprising that people hold a “more-is-better” heuristic, and that it may influence policy decisions. But it is also not surprising that use of the heuristic may sometimes backfire.

Three possible outcomes of more-is-better policies

The effects of well-intended, more-is-better policies may result in three categorically different kinds of outcomes, the first two of which are consistent with the economic ideal. The first possibility is that the effects of policies and guidelines that encourage (or mandate) “more” will be better and result in positive additive effects. For example, physician guidelines to talk to patients about their smoking may result in smokers hearing information about the negative health effects of smoking more often, potentially resulting in a greater likelihood to quit (Fiore et al., 2008). Combining those guidelines with more graphic warning labels on cigarette packages (in use in countries around the world including Europe and mandated to appear on US cigarette packages by the Family Smoking Prevention and Tobacco Control and Federal Retirement Reform, 2009, but currently locked in litigation) is expected to result in additional exposures to negative health information and positive effects on quitting. In this case, more information (from physicians and warning labels) may result in more health advantages.

A second possibility is that “more” may be better in synergistic ways. Governmental policies that mandate large and graphic warning labels in tandem with hard-hitting mass media campaigns, for example, have proven effective in reducing tobacco use and encouraging people to quit (World Health Organization, 2011). They may provide synergistic benefits, with the more narrative-like media format providing context and meaning to the more frequently-viewed, two-dimensional graphic warnings, thus driving health messages home (Premium Research, 2008).

In the present paper, we highlight a third possibility, supported by psychological research, that “more” can backfire and interfere with intended policy effects.

Theory underlying why “more-is-better” policies can backfire

The most prominent view in contemporary social science is that human beings have preferences and that their choices reflect these preferences. In fact, we do carry preferences in memory for many things such as favorite foods (a very concrete preference) and being healthy (an abstract preference), having built these preferences over a lifetime of experiences. Policy makers and others assume that consumers, armed with information, can access these preferences and make quality choices. True “preferences,” however, may not always exist, or may exist in conflict with one another. A major theme in the literature on judgment and decision making is

that of the construction of preferences (Lichtenstein & Slovic, 2006). Its central idea is that in many situations, people making decisions often do not know what they prefer. As a result, they use mental shortcuts (called heuristics) and construct their preferences “on the spot” based on internal and external cues available at the moment. Preference construction is more likely when decisions are unfamiliar or complex, when conflict exists among preferences for known options, when it is difficult to translate feelings into numerical scales such as money, and when strong feelings about options are lacking or in conflict. As will be seen, some of these same characteristics overlap with decisions that must be made under policies that mandate “more.” In the present paper, we focus on why “less” (fewer options, less information, and less personal decision autonomy) can result in superior judgments and choices based on three lines of psychological inquiry.

First, providing “more” information or options can overwhelm cognitive abilities and result in inferior, less well understood choices. This is because consumers do not always comprehend even fairly simple information. For example, in one study consumers were presented with decision tasks that involved simply locating information in tables and graphs (Hibbard, Peters, Slovic, Finucane, & Tusler, 2001). The youngest participants (aged 18–35) averaged 8% errors; the oldest participants (aged 85–94) averaged 40% errors. Even identifying a dominant option in a large set can be difficult for some individuals (Hibbard, Slovic, et al., 2002). In addition, information can be insufficient and uncertain, making it difficult to use in decisions and encouraging the use of heuristics. It can also be ambiguous or conflicting and research has demonstrated that people exhibit “ambiguity aversion” in that they prefer choices associated with known outcome probabilities to choices with ambiguous probabilities (Ellsberg, 1961) – even when ambiguous options afford higher expected value. Such an aversion extends to the processing of ambiguous messages, which are inherent in many policy efforts. For example, recent downgrades by the US Preventive Services Task Force (USPSTF) in the judged efficacy of mammography among women younger than 50 conflict with earlier recommendations, thereby conveying ambiguous messages to affected women. An emerging body of work shows that people become more worried, feel more at risk, and are more likely to disengage when faced with ambiguous messages (e.g., Han, Kobrin, Klein, Davis, Stefanek, & Taplin, 2007), an effect particularly ap-

parent among older and less educated individuals (Han, Reeve, Moser, & Klein, 2009).

Second, consumers may comprehend information without understanding what it means for the decision at hand. This “meaning” is operationalized in research on the affect heuristic as experienced good and bad feelings concerning a likelihood, an outcome, or an option in a decision situation, and these feelings guide judgments and decisions (Slovic & Peters, 2006). For example, a man may not understand what the experience would be like of an adverse event from a prostate biopsy or cancer treatment such as hormone therapy. Alternatively, he may demonstrate understanding of its precise likelihood by rehearsing the 40% chance of the adverse event, but not understand the meaning of that 40%. Consumers are often quite poor at using numeric information in decisions because they don’t understand its meaning (Peters, Dieckmann, et al., 2009). “More” information without meaning is useless at best.

Finally, having more information and options can produce task-induced regret and decision dissatisfaction because individuals make more comparisons and often face more tradeoffs and, thereby, potential for regret. For example, in a choice between hospitals, one might choose between a hospital with a somewhat lower likelihood of medical errors and one that is more convenient. If the convenient hospital is chosen and a medical error is experienced, regret may ensue. In addition, if the tradeoffs are emotionally difficult, the emotional toll can lead consumers to choose to maintain the status quo rather than make a more active choice (e.g., Luce, Bettman, & Payne, 1997).

These effects may be moderated by a number of individual difference factors. In decisions involving numbers, for example, more numerate consumers (those with greater abilities to understand and use mathematical and probabilistic concepts) likely will understand and integrate more numeric information (Peters, Dieckmann et al., 2009), ameliorating “more” effects. The effects of older age are more difficult to predict. On the one hand, increasing age is associated with robust declines in cognitive abilities including numeracy (Peters, Hess, et al., 2007), and, in fact, older adults prefer to choose among fewer options than younger adults (Reed, Mikels, & Simon, 2008), perhaps a reflection of their declining cognitive abilities. At the same time, older adults have more experience and expertise in making decisions (e.g., medical decisions), enabling them to make more efficient and knowledgeable decisions. The age-related preference for

fewer options, in fact, could reflect older adults' awareness of the negative effects of too much choice. Motivated consumers also may not experience the same problems with "more" because they process information diligently and procure more of the advantages that economic theories predict (Wood et al., 2010). And those with strong prior preferences or expertise may actually benefit from the availability of more choice options (Mogilner et al., 2008).

Much of the work reviewed here (and in decision science and behavioral economics more generally) also has a decidedly Western and middle-class flavor to it. We recognize this limitation. Consider, for example, the well-documented tendency for people to experience cognitive dissonance after making a choice between two options that are largely equivalent in attractiveness (Brehm, 1956). In an elegant set of studies, Markus and colleagues (e.g., Markus et al., 2006; Stephens et al., 2011) demonstrated that this effect is not universal. Working class Americans, Indians, and Japanese participants were less likely to experience dissonance after a decision was made; instead, they tended to value social relationships over choice. In one study with US working-class participants, their descriptions of choices included fewer mentions of freedom and more associations with negative affect and difficulty than did descriptions of middle-class participants (Stephens, Fryberg, & Marcus, 2010). Consequently, policies that offer more choice and autonomy may be less well liked by some subgroups or populations who simply do not share these values when it comes to choice. Future research in other cultural settings is needed.

