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TAKE-UP

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Take-Up

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Working Paper¹

Why are take-up rates incomplete or low when opportunities are unambiguously advantageous to people who are eligible for them? How can public officials promote higher take-up of opportunity? All over the world, these are challenges of the first order. There are three primary barriers to take-up: learning, compliance, and psychological costs. These costs lower the net expected benefit of opportunities, and reduce participation in otherwise advantageous programs. Fully rational agents would consider these costs in their take-up decisions, and in light of behavioral biases, such costs loom especially large and may seem prohibitive. Experimental and other evidence suggest methods for reducing the barriers to take-up and the effects of behavioral biases. Use of such methods would significantly increase access to a wide range of opportunities that would increase individual well-being and social welfare.

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I. Introduction

Why are take-up rates incomplete or low when opportunities are unambiguously advantageous to people who are eligible for them? How can leaders encourage higher take-up of opportunity? All over the world, these are challenges of the first order.

Take-up is defined as receiving a benefit for which an individual is eligible. The take-up rate is the fraction of those eligible for a benefit who participate and receive the benefit. Take-up rates vary dramatically across programs and countries. Nearly one-quarter of high-income countries have take-up rates of social benefits of 40% or below (Moffitt & Ko, 2022). Incomplete take-up rates of benefits, defined as take-up below 100%, pose a potential puzzle to economists who typically assume that “more is better.” Of course it is true that the costs of take-up might exceed the benefits, but in many cases, it is extremely difficult to show that incomplete take-up rates can be adequately justified on that ground. In any event, we need to understand the diverse costs of take-up to understand why take-up rates are often low.

This article proceeds as follows. Section II reviews what we now know about the determinants of benefit take-up from both the traditional economic theory and behavioral science perspective. We focus on welfare programs because they are well-researched and instructive about why individuals may not participate in opportunities that are likely to be “good for them.” We also extend lessons learned to take-up of opportunity broadly. Section III reviews frontier research on policy changes that affect benefit take-up, and recent experimental evidence of the effects of such changes. Section IV briefly concludes.

II. What we know

a. The economics underlying take-up decisions

The notion that “more is better” is a core property of the economic theory of consumer demand. This property, termed *nonsatiation* by economists, is the idea that for any bundle of goods there is often another bundle of goods nearby, or near enough, that provides higher utility (Mas-Colell, 1995). An economic good is defined as an item that is desired and provides utility to the consumer, whereas a “bad” provides negative value to the consumer (Varian, 2006). Our focus here is on economic goods. Economists have generally assumed that nonsatiation holds because it has been observed in practice. For example, recent research has shown that people are happier with more money compared to less, regardless of their income level (Killingsworth, 2021).² Additionally, in a market in which consumers can freely dispose of excess goods, consumers are not made worse off by having more of a good. By this reasoning, consumer theory predicts that a consumer will always choose more of a good when given the choice between more or less because it results in higher utility.

On plausible assumptions, economists who accept traditional consumer theory would expect that so long as the costs of participation are low, there would be near complete levels of participation in programs that are designed to increase individual or household well-being through the

² These findings are in contrast to other research, which has shown that experienced well-being plateaus above incomes of \$75,000 per year (Kahneman & Deaton, 2010).

provision of “free” or highly subsidized goods. Consider the take-up of welfare programs as an illustrative example. For eligible individuals, welfare programs offer more of an economic good (e.g., money, food, healthcare, etc.) to individuals or households. Accordingly, take-up rates should be near complete if consumers are utility maximizing. However, incomplete take-up rates of welfare programs are well-documented across program types and countries (Ko & Moffitt, 2022), violating the key tenant of nonsatiation.

An influential article explained this apparent violation of consumer theory, suggesting for the first time that non-participation in welfare programs by eligible individuals could be explained by stigma (Moffitt, 1983). Stigma is explained as a form of disutility that results from the decision to participate in a program and the benefit accrued from participation in the program (Hernanz et al., 2004; Moffitt, 1983). Stigma can be personal (e.g., negative self-characterizations or lack of self-respect) or social (e.g., negative characterizations by others) because of participation in welfare – a phenomenon that had been documented by sociologists at the time but largely ignored by economists (Horan & Austin, 1973).

