



INSTITUTE FOR DEFENSE ANALYSES

Effective Financial Decision Aids

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July 2017

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IDA Document D-8214

Log: H 16-001152



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About this Publication

This work was conducted by the Institute for Defense Analyses (IDA) under contract HQ0034-14-D-0001, project number BE-7-4151, "Discount Rate Analysis for Retirement Options," for the Director for Military Compensation, Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs), Office of the Under Secretary of Defense (Personnel and Readiness). The views, opinions, and findings should not be construed as representing the official position of either the Department of Defense or the sponsoring organization.

Acknowledgments

Thank you to John Dexter Fletcher and David M. Tate for performing technical review of this document.

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Executive Summary

The National Defense Authorization Act for FY 2016 directs the Secretaries of the Armed Forces and the Chiefs of Staff of the Armed Forces to provide financial literacy training to Service members at certain critical points throughout their careers, including the transition to retirement.¹ The training is to be designed to help eligible enrollees understand the implications of their retirement options for their finances and tax liabilities. The intent is to help Service members better understand the impact of their choices on their short- and long-term financial interests.

If low levels of financial literacy are leading to poorer retirement planning, how should the Defense Department go about improving those financial skills? A review of the research literature reveals that three general methodological options have been used to improve financial literacy: (1) improving economics education, (2) framing choices to highlight commonly overlooked outcomes and to limit harm from making uninformed choices, and (3) providing timely and tailored decision support.

A literature review by Fernandes, Lynch, and Netemeyer² asserts that despite the widespread advocacy for improved financial education and training, little is known about the effectiveness of such educational programs. These researchers describe the effects of training interventions as “miniscule” [*sic*]. Thus, the empirical research literature suggests that increasing financial training and education is not an effective method for improving economic behavior. When faced with a difficult decision having both short- and long-term outcomes and requiring multiple actions, humans typically simplify the problem by attending only to its most salient aspects or focusing only on short-term benefit. As a result, how information is presented can influence people’s decisions. We refer to this effect as *framing*.

In general, a review of the research indicates that framing effects are inconsistent in size and direction of the impact, and very sensitive to the research design. Despite these problems, the research suggests some tentative conclusions. For instance, a particularly influential frame appears to be one that presents a default alternative. When faced with such a frame, people have a strong tendency to choose the default.

¹ *National Defense Authorization Act for Fiscal Year 2016*, 114th Cong., Pub. L. No. 114-92, § 661 (2015).

² Daniel Fernandes, John G. Lynch, Jr., and Richard G. Netemeyer, “Financial literacy, financial education, and downstream financial behaviors,” *Management Science* 60, no. 8 (August 2014): 1861–83, doi: 10.1287/mnsc.2013.1849.

In addition, when faced with a difficult decision, people often employ simple rules of thumb that provide quick but not necessarily accurate solutions, rather than using more complex sets of well-defined procedures that require more time and cognitive resources but assure a correct solution. Bertrand and Morse³ found that simple information treatments broadened the view of borrowers considering long-term impacts of payday loans. Their study demonstrates that very simple displays of outcomes can be effective in modifying real-world financial decisions. There is a growing body of evidence showing that providing information tailored to subgroups within a population leads to better choices in varied decision-making domains.

Based on our literature review, we recommend that the proposed financial literacy training include decision support systems in the form of a computer- or web-based application or software wizard, along the lines of embedded tax advisors (e.g., TurboTax) or retirement planners (e.g., TIAA-CREF). The retirement wizard proposed here would frame the enrollee's decisions and support their choices while providing information tailored for the individual.

Presenting information on long-term consequences of retirement decisions based on finances alone does not guarantee that an eligible enrollee will choose an option that maximizes their personal benefit. The information may in fact inadvertently bias the enrollee toward a perceived "correct" or "desired" choice. In practice, the cues that control such perceptions are often very subtle and have unintended effects that are difficult to predict a priori. On the other hand, such biasing cues can be discovered through systematic beta tests of the wizard prior to implementation.

Overall, we find that general financial education has little impact on people's financial decisions. A more effective approach to influencing people's financial decisions is to require use of a decision aid that delivers relevant information at the time each decision is made. We propose that this aid be implemented as a web-based "wizard"—a computer application designed to automate complex tasks by asking the user a series of relevant questions while displaying key information and performing relevant computations for the chooser. This paper uses behavioral economics and prior research on financial literacy to identify some of the essential features of such a wizard.

³ Marianne Bertrand and Adair Morse, "Information Disclosure, Cognitive Biases, and Payday Borrowing," *The Journal of Finance* 66, no. 6 (November 2011): 1865–93, doi: 10.1111/j.1540-6261.2011.01698.x.

Contents

A.	Introduction	1
B.	Improving Financial Literacy	1
C.	Framing the Problem	3
1.	Research on Framing	3
2.	Framing in the Retirement Context	6
D.	Supporting the Decision	8
1.	Financial Advising	9
2.	Tailoring Advice	12
a.	Consumer Choice	12
b.	College Application	12
c.	Health-Related Choice	13
d.	Credit Card Disclosure Information	13
E.	Implications from the Literature Review	16
	Appendix A. Design Features of Proposed Wizard	A-1
	Illustrations	B-1
	References	C-1
	Abbreviations	D-1

A. Introduction

The National Defense Authorization Act for FY 2016 (NDAA 2016) directs the Secretaries of the Armed Forces and the Chiefs of Staff of the Armed Forces to provide financial literacy training to Service members at certain critical points throughout their careers, including the transition to retirement.¹ This training will provide Service members information about the options available to them under the Blended Retirement System (BRS). Essentially, Service members eligible to enroll in the BRS will choose one of three options for disbursing their retirement benefits: (1) 100 percent of their total benefits paid as a monthly annuity—the current disbursement system, (2) 50 percent of their total benefits paid as a lump sum and 50 percent in a monthly annuity, or (3) 25 percent of their total benefits paid as a lump sum and 75 percent in a monthly annuity.² The training will be designed to help eligible enrollees understand the implications of those options on their finances and tax liabilities. The intent is to help Service members better understand the impact of their choices on their short-term and long-term financial interests. This paper reviews research literature relevant to designing and developing a training and decision support system that would aid Service members in making these choices.

Overall, we find that general financial education has little impact on people’s financial decisions. A more effective approach to influencing people’s financial decisions is to require use of a decision aid that delivers relevant information at the time the decision is made. We propose that this aid be implemented as a web-based “wizard”—a computer application designed to automate complex tasks by asking the user a series of relevant questions. This paper derives some of the essential features of this wizard based on current research on financial literacy and behavioral economics.

