EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
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MEMORANDUM TO THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: John P. Holdren
Director

SUBJECT: Implementation Guidance for Executive Order 13707: Using Behavioral Science Insights to Better Serve the American People

INTRODUCTION

On September 15, 2015, President Obama issued Executive Order 13707, "Using Behavioral Science Insights to Better Serve the American People," recognizing that "behavioral science insights can support a range of national priorities, including helping workers to find better jobs; enabling Americans to lead longer, healthier lives; improving access to educational opportunities and support for success in school; and accelerating the transition to a low-carbon economy." The Executive Order calls for the Assistant to the President for Science and Technology, on behalf of the Social and Behavioral Sciences Team (SBST), to provide agencies with advice and policy guidance to help them execute the policy objectives of the Order.

This guidance document focuses on agency implementation of Section 1(a)(i) of the Order, which encourages agencies to identify promising opportunities to apply behavioral-science insights to Federal policies and programs. It is organized around four key aspects of Federal policy where research and practice show that behavioral factors play an especially strong role in program outcomes[1]: (1) determining access to programs, (2) presenting information to the public, (3) structuring choices within programs, and (4) designing incentives.

In many cases, program changes that leverage behavioral-science insights can be done under existing authorities. In cases where changes to underlying program design are required, policymakers are encouraged to consider how such changes could be accomplished while preserving overall program objectives. Agencies are encouraged to contact SBST for advice and assistance as they work in support of this directive.

DETAILED GUIDANCE

1. Access to Programs

Pursuant to section (1)(b)(i) of Executive Order 13707, agencies are encouraged to "identify opportunities to help qualifying individuals, families, communities, and businesses access public programs and benefits by, as appropriate, streamlining processes that may otherwise limit or delay participation—for example, removing administrative hurdles, shortening wait times, and simplifying forms."

[1] Raj Chetty, "Behavioral Economics and Public Policy: A Pragmatic Perspective," *American Economic Review* 105 (2015): 1–33; Brigitte C. Madrian, "Applying Insights from Behavioral Economics to Policy Design," *Annual Review of Economics* 6 (2014): 663–688; Eldar Shafir, ed., *The Behavioral Foundations of Public Policy*, (Princeton, 2012); William J. Congdon, Jeffrey R. Kling, and Sendhil Mullainathan, *Policy and Choice: Public Finance through the Lens of Behavioral Economics*, (Brookings Institution, 2011); Richard H. Thaler and Cass R. Sunstein, *Nudge* (Yale, 2008).

The Federal Government administers a wide array of programs on behalf of the American people. Well-known examples include financial aid to assist with college attendance, social-insurance programs and tax benefits to promote retirement security, and health-insurance programs to ensure access to healthcare and financial protection for families.

Access to these programs and benefits is typically determined by defined eligibility criteria and a specified process by which individuals apply for programs, claim benefits, or maintain their participation. Behavioral-science research shows that even small barriers imposed by program rules and procedures can have outsized impacts on program access and outcomes. As such, when agencies are determining the rules and procedures that govern access to their programs, they should consider streamlining access for eligible individuals.

1.1. Central insight: Small barriers to program access can have large impacts on participation and outcomes

Behavioral-science insights suggest that imperfect take-up in Federal programs may not necessarily reflect a lack of interest in those programs among eligible individuals. Instead, low take-up may result from barriers to program access that deter eligible people from participating.[2] Potential barriers include the length and complexity of applications and forms, the length of wait times to speak or meet with program officials, travel or time costs associated with application processes, and overly burdensome verification requirements. By negatively affecting program participation, these small barriers can prevent programs from delivering their intended social or economic benefits.[3]

Note that while a standard economic analysis suggests that the costs associated with program access—whether in time, hassle, or otherwise—can lead to efficient screening (i.e., those individuals who will benefit most from a program will find the costs associated with participation most worth paying), a behavioral perspective recognizes that this may not always be the case. In fact, those individuals who would most benefit from a program may be among those most affected by small barriers and minor costs.[4] As a result, agencies should be aware that eligible non-participants are not necessarily those individuals who value the program the least.

1.2. Key Implication: Agencies should consider streamlining access to programs

1.2.1. Consider streamlining processes for enrolling in programs, such as by simplifying forms or making use of available administrative data

Agencies should consider opportunities to simplify the process by which eligible individuals access programs and benefits. Forms can be shortened and simplified, and technology can be used to make forms accessible through a variety of channels, such as online.[5] For example, research has shown that a lengthy Free Application for Federal Student Aid (FAFSA) not only discouraged students from applying for aid, but also led some students to delay or forgo college altogether. When researchers provided families with application assistance and helped them to fill out parts of the application using information from their tax