Moffitt (1983) developed a simple utility function that contains both disposable income and participation in welfare. Agents choose their optimal labor supply and whether to apply for welfare, which is associated with a “cost” of participation – stigma. He models two types of stigmas: 1) a fixed cost, whereby individual utility is decreased if agents receive welfare; 2) a variable cost, whereby individual utility decreases as the size of the benefit increases. In the model, utility is accrued by:

$$U = U(Y + \gamma PB) - \phi P$$

where Y is income in absence of the program, B is the benefit derived from the program, P is an indicator for program participation, γ is the variable cost of participation, and ϕ is the fixed cost of participation. Using data from the 1976 wave of the Michigan Panel Study of Income Dynamics, Moffitt empirically tests the presence of both types of stigma for single female headed households that are eligible for Aid to Families with Dependent Children and estimates a take-up rate of approximately 45%. He finds that only the fixed cost of stigma (ϕ) is statistically significant, which implies that stigma affects the decision to participate in welfare, but once on welfare, the size of the benefit has no additional stigmatizing effect. Additional empirical research has found stigma to be an important reason for nonparticipation in other benefits, such as Temporary Assistance for Needy Families (TANF) and Medicaid (Stuber & Kronebusch, 2004; Stuber & Schlesinger, 2006). Contrary to the economic assumption that “income is income,” and so more is always better, this model illustrates that the source of income matters for utility. Stigma increases the cost of participating in the program, so non-participation in welfare programs can be a utility-maximizing decision for some agents or households that would participate in the absence of stigma.

In the economics literature, learning and transaction costs are viewed as equally or more important barriers to participation in social programs (J. Currie, 2004). First, learning costs refer to the time and effort required to learn about a program or service (Herd, 2018). Eligible people may choose non-participation because of a lack of information concerning eligibility, the level of

benefits, or logistics of the application process.³ In this case, individuals choose non-participation due to learning costs that result in a lack of information – not because the costs of participation are higher than the benefits. This is problematic because it raises the possibility that people are not making optimal decisions about their use of programs. Rather, a lack of information, which may or may not be costly to obtain, is preventing access to and benefit from programs that are available. Consistent with this view, in a survey of people eligible for the French minimum income benefit, 68% cited lack of information as a reason for non-participation (Dubois et al., 2015).

Second, compliance costs⁴ refer to the costs associated with applying for a program, including the time and effort incurred trying to abide by program rules and meet eligibility criteria. These types of costs may arise from detailed eligibility criteria, complicated documentation requirements, difficult and time-consuming forms, waiting time, and trips to program offices to be interviewed and tested. While these measures are introduced to enable program administrators to accurately determine eligibility (and hence to ensure program integrity), they also introduce hassle and cognitive costs (to be discussed in the next subsection) into the application process, which lowers take-up. Several empirical studies have documented the negative effect of compliance costs – notably, complexity and administrative hassle – on program take-up (Aizer, 2006; Bitler et al., 2003; J. M. Currie & Grogger, 2001; Kleven & Kopczuk, 2011).

Traditional economic theory assumes that people are rational, hold coherent, well-informed and justified beliefs, and pursue their goals efficiently based on cost-benefit analysis (CBA) (Bertrand et al., 2006). This view holds that individuals account for costs – including those associated with stigma, learning, and compliance – and optimally choose participation or non-participation in a program based on the net benefit that they would receive. Table 1 summarizes the three important costs that may deter program take-up. In the next subsection, we discuss a broader set of behavioral and psychological costs that are associated with take-up of opportunity.

³ In contrast, consider another possible scenario whereby lack of information is not problematic. In this case, eligible individuals make optimal decisions about their use of programs. If they choose non-participation, it is because the costs of participating are greater than the benefits. Lack of information would play a minor role, as individuals would learn about programs so long as the anticipated benefits of doing so seemed large enough. As a result, the individuals with the highest expected benefit from the program would participate, and non-participation would not be a concern.

⁴ In the literature, compliance costs and transaction costs appear to be used interchangeably. In this paper, we will use compliance costs for consistency.

Table 1: Three costs associated with take-up

Learning costs	Time and effort expended to learn about the program or service, ascertaining eligibility status, the nature of benefits, conditions that must be satisfied, and how to gain access
Compliance costs	Provision of information and documentation to demonstrate standing; financial costs to access services (such as fees, legal representation, travel costs); avoiding or responding to discretionary demands made by administrators
Psychological costs	Stigma arising from applying for and participating in an unpopular program; loss of autonomy that comes from intrusive administrative supervision; frustration at dealing with learning and compliance costs, unjust or unnecessary procedures; stresses that arise from uncertainty about whether a citizen can negotiate processes and compliance costs

Source: Herd (2018)

b. Behavioral science and take-up

While the CBA framework has remained central to studies on take-up, behavioral science has introduced important additions to the classical model of consumer theory. In particular, individuals make suboptimal decisions when experiencing psychological costs, which can include stigma associated with the program, stress or frustration in meeting requirements, or loss of autonomy because of supervision (Herd, 2018). To be sure, rational agents would consider these costs. The problem is that psychological and attitudinal shortcomings can result in judgments and decisions that are misguided and fallible choices (Bertrand et al., 2006). This subsection explores behavioral and psychological costs – including cognitive, motivational, and emotional limits to decision making – that can affect the take-up of welfare programs, and that extend to the take-up of opportunity broadly.