Environmental influences also can moderate the negative effects of "more" (Scheibehenne, Greifeneder, & Todd, 2010). For example, the lack of an easily identifiable dominant option (a common situation in consumer decisions in public services) increases choice-overload effects (Dhar, 1997). Lack of familiarity or clear prior preferences in the choice domain also appear to exacerbate the effects of "more" at least with respect to choice overload (Iyengar & Lepper, 2000). Older adults faced with choices among Medicare Part D plans, for example, had never made such a choice before and therefore had no clear prior preferences. In addition, tradeoffs existed among plans on attributes that were important to older adults (e.g., monthly premiums versus copayment amounts per prescription) so that a dominant option generally did not exist. Ordering options on an important attribute may reduce "more" effects (Russo, 1977; Hibbard, Slovic, Peters, & Finucane, 2002). A greater use of simplifying heuristics also should

reduce them although the implications for choice quality are unclear and likely depend on the situation (Payne, Bettman, & Johnson, 1993; Scheibehenne et al., 2010).

Individual-difference and environmental factors, of course, can work together to improve or degrade decisions. For example, numeric information about options that is not ordered based on an important attribute such as price or quality of care may be particularly overwhelming for less numerate populations. Younger adults may find it easier than older adults to process and identify superior options in an unfamiliar and complex choice.

Organization of the paper

The present paper is organized into three sections that highlight policies and guidelines that have at their core one of these types of “more is better” and their potentially negative consequences. The first section is based on the effects of having more choice options. In the second section, we focus on the assumption that providing more information is better. Finally, it is often thought that giving consumers more choice autonomy is better. Of course, these three “more” approaches are related because having more options generally means more information, and greater decision autonomy usually necessitates provision of more options and information. We nonetheless loosely group examples within each of the sections, recognizing that overlap exists. We also identify potential solutions based on psychological research that may reduce the negative unintended consequences of a “more-is-better” approach.

Is Having More Choice Options Better?

Although having more choice options can have advantages, recent research has pointed towards the notion of a “paradox” or “tyranny” of choice. For example, psychological research has demonstrated that having more options can lead to worse choices and lower satisfaction in Medicare Part D and elsewhere (Hanoch et al., 2009; Schwartz, 2005). In particular, researchers have suggested that an overabundance of choice can lead to information overload (Huffman & Kahn, 1998; Reutskaja & Hogarth, 2009; Scammon, 1977), decreased motivation and an inability to choose (Dhar, 1997; Iyengar, Huberman, & Jiang, 2004; Iyengar & Lepper, 2000), decision-related anxiety (Garbarino & Edell, 1997), and outcome dissatisfaction and regret (Botti & McGill, 2006; Schwartz, 2000, 2004). Schwartz et al. (2002) further found that the combination of large choice sets and a desire to choose the best were related to more regret, reduced happi-

ness, and less overall choice satisfaction (Schwartz et al., 2002).

Medicare Part D exceeds actual ability but not perceived ability. In Medicare Part D, consumers can re-evaluate and change providers each year to reduce costs and maximize benefits. The annual re-evaluation and wide array of choices is intended to better meet the needs of beneficiaries who differ in what they want and to promote competition among providers who presumably will then seek out innovative ways to reduce costs and increase quality. However, the large quantity of options for older adults (often over 100 options) may be particularly problematic given robust declines in cognitive efficiency across the lifespan (Peters, Hess, et al., 2007). To put this number in context, among younger adults covered by their employers' insurance, 37% have one plan choice, and only 20% have more than five (Hanoch & Rice, 2006). In fact, an Associated Press poll suggested that many seniors found the program confusing; presumably in response, the government quickly increased the availability of help-line workers (Lester, 2006 as cited in Wood et al., 2010). Nonetheless, most Medicare beneficiaries (73%) reported that the drug program was too complicated (Kaiser Family Foundation/Harvard School of Public Health, 2006). Hanoch, Rice, et al. (2009) also reviewed evidence that, despite this vast choice, fewer than 10% of enrollees switched drug plans during the open enrollment period between the first and second years of the program, and nearly half of those were low-income beneficiaries who had to switch because their plan no longer covered them (Neuman et al., 2007). The small proportion of enrollees who switched is important because many beneficiaries (43%) would have saved money had they switched plans, with potential savings of about \$500 annually (Domino et al., 2008). Gruber (2009) concluded that beneficiaries "are not financially optimizing in their choice of a Medicare drug plan" (p. 5).

Experimental evidence also suggests that older adults may be better off with fewer choices under Medicare Part D. Hanoch, Rice, et al. (2009) demonstrated that decision quality among older adults deteriorated as the number of plans increased. In their study, participants were randomly assigned to 3, 10, or 20 hypothetical drug plans. Older age and a greater number of plans were significantly associated with less comprehension after controlling for other sociodemographic factors and health status. In particular, those assigned to 10 and 20 plans demonstrated lower comprehension than those assigned to three plans. Older adults exhibited

poorer performance than younger adults, but, paradoxically, they expressed greater confidence than the younger adults that they were able to identify the lowest-cost plan. The effect of more choice options in this Medicare Part D study, however, was no greater for older than younger adults, suggesting that the negative effects of more options were relatively stable across age.

It may be that experience with similar choices could ameliorate or even reverse the negative effects of choice overload (Mogilner et al., 2008). In an experimental study of two repeated hospital choices in England, the proportion of respondents choosing the highest quality hospital increased when participants chose a second time 2-4 weeks later. A learning effect appeared to exist and to occur equally regardless of age, education, or numeracy (Boyce et al., 2010). The effect is not limited to the UK: A positive expertise effect also appeared in hypothetical choices of an earlier US Medicare program (Wood et al., 2010). Specifically, older adult participants given more choices in a previous round were more, rather than less, likely to seek new information and were more likely to consider switching as if their earlier experience gave them more confidence about their future ability or interest in making a decision.

“More” is a problem in non-health domains and for younger adults too: A telecommunications example. Similar effects appear in the cell phone industry which provides services to consumers of all ages. Deregulation of the industry began in 1984 in the US and UK and further spread to many other countries. The deregulation has generally led to more options for consumers in service providers and service offerings and reduced cost of services (although the benefits are not as clear as might be supposed). Too much and too complex information have made it difficult for all but the most technologically savvy to choose the product best suited to their needs. Customers unable to choose based on attribute preferences appeared to make their choices based on price, only to later find out that the product did not meet their needs (Lally & Rowe, 2009). This tendency is further complicated by a lack of comprehension. When provided with multiple options, consumers are only able to choose the least expensive about 65% of the time (Redden & Hoch, 2011). When faced with the complex options of base service fees, additional features and cost for usage overages, customers tend to choose plans that greatly exceed their requirements, significantly overpaying each month rather than risking the chance of occasional overage costs. Problems navigating the telecommunications industry are not limited to older adults, although

they may be particularly vulnerable (Xavier, 2008).