B. Improving Financial Literacy

In a widely cited study, Lusardi and Mitchell³ investigated financial literacy in older Americans and its relationship to retirement planning. These researchers developed survey items designed to measure both financial literacy and retirement planning for the 2004 Health and Retirement Study, a recurring nationwide survey of Americans over the age of 50. Consistent with research in other countries and on other segments of the population, the results reveal widespread financial illiteracy in this large sample of older Americans.

¹ *National Defense Authorization Act for Fiscal Year 2016*, 114th Cong., Pub. L. No. 114-92, § 661 (2015).

² Options 2 and 3 apply only to the retirement benefits received up to age 67.

³ Annamaria Lusardi and Olivia S. Mitchell, “Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education,” *Business Economics* 42, no. 1 (January 2007): 35–44, doi: 10.2145/20070104.

They also show a link between financial literacy and retirement planning: “Those who understand compound interest and can do a simple lottery division are much more likely to have planned for retirement.”⁴ Although these findings are based on cross-sectional survey data, the implication from this correlation is that basic financial literacy skills are required for effective retirement planning.

If individuals have low levels of financial literacy and are making poorer retirement decisions, how do we go about improving those financial skills? Based on a review of the research literature, Carlin and Robinson⁵ find that three general methodological options have been used to improve financial literacy. Reordering and paraphrasing their methods, these options are (1) improving economics education, (2) framing choices to highlight commonly overlooked outcomes and to limit harm from making uninformed choices, and (3) providing timely decision support tailored to the individual.

In a more recent literature review, Fernandes, Lynch, and Netemeyer⁶ assert that most experts prescribe the same remedy for the problem of financial illiteracy: increased financial education (i.e., the first option identified by Carlin and Robinson). Despite the widespread advocacy for improved financial education and training, little is known about the effectiveness of such educational programs. For that reason, Fernandes et al. performed a meta-analysis of 201 studies that provide empirical data on the effects of financial education programs on downstream financial behavior. Based on their results, these researchers describe the effects of training interventions as “miniscule” [*sic*]—accounting for only 0.1 percent of the observed differences in financial behavior. This small effect grows even smaller with increased delay between the intervention and the measurement of financial behavior: in order for a brief training session (1 hour or less) to have any effect at all, Fernandes et al. found that it must be provided well within five months of the decision. Even large interventions incorporating 24 or more hours of instruction have practically no effect if measured 20 or more months after the intervention. Thus, the empirical research literature suggests that increasing financial training and education is not a very effective method for changing actual economic behavior.

NDAA 2016 directs that the Services provide financial literacy training, which corresponds to the first option identified by Carlin and Robinson. In light of Fernandes et al.’s findings, we suggest supplementing financial training with a combination of the

⁴ Ibid., 39.

⁵ Bruce Ian Carlin and David T. Robinson, “Financial Education and Timely Decision Support: Lessons from Junior Achievement,” *American Economic Review: Papers & Proceedings* 2012 102, no. 3 (May 2012): 305–08, doi: 10.1257/aer.102.3.305.

⁶ Daniel Fernandes, John G. Lynch, Jr., and Richard G. Netemeyer, “Financial literacy, financial education, and downstream financial behaviors,” *Management Science* 60, no. 8 (August 2014): 1861–83, doi: 10.1287/mnsc.2013.1849.

second and third options. That is, our concept is to frame information to support specific decisions required by enrollees in the new retirement system. Furthermore, that information must be tailored to the individual enrollee's current economic situation and long-term financial goals. Sections C and D review literature on what we see are two aspects to making better-informed retirement choices under the BRS: properly framing the problem for eligible Service members and supporting their decisions.

C. Framing the Problem

It has been well established since the 1950s that humans are severely limited information processors.⁷ When faced with a difficult decision having both short- and long-term outcomes and requiring multiple actions, humans typically simplify the problem by attending only to its most salient aspects or focusing only on short-term benefit. As a result, how information is presented can influence people's decisions. We refer to this effect as *framing*.

1. Research on Framing

The classic example of framing is the Asian Disease problem described by Tversky and Kahneman.⁸ The decision scenario is a disease outbreak in Asia that is expected to kill 600 people. Two programs to combat the disease have been proposed and people are asked to choose between them. The options are first described in a positive frame as follows: In the Program 1 scenario, 200 people will be saved. In Program 2, there is a 1/3 probability that 600 people will be saved and a 2/3 probability that no people will be saved.⁹ Both programs offer the same expected value, but most people (72 percent) choose Program 1. Next, the two programs are rephrased in a negative frame: under Program 1 400 people will die, while under Program 2 there is a 1/3 probability that no one will die and a 2/3 probability that 600 people will die. When the problem is presented in this negative frame, most people (78 percent) choose Program 2. The number of people who are saved or die is identical in the two presentations, but the framing has changed from positive to negative (200 saved to 400 die). People not only change their answer from Program 1 to Program 2, they switch from a risk-averse answer (certainty of saving 200 people) to the risk taking answer of a 1/3 chance of saving 600 people.¹⁰ Table 1 summarizes the options.

⁷ George A. Miller, "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information," *Psychological Review* 63, no. 2 (1956): 81; Donald E. Broadbent, *Perception and Communication* (Oxford, UK: Pergamon Press, 1958), http://www.communicationcache.com/uploads/1/0/8/8/10887248/d_e_broadbent_-_perception_and_communication_1958.pdf.

⁸ Amos Tversky and Daniel Kahneman, "The Framing of Decisions and the Psychology of Choice," *Science* 211, no. 4481 (January 1981): 453–8, doi: 10.1126/science.7455683.

⁹ *Ibid.*, 453.

¹⁰ *Ibid.*

Table 1. Positive and Negative Frames for Choosing Between Two Programs

	Positive Frame	Negative Frame
Program 1	200 people saved	400 people die
Program 2	1/3 probability 600 people saved, 2/3 probability no one saved	1/3 probability no one dies, 2/3 probability 600 die
Preferred Choice	72% chose Program 1	78% chose Program 2

Note: Adapted from Tversky and Kahneman, "The Framing of Decisions and the Psychology of Choice," Problems 1 and 2.