Scarcity and complexity

Cognitive biases can affect optimal decision making in several ways that are relevant to take-up decisions. An important prerequisite for take-up of any program is that eligible populations know about it and understand it. Scarcity, defined as broadly as “having less than you feel you need,” can affect the cognitive capacity or “bandwidth” of relevant populations, the psychological mechanisms that underlie people’s ability to solve problems, retain and process information, and engage in logical reasoning to make optimal decisions (Mullainathan & Shafir, 2013).⁵ It is rational, of course, to take account of limited bandwidth in deciding what to do. But when individuals are operating in circumstances of cognitive scarcity, people might “tunnel,” directing

⁵ It is important to note the distinction between scarcity and stress (Mullainathan & Shafir, 2013). Stress is a physiological and psychological response to internal or external pressures in the environment (*APA Dictionary of Psychology*, n.d.). Stress activates hormones such as cortisol or adrenaline to active a “fight or flight” response. Scarcity, on the other hand, refers to a “bandwidth” tax that lowers cognitive resources, making it more difficult to process information and make optimal decisions. While stress can result in cognitive overload and contribute to cognitive scarcity, or cognitive scarcity can result in stress, the two are distinct with different underlying mechanisms.

disproportionate attention to immediate problems and costs, while neglecting or overlooking opportunities that may have moderate-term or long-term benefits. Indeed, research on “unbanked” American households (the majority of whom live in poverty) has shown that being in situations that are unfamiliar, threatening, or stigmatizing (e.g., completing paperwork in a bank) can consume cognitive resources, leaving fewer available to process information about participation in the financial mainstream (Bertrand et al., 2006). In terms of take-up of opportunity broadly, for individuals experiencing high levels of cognitive scarcity, immediate learning and compliance costs could be exaggerated relative to seemingly distant benefits, and information relevant to decision making may become more difficult to interpret, resulting in lower-than-optimal participation.

Even in the absence of scarcity, several studies have shown that people may well misunderstand information when it is complex. For example, in the case of pricing (Liebman & Zeckhauser, 2004) and taxes (Chetty et al., 2009) people have been shown to misunderstand costs and benefits when the information is presented in a complex way, resulting in inaccurate assessments of risk. Complexity can contribute to choice overload, which occurs when the number of choices increase such that people feel overwhelmed and choose non-participation (Iyengar & Lepper, 2000). For example, Baicker et al. (2012) explore choice overload in the context of health-insurance take-up, and present evidence that people prefer fewer choices in plans and, in some cases, avoid choosing altogether when there are many options. As a consequence, complexity and choice overload may lower take-up of opportunities broadly.

Hassel and sludge

Take-up is also affected by small “hassle” factors, or “sludge,” that discourage participation by imposing additional (and often unnecessary) administrative burdens onto individuals. A rational agent will consider sludge because it imposes costs. But the costs might loom excessively large when they amplify behavioral biases, such as inertia and procrastination (Sunstein, 2021, 2022).

The relevant costs are associated with the application or approval process, and include the amount of paperwork, documentation, travel and meeting time, and other practical considerations involved in participation. While certain hassle costs may be necessary in order to verify that programs are reaching the intended population, these costs can escalate to unacceptable levels of sludge when they result in excessive frictions, including frictions that exploit behavioral biases (Akerlof, 2015; Sunstein, 2021, 2022). For example, sludge exacerbates behavioral biases such as inertia (Madrian & Shea, 2001), and procrastination (Akerlof, 1991). Although hassle costs might appear minor relative to other costs, they represent a real barrier to program take-up (Bertrand et al., 2006; Sunstein, 2021), especially when understood in terms of their compounding effects on other behavioral biases. Individuals may be inclined to put off tasks necessary for take-up if they involve hassle or sludge to the point that they never perform them.