More options for retirement savings decreases motivation to choose. US employers often offer their employees participation in a type of retirement savings account called a 401(k) that began wide adoption in the 1980's as an alternative to the traditional retirement pension. Although intuitively (and in keeping with economic tenets), a company might want to expand available 401(k) options in hopes that additional choices would attract greater interest and enrollment, having more choices is not always better. Iyengar, Huberman, and Jiang (2004) used 401(k) participation data from a nationwide financial firm and found that the fewer choice options offered, the greater the likelihood of participation (see also Beshears et al., 2006). Iyengar and Lepper (2000) suggested that extensive choice sets instead may produce increased feelings of personal responsibility which drive choice overload effects. We will return to this notion of perceived greater autonomy in the third section. The use of default options (discussed in the conclusion) may be one way to psychologically reduce the size of these choice sets.

Is Having More Information Better?

Similar to the assumption that more choice options should be provided, providing more information is also believed better for a variety of reasons including the ethics of informing consumers and providing autonomous choices as well as the economic notion that consumers need information to compare alternatives for markets to function efficiently. Public policies, as a result, often pair a competitive marketplace with easy access to comparative information; examples include public school report cards, nutritional labeling, toxic pollution reporting, auto safety and fuel economy ratings, and corporate financial reporting (Weil et al., 2006)—all intended to make comparative information readily available. Federal governments even provide their own comparative websites in some cases (e.g., NHS Choices in England

<http://www.nhs.uk/servicedirectories/Pages/ServiceSearch.aspx?ServiceType=Hospital>; US

Medicare plans, www.medicare.gov/find-a-plan and nursing home quality-of-care reporting

www.medicare.gov/nhcompare/). This approach can work. Hibbard, Stockard, and Tusler

(2003), for example, demonstrated that quality improvement was stimulated among Wisconsin hospitals when performance information was made public; they also, however, ensured that the information was easy to evaluate for consumers and others. Many governmental policies and

guidelines concern the provision of more information, but often without this extra step of assisting consumers in understanding provided information and its meaning. In the UK, for example, research participants perceived quality-of-care measures as difficult to interpret and mostly irrelevant (Boyce et al., 2010).

In this section, we categorize and discuss unintended consequences of “more information” and some of their likely theoretical bases in two ways. First, we focus on “too much information” being superfluous and distracting, with a resulting lack of comprehension of the most important information. The most relevant theory-based explanations include: a) the cognitive difficulty of “too much” (too much information in this case) and b) the lack of perceived affective meaning in provided information. Second, we highlight examples of “too much information” that is salient in ways that influence decisions disproportionate to the importance of the information. Here, a variety of different explanations appear relevant including: a) information sources such as the government being perceived as an authority figure, resulting in inappropriate attributions of credibility, b) the power of the affect heuristic and available affective information, and c) simply having information means that consumers and patients will tend to use it; we discuss the relevance of Gricean maxims to policy.

Superfluous and distracting information

Information is provided to respect the autonomy of consumers and patients and help them make better informed decisions. Providing information also potentially helps the information provider by shifting liability from the provider to the consumer. The more information provided, the less the information provider has to worry about being blamed for some bad decision outcome. Thus, an information imperative presumably benefits everyone. The information imperative, however, overlooks the cognitive and affective drawbacks of this approach.

To begin, research has demonstrated that people tend to comprehend more and make better informed decisions when the presentation format makes the most important information cognitively easier to process and evaluate (Peters, Dieckmann, et al., 2007). In three experiments concerning comparative hospital performance, the results were particularly strong for those with lower numeracy skills and support the idea that “less is more.” In one study, respondents who were given only the most relevant information about hospital quality (e.g., the percentage of pa-

tients receiving recommended care) were better able to comprehend that information and were more likely to choose a higher quality hospital compared with respondents who received the same quality information plus less relevant information (e.g., the number of general care beds). In a second study, making only a more important quality measure easier to evaluate through the use of evaluative symbols such as those used by Consumer Reports rather than making all indicators easier to evaluate led to more choices of higher-quality hospitals. In a third study, less cognitive effort was more; presenting quality information in a format in which a higher number means better (the number of registered nurses per 100 patients) compared to one where a lower number means better (the number of patients per registered nurse) facilitated comprehension and helped respondents make better choices. A “less is more” effect also was demonstrated in women’s choices among adjuvant treatments for breast cancer (Zikmund-Fisher, Fagerlin, & Ubel, 2008). Zikmund-Fisher and colleagues tested the impact of providing risk information about only the two more appropriate treatment options (compared to all four options) and found that, when fewer options were presented, women’s knowledge and speed of processing increased significantly. Requiring less cognitive effort (e.g., by providing less information) appears to result in greater comprehension and use of important information.

A second difficulty people experience in making decisions is the lack of affective meaning for important information. Individuals making decisions appear to use an affect heuristic to guide judgments and decisions. Consideration of information and options in decisions is accompanied by a feeling about them, and that experienced feeling guides decisions (Slovic & Peters, 2006). Oftentimes, however, consumers do not experience a feeling about provided information; they are not able to interpret its meaning (e.g., how good or bad a 9% risk is). As a result, the information is not weighed much in decisions. Provision of that meaning can have a robust influence in judgments and choices across diverse adult populations (Peters, Dieckmann, et al., 2009). In one study, for example, providing interpretive labels (e.g., such as “excellent” and “poor”) resulted in greater use of numeric quality-of-care information in judgments and less reliance on an irrelevant affective state among the less numerate. Follow-up studies in this paper demonstrated that consumers given interpretive labels processed the numeric information (and did not ignore it due to the presence of labels). Instead, the interpretive labels appeared to increase the

relative accessibility of valenced feelings about the choice options over valenced thoughts about the same options.

Policy makers who rely solely on their more-is-better intuitions ignore these inherent cognitive and affective limitations. Examples of such policies are provided below.

Nutrition labels exceed cognitive limitations. The provision of numeric information is often mandated by federal and local governments. For example, many countries around the world, including the US, Canada, Australia, the European Union, and India, require a standardized nutrition facts label on packaged foods. In the US, the label was mandated for most food products under the provisions of the 1990 Nutrition Labeling and Education Act (NLEA). The labels are intended to help consumers make better and more informed food choices, but research has demonstrated that nutrition fact labels are not particularly successful in assisting consumers to choose healthy options (Cowburn & Stockley, 2005). In a study of people with diabetes who could particularly benefit from nutrition facts labels, Rothman et al. (2006) found that comprehension of the labels was relatively poor and was significantly associated with numeracy skill, even after adjusting for education and income. Although 89% of participants in this study reported using food labels, only 32% could accurately calculate the number of carbohydrates in a 20-oz soda with 2.5 servings. Such findings are important given the need for people with diabetes and other chronic health problems to carefully control nutrient intake.