Since that initial study, framing effects have been documented in a wide range of decision-making studies including perceptual judgments, healthcare, consumer choice, bargaining, and more. A meta-analysis by Anton Kuhlberger¹¹ focused on how framing affects risky decisions that are presented as either gains or losses. He examined more than 136 empirical and experimental papers written over 15 years. Kuhlberger developed categories for the studies based on their characteristics. Risk was characterized by whether there was a sure versus an uncertain option, whether the reference was framed in terms of risk or outcome, and whether the study analyzed one or multiple risk events. The framing could also manipulate the perception of risk. For example, referring to a problem as a commons problem or a public good problem, or manipulating the description to be positive or negative without explicitly referring to such, manipulates the perception of risk. Studies were also characterized by the type of decisions subjects were asked to make: choosing among options versus rendering a judgment or assessing the options.

In general, Kuhlberger found that framing effects are inconsistent in size and in how they affect the direction of the impact, and are very sensitive to the research design. He noted that factors other than research design could exist, under which "the framing effect can interact, may be dampened, or may be made to disappear."¹² Despite this, he concluded that choices between risky and riskless options resulted in the largest framing effects, especially when compared to choosing among levels of risk. He also found that making a choice between options elicits much larger framing effects than making a judgment. Lastly, he found that including reference points or anchors in the decision problem can also result in strong framing effects.

¹¹ Anton Kuhlberger, "The Influence of Framing on Risky Decisions: A Meta-Analysis," *Organizational Behavior and Human Decision Processes* 75, no. 1 (July 1998): 23–55, doi: 10.1006/obhd.1998.2781.

¹² *Ibid.*, 46.

A survey paper by Levin, Schneider, and Gaeth¹³ also reviewed how framing effects can vary. The authors focused on framing effects that characterize the same information in a positive or negative way, referred to as valence framing. Within valence framing, they identified three types: risky choice framing, attribute framing, and goal framing. Risky choice framing presents options that differ in level of risk and then focuses on how the choices are described. Attribute framing does not rely on risk differences. A characteristic or event is used to serve as the focus of the framing. For example, ground beef labeled 75 percent lean is perceived as higher quality than ground beef labeled 25 percent fat.¹⁴ There is no change in risk level between the two packages of ground beef—they are simply labeled differently. Goal framing manipulates the framing of the outcome by increasing the salience of positive or negative outcomes (e.g., lives saved versus lives lost). Levin et al. categorized prior research into these categories and then showed that the effects on behavior differ by category. They found that within their categories, the framing effects are generally consistent. In risky choice framing, positive frames increase the likelihood of choosing risk-averse responses. Positive descriptions of attributes also leads to more positive views of those attributes. Lastly, in goal framing, emphasizing losses has a larger impact on behavior than emphasizing gains.

The DRIFT model by Read, Frederick, and Scholten¹⁵ focuses on intertemporal choice. DRIFT is an acronym for absolute Difference in amount, Ratio (proportional difference), Interest rate, Finance (whether an offer is viewed as a consumption or investment choice), and Time. The paper examined the specific case of how individuals choose between a lower amount today and a higher amount in the future by manipulating the focus on different features of the choice. In this model, people balance a weighted average of the DRIF features against Time. The authors ran experiments that focused on emphasizing one of the four DRIF features, then used combinations of the features. They show that while choices are affected by framing the outcomes, combining frames with contradictory effects tends to mitigate the impact.

Overall, our review of the literature shows that framing effects are complicated. Kuhlberger found inconsistent effects across 136 studies, while Levin et al. found consistency only after careful sorting into categories. While effects within a category may be consistent, the impact of effects may vary between categories. If multiple frames are

¹³ Irwin P. Levin, Sandra L. Schneider, and Gary J. Gaeth, “All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects,” *Organizational Behavior and Human Decision Process* 76, no. 2 (February 1998): 149–88, doi: 10.1006/obhd.1998.2804.

¹⁴ *Ibid.*, 159.

¹⁵ Daniel Read, Shane Frederick, and Marc Scholten, “DRIFT: An Analysis of Outcome Framing in Intertemporal Choice,” *Journal of Experimental Psychology: Learning, Memory, and Cognition* 39, No. 2 (March 2013): 573–88, doi: 10.1037/a0029177.

applied, this can lead, as demonstrated by Read et al., to mitigating the effects of framing. Thus, predicting the overall effects of framing is complicated, and caution must be used.

2. Framing in the Retirement Context

Framing has also been studied in the context of retirement behavior. Brown, Kapteyn, and Mitchell¹⁶ examined framing effects in claiming Social Security benefits. Participants in Social Security can begin claiming benefits at any time between age 62 and age 70. The level of benefits is actuarially adjusted based on age at claiming, and is designed to be equal in net present value of lifetime benefits for those with average mortality. Participants in an internet survey were shown the monthly benefit at alternative claiming ages. The experimenters presented the same information in each survey, but varied how the information was presented. The first two frames used were (1) a baseline that attempted to present the information as neutrally as possible, and (2) a “breakeven” frame that emphasized the number of years one would need to live for the nominal sum of the incremental monthly benefits from waiting to equal the amount foregone by waiting. Other frames used involved combinations of consumption versus investment, gains versus losses, and older versus younger reference ages.¹⁷ The authors found that the breakeven frame led to substantially earlier claiming dates than any other frame.¹⁸ In addition, they found that focusing on gains (e.g., the increase in Social Security payments from waiting) led to later claiming dates than focusing on losses (e.g., the decrease in Social Security payments from claiming earlier), and that using older reference ages led to later claiming dates. These results suggest that even high-stakes decisions are subject to the framing effects discussed above.

A particularly influential frame is to present a default alternative. When faced with such a frame, people have a strong tendency to choose the default. For example, in the United States, the default choice for organ donation is to not donate. Potential donors must register to become organ donors. Some European countries use the principle of presumed consent, in which individuals are assumed to be organ donors unless they take action to opt out. Under this doctrine, Abadie and Gay¹⁹ found that organ donation rates are

¹⁶ Jeffrey R Brown, Arie Kapteyn, and Olivia S. Mitchell, “Framing Effects and Expected Social Security Claiming Behavior,” National Bureau of Economic Research (NBER) Working Paper 17018 (Cambridge, MA: NBER, May 2011), <http://www.nber.org/papers/w17018>.

¹⁷ Reference age here means the age that was referred to as the normal retirement age.

¹⁸ Brown, Kapteyn, and Mitchell, “Framing Effects,” 4.

¹⁹ Alberto Abadie and Sebastien Gay, “The Impact of Presumed Consent Legislation on Cadaveric Organ Donation: A Cross-Country Study,” *Journal of Health Economics* 25, no. 4 (July 2006): 599–620, doi: 10.3386/w10604.

approximately 25 percent higher in countries using presumed consent than in countries that require registration.

