Numbers Are Just Numbers
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Making good choices about retirement involves the processing of numbers. In particular, consumers must have easily available, accurate, and timely numbers, and they must also use them. Contrary to the consumer-driven approach, however, the evidence demonstrates that having an abundance of information does not always translate into it being used to inform choices. The challenge is not merely to communicate accurate information to consumers, but to understand how to present that information so that it is actually used in decision making. How do decision makers process information and what formatting strategies increase the likelihood that information will be used in judgments and decisions?

Where economists usually assume decision makers are well-informed, farsighted, and rational, psychologists who study judgment and decision making assume that individuals are “boundedly rational,” and may or may not have the cognitive resources or motivation available to process information at the moment of a decision. In other words, while we are capable of great feats of intellect, our intellectual capacity is nonetheless limited. Decision makers are able to process and use only a limited number of variables in any one choice. As the number of options and information increases, the ability to use all of it in choice declines. Although our market economy assumes that more information is better, evidence from decision-making research demonstrates that more information does not always improve decision making, and can in fact undermine it (Gabardino & Edell, 1997; Iyengar & Lepper, 2000; Slovic, 1982; Tversky & Shafir, 1992).

We know, for example, that people have limited resources to deal with complex decisions and the great quantity of information with which they are sometimes faced. As a result, they rely on mental shortcuts to deal with such complexity. The use of mental shortcuts is frequently adaptive
(because they are efficient and the resulting judgments or decisions are generally good enough), but it can also be maladaptive (resulting in poorer decisions). Individuals with more limited resources may use mental short-cuts more often (e.g., older adults, Mutter & Pliske, 1994).

A major theme that emerges from judgment and decision research is that we frequently do not know our own “true” values (e.g., the value of working to an older age vs. saving more money now). Instead, we construct our values and preferences “on the spot” when asked to form a particular judgment or to make a specific decision (Lichtenstein & Slovic, in press).

With human judgment as a constructive process, individual preferences can be unstable across different contexts, and situational influences can carry great impact. Different presentations of the same information will impact the construction of choices, including retirement choices, making it important for policy makers and others to choose information presentation formats that support better decisions. Burtless (this issue) lists three types of retirement choices (age to retire, percent of wages to set aside, and allocation of savings) that are not well-described by economic models. How can we describe decision making in order to predict decisions and to help people make the best decisions (or at least avoid the worst ones)?

**DUAL PROCESS MODES IN DECISION MAKING**

Information in decision making appears to be processed using two different modes of thinking: deliberative and affective/experiential (Epstein, 1994; Sloman, 1996). The deliberative mode is conscious, analytical, reason-based, verbal, and relatively slow. It is the deliberative, “high reason” view of decision making that we tend to consider in our attempts to inform choices (e.g., provide more information for better choices). The problem with this view, however, is that we have limited capacity to process information (Simon, 1955) and that capacity declines with age (Salthouse, 1996). A result of focusing on high reasons is that we may also ignore the important influences of the experiential mode. The experiential mode is intuitive, automatic, associative, and fast. It is based on affective (or emotional) feelings, and one of its primary functions is to highlight information important enough to warrant further consideration.
As shown in a number of studies, these affective feelings provide meaning, motivation, and information to choice processes (Damasio, 1994; Osgood, Suci, & Tannenbaum, 1957; Peters, in press). Marketers, who well understand the power of affect, aim their advertisements to evoke an experiential mode of information processing. Ads typically try to associate a product with positive affective images. Try to imagine a car ad without images of freedom, prestige, sex, or power.

Both modes of thinking are important, and good choices are most likely to emerge when both affective and deliberative modes work in concert and decision makers think as well as feel their way through judgments and decisions (Damasio, 1994). Consumers need to consider information carefully, but they also need to be able to understand and be motivated by the meaning that underlies that information.

These multiple needs suggest that the simple provision of information may not be enough to ensure good decisions. The state of Nebraska found this out the hard way. For 30 years they allowed workers to choose either a traditional pension plan or a 401(k) plan that was managed by the individual worker. Workers who chose the 401(k) plan earned average annual returns that were far less than the traditional pension plan, even though Nebraska provided not only information but plenty of education (see Figure 4.7). In 2003, Nebraska eliminated employee choice from its 401(k) plan.