[2] Marianne Bertrand, Sendhil Mullainathan, and Eldar Shafir, "Behavioral Economics and Marketing in Aid of Decision Making Among the Poor," *Journal of Public Policy & Marketing* 25 (2006): 8–23.
[3] Of note: on March 30, 2016, the Office of Management and Budget (OMB) launched the Core Federal Services Council, which comprises the top 30 or so Federal programs that provide services directly to the public. The Council promotes the use of customer-centric best practices and has conducted a self-assessment identifying design as a critical discipline to improve the delivery of services. See, OMB Memo M 16-08 (Establishment of the Core Federal Services Council) at: https://www.whitehouse.gov/sites/default/files/omb/memoranda/2016/m-16-08.pdf
[4] Anuj K. Shah, Sendhil Mullainathan, and Eldar Shafir, "Some Consequences of Having Too Little," *Science*, 338 (2012): 682–685.
[5] See the joint OIRA and OSTP memorandum of September 15, 2015: "Behavioral Science Insights and Federal Forms": www.whitehouse.gov/sites/default/files/omb/inforeg/memos/2015/behavioral-science-insights-and-federal-forms.pdf
as well as the OMB memorandum of August 9, 2012: "Testing and Simplifying Federal Forms": www.whitehouse.gov/sites/default/files/omb/inforeg/memos/testing-and-simplifying-federal-forms.pdf

return, it increased rates of FAFSA applications as well as college enrollment and matriculation.[6] Based in part on this research, the Department of Education (ED) has taken a series of steps to streamline the FAFSA, enabling applicants to skip questions that don't pertain to them and to automatically fill parts of the application using information from their tax return.[7]

Agencies can also use existing administrative data—such as by making eligibility determinations for one program based on data available under other programs—to streamline program access. Direct certification for low-income students into the National School Lunch Program (NSLP) based on their eligibility for the Supplemental Nutrition Assistance Program (SNAP) or Medicaid is one example.[8] Agencies can also create channels that allow individuals to draw on administrative data directly to reduce barriers to access, as in the case of financial-aid applicants populating the FAFSA with data from their income tax return.

1.2.2. Consider automatically enrolling eligible individuals

Where possible, agencies can use default program settings to encourage participation. Research has found, for example, that individuals are substantially more likely to participate in and save through retirement plans when they are automatically enrolled in those plans and their contribution rates escalate automatically.[9] Reflecting this research, the Pension Protection Act (PPA) of 2006 facilitates the practice of automatically enrolling workers into retirement-savings plans.[10]

1.2.3. Consider the impact of enrollment or application periods on program participation

For programs where access is only available at discrete points in time (e.g., health-insurance programs with annual enrollment periods, financial-aid application timelines that reflect school calendars, or benefits that are claimed as part of tax filing), agencies can help ensure that application windows and deadlines are set up to promote access. When individuals' financial resources and available time are not well-aligned with enrollment timelines, it may be more difficult for individuals to complete the administrative processes required to establish or maintain participation in a program.[11] For example, forthcoming changes by ED will allow students to apply for financial aid earlier in the school year. This change will allow students to use expected levels of financial support to inform their decisions about whether and where to apply to college, which may in turn support college access.[12]

1.2.4. Consider revisiting program-eligibility criteria in cases where the benefits to targeting efficiency may be outweighed by the costs to program access and outcomes

While program application requirements, such as questions on a form, might represent a barrier to access, they typically serve the function of collecting necessary information to determine benefit eligibility. The marginal benefit of such questions (i.e., improving targeting efficiency) should be weighed against the marginal cost (i.e., deterring access). A key implication from behavioral science is that failing to take

[6] Eric P. Bettinger, Bridget Terry Long, Philip Oreopoulos, and Lisa Sanbonmatsu, "The Role of Application Assistance and Information in College Decisions: Results from the H&R Block Fafsa Experiment," *Quarterly Journal of Economics* 127 (2012): 1205–1242.
[7] U.S. Department of Education, "Fiscal Year 2017 Budget: Summary and Background Information," (2016), p. 46.
[8] Direct certification refers to the ability of states and local education authorities to certify children as eligible for the NSLP without the need for an application by using information that those authorities have, such as whether or not a household receives Supplemental Nutrition Assistance Program benefits. For more information on direct certification in NSLP, see: "Direct Certification in the National School Lunch Program: State Implementation Progress, School Year 2012–2013," U.S. Department of Agriculture (2013), p. 2.
[9] Brigitte C. Madrian and Dennis F. Shea, "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior," *Quarterly Journal of Economics* 116 (2001): 1149–1187; Richard H. Thaler and Shlomo Benartzi, "Save More Tomorrow™: Using Behavioral Economics to Increase Employee Saving," *Journal of Political Economy* 112 (2004): S164–S187.
[10] Pension Protection Act of 2006, Public Law 109-280, U.S. Statutes at Large 120 (2006): 780–1172.
[11] Katherine Swartz and John A. Graves, "Shifting The Open Enrollment Period For ACA Marketplaces Could Increase Enrollment And Improve Plan Choices," *Health Affairs*, June 25, 2014.
[12] See a description of this change the FAFSA application timeline at: https://studentaid.ed.gov/sa/about/announcements/fafsa-changes

these costs into account can lead to eligibility criteria that are more burdensome than necessary.[13] For example, in the case of financial aid, the costs of having a complex application include deterring or delaying some students from attending college. Agencies and policymakers should consider whether underlying eligibility rules are optimal. Consider again the example of the FAFSA: research suggests that even a substantial reduction in the amount of information required of applicants would have relatively small impacts on the ability of the program to efficiently target aid to those most in need.[14]

Note, too, that small differences in eligibility criteria across programs can prevent agencies from using administrative data to cross-enroll individuals into other programs without requiring a duplicative collection of information.[15] Where possible, agencies should align eligibility criteria or adopt standard definitions of key fields, such as income or family size, across programs that are meant to serve similar or overlapping populations.