Default choices are of particular importance to retirement decisions. Madrian and Shea²⁰ studied a firm that switched its retirement plan from requiring employees to opt *in* to one that required employees to opt *out* of contributing a portion of their paycheck. If employees did not choose to opt out, they made an automatic contribution of 3 percent allocated to a money market fund. At any time, employees could opt out of the 401(k) plan or change the allocation to a different fund. Changing the default choice to automatic enrollment not only dramatically increased the participation rate, it also increased the fraction of employees using the default contribution rate. Furthermore, before the change, few employees chose the money market fund. After the change, a substantial fraction stuck with the money market fund despite very low transaction costs for making changes.²¹

The default choice examples above are examples of “mass defaults.” That is, the same default choice applies to everyone. Defaults may also be personalized, or tailored, to individual differences and needs. For example, an airline may automatically assign aisle seats to passengers who previously chose aisle seats.²²

Public policies often set defaults. Owners of 401(k) or similar accounts who change jobs must decide what to do with the funds in the account. In general, they have three options: leave the money where it is, roll it over to an account at their new employer or an Individual Retirement Account (IRA), or take a lump-sum distribution in cash for other purposes. How public policies affect this decision is the focus of Gale and Dworsky.²³ People who cash out their funds pre-retirement sacrifice future retirement income. As a result, there are a number of policies designed to discourage cash-outs. Nevertheless, only a small percentage of recipients roll over the funds.

As discussed earlier, it is possible that other factors can overwhelm the influence of framing. Taking a lump-sum distribution subjects the funds to a variety of taxes and penalties. Gale and Dworsky found that the increase in tax rates after 1986 and changes in withholding rules in 1993 decreased the overall frequency of taking a cash-out. However,

²⁰ Brigitte C. Madrian and Dennis F. Shea, “The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior,” *The Quarterly Journal of Economics* 116, no. 4 (November 2001): 1149–87, doi: 10.1162/003355301753265543.

²¹ *Ibid.*, 1176.

²² Daniel G. Goldstein et al., “Nudge Your Customers Toward Better Choices,” *Harvard Business Review* (December 2008): 99–105, <https://hbr.org/2008/12/nudge-your-customers-toward-better-choices>.

²³ William G. Gale and Michael Dworsky, *Effects of Public Policies on the Disposition of Lump-Sum Distributions: Rational and Behavioral Influences*, CRR WP 2006-15 (Boston: Center for Retirement Research at Boston College, August 2006), <http://crr.bc.edu/working-papers/effects-of-public-policies-on-the-disposition-of-lump-sum-distributions-rational-and-behavioral-inf/>.

among people with low retirement account balances (less than \$3500), the probability of a cash-out rose.

What to do with a 401(k) account at retirement presents a different quandary. Should individuals take a lump sum or convert the 401(k) account into an annuity? Longevity risk, or outliving your savings, is a real concern. Annuities pool risk and provide a lifetime income. Economics predicts that annuities should be popular because they reduce the risk of outliving one's wealth and they relieve the burden of determining the correct drawdown rate. However, annuity contracts are rare, creating what is called the annuitization puzzle. The puzzle is this: people are generally risk-averse and thus are expected to prefer the safety of an annuity to the risky alternative of a lump sum. Benartzi, Previtro, and Thaler²⁴ provide an overview of the literature on this puzzle.

Most employer plans, such as 401(k)s, do not offer annuities. This increases the burden on retirees. They have to find annuities, make a choice, and decide how much to invest. As Benartzi et al. discuss, anything that increases the effort required by the individual to choose an annuity can lower the participation rate. When it is very easy to choose an annuity, many people with non-trivial balances do so. Those with small balances are more likely to choose a lump sum.²⁵

In regard to the military's BRS, determining the best choice among the 25 percent lump-sum, 50 percent lump-sum, and full annuity distributions is a difficult task. It is also likely that most retirees have not thought about this topic before. Finally, the retirees only get one chance to make this decision, so they need to understand both the short- and long-term implications of their choice.

D. Supporting the Decision

When faced with a difficult decision, people often employ simple rules of thumb (heuristics) that provide a quick but not necessarily accurate solution rather than use more complex sets of well-defined procedures (algorithms) that require more time and cognitive resources but assure a "correct" solution. Daniel Kahneman²⁶ and other cognitive psychologists have demonstrated how the use of heuristics accounts for many common errors and biases in human reasoning. Conversely, Gigerenzer and Goldstein²⁷ have shown

²⁴ Shlomo Benartzi, Alessandro Previtro, and Richard H. Thaler, "Annuitization Puzzles," *The Journal of Economics Perspectives* 25, no. 4 (Fall 2011): 143–64, doi: 10.1257/jep.25.4.143.

²⁵ Ibid., 151.

²⁶ Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux, 2011).

²⁷ Gerd Gigerenzer and Daniel G. Goldstein, "Reasoning the Fast and Frugal Way: Models of Bounded Rationality," *Psychological Review* 103, no. 4 (1996): 650–69, http://library.mpib-berlin.mpg.de/ft/gg/GG_Reasoning_1996.pdf.

that some heuristics can be surprisingly accurate. These authors argue that the principal advantage of heuristics is that they are “fast and frugal”—that is, they can be applied rapidly with little cognitive effort.

Some decision frames have been devised to take advantage of the human tendency to use heuristics to make simple consumer choice decisions. Such simple frames selectively increase or decrease the salience of certain outcomes to “nudge” people toward more socially desirable outcomes.²⁸ Of course, the decision to take a portion of retirement income as a lump sum does not have an unambiguous “correct answer” for the individual or for society at large. Also, compared to simple consumer decisions, the retirement problem is much more complex in terms of both short- and long-term financial implications. To address this sort of problem, the enrollee would need to invoke slower, conscious, and more analytic cognitive processes. Kahnemann²⁹ suggests that broader frames that emphasize both short- and long-term consequences of the decision choices are more likely to engage these slower, more analytic processes and lead to more rational decisions. In the following sections, we provide examples of how such broad frames have been used to aid decision making and how they may be applied to the military retirement decisions described earlier.

1. Financial Advising

Bertrand and Morse³⁰ investigated how several simple information treatments broadened the view of borrowers to think about some of the long-term impacts of payday loans. A randomized design was used in which treatments were administered to 1,441 volunteering customers³¹ in 100 stores of one of the largest payday loan companies in the United States. Information was printed on the front of envelopes that contained cash and paperwork pertaining to a payday loan transaction. Three different information treatments were compared to a control condition where borrowers received cash in the standard company envelope.