![FIGURE 4.7  Average annual returns in Nebraska retirement plans.](source: Merriman (2002).)
POTENTIAL BARRIERS TO USING INFORMATION EFFECTIVELY IN RETIREMENT CHOICES

At least three reasons exist for why simple provision of information may not be effective in retirement choices. First, information can be insufficient, uncertain, and changeable. Burtless (this issue) points out that workers face uncertainty about the path of future earnings, age at death, and the interest rate that can be earned. Second, workers may not comprehend the information when it is sufficient. Some economists, for example, argue that only a small percentage of workers have the capacity or willingness to understand retirement program rules and to interpret their meaning in order to make optimal choices (Burtless, this issue). Results from health plan choice studies support this lack of comprehension and suggest that a proportion of workers, and particularly older workers and retirees, do not always comprehend even fairly simple information. Hibbard, Peters, Slovic, Finucane, and Tusler (2001) presented employed-aged adults (18–64 years old; \( n = 239 \)) and older adults (65–94 years old; \( n = 253 \)) with 34 decision tasks that involved interpretation of numbers from tables and graphs. For example, participants were asked to identify the Health Maintenance Organization (HMO) with the lowest copayment from a table that included four HMOs with information about monthly premiums and copayments. A comprehension index reflected the total number of errors made across the 34 tasks. The youngest participants (aged 18–35) averaged 8% errors; the oldest participants (aged 85–94) averaged 40% errors; the correlation between age and the number of errors was .31 (\( p < .001 \)). Education was protective of comprehension such that those with higher education demonstrated smaller age differences.

A third barrier to using information effectively is that workers may comprehend numerical information without understanding what it means. Bateman, Dent, Peters, Slovic, and Starmer (2005; also reported in Slovic, Finucane, Peters, & MacGregor, 2002) examined how people evaluate the attractiveness of a simple gamble. One group rated a bet that gives a small chance to win $9 (7/36, win $9; otherwise, win $0) on a 0–20 scale; a second group rated a similar gamble with a small loss (7/36, win $9; 29/36, lose 5¢) on the same scale. This second group had an objectively worse bet so that, normatively, they should rate the bet as worse. However, the data were anomalous from the perspective of economic theory. The mean response to the first gamble was 9.4. When a loss of 5¢ was added,
the mean attractiveness jumped to 14.9 and there was almost no overlap between the distribution of responses around this mean and the responses for the group judging the gamble that had no loss.

We hypothesize that these curious findings can be explained by affect and affective precision. According to this view, a probability maps relatively precisely onto the attractiveness scale, because it has an upper and lower bound and people know where a given value falls within that range. In contrast, the mapping of a dollar outcome (e.g., $9) onto the scale is diffuse, reflecting a failure to know whether $9 is good or bad, attractive or unattractive. Thus, the impression formed by the gamble offering $9 to win with no losing payoff is dominated by the rather unattractive impression produced by the 7/36 probability of winning. However, adding a very small loss to the payoff dimension puts the $9 payoff in perspective (i.e., makes it more affectively precise) and thus gives it meaning. The combination of a possible $9 gain and a 5¢ loss is a very attractive win/lose ratio, leading to a relatively precise mapping onto the upper part of the scale. Whereas the imprecise mapping of the $9 carries little weight in the averaging process, the more precise and now favorable impression of ($9; –5¢) carries more weight, thus leading to an increase in the overall favorability of the gamble. Participants asked directly about their affect and precision of affect to the $9 had more clear and more positive feelings about the $9 in the $9–5¢ loss condition (Bateman et al., 2005). A follow-up study demonstrated that the effect of the small loss is driven by people high in number ability rather than those low in ability, presumably because highly numerate individuals are more likely or more able to draw meaning from a comparison of numbers (Peters et al., in press). It is not that these decision makers did not comprehend the $9; everybody knows what $9 is. However, the meaning of the $9 was more clear and more positive in the presence of the five cent loss.

SUPPORTING RETIREMENT DECISIONS

Retirement decisions are much more complicated than a simple bet. And yet even with a simple bet, there are barriers to how decision makers understand the meaning of numerical information. Given this, how can we support retirement decisions and the well-being of the aged? Past research suggests that through an understanding, first, of how people process
information and, second, what they will be faced with in a decision situation, decision aids can be designed (if necessary) in order to help support decision making.

Decisions can be supported through various means. First, intermediaries, who have an understanding of the decision that people face and the attributes that may be of importance to them, can help decision makers comprehend the decision situation and its necessary tradeoffs. Second, decisions can be supported through how information and choices are presented. Thaler and Sunstein (2003), for example, discussed the use of default options in retirement plans. Companies offering 401(k) plans to their workers have a choice of what to make the default option, (a default option is defined as what will happen if the employee does nothing at all). As it turns out, this default option makes a big difference. If the workers are automatically out of the plan (and must choose to be in it; this is the norm), about half the workers initially enroll (49%). However, if the default is that the workers are in the plan (but of course they can freely choose not to be), substantially more workers initially enroll (86%, Madrian & Shea, 2001). Automatic enrollment has particularly powerful effects in increasing retirement savings among low-income and younger workers (Munnell & Sunden, 2004).

If you know what people prefer or what is better for their well-being (let’s assume for the moment that saving more is better than saving less in this case) and some default option must be chosen, why not design the default to promote better decisions while still allowing free range of choice?