Finally, while important for program integrity, frequent or burdensome recertification requirements may impede eligible individuals' continued participation in programs. Agencies can utilize similar tools for reducing these barriers as they might for initial program applications. For example, agencies can draw on administrative data sources, simplify processes, or consider the timing of recertification periods by aligning them with those of other programs.

2. Information provision

Section (1)(b)(ii) of Executive Order 13707 encourages agencies to "improve how information is presented to consumers, borrowers, program beneficiaries, and other individuals, whether as directly conveyed by the agency, or in setting standards for the presentation of information, by considering how the content, format, timing, and medium by which information is conveyed affects comprehension and action by individuals, as appropriate."

Agencies issue informational products to the public directly, provide data and statistics through websites and other formats, and enforce labeling and disclosure standards that apply to businesses. Examples include the nutrition facts label found on packaged foods, the mortgage disclosures presented to borrowers at settlement, the Energy Star label on consumer appliances, and the College Scorecard.[16] Well-presented information makes it easier for consumers to satisfy their preferences and make informed choices, in addition to supporting the efficient functioning of markets.

As such, it is important that agencies consider not just the accuracy and completeness of the information they provide to the public, but also how individuals are likely to understand and respond to that information.

2.1. Central insight: How individuals understand and respond to information depends on its presentation

Behavioral science research demonstrates that how people understand and act on information depends not only on the quality and completeness of that information, but also on the manner in which it is presented. The complexity of information, the units and scale with which numerical information is presented,

[13] Henrik Jacobsen Kleven and Wojciech Kopczuk, "Transfer Program Complexity and the Take-Up of Social Benefits," *American Economic Journal: Economic Policy* 3 (2011): 54–90.
[14] Susan M. Dynarski and Judith E. Scott-Clayton, "College Grants on a Postcard: A Proposal for Simple and Predictable Federal Student Aid," Hamilton Project Discussion Paper 2007-01 (Brookings, 2007); Kim S. Rueben, Sarah Gault, Sandy Baum, "Simplifying Federal Student Aid: How Do the Plans Stack Up?," (Urban Institute, November 2015).
[15] Stan Dorn, "Integrating Health and Human Services Programs and Reaching Eligible Individuals under the Affordable Care Act: Final Report," Report Prepared for the Department of Health and Human Services, (Urban Institute, February 2015).
[16] The College Scorecard can be viewed at: https://collegescorecard.ed.gov/

whether information is framed as a loss or gain, how probabilities are communicated, and other elements of the presentation all strongly contribute to how individuals interpret and respond to information.[17]

2.2. Key implication: Agencies should present information in a manner that is meaningful to the intended audience and that effectively promotes the intended use of that information

2.2.1.Consider the salience of the information provided

The salience of information—how readily it commands attention—can affect how individuals interpret and act on the content. Simplified notices that make program benefits salient have helped qualifying individuals claim the Earned Income Tax Credit.[18] Agencies should also consider the location and timing of where and when information will be encountered by decision-makers, in relation to the location and timing of the decision or action that information is intended to inform. For example, information intended to help consumers make purchasing decisions may be more effective when it is presented at the time of purchase, as with nutrition labeling.[19] Finally, agencies should consider the overall amount, density, and mix of information being presented, along with its format, specificity, and content.

2.2.2. Consider the framing of the information provided

Agencies are encouraged to consider how alternative ways of presenting the same information can affect how individuals understand and act on it. When presenting numerical or probabilistic information, for example, research shows that two mathematically equivalent expressions can lead to different levels of understanding and different actions. In one study, the presentation of automotive fuel efficiency in gallons per mile, rather than miles per gallon, led individuals to form more accurate judgments about the relative benefits of alternative automotive purchases.[20] Based in part on this research, the sticker required by the Environmental Protection Agency to display fuel efficiency on new cars, which traditionally described fuel efficiency in terms of miles per gallon, now also presents the same information in gallons per mile.[21]

Where information is provided to foster comparisons, agencies should carefully consider the use of units, scales, and reference points. For example, presenting interest rates as an annual percentage rate rather than a biweekly fee has been shown to decrease the use of high-cost payday loans.[22] Agencies can also use personalized information and illustrative examples to more effectively communicate information. For example, the Card Accountability Responsibility and Disclosure Act requires that credit card statements indicate the interest savings from paying off full balances in 36 months rather than simply making the minimum required payment.[23]

3. Choices within programs

Section (1)(b)(iii) of Executive Order 13707 encourages agencies to "identify programs that offer choices and carefully consider how the presentation and structure of those choices, including the order, number,