The obesity epidemic has spurred further informational interventions in attempts to reduce food intake at the population level. US policy makers, for example, have mandated calorie counts on foods served at fast food establishments and restaurants, first in New York City and more recently in the federal Patient Protection and Affordable Care Act of 2010. However, numerous research studies have demonstrated that providing calorie information is not sufficient to influence eating behavior (Elbel et al., 2009; Downs et al., 2009; Finkelstein et al., 2011; Girz, Polivy, Herman, & Lee, 2011; Vadiveloo et al., 2011). Some exceptions exist (Bassett et al., 2008; Bollinger et al., 2011; Dumanousky et al., 2011). At Starbucks, for example, mandatory calorie counts were associated with a 6% decrease in average calories per transaction (Bollinger et al., 2011). It may be that establishments such as Starbucks cater to higher education and/or more health conscious individuals who are more skilled with or more sensitive to such infor-

mation. Consistent with this possibility, there was no influence of calorie labeling on adolescents in low-income communities even though more than half reported noticing the labels (Elbel, Gyamfi, & Kersh, 2011). Not only does the presence of calorie information generally not aid in choosing healthier food options but it may interfere with the ability of higher prices (due to increased taxes) to decrease consumption of high-calorie food choices (Giesen, Payne, Havermans, & Jansen, 2011). It has been speculated that cheaper meals with more calories may be viewed as a better ‘deal’ among low-income dieters (Loewenstein, 2011). More research is needed to examine how calorie labeling influences subpopulations and what mechanisms may enhance the effectiveness of calorie labeling.

Decision aids, as currently formatted, may exceed ability. The idea that more information is better is also pervasive in guidelines for health care. For example, the International Patient Decision Aid Standards Collaboration (IPDAS) standards are rapidly becoming the quality standard for decision aids in the US and Europe. Decision aids usually blend user preferences, epidemiological data, and personal tailoring to help patients make preference-sensitive decisions such as which modality to adopt for colorectal screening or whether to elect surgery over watchful waiting for prostate cancer (O’Connor et al., 2003). Among other recommendations, IPDAS recommends that all patients considering preventive interventions be given quantitative information about the baseline risk of the disease in question, the specific magnitude of risk reduction offered by the preventive service, and the probability of negative outcomes to help them make an informed decision (Elwyn et al., 2006). The value of prevention, after all, is based on its ability to reduce the risk posed by some disease or condition, and the magnitude of this risk reduction can be stated precisely only by using numbers.

Schwartz (2011), however, questions this “quantitative imperative.” He argues that, although some studies show that providing this quantitative information improves patient comprehension, innumeracy (a lack of ability to understand numbers) is rampant, and, when provided numbers, consumers and patients often fail to maximize expected utility. He further suggests that little research has demonstrated clearly positive impacts of providing numbers on decision making or medical outcomes. Consistent with our earlier reasoning, he concludes by saying “Simply attempting to present all information to all patients, possibly through the use of decision aids,

could hurt rather than help medical decision-making. Instead, careful thought about the proper way to present such information—targeted to individuals’ abilities, interests, and situations—can make an important contribution to improving prevention and medical care more generally” (Schwartz, 2011, p.37). Communicators must choose strategically what information is presented and how it should be formatted so that consumers are not lost in the details. Numeric information, in particular, is difficult to process, and care should be taken to ensure that individuals can understand and use it (e.g., through presentation format, possibly including interpretive labels).

Salient information that influences choices incorrectly or disproportionately

Communicators often provide more information because of a sense that it might be useful and an assumption that consumers who do not need the information can simply ignore it. The research highlighted above points out that these assumptions can be incorrect. In other situations, information is provided based on government policy, but ends up influencing choices incorrectly or disproportionate to its importance through three mechanisms described below.

In the first, research has examined how perceptions of information sources can result in inappropriate attributions. In public policy, government agencies are a prime source of information. Research suggests that government credibility (perceptions of trustworthiness and expertise) plays an important role in communicating health information and individuals’ willingness to accept these messages (Bates, Romina, Ahmed, & Hopson, 2006; Guttman, Boccher-Lattimore, & Salmon, 1998; Guttman & Peleg, 2003; Hyland & Birrell, 1979). More generally, perceptions of authority (and government agencies are viewed as authorities) can lead individuals to trust provided information to a greater degree (Cialdini, 2001) although messages coming from the government do not necessarily secure trust (Robertson, 2008).

Second, provided information can have more direct effects simply because it is available or it elicits an emotional reaction. For example, information that is more available and salient is likely to be more readily remembered and influence judgments and decisions (Tversky & Kahneman, 1974). Colonoscopy rates, for example, were found to rise significantly in the months following a well-televised US colorectal cancer awareness campaign (Cram et al., 2003). Available information that is emotionally compelling and vivid appears to be even more influen-

tial. In decision making, vivid testimonials are given more weight than statistical summaries when both information sources are available (Borgida & Nisbett, 1977). Emotional advertisements are also better recalled than nonemotional ones (Friestad & Thorson, 1986). As a practical example, the government-sponsored website in England – NHS Choices – provides information to patients and the public on the comparative performance of hospitals. However, among patients who were recently offered a choice of hospital, one of the strongest factors predicting why she or he did not attend their local hospital was a previous bad experience with it (Dixon et al., 2010). The affect heuristic also suggests another potential benefit to advertisers who convey positive affect in ads for products that involve both risks and benefits. Research on the affect heuristic demonstrates that individuals derive perceptions of product benefits and risks from affective reactions to the product (Slovic, Peters, Finucane, & MacGregor, 2005). As a result, incidental sources of positive affect (such as advertisements) potentially can reduce risk perceptions, increase benefit perceptions, and increase the likelihood that a consumer would make choices in favor of the advertised product.

Finally, simply being given information appears to produce a tendency for consumers to use it. Sociologist Paul Grice observed that interpersonal interactions were imbued with several basic assumptions about the content of discourse (now called Gricean maxims), including the assumption that the transmission of any information implies that the information is important (Wilson & Sperber, 1981). Consider an example. Many national parks erect well-meaning informational signs imploring visitors not to remove natural artifacts from the premises and to refrain from polluting. Cialdini (2003) reasoned that such signs could backfire because park visitors would conclude – and reasonably so – that these signs were necessitated by a social norm to take artifacts and pollute. People often are influenced more by descriptive norms (that is, what other people *do*) than by injunctive norms (that is, what other people think they should do); hence, the signs might have the unintended effect of eliciting *more* theft and pollution. Cialdini followed up these observations by showing that signs containing descriptive norms – that is, signals that most other people were engaging in “green” behavior – were more effective. The hotel industry has capitalized on this research to reduce energy costs and save precious environmental resources by simply providing descriptive norms to hotel guests about the extent to which other

guests reuse their towels.