²⁸ Richard Thaler and Cass R. Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (New Haven, CT: Yale University Press, 2008), <http://yalebooks.com/book/9780300122237/nudge>.

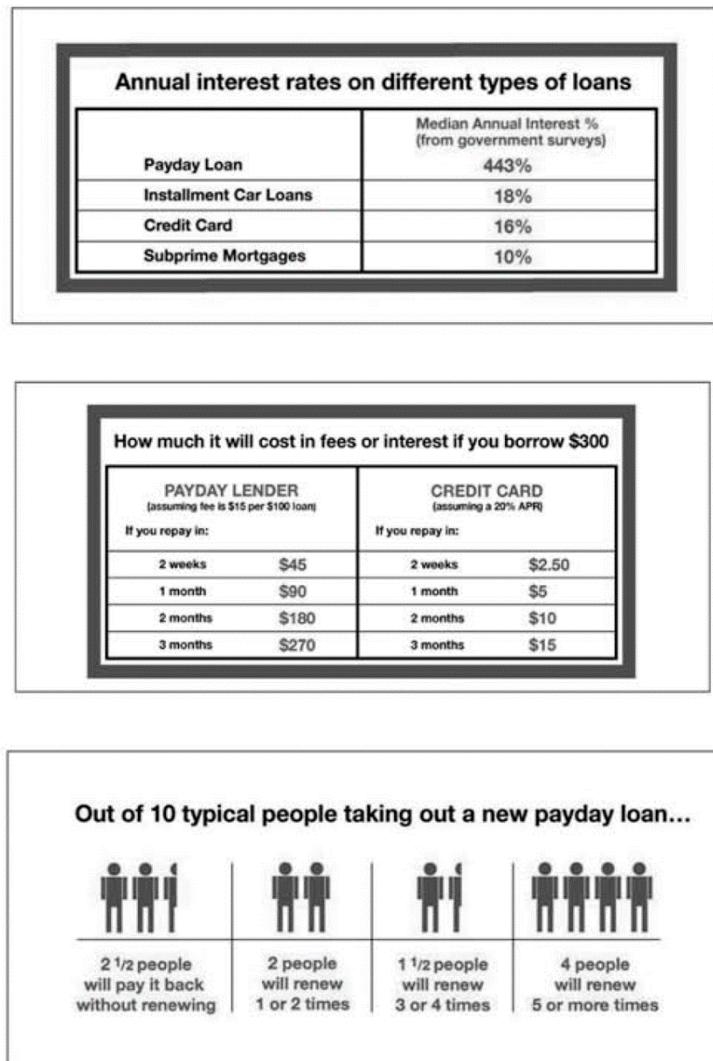
²⁹ Kahneman, *Thinking, Fast and Slow*.

³⁰ Marianne Bertrand and Adair Morse, “Information Disclosure, Cognitive Biases, and Payday Borrowing,” *The Journal of Finance* 66, no. 6 (November 2011): 1865–93, doi: 10.1111/j.1540-6261.2011.01698.x.

³¹ A total of 6,538 borrowers were asked to participate in the study (21 percent participation rate). In exchange for participation, volunteers received a free year’s subscription to one of five popular magazines.

The three information treatments, shown in Figure 1, are as follows:

- The “APR information” treatment (top) compares payday loans to car loans, credit cards, and subprime mortgages in terms of their respective annual percentage rates (APRs).
- The “dollar information” treatment (middle) displays the accumulated fees paid for having a typical payday loan (\$300) outstanding for two weeks, one month, two months, or three months compared to the fees for borrowing the same amount on a credit card with a 20 percent APR.
- The “refinancing information” treatment (bottom) presents a simple graphic representing the number of times the average borrower refinances a payday loan before paying it back.



Source: Adapted from Bertrand and Morse, “Information Disclosure,” Figure 2.

Figure 1. Information Treatment Envelopes

Results from Bertrand and Morse³² indicate the most effective display was the dollar information treatment (Figure 1, middle). This particular treatment reduces the take-up of future payday loans by 11 percent in the four months after receiving the loan with the information treatment. This study demonstrates that very simple displays of outcomes can be effective in modifying real-world financial decisions.

Having financial information and advisory services available does not ensure that customers will take advantage of them. Meier and Sprenger³³ conducted a field study to see the relationship between the borrower's financial patience and the decision to receive a credit counseling session. The data were obtained from 870 low-to-moderate income individuals who sought assistance in filing taxes from a city-coordinated volunteer program. All participants completed a standard incentivized matching-based task to determine their individual discount factor (IDF), which was used as a measure of financial patience.³⁴ Participants were asked to make multiple choices between a smaller reward paid sooner and a larger reward dispensed at some later time. Time periods varied from immediate to six months. The larger reward was always \$50, whereas the smaller reward varied from \$49 to \$14. As an incentive, 10 percent of participants were randomly selected to receive a payoff delivered in accordance with one of their choices. They were also offered a short (15 minute) credit counseling session that they could receive while waiting for tax assistance, but only about 55 percent of the participants took advantage of the offer.

The major finding from Meier and Sprenger³⁵ is that the participants who chose to receive the credit counseling session exhibited significantly higher patience on the matching-based task (IDF = 0.85) than did those who elected not to receive the session (IDF = 0.78).³⁶ The credit counseling occurred after the determination of IDF and consequently had no effect on patience. The implication for us is that, if financial advising is voluntary, the more impatient enrollees will tend to opt out of the instruction and deny themselves advice about the long-term effects of their choices. Thus, we recommend that

³² Bertrand and Morse, "Information Disclosure."

³³ Stephan Meier and Charles D. Sprenger, "Discounting Financial Literacy: Time Preferences and Participation in Financial Education Programs," *Journal of Economic Behavior & Organization* 95 (November 2013): 159–74, doi: 10.1016/j.jebo.2012.02.024.

³⁴ $IDF = \left(\frac{X^*}{Y}\right)^{\frac{1}{t}}$, where t equals time in months, Y is the larger payment, and X^* is the point where the individual switches from choosing the smaller, sooner payment to the larger, later payment. The IDF was used instead of individual discount rate (IDR), which is considered a measure of impatience. The relationship between the measures is $IDF = 1/(1 + IDR)$.

³⁵ Meier and Sprenger, "Discounting Financial Literacy."