[17] Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica* 47 (1979): 263–291; Marianne Bertrand, Dean Karlan, Sendhil Mullainathan, Eldar Shafir, and Jonathan Zinman, "What's Advertising Content Worth? Evidence from a Consumer Credit Marketing Field Experiment," *Quarterly Journal of Economics* 125 (2010): 263–305.
[18] Saurabh Bhargava and Dayanand Manoli, "Psychological Frictions and the Incomplete Take-Up of Social Benefits: Evidence from an IRS Field Experiment," *American Economic Review* 105 (2015): 3489–3529; Dayanand S. Manoli and Nicholas Turner, "Nudges and Learning: Evidence from Informational Interventions for Low-Income Taxpayers," (NBER Working Paper No. 20718, November 2014).
[19] Jessica Wisdom, Julie S Downs, and George Loewenstein, "Promoting Healthy Choices: Information versus Convenience," *American Economic Journal: Applied Economics* 2 (2010): 164–178.
[20] Richard P Larrick and Jack B. Soll, "The MPG Illusion," *Science* 320 (2008): 1593–1594.
[21] Cass R. Sunstein, *Simpler: The Future of Government*, (New York: Simon & Schuster, 2013).
[22] Marianne Bertrand and Adair Morse, "Information Disclosure, Cognitive Biases, and Payday Borrowing," *The Journal of Finance* 66 (2011): 1865–1893.
[23] Sumit Agarwal, Souphala Chomsisengphet, Neale Mahoney, and Johannes Stroebel, "Regulating Consumer Financial Products: Evidence from Credit Cards," *Quarterly Journal of Economics* 130 (2015): 111–164.

and arrangement of options, can most effectively promote public welfare, as appropriate, giving particular consideration to the selection and setting of default options."

Many Federal policies and programs offer individuals choices. Sometimes these are choices from an explicit menu of options—for example, health-insurance plans offered by private insurers, or student-loan repayment plans. In other instances, choices are implicit in the design of the program—for example, in the retirement portion of Social Security where eligible individuals may elect to claim benefits across a range of ages.

When agencies offer choices within programs, they should consider ways to simplify the presentation and structure of different options and to assist individuals with making decisions.

3.1. Central insight: Complex or difficult choices in programs can lead individuals to choose inconsistently

Behavioral-science evidence shows that how people choose among options within a program can be sensitive to even minor features of the context in which a decision is made; that is, people are materially influenced by factors such as the complexity of the choice or the number of available options.[24] Research demonstrates that individuals can have difficulty choosing, and choosing consistently, when choices involve numerous alternatives, vary along multiple or complex dimensions, involve assessments of probability or risk, or have a substantial time dimension (i.e., choices made now that have consequences long into the future).

Importantly, the structure of program alternatives has consequences not just for the welfare of the individuals facing the choice, but also for market outcomes more broadly. For example, in Federal health-insurance programs where individual buyers select plans offered by private insurers, the efficiency of the overall marketplace depends, in part, on individual choices (to which insurers will dynamically respond). Similarly, patterns of choice can also limit the efficacy of the marketplace. For example, health insurance markets can suffer from what is known as adverse selection—individuals in relatively poor health choose more generous coverage, but their greater expected health-care expenditures can negatively affect plan pricing and availability. That said, behavioral factors, such as individuals' tendencies to stick with plan choices over time, regardless of their health status, may mediate such effects.[25]

3.2. Key implication: Agencies should improve how choices are offered in programs

3.2.1. Where complex choices are presented in programs, consider efforts to assist individuals with making those choices

Behavioral insights suggest that how individuals choose among Federal program options can be sensitive to how those options are presented to individuals. Research shows that people's choices in a particular context may not always reflect individual preferences, but instead reflect their difficulty choosing the option that best fits their needs. Simplifying the presentation of choices or assisting individuals with making choices might benefit individuals and support program objectives.

Agencies can assist individuals with making choices by better communicating and presenting information about options and consequences. For example, it has been shown that individuals are more likely to

[24] Eric J. Johnson, Suzanne B. Shu, Benedict G. C. Dellaert, Craig Fox, Daniel G. Goldstein, Gerald Häubl, Richard P. Larrick, et al., "Beyond Nudges: Tools of a Choice Architecture," *Marketing Letters* 23 (2012): 487–504.
[25] Benjamin R. Handel, "Adverse Selection and Inertia in Health Insurance Markets: When Nudging Hurts," *American Economic Review* 103 (2013): 2643–2682.

choose the first item from a list or the first option they consider.[26] Therefore, agencies should consider carefully the order in which options are presented on forms, on websites, or in other materials.

To facilitate easier choices, options can be grouped into meaningful categories as seen in the metallic tiers used to organize plans in the Health Insurance Marketplace (bronze, silver, gold, and platinum), which correspond to their generosity of coverage.[27] Personalizing information can also help support individual choices. For example, in one study, offering beneficiaries personalized information about costs among Medicare Part D prescription drug plans led recipients to choose lower-cost plans.[28]

Agencies should also consider developing or promoting the use of decision-support tools, sometimes known as choice engines, to help individuals make decisions when program choices are complex.[29] These could include adaptive tools that help individuals to narrow, sort, or personalize options based on their circumstances or preferences. For example, the Medicare Plan Finder allows beneficiaries to project their costs under multiple Medicare Part D prescription drug plan options based on information they enter regarding their geographic location and the prescription drugs they are currently taking. Decision tools can also leverage existing program administrative data to provide more personalized, automated recommendations to individuals. Finally, agencies can support the creation of such tools not only by building them directly, but by encouraging private-sector innovation. Disclosing information in machine readable formats can enable use of third-party tools or choice engines developed by the private sector.[30]

3.2.2. Review opportunities to use default settings or require active choices to assist individuals

Agencies should review how default choices are set within programs. Behavioral science suggests that individuals tend to stick with default settings, as demonstrated by their effectiveness in retirement savings plans.[31] Importantly, setting defaults can reduce choice complexity without reducing the total number of options available to individuals, thereby assisting individuals and advancing program goals.