Attributions of information credibility can come (inappropriately) through links with government agencies: Three exemplars

1. The case of providing cigarette constituent information. In 1966, the US Federal Trade Commission (FTC, 2008) issued guidance to cigarette manufacturers that a machine measure – the Cambridge Filter Method – could be used to assess cigarette tar, nicotine, and carbon monoxide levels. Factual statements based on this measure could be reported to the public as long as they did not imply a reduction or elimination of health hazards. At the time this guidance was issued, public health officials nonetheless believed that reducing the amount of ‘tar’ in cigarettes might reduce a smoker’s risk of lung cancer and that this information would help smokers make more informed decisions about the cigarettes they smoked.

Unintended consequences ensued. In 1997, the National Cancer Institute reported that, while machine-measured tar and nicotine levels had decreased in the previous 40 to 50 years, mortality risk of current smokers had increased (National Cancer Institute, 1997). Indeed, more recent research has indicated that machine yields do not replicate actual smoking topography (the ways in which smokers titrate their nicotine through differences in deeper or more frequent puffs) (Kozlowski & O’Connor, 2002). Smokers may have misunderstood (the lack of) reduced health risks offered by lower yield cigarettes. In particular, among smokers who switched to lower tar/nicotine brands, 85% stated that they were concerned about smoking’s health effects compared to only 70% of those who never switched (Giovino, Tomer, et al., 1996).

These potential unintended consequences may have emerged due to the effects of the FTC as an authority figure and the explicit link between FTC and the tar and nicotine information. This may have created attributions of information credibility (and usefulness) that exacerbated misunderstandings.

2. The case of dietary supplements. In similar fashion to low-yield cigarettes, perceptions of government credibility and trustworthiness may play a role in responses to dietary supplements (the Dietary Supplement Health and Education Act, DSHEA; 1994). DSHEA transferred responsibility for ensuring the safety and effectiveness of supplements from the FDA to manufacturers. Although DSHEA has been in place for over 15 years, individuals continue to misper-

ceive FDA's now-limited regulatory authority over dietary supplements. And the false linkage between FDA as a credible government organization and supplement regulation has been associated with increased perceptions of the safety and effectiveness of supplements and possibly an increased willingness to use them (Dodge & Kaufman, 2007; Dodge, Litt, & Kaufman, 2011).

3. *The case of obesity.* Dietary guidelines may have produced a related information credibility (and salience) effect among the US public. Rates of overweight and obese individuals have doubled since 1980 (Centers for Disease Control and Prevention, 2009) even though the Dietary Guidelines for Americans have been released every 5 years. These guidelines advise dietary habits to promote health and reduce chronic disease risk (US Department of Health and Human Services and US Department of Agriculture, 2005). In the 1980 and 1985 iterations, a recommendation was added that less than 30% of total caloric intake should come from fat, and it is during this time period and beyond that obesity rates rose dramatically. Paradoxically, the guidelines may have indirectly caused the current US obesity epidemic through behavioral means (marketing of low-fat foods that increase caloric intake through high carbohydrates) and biological mechanisms (lack of fat intake and satiety; Marantz et al., 2008). Wansink and Chandon (2006) found that low-fat labeling led to increased consumption of snack foods by increasing portion sizes perceived as appropriate and decreasing guilt in eating snack foods; the increased consumption was even greater among obese participants.

Why might this have occurred? When dietary guidelines are released by a reliable source, individual food decisions may change with the new information, but not necessarily in the way envisioned by policy makers. Individuals form beliefs that reflect the things that they experience, including information (Fishbein & Ajzen, 1975). Beliefs about certain types of foods may be generated by the issuance of such guidelines from a trusted source. Changes in Americans' attitudes towards fatty foods may have driven them to decrease fat intake and increase intake of other high caloric foods. Recent research suggests that individuals now perceive dietary fat as risky and related to being overweight (Lupton, 2005). Consumers may have replaced one 'harm' (calories from dietary fat) for a different 'harm' (total calorie and carbohydrate consumption).

Available affective information can have powerful influences: Advertising for prescription drugs. Information does not necessarily have to be linked with a credible government organ-

ization to have unintended effects. Simply making information salient (particularly affective information) may alter choices that patients and others make in unintended ways. The US is one of only two nations that allow direct-to-consumer ads (DTCA) for pharmaceuticals (New Zealand is the other nation). As mentioned earlier, exposure to advertising may lead to greater positive affect (ads show happy, successful patients, not those who are suffering) and, through it, increased benefit perceptions, decreased risk perceptions, and increased usage through increased availability of product names. These possible effects of DTCA, however, are less clear and predictable given the preponderance of side-effect information required in FDA-regulated advertisements.

One way to examine possible DTCA effects is to compare prescription rates between countries that allow and do not allow DTCA. In one study, US patients exposed to DTCA were more than twice as likely to request a specific drug compared to Canadian patients, and patients who requested a specific drug were more than twice as likely to be prescribed that drug; they were also more than 16 times as likely to be prescribed any drug (Mintzes et al., 2002). Drug ads also appear to have effects that go beyond the specific advertised product. Rather than simply increasing market share of a specific drug, marketing has been shown to increase the sales for whole classes of drugs. For example, a 10% increase in marketing in a class of drugs results in a 1% increase in sales for that class of drugs rather than only an increase in the specific drug marketed (Gellad & Lyles, 2007). One possible benefit of DTCA is that it could lead patients to seek treatment earlier and thereby avoid more invasive treatment for serious disease due to early diagnosis. Mintzes et al. (2003), however, found that most requested prescriptions were for “lifestyle drugs” or symptomatic treatments for conditions such as erectile dysfunction or obesity that were unlikely to prevent hospitalization or serious morbidity (Lexchin, 2001).

Although the stated intent of advertisements is to increase the awareness of under diagnosed conditions, it also may increase awareness of over-diagnosed conditions. For example, women exposed to DTCA for osteoporosis treatments were 9 times more likely to request (and receive) bone densitometry (Hollon et al., 2003). The criteria for diagnosis are based on average bone density for healthy young women. Because bone density naturally declines with age (without the involvement of disease), more tests lead to larger numbers of women who are diagnosed and receive necessary treatment, but more tests also lead to more unnecessary treatment. Many

treatments, for example, show improvements on bone densitometry scans (a non-symptomatic sign) but little improvement in symptoms (e.g., hip fracture rates).

The research above is correlational and, as a result, is likely confounded by the fact that less healthy people are more likely to request drugs in the first place (but may or may not have identified the appropriate drug for themselves). More empirical study of this topic is needed.

Cancer screening and “more information” may lead to overdiagnosis. Policies and guidelines sometimes exist to help patients access health preventive measures and obtain appropriate information to use in preventing disease. For example, in Germany, mass screening for breast cancer using mammography was introduced in the 1930s; the US has introduced similar guidelines (Gigerenzer, 2002). In concordance with Gricean maxims that assume that the transmission of information implies that it is important, screening results are assumed to be useful and do tend to be used.