³⁶ The corresponding IDRs for those electing to receive or not receive the credit counseling session were 18 and 28 percent, respectively.

all Service members eligible for lump-sum payments work through the retirement wizard to ensure that they are aware of the short- and long-term implications of every option.

2. Tailoring Advice

The previously described studies provided standardized advice or disclosure information to all individuals. Loewenstein, Sunstein, and Golman³⁷ repeat a point that has been made several times in this paper—they mention that a “seemingly promising strategy for improving the impact of information is to tailor it to the individual receiving it.” In that regard, there is a growing body of evidence showing that providing information tailored to subgroups within a population leads to better choices in varied decision-making domains. The following are four examples in different areas.

a. Consumer Choice

Through Time-Sharing Experiments for the Social Sciences (TESS), a program funded by the National Science Foundation, Davis and Metcalf³⁸ asked respondents to make hypothetical purchase decisions concerning room air conditioners based on price and annual energy cost. Participants were randomly assigned either to a condition where they received information on electricity costs and air conditioner usage in the participants’ state of residence or to one where costs were based on national averages. Results indicated that participants in the tailored information condition made better choices (i.e., more energy efficient) among air conditioners relative to their location.

b. College Application

Hoxby and Turner³⁹ randomly assigned high-achieving but low-income students to the Expanding College Opportunities (ECO) Project, which provides “semi-customized” information on college opportunities. By “semi-customized,” the authors meant that the information interventions were based on a standard frame, but filled in with information that was likely to be relevant to the individual, such as information on colleges that are local, colleges at which applicants are eligible for in-state rates, and financial aid for which

³⁷ George Loewenstein, Cass R. Sunstein, and Russell Golman, “Disclosure: Psychology Changes Everything,” *Annual Review of Economics* 6 (August 2014): 409. doi: 10.1146/annurev-economics-080213-041341.

³⁸ Lucas W. Davis and Gilbert E. Metcalf, “Does Better Information Lead to Better Choices? Evidence from Energy-Efficiency Labels,” NBER Working Paper No. 20720 (Cambridge, MA: NBER, November 2014), <http://www.nber.org/papers/w20720>.

³⁹ Caroline M. Hoxby and Sarah Turner, “Expanding College Opportunities for High-Achieving, Low-Income Students,” SIEPR Discussion Paper No. 12-014 (Stanford, CA: Stanford Institute for Economic Policy Research, Stanford University, March 2013), <http://siepr.stanford.edu/research/publications/expanding-college-opportunities-high-achieving-low-income-students>.

they would likely qualify. Compared to high-achieving but low-income students who did not receive this information, the targeted students applied to and enrolled in colleges with higher graduation rates, greater instructional resources, and curriculum more geared toward better prepared students.

c. Health-Related Choice

There is also a growing body of evidence that tailoring health information to individual needs leads to improved health-related choices. In particular, Lustria et al.'s⁴⁰ meta-analysis revealed that web-based, tailored interventions led to greater improvement in both short- and long-term health outcomes compared to control conditions in which websites provide more general (i.e., non-tailored) health information.

These and other studies indicate that tailoring information to the individual decision maker can lead to better quality decisions. The implication for the proposed wizard is that its outputs must be framed and tailored to the retiree's individual situation. This situation includes the retiree's current and future economic conditions, his/her financial goals, and tax liabilities. For instance, if the enrollee indicated that he/she intended to take the lump sum, information on the expected rate of return on investments would help the individual determine whether to save or to consume the money.

d. Credit Card Disclosure Information

Disclosure information provided in typical consumer credit card statements is both simplified yet tailored to the individual borrower's data. This information is intended to help consumers make better choices regarding the amount of repayment. An implicit assumption in this line of research is that "better choices" means behaving more patiently or paying off interest more quickly. Unfortunately, research indicates the effects of this information are subtle and sometimes counter-intuitive, in that providing seemingly helpful information can result in behavior that is economically harmful to the borrower. For instance, in addition to providing the outstanding balance, lenders typically provide a minimum payment to prevent borrowers from defaulting on their loans. This payment is typically a small percentage (2–3 percent) of the borrower's current balance. Although the intent of the minimum payment disclosure is to encourage reliable loan payments, research indicates that disclosing a minimum payment actually lowers the percent of borrowers who pay their balance in full and reduces the average payment.⁴¹ Researchers suggest that the

⁴⁰ Mia Liza A. Lustria et al., "A Meta-Analysis of Web-Delivered Tailored Health Change Interventions," *Journal of Health Communications* 18, no. 9 (June 2013): 1039–69. doi: 10.1080/10810730.2013.768727.

⁴¹ Daniel Navarro-Martinez et al., "Minimum Required Payment and Supplemental Information Disclosure Effects on Consumer Debt Repayment Decisions," *Journal of Marketing Research* 48, no.

minimum payment acts as an anchor that borrowers use to determine the amount of their payment.

It can be easily demonstrated that repeatedly paying the minimum amount due is an undesirable decision strategy because it dramatically lengthens the time required to pay off the balance and inflates the total interest costs. Some proponents of information disclosure maintain that such poor economic behavior can be corrected if the consumer is provided actual data on the outcomes of such decisions. In Experiment 1b, Navarro-Martinez et al.⁴² tested this notion by asking samples of adult US consumers to participate in a web-based experiment where they make a repayment decision based on hypothetical credit card statements that provided different levels of information, including the time to pay off the balance and the total future interest. Results from this experiment showed that including the minimum payment due negatively affected the proposed payment, replicating the results of Experiment 1a. Including time to pay off or future interest or both pieces of information did not mitigate the negative effect of presenting the minimum payment. Evidently, the minimum payment amount provides a powerful choice cue that is not easily overcome by revealing the decision's potentially negative consequences.

One of the provisions of the Credit Card Accountability and Responsibility Disclosure (CARD) Act of 2009 is that statements must disclose the time to pay off the loan and its total cost, assuming the consumer remits only minimum payments. The CARD Act also requires that statements include a second scenario: the monthly amount required to pay off the balance in three years along with the total cost of the loan, including interest. In addition, the arithmetic difference in total costs between the two scenarios (minimum payment vs. three-year) is displayed to illustrate the potential "savings" (or costs avoided) that could be realized by paying the larger amount. Figure 2 provides an example of a credit card statement that displays these two payback scenarios.

SPL (November 2011): S60–S77, doi: 10.1509/jmkr.48.SPL.S60; and Neil Stewart, "The Cost of Anchoring on Credit-Card Minimum Repayments," *Psychological Science* 20, No. 1 (January 2009): 39–41, doi: 10.1111/j.1467-9280.2008.02255.x.