Present bias and misperception of risks

Many of the costs associated with take-up are borne before the benefits are realized. For example, learning and compliance costs, as well as hassle costs, are all upfront costs that affect CBA about whether to participate in a program. Traditional economic models assume

exponential discounting, which is the idea that rational, well-informed agents account for the present costs in comparison to future unrealized benefits accurately, and make optimal decisions according to the CBA. As a result, an individual's relative preference for a program in the present versus in the future should be identical. However, research has shown that individual preference for well-being changes temporally and that people are *present-biased*, meaning that they put more weight on the present than on the future in decision making (O'Donoghue & Rabin, 1999a, 1999b). Relatedly, individuals may be inclined to procrastinate as present costs are more salient than future costs (Akerlof, 1991). If the costs of take-up are concentrated on the front-end and people are present-biased with a tendency for procrastination, the result may be that individuals will fail to take up opportunities even if doing so will reduce their well-being in the long run.

Present-biased decision making is one mechanism through which individual ability to accurately assess risk is eroded (Thaler & Sunstein, 2008). For example, people delay signing up for 401(k) plans because they do not accurately experience their need for the plan in the present (Madrian & Shea, 2001). Additionally, Kahneman and Tversky (1979) show that misperceptions about risk can result from overestimating events that will occur with low probability and underestimating events that will occur with high probability. Misperceptions about risk affect decisions to take up programs if people underestimate the probability that they will need the program or overestimate the probability that they will not need the program.

Psychological costs – such as feelings of anger, frustration, and humiliation – associated with low program awareness, confusion, scarcity and complexity, avoidance of hassle or sludge, and inclination toward present bias and misperception of risk discourage program take-up. It follows that reducing these barriers would encourage take-up of programs that are highly beneficial to individuals. A number of experiments have been run to understand how to address the economic costs and behavioral biases that lower take-up, and these studies and their implications for encouraging take-up of opportunity broadly are the focus of the next section.

III. Approaches to increase take-up

Barriers to take-up of opportunity can be pooled into three broad categories: learning, compliance, and psychological costs (including stigma), although there are intersections between them. Each of these categories is nuanced, and composed of diverse challenges with distinctive implications for responses to increase take-up. Table 2 (below) summarizes approaches to increase take-up based on each cost and cites related experiments.

First, learning costs can be reduced by making information readily available. In collaboration with the IRS, Bhargava and Manoli (2015) performed a large field experiment to examine the causes of low EITC take-up, and find that the way in which information is delivered affects take-up. They targeted California residents who were eligible for the EITC but did not claim the credit in the prior year (2009). All of the interventions were letters sent out in an envelope indicating a prominent message of “Important – Good News for You.” They designed four interventions:

- 1) *Simplicity intervention (control)*: for the control group, they sent out a simplified notice of an initial document about the EITC that had been sent out months earlier.

- 2) *Complexity interventions*: this intervention sent out the same information as the initial EITC notice
 - a. With standardized text.
 - b. Adds eligibility requirements to the notice to test the effect of complexity.
- 3) *Information interventions*: this intervention sent a notice about the EITC that
 - a. Presents an upper bound of the potential benefit (e.g., “you may be eligible for up to \$457”).
 - b. Presents the amount of time it could take to complete and return the eligibility worksheet to test transaction costs.
 - c. Presents that reporting incorrect information will not result in a penalty to test the importance of perceived penalty costs.
 - d. Includes an information flier with benefit information.
- 4) *Stigma intervention*: this intervention tests for
 - a. Social stigma by using a stigma-reducing headline (e.g., “usually, four out of five people claim their refund”).
 - b. Personal stigma by emphasizing that the credit was an earned consequence of hard work not a welfare transfer.

Overall, Bhargava and Manoli (2015) find that simply having a second opportunity to make a claim months after the initial notice led 0.22 of the sample to take-up. Across the sample, simplification – either through making the notice more visually appealing or shorter – increased take-up from 0.14 (control) to 0.23. Including the possible benefit amount further improved take-up from 0.23 to 0.31. Finally, attempts to lower social and personal stigma did not have a significant effect on take-up. The results show that the frequency, salience, and simplicity of information leads to significant uptake in EITC claimants.

These results suggest that it is not only important to provide information but also to be thoughtful about *how the information is presented* to increase take-up. Consistent with this view, Daponte et al. (1999) conducted a randomized experiment on Food Stamps Program participation and find that providing information to households that are eligible for food stamps causes a significant increase in participation. Dechausay et al. (2015) find that behavioral messaging – such as posts cards and text messages that had implementation prompts, loss aversion themes, and prominent deadlines – increased meeting attendance among New Yorkers eligible for an add-on credit to the EITC compared to standard messaging. Saez (2009) conducted a large field experiment in collaboration with H&R Block during the 2006 tax season and finds that both presentation of information and incentives matter for retirement saving contributions. In an experiment based in a Chinese manufacturing firm, Wanlida Group Company, Hossain & List (2012) show that framing information about incentives in terms of “losses” has a larger effect on individual and team productivity than framing information as “gains,” but both are impactful compared to standard messaging. Consistent with this, Bertrand et al. (2006) find that loss-based framing can be more effective than gain-based framing in motivating unbanked individuals to open bank accounts.