In some circumstances, no single default setting is appropriate or suitable for every individual covered by a program. In such cases, defaults can sometimes be personalized to individual circumstances and characteristics.[32] For example, in health-insurance programs, individuals can be presented with defaults tailored to their personal or family circumstances based on program data or data they have entered.[33] Default settings can also have dynamic features, such as when individuals are automatically enrolled into retirement savings plans with contribution rates that automatically escalate over time.

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[26] Joanne M. Miller and Jon A. Krosnick, "The Impact of Candidate Name Order on Election Outcomes," *Public Opinion Quarterly* 62 (1998): 291–330. As a corollary to this point, in situations where agencies offer many options and there is truly no evidence that one option or another is more appropriate for an individual or business, agencies should consider randomizing the order in which options are presented.

[27] See: https://www.healthcare.gov/choose-a-plan/plans-categories/; Peter A. Ubel, David A. Comerford, and Eric Johnson, "Healthcare.gov 3.0 — Behavioral Economics and Insurance Exchanges," *New England Journal of Medicine* 372 (2015): 695–698.

[28] Jeffrey R. Kling, Sendhil Mullainathan, Eldar Shafir, Lee Vermeulen, and Marian Wrobel, "Comparison Friction: Experimental Evidence from Medicare Drug Plans," *Quarterly Journal of Economics* 127 (2012): 199–235.

[29] See Richard H. Thaler and Will Tucker, "Smarter Information, Smarter Consumers," *Harvard Business Review* (January-February 2013).

[30] See Executive Order 13642 of May 9, 2013, "Making Open and Machine Readable the New Default for Government Information," and "Smart Disclosure and Consumer Decision Making: Report of the Task Force on Smart Disclosure," National Science and Technology Council (2013).

[31] Richard H. Thaler, Cass R. Sunstein, and John P. Balz, "Choice Architecture," in Eldar Shafir, ed., *The Behavioral Foundations of Public Policy*, (Princeton, 2012).

[32] Craig N. Smith, Daniel G. Goldstein, and Eric J. Johnson, "Smart Defaults: From Hidden Persuaders to Adaptive Helpers," INSEAD Business School Research Paper No. 2009/03/ISIC (2013); Yuting Zhang, Chao Zhou, and Seo Hyun Baik, "A Simple Change To The Medicare Part D Low-Income Subsidy Program Could Save $5 Billion," *Health Affairs* 33 (2014): 940–945.

[33] Benjamin R. Handel and Jonathan T. Kolstad, "Health Insurance for 'Humans': Information Frictions, Plan Choice, and Consumer Welfare," *American Economic Review* 105 (2015): 2449–2500; Saurabh Bhargava, George Loewenstein, Justin Sydnor, "Do Individuals Make Sensible Health Insurance Decisions? Evidence from a Menu with Dominated Options," (NBER Working Paper No. 21160, 2015); Eric J. Johnson, Ran Hassin, Tom Baker, Allison T. Bajger, and Galen Treuer, "Can Consumers Make Affordable Care Affordable? The Value of Choice Architecture," *PLoS ONE* 8 (2013): e81521.

In circumstances where defaults are not desirable or feasible, agencies should consider presenting individuals with active choices—that is, requiring or prompting individuals to make a choice in the absence of a default.[34] For example, asking workers to make an active choice about their participation in retirement savings plans has been shown to boost participation rates.[35]

Additional considerations may depend on the frequency with which choices are made. Special attention should be given to decisions individuals will make infrequently, especially those that are difficult to later change. Infrequent or irreversible choices provide few opportunities for individuals to learn from or revisit their decisions, increasing the stakes and justifying particularly careful attention to default settings. Where individuals are asked to make choices on a recurring basis, as with annual health-insurance open enrollment periods, program designers should be aware that individuals tend to stick with their earlier choices.[36]

Finally, it should be noted that defaults are not simply a useful tool for supporting good choices from among an existing set of options. Defaults can also be a powerful tool for introducing new program features, while preserving old ones. Program and policy reforms sometimes replace existing options. With defaults, agencies have the additional options of either introducing the new features as the default and leaving the older features as an available option, or retaining the old program features as the default and introducing new features as available options.