⁴² Navarro-Martinez et al., "Minimum Required Payment and Supplemental Information Disclosure Effects," Experiment 1b.

ACCOUNT SUMMARY		PAYMENT INFORMATION											
Account Number:	[REDACTED]	New Balance	\$2,061.62										
Previous Balance	\$753.52	Payment Due Date	07/12/12										
Payment, Credits	-\$753.52	Minimum Payment Due	\$25.00										
Purchases	+\$2,053.55	Late Payment Warning: If we do not receive your minimum payment by the date listed above, you may have to pay a late fee of up to \$35.00 and your APR's will be subject to increase to a maximum Penalty APR of 29.99%.											
Cash Advances	\$0.00	Minimum Payment Warning: If you make only the minimum payment each period, you will pay more in interest and it will take you longer to pay off your balance. For example:											
Balance Transfers	\$0.00	<table border="1"> <thead> <tr> <th>If you make no additional charges using this card and each month you pay...</th> <th>You will pay off the balance shown on this statement in about...</th> <th>And you will end up paying an estimated total of...</th> </tr> </thead> <tbody> <tr> <td>Only the minimum payment</td> <td>11 years</td> <td>\$3,723</td> </tr> <tr> <td>\$71</td> <td>3 years</td> <td>\$2,548 (Savings=\$1,175)</td> </tr> </tbody> </table>			If you make no additional charges using this card and each month you pay...	You will pay off the balance shown on this statement in about...	And you will end up paying an estimated total of...	Only the minimum payment	11 years	\$3,723	\$71	3 years	\$2,548 (Savings=\$1,175)
If you make no additional charges using this card and each month you pay...	You will pay off the balance shown on this statement in about...				And you will end up paying an estimated total of...								
Only the minimum payment	11 years	\$3,723											
\$71	3 years	\$2,548 (Savings=\$1,175)											
Fees Charged	+\$8.07												
Interest Charged	\$0.00												
New Balance	\$2,061.62												
Opening/Closing Date	05/16/12 - 06/15/12												
Credit Access Line	\$20,000												
Available Credit	\$17,938												
Cash Access Line	\$4,000												
Available for Cash	\$4,000												

Source: Hal E. Hershfield and Neal J. Roese, "Dual payoff scenario warnings on credit card statements elicit suboptimal payoff decisions," *Journal of Consumer Psychology* 25, no. 1 (2015): 15–27.

Figure 2. Example of a Credit Card Statement with Two Payoff Scenarios

Does the inclusion of a second scenario help mitigate the negative effect of disclosing the minimum payment? The answer to this question is highly qualified. Most research studies in this area are randomized design experiments with consumers asked to make payment decisions based on hypothetical credit card statements. Salisbury showed that including a second scenario increases the likelihood of paying the alternate (i.e., three-year) payment amount, but does not increase the probability of paying off the balance in full or increase the size of the average payment.⁴³ Furthermore, Salisbury's findings suggest that providing the payment to repay the full loan in three years may actually reduce the payments for those who would have normally repaid an amount larger than the three-year scenario payment. Hershfield and Roese demonstrated that survey participants who are provided a second three-year payoff scenario make lower average payments and are less likely to pay their balance in full compared to those who are shown a single minimum payment scenario.⁴⁴ Hershfield and Roese theorize that this effect is due to borrowers inferring that the three-year payment is the appropriate payment amount. Then more

⁴³ Linda Court Salisbury, "Minimum Payment Warnings and Information Disclosure Effects on Consumer Debt Repayment Decisions," *Journal of Public Policy & Marketing* 33, no. 1 (Spring 2014): 49–64, doi: 10.1509/jppm.11.116.

⁴⁴ Hal E. Hershfield and Neal J. Roese, "Dual payoff scenario warnings on credit card statements elicit suboptimal payoff decisions," *Journal of Consumer Psychology* 25, no. 1 (January 2015): 15–27, doi: 10.1016/j.jcps.2014.06.005.

recently, McHugh and Ranyard⁴⁵ tested a slightly higher payment amount for the second scenario in Experiment 1: the amount required to pay off the loan in two years. The results essentially replicate those of Hershfield and Roese: presenting a second scenario lowers the average payment amount. In Experiment 2, the second scenario amount was increased to that required to pay off the loan in nine months (essentially 12 percent of balance). In that case, providing a second scenario raises the average payment by reducing the percent of participants paying the minimum amount and increasing the percent paying the higher alternative or above. On the basis of their findings, McHugh and Ranyard concluded that a second scenario has a positive effect only if it suggests an amount that is above what the borrowers would have otherwise paid.

The research on credit card disclosure suggests that providing more information to decision makers does not necessarily make them more patient in their economic choices. More information increases the possibility that decision makers focus on irrelevant aspects of the problem or misinterpret the intended meaning of an information display. For instance, the secondary scenarios were intended as examples of the general principle that increasing the amount of repayment decreases time to pay off loans and lowers total costs. Results suggest that consumers do not view the payments in the secondary scenarios as examples; rather, they interpret these as “appropriate” payment values that are suggested by the lending organization.

The implication for the retirement wizard is that simply presenting information on long-term consequences of the retirement decision does not guarantee an eligible enrollee will choose the option that maximizes their personal benefit based on finances alone. The information may in fact inadvertently bias the enrollee toward a perceived “correct” or “desired” choice. In practice, the cues that control such perceptions are often very subtle and have unintended effects that are difficult to predict a priori. On the other hand, such biasing cues can be discovered through systematic beta tests of the wizard prior to implementation. In addition to revealing the direction of response bias, beta tests can provide an estimate of individual differences in responding.

E. Implications from the Literature Review

We conclude by summarizing the results of this literature review. These results are described in terms of their implications for the design and development of the proposed wizard. Based on these implications, Appendix A provides examples of specific features that could be incorporated into the wizard.

⁴⁵ Sandie McHugh and Rob Ranyard, “Consumers’ credit card repayment decisions: The role of higher anchors and future repayment concern,” *Journal of Economic Psychology* 52 (February 2016): 102–14, doi: 10.1016/j.joep.2015.12.003.

1. *Very few Service members will have the financial literacy skills to make well-informed decisions.* The research indicates that there is widespread financial illiteracy across populations. There is also evidence to suggest that this illiteracy negatively affects retirement planning.