Financial and other information has generally been designed to evoke deliberative processing. However, comprehension, motivation, and the actual use of information can be increased through subtle changes in how information is presented that influence both deliberative and experiential processing. The way information is presented can make a difference in how difficult it is to understand and use. Hibbard and Peters (2003) review a variety of methods to make numbers more meaningful, such as by highlighting affective meaning. An example of highlighting affective meaning is the best example when adding the five cent loss caused the affective meaning of the $9 to become more clear and more positive. Another way to make numbers more meaningful is by moving the decision maker closer to an experience. The use of narratives can help someone understand what it might be like to live on 60% of their income after retirement. Finally, we can lower the cognitive effort required to understand numbers, for
example, by organizing the data for decision makers and ordering it from highest to lowest value (Hibbard, Slovic, Peters, & Finucane, 2002). The use of these three processes (lowering cognitive effort, helping people to understand the experience of choice, and highlighting the affective meaning of information) as design principles in the creation of consumer information products likely will enhance the successful use of information to inform choice.

When designing ways to increase the usability of information, the information provider should also keep in mind the characteristics of the audience receiving the information. An understanding of audience characteristics can help shape the strategy or strategies used. Hibbard et al. (2001), for example, found that many older adults (i.e., Medicare beneficiaries) have more difficulty than younger adults in using information accurately to inform health plan choice. Decision makers who do not have the analytical skills necessary for the task may need additional assistance in lowering the cognitive burden of health decisions. These decision makers may include some older adults, decision makers low in literacy or numeracy, or individuals suffering cognitive decline. In recent research, Hibbard et al. (2001) documented a simple screening device consisting of age, education, and self-reported health that related strongly to older and younger adults’ abilities to comprehend and use comparative information. The use of such a screening device may assist information producers in choosing appropriate strategies, particularly when strategies that lower cognitive burden may be needed. Since it is frequently not possible to give numeracy or literacy measures to consumers (e.g., a Medicare beneficiary phones in to get help in choosing a health plan), additional research on simple screening devices would be helpful.

Consumers are going to differ in their ability to handle different types and quantities of financial information. Knowing this and understanding the elements that underlie the usefulness of particular strategies should help information providers design the key ingredients necessary for usable information.

Each of the processes and strategies discussed above has the potential to influence health and financial behaviors and choices. These attempts, by definition, bring up important ethical considerations. Because the way health information is presented is very likely to influence how it is used, information producers have a responsibility to be conscious of that influence and direct it in productive and defensible ways. The alternative is to
manipulate people in ways that are unknown, are not thought out, or are not defensible, but are no less manipulative.

Thus, three factors should be considered in selecting information presentation strategies: (a) the complexity and amount of the information; (b) the experience, skill, and motivation of the users; and, (c) the nature of the choice (e.g., the degree to which there is a right or “best” option). These factors can be used to determine which combination of strategies is going to best facilitate decision making. The testing of consumer information products then should focus on three levels: the degree to which the information is understood; the degree to which the process goals are achieved (reduce cognitive effort, highlight information; help understand the experience of the choice); and the degree to which information is actually used in choice. This too represents a departure from current testing methods. Most consumer information material, if tested at all, assesses consumer preferences for how information is presented. However, consumer preferences for presentation format may not actually support the use of that information in choice.

The conscious use of information presentation strategies to support choice represents a critical departure from how most information producers see their role (i.e., most view their role as providing complete, objective, and accurate information.) To acknowledge that the way information is presented can influence choice is to accept a new level of responsibility. For example, choosing how to display information puts a greater burden on the information provider to summarize or to add “meaning” to the information. However, if the information is going to be weighted and used in choice, information producers must aim beyond providing more and accurate information to providing information in a way that supports decisions. As the preceding discussion makes clear, supporting decisions will require more strategic and sophisticated efforts. While the quantity of information can be voluminous and complex, strategies exist to increase the likelihood that information will actually get used in judgment and choice.

CONCLUSION

Ultimately, we need to develop conceptual models to help us understand and predict what consumers might comprehend, how they decide, and, how then to support and aid those decisions. We may be able to “diagnose”
decision situations and aids as well as individuals in order to illuminate the best path to support good decision making in a particular situation.

Numbers appear to be just that—numbers. Research suggests that they may not be information until we compare and contrast the available data and calculate their evaluative meaning for choice or until the data acquire affective meaning through other means. These findings are consistent with the constructed preferences approach in decision making and imply that policy makers cannot present “just the facts.” Any method of information presentation manipulates choice; no method presents facts only. It appears that whatever method of presentation we choose will influence how consumers and others find meaning in numbers and construct choices in unfamiliar domains. Policy makers need to make thoughtful choices about how to present information in order to pick a method of data presentation (and therefore preference manipulation) that they can defend, and research scientists need to help them understand how to make that choice. The presentation of simple numbers (a common phenomena in our world of instantaneous data and informed choice) appears to be much more complex than might be thought at first glance. By paying careful attention to how information is presented, information providers can provide additional rationality into retirement choices.

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REFERENCES