However, guidelines for breast cancer in both countries are controversial because the results of randomized trials have demonstrated that women 40 to 50 years of age do not show a clear benefit from screening (National Institutes of Health, 1997). Recommendations against routine mammography for all women over 40 (e.g., USPSTF, 2009) have been consistently challenged, however, even though it is estimated that up to 50 percent of women who are annually screened for breast cancer will receive an abnormal result over a 10-year period causing anxiety while waiting for a new test or biopsy. Of the detected cancers, Welch et al., (2011) estimated that about 10% are clinically important (will threaten health) and treatable. The other 90% are either not clinically important or would not benefit from early diagnosis. Prostate cancer screening provides a similar example (Sakr et al., 1996; USPSTF, 2011).

Nonetheless, a mentality exists that early diagnosis is worth the consequences of routine screening. This value judgment may resonate appropriately with many patients who fear the unknown possibility of cancer more than the increased anxiety of false positives and potential for overtreatment. However, it is worth noting that patients, similar to policy makers, may hold a “more-is-better” intuition in regard to obtaining diagnostic information. This assumption in combination with the patient’s values about screening’s pros and cons (including potential changes to anxiety, fear, and overall life satisfaction and utility) should be examined thoughtfully within the

patient-physician relationship. The conversation should also be held keeping in mind that interest in screening is generated by a number of factors besides an interest in overall health and well-being. The idea that more information is better has led to increased advertising and media attention which creates awareness and fear of disease. Intolerance of uncertainty affects both patients and doctors and has been associated with a preference for highly technical medical care to resolve the uncertainty (Hall, 2002). In some cases, such care is warranted and concordant with patient values and/or clinical judgment. In other cases, it is based on simple heuristics applied with good intentions but little thought.

More Decision Autonomy is Better?

It is generally thought that giving consumers more autonomy in choice (in part by providing more options and information) is better. The Hippocratic Oath is a pledge taken by physicians whereby they swear to “*primum non nocere*” (first, do no harm) and to practice medicine ethically. One interpretation of this ethical mandate is that patients must be fully informed about and understand the risks and benefits of potential treatment options available to them through an informed consent process. This interpretation, in fact, is at the crux of shared decision making. Autonomous decisions thus can be made for medical treatments by providing a full range of options and their related information. In the domain of cancer, for example, the National Comprehensive Cancer Network Clinical Practice Guidelines are a source for evidence-based recommendations on how to treat most cancers. These guidelines are also being translated into patient-friendly formats (McClure, 2011). Results from the Health Information National Trends Survey (2005) also indicate that over 60% of individuals look to the internet for health or medical information for themselves or someone else (Health Information National Trends Survey, 2005). These results suggest that consumers want more information when making choices.

In support of these ideas, several studies have found that patients who ask questions and express concerns during clinical encounters have better outcomes than their more passive counterparts (Greenfield, Kaplan, et al., 1988; Kaplan, Greenfield, & Ware, 1989; Loh, Simon, Wills, Kriston, Niebling, & Harter, 2007). For example, Ward, Sundaramurthy, et al. (2003) reported that women with a lupus diagnosis who participate more actively in their visits had less morbidity compared with women who were more passive. It may be that more active participation in-

creases knowledge about health conditions and the motivations necessary to take care of them; this research is correlational, however, and it is not clear what would happen if patients who do not choose an active participation role were suddenly thrust into one. However, a substantial literature rooted in self-determination theory (Ryan & Deci, 2000) has shown that helping people to feel autonomous about their behavior – that is, feeling they are the willing agents of a behavior rather than acting in response to demands or incentives – can have long-lasting beneficial effects on repeated behaviors such as exercise (e.g., Rouse, Ntoumanis, Duda, Jolly, & Williams, 2011). Of course, risk-perception research has also highlighted the notion that the more controllable a risk is perceived, the less danger is perceived (Slovic, 1987), perhaps allowing patients to take on riskier but more beneficial treatments that lead to improved health outcomes in the long run. But, it is not necessarily the case that having more decision autonomy should result in more perceived controllability. The benefits and risks of treatment options are probabilistic, and greater autonomy in choice does not confer greater control over these probabilistic outcomes.

One potential unintended consequence of providing greater autonomy to individuals making decisions is that it may lead to increased regret. Although greater autonomy is touted as a beneficial end in and of itself, little is actually known about the effects of shifting to patients what may be a burden of responsibility in decision making. And some research has demonstrated that risk perceptions increase under conditions that emphasize this greater autonomy (Nordgren et al., 2007); the effect is thought to be due to greater anticipated regret. Nordgren et al. (2007) provided the following example: city dwellers living on a bus route perceive greater risk associated with driving compared with rural dwellers. According to Nordgren et al., this difference occurs because city dwellers have a choice over whether or not to engage in the risky activity, whereas the act of driving is imposed for rural dwellers who have few, if any, alternative forms of transportation. The result is that city dwellers may anticipate greater regret from a risky activity they can avoid and thus experience increased perceptions of its risk. Patients making more autonomous decisions, in similar fashion, have been shown to perceive greater risk from treatment options compared to those (faced with the same treatment choices) whose physicians chose for them (e.g., Lavery, Prall, & Abaza, 2011). In particular, a recent systematic review found that, on average, patients in controlled trials have stronger preferences for conservative versus major sur-

gical interventions when randomized to a decision aid compared with those receiving usual care (O'Connor et al., 2003). The accepted explanation for this finding is that patients are more likely to choose conservative measures when empowered to make informed, value-concordant decisions (Deyo et al., 2000; Wennberg et al., 2007).

Providing more autonomy can also lead consumers to feel overwhelmed. This consequence, of course, goes hand-in-hand with the issues of too much information and too many options. Research has demonstrated, for example, that patients have trouble making preference-sensitive decisions (in which science does not identify the best option); in them, patients must understand the options and apply their preferences to make a choice. In these cases, patients may not make the best decisions when provided with multiple therapies at one time even if providing all of the alternatives maximizes autonomy. In a study of women with breast cancer, providing cancer treatment options sequentially (in 'small doses') rather than making a decision all at once, led to greater comprehension of the therapies, which could presumably reduce chemotherapy use among women with low risk of recurrence (Zikmund-Fisher et al., 2011). It may be that greater autonomy will require allowing patients to take more time with the new and unfamiliar information, and in a familiar comfortable environment. In a study examining treatment decision making among colorectal cancer patients, understanding of prognosis, options, and benefits was higher among individuals who received a take-home decision aid than those who received a standard consultation (Leighl et al., 2011). Evidence from an English study of decision aids further showed that patients were more satisfied with their treatments when a structured values-clarification interview was combined with information (Kennedy, Sculpher, et al., 2002). These results highlight again that greater thought should be given to how best to present treatment options and guide patients in their decision-making processes.