3.2.3. Where programs offer many options, or options that differ in many ways, consider efforts to reduce the number and dimensionality of choices

It should not be assumed that adding large numbers of program options, or allowing choices to vary along many dimensions, will necessarily lead to better outcomes for individuals. Presenting individuals with a large number of complex options can make optimal choosing difficult for individuals, and under some circumstances may lead individuals to avoid making a choice altogether.[37]

As a result, the underlying structure of program choices may benefit from simplification. Agencies should consider ways to standardize offerings or otherwise limit the dimensions along which options differ. This is true when distinctions are not necessary to fulfill core policy goals, or when the costs associated with presenting individuals with additional program features or a wider array of choices outweigh the benefits.[38] For example, while student-loan borrowers now have the option to choose from among at least four different, but similar, income-driven repayment plans (in addition to their standard repayment plan), a proposed reform would be to reduce this set to a single income-driven repayment option in order to simplify the choice.[39]

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[34] Punam Anand Keller, Bari Harlam, George Loewenstein, and Kevin G. Volpp, "Enhanced Active Choice: A new Method to Motivate Behavior Change," *Journal of Consumer Psychology* 21 (2011): 376–383.
[35] Gabriel D. Carroll, James J. Choi, David Laibson, Brigitte Madrian, and Andrew Metrick, "Optimal Defaults and Active Decisions," *Quarterly Journal of Economics* 124 (2009): 1639–1676;
[36] William Samuelson and Richard Zeckhauser, "Status Quo Bias in Decision Making," *Journal of Risk and Uncertainty* 1(1988): 7–59.
[37] Sheena Iyengar, Gal Huberman, and Wei Jiang, "How Much Choice Is Too Much? Contributions to 401(k) Retirement Plans," in *Pension Design and Structure: New Lessons from Behavioral Finance*, Olivia Mitchell and Stephen Utkus, eds. (Oxford, UK: Oxford University Press, 2004); Sheena Iyengar and Mark Lepper, "When Choice Is Demotivating: Can One Desire Too Much of a Good Thing?" *Journal of Personality and Social Psychology* 79 (2000): 995–1006; Alexander Chernev, Ulf Böckenholt, and Joseph Goodman, "Choice Overload: A Conceptual Review and Meta-Analysis," *Journal of Consumer Psychology* 25 (2015): 333–358.
[38] Saurabh Bhargava and George Loewenstein, "Choosing a Health Insurance Plan, Complexity and Consequences," *Journal of the American Medical Association*, 314 (2015): 2505–2506; Keith M. Marzilli Ericson and Amanda Starc, "How Product Standardization Affects Choice: Evidence from the Massachusetts Health Insurance Exchange," (NBER Working Paper No. 19527, October 2013).
[39] Department of Education, "Student Aid Overview: Fiscal Year 2017 Budget Request," (2016), p. 8. Available at: http://www2.ed.gov/about/overview/budget/budget17/justifications/n-sao.pdf

3.2.4.Where programs entail implicit choices, consider efforts to assist individuals with those decisions

Not all choices within programs entail explicit selections from menus of options at discrete points in time. Instead, many highly consequential choices are made implicitly, as part of ongoing interactions within programs. For example, workers covered by Social Security can claim retirement benefits at any time after reaching age 62. The choice of when to claim is implicit in the sense that individuals never face a single moment in time during which they are asked to select a claiming age. In these cases of implicit choice, all of the challenges associated with the presentation and structure of choices noted previously still apply.[40] Carefully considering how implicit choices are designed and how options and consequences are communicated to individuals can have significant impacts on program outcomes and individual welfare.

4. Incentive design

Finally, section (1)(b)(iv) of Executive Order 13707 encourages agencies to "review elements of their policies and programs that are designed to encourage or make it easier for Americans to take specific actions, such as saving for retirement or completing education programs. In doing so, agencies shall consider how the timing, frequency, presentation, and labeling of benefits, taxes, subsidies, and other incentives can more effectively and efficiently promote those actions, as appropriate. Particular attention should be paid to opportunities to use nonfinancial incentives."

Incentives are often used by agencies to encourage or discourage certain behaviors, practices, or market outcomes. For example, the Federal Government offers incentives for businesses that purchase energy efficient vehicles and use renewable fuels, hospitals that use electronic health records, and individuals who save for retirement.

When designing incentives, agencies should account for how individuals respond to both financial and nonfinancial incentives and consider the importance of the relative salience of those incentives, their timing, and their relationship to reference points.

4.1. Central insight: How individuals respond to financial incentives depends on the framing and structure of those incentives; individuals also respond to nonfinancial incentives

A central insight from behavioral science is that individuals do not respond to incentives as neatly as predicted by standard economic theory.[41] When financial incentives are used to encourage particular behaviors or advance particular policies, the amount, presentation, and structure of those incentives can influence their effectiveness. In addition, individuals respond, sometimes strongly, to non-price or non-financial incentives.[42]

4.2. Key implication: Agencies should consider efforts to enhance the effectiveness of program incentives

4.2.1.When utilizing financial incentives, consider the salience of the incentive

[40] Jeffrey B. Liebman and Erzo F. P. Luttmer, "Would People Behave Differently If They Better Understood Social Security? Evidence from a Field Experiment," *American Economic Journal: Economic Policy* 7 (2015): 275–299; Jeffrey R. Brown, Arie Kapteyn, and Olivia S. Mitchell, "Framing and Claiming: How Information-Framing Affects Expected Social Security Claiming Behavior," *Journal of Risk and Insurance* 83 (2016): 139–162; Melissa A. Z. Knoll, Kirstin C. Appelt, Eric J. Johnson, & Jonathan E. Westfall, "Time to Retire: Why Americans Claim Benefits Early and How to Encourage Delay," *Behavioral Science and Policy* 53 (2015): 53–62.