2. *General economic training is not effective for improving the financial literacy skills related to the lump-sum decision.* Research shows that general economic training and education have negligible effects on financial behavior. Furthermore, these small effects are further degraded if there is a significant delay between the training intervention and decisions regarding the lump-sum option.

3. *A more effective approach is to employ a decision aiding tool that delivers relevant information when Service members make their choices.* In order for enrollees to make a decision that is consistent with their values and goals, research indicates that decision aids should frame the problem in a comprehensible manner and provide information that is relevant to their choice. Related findings also suggest that effectiveness of information interventions decays over time, arguing that the decision support should be provided at the time of the required choice if at all possible.

4. *Effects of framing simple choices based on one or two factors are predictable.* Research indicates that choice behavior is very predictable for a problem framed by focusing on one or two decision factors, such as subjective utility (perceived gains vs. losses) and attitude toward uncertainty (risk-taking vs. risk-averse).

5. *Effects of combining frames based on multiple factors are not predictable.* Research indicates that the effects of more complex frames are inconsistent in size and direction of impact. The implication is that complex decisions should be broken down into smaller, simpler decisions that build to the more complex decision.

6. *Default choices have powerful effects on decisions.* Considerable research has revealed strong tendency to take the passive no-response option (default) versus options that require an active response.

7. *Simple information displays can support complex decisions.* Simple displays can be devised that make people aware of the short- and long-term implications of their financial decisions. There is emerging research that these simple displays help people make informed choices that serve their best interests.

8. *The decision aid should be built into the system by which people register their selections.* When given the option to receive or not receive financial advice, research indicates that those who opt out are less patient—that is, they are more likely to choose a smaller but immediate lump-sum payment over a larger but delayed total annuity. The implication for us is that, if financial advising is voluntary, the less patient individuals may deny themselves advice about the long-term effects of their choices. Thus, all eligible

enrollees must work through the proposed wizard as a requirement for choosing their payment option.

9. Financial advice must be tailored to the individual. Research indicates that people make decisions that are better aligned with economic self-interests when supporting information is tailored to their individual financial situations. Thus, information provided by the proposed wizard will be contingent on the enrollee's situation, such as family income and level of Department of Veterans Affairs (VA) disability benefits. Tailoring not only can present the most relevant information in the most relevant way, it avoids presenting irrelevant and distracting information.

10. The eligible enrollee's choice can be inadvertently biased toward a perceived "correct" or "desired" choice. Research indicates that when borrowers are provided credit card disclosures that display the long-term outcomes of different payment scenarios, they often choose the option that they perceive as "appropriate" rather than the one that maximizes personal benefit. Such inadvertent effects may be avoided by systematically beta testing the wizard before rollout.

Appendix A.

Design Features of Proposed Wizard

Given the large annual population of military retirees, the proposed financial decision support system is likely to take the form of computer- or web-based application or software wizard along the lines of embedded tax advisors (e.g., Turbo Tax) or retirement planners (e.g., TIAA-CREF). The proposed retirement wizard frames the enrollee's decision and supports their choice by providing tailored information and performing complex calculations.

We also envision the wizard to be embedded in the web utility that is used to enroll participants into the retirement system. In so doing, this allows the wizard to access relevant data on an individual's military employment history and accrued retirement benefits, including age and high-3 salary at retirement. The wizard will also be a mandatory part of the choice. The results from Meier and Sprenger¹ imply that if you make this support voluntary, those who most need it will opt out.

In addition to the information in the retirement system, individual enrollees will need to provide information on their situation and financial goals. We envision enrollee inputs to the wizard to include items such as the following:

- Family gross taxable income (recent or expected)
- Any health concerns
- Existing debt (amount, interest rate)
- Take lump sum in how many annual installments?²
- How much of the lump sum (\$) are you planning to spend?
- How much of the lump sum are you planning to save/invest?
- If you don't take the lump sum, what portion of the annuity would you expect to be able to save/invest?
- What kind of return do you expect to get on your savings/investment?

¹ Stephan Meier and Charles D. Sprenger, "Discounting Financial Literacy: Time Preferences and Participation in Financial Education Programs," *Journal of Economic Behavior & Organization* 95 (November 2013): 159–74. doi: 10.1016/j.jebo.2012.02.024.

² Enrollees may choose to split their lump sum into as many as four annual payments.

- 0%? (checking account, mattress)
- 1%? (savings account)
- 4%? (e.g., bond fund)
- 7%? (e.g., stock fund)
- Other? _____

The wizard will also have to carefully frame the enrollee's decision. The annuity should be the default option, if we assume that this is generally the more financially prudent response. Further, the annuity option should be described as "guaranteed lifetime income through age 67" because it is more understandable and has a more positive valence compared to "annuity." (The wizard should also indicate that the family can keep this income if the enrollee should die before age 67.) Likewise, the lump-sum option should be described as "a loan, paid back from your guaranteed income" that focuses on the negative aspects of that option. Regarding the lump-sum option, the discount rate could be described as the "interest rate on the loan," and the marginal tax penalty labeled as the "fee on the loan."

By calculating the individual annuity payments and the total and discounted benefits, the e-advisor offloads significant cognitive workload required to make an informed decision. Presenting the implications of alternative decisions makes the enrollee consciously aware of both short- and long-term implications of his/her decision, including the following:

- Present value of annuity, assuming __% interest
- Present values of lump sums, assuming stated spend/save/invest pattern
- Marginal tax penalty ("fee") for taking each lump sum
- Estimated effect of Alternative Minimum Tax
- Any other implications that retiree may not think of, e.g., Department of Veterans Affairs (VA) disability

Illustrations

Figures

Figure 1. Information Treatment Envelopes	10
Figure 2. Example of a Credit Card Statement with Two Payoff Scenarios	15

Table

Table 1. Positive and Negative Frames for Choosing Between Two Programs	4
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Abbreviations

APR	Annual Percentage Rate
BRS	Blended Retirement System
CARD	Credit Card Accountability and Responsibility Disclosure
DRIFT	Difference, Ratio, Interest, Finance, and Time
ECO	Expanding College Opportunities
IDF	Individual Discount Factor
IDR	Individual Discount Rate
IRA	Individual Retirement Account
NBER	National Bureau of Economic Research
NDAA	National Defense Authorization Act
SIEPR	Stanford Institute for Economic Policy Research
TESS	Time-Sharing Experiments for the Social Sciences
TIAA-CREF	Teachers Insurance and Annuity Association-College Retirement Equities Fund
US	United States
VA	Department of Veterans Affairs

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