Most of our examples have concerned empowering patients with more decision-making authority by providing more information and/or options, and we have presented evidence that "more"-type policies can lead to misunderstandings and other unintended consequences. Fraenkel and Peters (2009) conducted an experiment, however, that controlled for the amount of information and options and concluded nonetheless that greater patient autonomy in choice may not inevitably lead to better outcomes. In particular, they demonstrated that it can lead to higher

risk perceptions and fewer choices of riskier (but more beneficial) drugs, thus reducing healthy outcomes. Consistent with Nordgren et al. (2007), they found that highlighting the responsibility of having a choice increased patients' worry about the risks of adverse events and decreased their willingness to accept treatment. Fraenkel and Peters' study, however, was limited in that it was designed as a proof-of-concept project and used extremes of volition. In clinical practice, the extent of patient involvement (and therefore choice autonomy) varies greatly, and would be expected to be strongly related to the patient-physician relationship, the specific clinical context, and the physicians' recommendation.

Having more knowledgeable and engaged patients making informed decisions is requisite to decreasing unwarranted variability in the distribution of health care services and ensuring high-quality health care. However, the effects of greater patient involvement in decision making are not well understood. Patients, for example, often dislike choosing among treatment options with unpleasant side effects, preferring instead to have their providers make the decision and, thereby, bear more of the blame in the event of a negative consequence (Botti & Iyengar, 2004). The results of Fraenkel and Peters' study further suggest that the worry and concern that patients experience in contemplating treatment decisions is influenced not only by the actual risks posed by treatments, but by the responsibility they themselves feel for making the decision. As mentioned earlier, Iyengar and Lepper (2000) suggest that choice-overload effects may, in fact, be driven by increased feelings of personal responsibility. Clinicians should be aware that promoting increased patient responsibility for decisions involving their health care may be associated with lower uptake of risky procedures or interventions. As regulators and policy makers move forward with well-intended policies designed to allow greater choice autonomy, understanding the burdens introduced and their implications is key.

Conclusion

People have strong desires for more choice, control, and autonomy; they also react negatively when faced with threats to any of the three (Brehm, 1966). This pattern appears to be adaptive given the wealth of evidence that perceptions of control and self-efficacy underlie positive mental and physical health outcomes (Bandura, 1986). It should not be surprising, then, that policy decisions are often predicated on the heuristic that "more is better" – that is, more options,

more information, and more autonomy. The desire for "more" is presumably accompanied by the seemingly intuitive ethical belief that individuals are entitled to have access to all possible information and options and to make autonomous decisions.

A key underlying assumption is that more choice, more information, and more autonomy invariably, or more often than not, engender better decisions and outcomes as well as greater comfort with those decisions and outcomes. A growing literature suggests that this assumption is problematic: it appears that foisting on individuals a wider swath of options and information in an autonomy-rich environment can lead to less satisfaction, more anxiety, greater disengagement, and poorer decision-making (e.g., Domino et al., 2008; Garbarino & Edell, 1997; Han et al., 2009; Hanoch et al., 2009; Iyengar et al., 2004; Merriman, 2002; Peters, Dieckmann, et al., 2007; Schwartz, 2005).

We have considered how these somewhat counterintuitive findings can aid our understanding of the effects of a variety of policy-related decisions that appear to derive (at least in part) from application of a "more-is-better" heuristic. Prime examples include policies related to retirement investment and health insurance decisions, sanctioned health screening recommendations, mandated health warnings and information (e.g., food, drug, dietary supplement, and cigarette labeling and advertising), and use of decision aids. Although not a comprehensive list of examples, one might be able to conduct a similar analysis of policies in other domains such as those related to provision of counsel in legal settings or mandated or heavily incentivized community policies regarding child care, green spaces, volunteerism, and alcohol consumption. The key conclusion to be gleaned is that policies building on the assumption that more options, information, and autonomy prevent negative outcomes may unwittingly increase unintended consequences and the probability that negative outcomes will occur.

Simple provision of "more" is not enough

An important implication of much of the research reviewed in this paper is that simple provision of facts is inadequate for improving behaviors in health (e.g., Robertson, 2008). This has been shown in many domains including AIDS-related behavior and drug use (Baker, Collins, & Leon, 2008; Ennett et al., 1994; de Walque et al., 2005). Simply providing individuals with more facts about health risks is not sufficient for behavior change because the information can be

ignored or used inappropriately, potentially placing the individual at greater risk. When information is combined with other support, however, its effectiveness increases (Robertson, 2008). For example, a systematic review of interventions that promote healthy behavior in low-income groups found that combining information with goal setting was effective in promoting healthy eating and exercise (Michie et al., 2008). As a result, the UK government has developed a multi-intervention approach to behavior change called ‘Change for Life’ which combines social marketing with local initiatives (www.nhs.uk/Change4Life).

Another important point is that not all people desire high levels of choice, information, and autonomy, nor are such preferences necessarily consistent across multiple domains for any given person. We have noted that several moderators have already been explored including sociodemographic variables, such as age and education, as well as psychological factors, such as numeracy. For some people, having more choices and more information will, in fact, promote more effective decision-making and better outcomes. Nevertheless, unlike personalized medical care that individuals receive from their providers, policies are not conventionally tailored to subgroups but rather are designed to be universal. Given that the world’s population is aging rapidly and a substantial portion of the population is lower in education and literacy abilities (De Nardi, French, & Jones, 2009; Peters, Hess, et al., 2007; Reyna, Nelson, Han, & Dieckmann, 2009), the overall public benefit of more choice, information, and autonomy is questionable. Policy makers need to consider whether implementing such policies may further disadvantage already disadvantaged populations and, if so, the ethics of doing so. There are circumstances when it would be best to provide fewer rather than more choice options and information.

A further issue is that simply making information easily accessible by no means guarantees that it is accessed or understood. How much effort consumers need to exert to access information may be a strong determinant of whether they use it. For example, Kling et al. (2012) found that directly providing information about Medicare Part D choices in a letter (compared to providing a letter that pointed to a free website address where the same information was available) helped older adults make better choices, including an average decline in predicted consumer cost of about \$100 per year. These examples suggest that policy makers have to be quite careful to provide (not merely make accessible) the most important, relevant, and accurate information.

Ameliorating unintended effects of the More-is-Better heuristic

Are there ways to ameliorate the unintended negative effects of the “more-is-better” heuristic in policy decisions? Fortunately, psychological research suggests some promising directions for the short-term and long-term.

Short-term, policy makers can present information that is salient, available, and less of a cognitive burden. They can provide only the most important information although often it may be difficult to make decisions about what information is most relevant in a given situation. They can provide affective meaning to otherwise meaningless data and highlight more important information. Each of these has been found to increase comprehension and the quality of judgments and choices, particularly among individuals lower in numeracy and health literacy (Fagerlin et al., 2007; Hibbard & Peters, 2003; Hibbard, Slovic, et al., 2002; Lipkus, 2007; Peters, Dieckmann, et al., 2007, 2009; Reyna & Brainerd, 2008). Bundling choice options together based on common features that allow for easy comparisons between options may be very helpful compared to listing each option separately. Policy makers also should recognize the reality of decision making that other types of “soft” information (e.g., information from friends, family, and the media) may actually be more influential on consumers’ decisions and actions than objective data from a government source. And relatedly, information coming from more trusted sources (whether a physician, celebrity, or next door neighbor) is also likely to be more impactful (Briñol & Petty, 2006).