[41] Emir Kamenica, "Behavioral Economics and Psychology of Incentives," *Annual Review of Economics* 4 (2012): 427–452; Uri Gneezy, Stephan Meier, and Pedro Rey-Biel, "When and Why Incentives (Don't) Work to Modify Behavior," *Journal of Economic Perspectives* 25 (2011): 191–210.

[42] Richard H. Thaler and Cass R. Sunstein, *Nudge* (Yale, 2008); Brigitte C. Madrian, "Applying Insights from Behavioral Economics to Policy Design," *Annual Review of Economics* 6 (2014): 663–688.

Standard economic theory suggests that individuals will react to a price increase by reducing their demand for an item (and conversely, react to a price decrease by increasing their demand for an item). Behavioral economics suggests that this relationship can be mediated by the degree to which prices are salient. For example, research suggests that consumers respond more strongly to changes in excise taxes, which are typically reflected in posted prices, than to changes in sales taxes, which are typically not displayed on price tags.[43]

In cases where the goal of an incentive is to encourage a particular behavior, agencies should ensure the incentive is salient to individuals. Incentives may be more salient if they are provided in isolation, rather than as part of a larger payment such as an income tax refund. Incentives may be less salient if they are embedded in otherwise complicated programs or schedules, such as the tax code.[44] Simple reminders can be an effective way to keep incentives salient.[45]

Finally, the salience of incentives can depend on the form or structure of the incentives. Research on the retirement savings contributions credit, or Saver's Credit, suggests that individuals may be more likely to respond to the incentive to save if the benefit were structured as a match to savings, rather than as a tax credit.[46]

4.2.2. Consider the timing of incentives

Immediate incentives are likely to be more effective than delayed incentives.[47] Agencies should consider factors such as whether individuals engage with incentives at the same time they take an action or only after a delay. Research finds, for example, that tax incentives for the purchase of hybrid vehicles are more effective at increasing the adoption of fuel-efficient cars when the customer receives the tax incentive at the point of purchase via a state sales tax waiver rather than as an income tax credit, which the customer receives when filing taxes, possibly months after the purchase.[48] Similarly, research shows that tax credits for households paying tuition and fees for education, which are received as part of the household's income tax refund long after an individual decides to attend school, have little impact on college attendance.[49]

[43] Raj Chetty, Adam Looney, and Kory Kroft, "Salience and Taxation: Theory and Evidence," *American Economic Review* 99 (2009): 1145–1177.
[44] Jeffrey B. Liebman and Richard J. Zeckhauser, "Schmeduling," (Harvard University Working Paper, 2004).
[45] John Guyton, Dayanand S. Manoli, Brenda Schafer, Michael Sebastiani, "Reminders & Recidivism: Evidence from Tax Filing & EITC Participation among Low-Income Nonfilers, (NBER Working Paper No. 21904, January 2016).
[46] Esther Duflo, William Gale, Jeffrey Liebman, Peter Orszag, Emmanuel Saez, "Saving Incentives for Low- and Middle-Income Families: Evidence from a Field Experiment with H&R Block," *Quarterly Journal of Economics* 121 (2006): 1311–1146; Emmanuel Saez, "Details Matter: The Impact of Presentation and Information on the Take-up of Financial Incentives for Retirement Saving," *American Economic Journal: Economic Policy* 1 (2009): 204–228.
[47] Shane Frederick, George Loewenstein and Ted O'Donoghue, "Time Discounting and Time Preference: A Critical Review," *Journal of Economic Literature*, 40 (2002): 351–401.
[48] Kelly S. Gallagher and Erich Muehlegger, "Giving Green to Get Green? Incentives and Consumer Adoption of Hybrid Vehicle Technology," *Journal of Environmental Economics and Management* 61 (2011): 1–15.
[49] George B. Bulman and Caroline M. Hoxby, "The Returns to the Federal Tax Credits for Higher Education," *Tax Policy and the Economy* 29 (2015): 13–88.

4.2.3. Consider the reference points against which individuals may evaluate incentives when structuring and framing incentives

Standard economic models suggest that the only factor influencing an incentive's effectiveness is the size of the incentive—the larger the incentive, the larger its effect. Yet, behavioral science suggests that individuals evaluate incentives relative to a reference point, and even very small incentives can have a large impact on behavior. Individuals may be more likely to respond to an incentive that is framed as a loss rather than as a gain, even when the two incentives are the same monetary amount.[50] For example, a five-cent tax on disposable grocery bags led to a significant decrease in plastic-bag use; in contrast, a financially equivalent reward for reusable bag use had no effect.[51]

The impact of incentives on behavior also depends on how their levels change, if at all, relative to expectations, past payments, or other reference points. For example, behavioral economics research shows that an unemployment-insurance system that frontloads benefit amounts rather than holding them constant over time can help people to return to work more quickly.[52]

Finally, in part for these reasons, financial incentives can have unintended consequences. For example, while cost-sharing provisions in health-insurance programs are intended to serve as incentives to help curb overutilization, they can also contribute to the underutilization of valuable care.[53] In addition, when incentives are too modest they may fail to motivate the intended behavior; where disincentives are too modest they may even appear to license the behavior.[54]

4.2.4. Consider the use of nonfinancial incentives

Behavioral-science research shows that individuals respond to nonfinancial incentives; that is, there are design features of programs other than prices, taxes, or subsidies that can be implemented specifically to encourage or discourage particular behaviors. Research has now identified, and continues to refine, a toolkit of such approaches.[55] For example, in many contexts, individuals are motivated by social comparisons, such as learning about the behavior of their peers. Research finds that individuals reduce residential energy consumption when provided with information on how their consumption compares with that of their neighbors.[56] Similarly, social comparisons have been found to promote tax compliance.[57] To take another example of the impact of nonfinancial incentives, adding a signature confirmation to the top of forms (including online forms) on which individuals or businesses self-report

[50] Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica* 47 (1979): 263–291; Roland G. Fryer, Jr, Steven D. Levitt, John List, and Sally Sadoff, "Enhancing the Efficacy of Teacher Incentives through Loss Aversion: A Field Experiment," (NBER Working Paper No. 18237, 2012).
[51] Tatiana Homonoff, "Can Small Increases Have Large Effects? The Impact of Taxes versus Bonuses on Disposable Bag Use," (Princeton University Industrial Relations Section Working Paper No. 575, 2013).
[52] Stefano DellaVigna, Attila Lindner, Balázs Reizer, Johannes F. Schmieder, "Reference-Dependent Job Search: Evidence from Hungary," (NBER Working Paper No. 22257, May 2016).
[53] Katherine Baicker, Sendhil Mullainathan, and Joshua Schwartzstein, "Behavioral Hazard in Health Insurance," *Quarterly Journal of Economics* 130 (2015): 1623–1667
[54] Uri Gneezy and Aldo Rustichini, "Pay Enough or Don't Pay at All," *Quarterly Journal of Economics* 115 (2000): 791–810; Uri Gneezy and Aldo Rustichini, "A Fine Is a Price," *The Journal of Legal Studies* 29 (2000): 1–17.
[55] Brigitte C. Madrian, "Applying Insights from Behavioral Economics to Policy Design," *Annual Review of Economics* 6 (2014): 663–688.
[56] Hunt Allcott, "Social Norms and Energy Conservation," *Journal of Public Economics* 95 (2011): 1082–1095; Hunt Allcott and Todd Rogers, "The Short-Run and Long-Run Effects of Behavioral Interventions: Experimental Evidence from Energy Conservation," *American Economic Review* 104 (2014): 3003–3037; Paul J. Ferraro, Juan Jose Miranda, and Michael K. Price, "The Persistence of Treatment Effects with Norm-Based Policy Instruments: Evidence from a Randomized Environmental Policy Experiment," *American Economic Review* 101 (2011): 318–322.
[57] Michael Hallsworth, John A. List, Robert D. Metcalfe, and Ivo Vlaev, "The Behavioralist as Tax Collector: Using Natural Field Experiments to Enhance Tax Compliance," (NBER Working Paper No. 20007, 2014).

income, sales, or other data may promote greater accuracy in self-reports.[58] Planning prompts, which ask individuals to make specific plans to take an action, have been shown to effectively increase flu vaccination rates.[59]

4.2.5.Consider the relative efficiency of financial and nonfinancial incentives

Often, achieving a policy goal through the use of incentives entails paying individuals directly for engaging in a particular behavior, such as installing energy-efficient technologies in the home. When financial incentives are offered to individuals or businesses, those incentives may motivate behavior change by some of the targeted individuals. In other instances, incentives merely represent payments to individuals who would have engaged in the indicated behavior even without the incentive.

The total cost of motivating the indicated behavior, therefore, includes payments to individuals who would have engaged in the activity even without the payment. It is important to recognize this fact when designing incentives and when preparing cost-benefit analyses, and to compare the total costs to what could be achieved through the use of nonfinancial incentives. For example, research has compared alternative incentives for retirement savings, finding in one study that while tax benefits are expensive in terms of tax expenditures, they induce relatively little new retirement saving; on the other hand, automatic enrollment in those plans motivates new retirement saving at little direct cost to the government.[60]

[58] Lisa L. Shu, Nina Mazar, Francesca Gino, Dan Ariely, and Max H. Bazerman, "Signing at the Beginning Makes Ethics Salient and Decreases Dishonest Self-Reports in Comparison to Signing at the End," *Proceedings of the National Academy of Sciences* 109 (2012): 15197–15200.
[59] Katherine L. Milkman, John Beshears, James J. Choi, David Laibson, and Brigitte C. Madrian, "Using Implementation Intentions Prompts to Enhance Influenza Vaccination Rates," *Proceedings of the National Academy of Sciences*, 108 (2011):10415–10420.
[60] Raj Chetty, John N. Friedman, Søren Leth-Petersen, Torben Heien Nielsen and Tore Olsen, "Active vs. Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence from Denmark," *Quarterly Journal of Economics* 129, (2014): 1141–1219.