Policy makers can empower others to limit choice sets, provide means for consumers and users to filter options to a manageable and relevant set while allowing more experienced consumers to select from a larger choice set. They can allow people more decision control as they are ready to take it on, help people become more ready by allowing them to practice decision making in a “safe” environment. They can coach consumers on what is important, allowing them to make choices that are more informed and in line with their preferences (Coulter & Collins, 2011; Dixon, 2008; Peters, Hibbard, et al., 2007). They can also give consumers who feel overwhelmed support and advice from intermediaries and professional advisors to help them identify what is important to them. And they can allow consumers not to choose but, instead, to trust someone else to make the decision on their behalf.

These and other short-term solutions could be considered examples of “choice architecture,” a term coined by Thaler and Sunstein (2008) that reflects the notion that many choices depend upon how they are presented. Architects of choice can influence what is chosen, for example, by varying the order of presentation, the salience of different kinds of information, and the selection of defaults. Policy makers cannot present choices in a ‘neutral’ architecture, because all ways of presenting a choice will influence the –person making the decision in some way. Thus, policy makers are already choice architects, with all of the accompanying ethical complications.

A prime example of choice architecture is the use of defaults. Defaults are choice options that are chosen a priori by policy makers and that are applied to individuals who do not take active steps to change away from them (Brown & Krishna, 2004). The default is “chosen” if the consumer does nothing. These are already in wide use, although not all policy makers may be aware of this fact. Their use may psychologically decrease the perceived number of options. Historically, in retirement investment choices, the default has been that employees are not automatically enrolled and have to opt in to be part of 401(k) retirement savings plans, but this default can be changed. Choi et al. (2002), for example, found that employees who were enrolled automatically (but could opt out) were far more likely to enroll in their companies’ retirement plans than those who were not enrolled automatically (but could opt in). Defaults have been shown to have strong effects on choices concerning investments (Cronqvist & Thaler, 2004; Madrian & Shea, 2001), insurance (Johnson et al., 2003), and organ donation (Johnson & Goldstein, 2003). They appeal to a wide audience in their ability to guide choice while preserving freedom of choice. Public policy makers have taken notice. In particular, concerns over low savings rates in 401(k) plans have led to changes in Internal Revenue Service (IRS) policy (under 401(k)(13) and section 414(w) of the Internal Revenue Code; Internal Revenue Service, 2007) that allow firms to use opt-out default options to increase employee participation. In another example, although providing calorie information has not consistently improved individuals’ food choices (contrary to more-is-better assumptions), providing healthy default options on a menu has significantly increased choices of lower-calorie foods (Wisdom, Downs, & Loewenstein, 2010).

In the UK, there has been a debate about whether to make organ donation opt out rather than the current opt in. The Department of Health in England decided not to change the default

for organ donation despite evidence from other countries that changing the default increased organ availability (Department of Health, 2008). Although using defaults for binary decisions such as organ donation or pension plan enrollment appear to have a positive effect, their use in other more complex multi-option, multi-criteria choices may be less effective. In an online experimental study of hospital choice, where participants were presented with comparative information on quality of five hospitals, setting the highest quality hospital as the default hospital did not improve the choices people made, and was found to be detrimental for older, highly educated participants (Boyce et al., 2010).

It may be that consumers sometimes process choices superficially and automatically without careful attention to what is important and what information means, even when they have the ability to do so. In these cases, they are more liable to make decision errors. Providing structural support may alleviate some of these motivational issues. In a recent hospital choice experiment, respondents were exposed to a manipulation that engaged deliberative processing (a so-called mindful nudge). Process tracing data showed that the “mindful” participants acquired and used information more systematically, suggesting that they made a more informed choice, in line with their preferences (Boyce et al., 2010).

Another example of choice architecture is the provision of affective meaning. Although numeric information is often provided in decisions, it may not be usable by consumers without assistance from information providers because consumers may understand what the numbers *are* but not what they *mean*. Despite evidence that patients believe the amount of information they get is “about right” (Dixon, Robertson, et al., 2010), the UK government has committed to providing more information to the public about the quality of services with the intention of helping patients make informed choices. It seems much of these data will go unused; even physicians are not making use of these data, relying instead on their own personal knowledge of hospital doctors. Helping consumers understand the affective meaning of data should allow consumers to use numeric information about hospital quality more in judgments (Peters, Dieckmann, et al., 2009).

A thoughtful and interactive approach to the three “more” categories outlined here (choice, information, and autonomy) also could be effective. Varying the levels or degree of each

of these categories could be a means to counteracting unintended consequences. A simple and compelling example is that *greater* information about *fewer* choices may be a more promising approach than one that indiscriminately provides more of both. Similarly, providing high levels of autonomy should be effective in a setting where a small number of clear options exist with comprehensible information about each one. Most of the decisions we have discussed, such as which retirement or health insurance plan to adopt, are discrete, single decisions. Future research is necessary to determine the role that autonomy plays in policy-driven decisions that must be repeated often (e.g., food choices) and how autonomy interacts with the choice and informational environment. As noted earlier, however, some initial evidence exists that application of a more-is-better heuristic could result in better choices when those choices must be repeated (e.g., Boyce et al., 2010).

For long-term success, education and its resulting increases in cognitive and decision abilities may be key. Research suggests, for example, that providing greater formal education develops cognitive, numeracy, and decision abilities and helps to minimize decision making errors and deficits (Fong et al., 1986; Nisbett, 2009; Peters, Baker, et al., 2010; but see West, Meserve, & Stanovich, 2012). Goldman and Smith (2002), for example, found that more years of schooling were associated with greater adherence behaviors to treatment recommendations for diabetic and HIV-positive patients controlling for other factors. Peters, Baker, et al. (2010) found that the robust associations between more schooling and healthier behaviors appeared to be moderated by cognitive, numeracy, and decision abilities, presumably developed in school.

Final Thoughts

We close with the observation that many policies – related and unrelated to the findings and research traditions reviewed here – are very effective and lead to very positive outcomes. Seat belt laws removed autonomy from what previously had been a personal decision; use of a seat belt is now more of a habit than an informed choice. That shift has produced a remarkable reduction in accident-related deaths (Cohen & Einav, 2003). Mandates regarding child vaccination have led to dramatic reductions in the spread of some infectious diseases (Ada, 2007) - even though they reduced autonomy and produced a default behavior that occurs as standard of practice in pediatric care rather than one that is imbued with much personal choice (outside of rare

religious and medical objections). We expect that in an era of informational access, informational excess, and expectations of autonomy, the tendency of policy makers will be to introduce policies that seek to increase choice and autonomy. This paper has demonstrated there are reasons to be cautious in adopting such an approach. Policy makers must be thoughtful when applying a "more-is-better" approach to policy development, lest they undermine the very goals they attempt to achieve.

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