Bhargava and Manoli (2015) build upon other experiments that show how information (Chetty & Saez, 2013; Karlan et al., 2016), salience (Chetty et al., 2009; Finkelstein, 2009), and complexity affect decisions (Bhargava et al., 2015). Their paper is one of the few that attempts to parse out

the effects of traditional economic costs and psychological costs on take-up. The findings are consistent with learning costs and informational complexity as a greater barrier to participation than psychological costs such as stigma.

Second, simplifying access to participation cuts compliance costs and increases take-up. Two large-scale experiments with the goal of increasing influenza vaccination rates provide insight on this. Milkman et al. (2011) study the effects of variations in implementation prompts on influenza vaccine compliance among nearly 4,000 employees at a large Midwestern utility firm. The employees were randomly assigned to receive one of three letters about the company's on-site influenza clinic. The first letter (the control) simply informed the employee that the firm was holding a free influenza shot clinic and specified the dates and times. The second letter had the same information as the control, but also prompted the employee to make a plan for which day they would get vaccinated. The third letter added to the second by also asking for the time that the employee planned to get vaccinated. The results show that vaccination rates increased among employees as the specificity of the prompt increased. The control group had a vaccination rate of 33%, which increased by 1.5 percentage points for treatment two (not a statistically significant difference) and by 4.2 percentage points for treatment three (statistically significant and meaningful magnitude). This shows that encouraging people to make a plan to accomplish a desired outcome can increase the likelihood of success.

Relatedly, in a recent large-scale experiment that was also aimed at increasing influenza vaccination rates, Patel et al. (2022) sent out text reminders to promote vaccination appointments three days before a visit with patients primary care clinician. Nineteen different text messages (interventions) were developed, which were randomized to nearly 75,000 patients across two health systems in the Northeastern U.S. On average, they found that the text messages increased vaccination rates by 1.8 percentage points relative to the control group, which did not receive any text messages. In particular, text messages that communicated that a vaccine was "reserved for you" and resembled the type of message that patients expected to receive from their health provider performed best at increasing vaccination rates. Three out of five of the best performing messages used the phrase "reserved for you." An explanation for the success of this communication strategy is that it provided patients with a sense of ownership of their vaccine dose. This is consistent with research on the endowment effect, which shows that people take action to avoid losing something that they feel ownership of (Kahneman et al., 1991).

Third, choice architecture can reduce psychological biases and result in increased take-up (Thaler & Sunstein, 2008). As discussed, people demonstrate time inconsistency in their choices, and tend to overestimate the present compared to the future in their decision making. Nudges, designed to encourage decisions that benefit individuals in the future but not (or less so) in the present, both preserve autonomy and point people in a utility-maximizing direction. This issue is particularly salient in making optimal retirement saving decisions, whereby people have to make choices to invest in their future in the present. In an early paper, Madrian and Shea (2001) present compelling evidence on choice architecture that effectively changes employee saving behavior in a forward-looking way. They examine the effects of a 1998 switch to automatic enrollment on 401(k) saving decisions among employee at a fortune 500 U.S. healthcare and insurance company. After 1998, employees who did not "opt-out" of the 401(k) were

automatically enrolled with a 3% contribution rate. The analysis takes place in 1999, fifteen months after the switch to automatic enrollment.

The authors find that 401(k) participation is significantly higher after the company switched to automatic enrollment. Interestingly, the default contribution rate and investment allocation that the company chose for the default plan had a significant influence on the saving behavior of all 401(k) participants. The authors argue that their findings illustrate the “power of suggestions” from a source of authority to motivate decisions that are affected by behavioral biases such as time inconsistency, procrastination, and inertia in decision-making. Consistent with this finding, Chetty et al. (2014) and Choi et al. (2009) find that structuring participation in saving plans as a “passive” rather than “active” choice through automatic enrollment increases take-up substantially in Denmark and in a U.S. chemical company, respectively.

The impact of automatic enrollment has been well-documented in several other important settings. In a recent working paper, Shepard and Wagner (2023) find that when an automatic enrollment policy for subsidized health insurance for low-income adults in Massachusetts was suspended in 2010, enrollment among qualified adults fell by 33%, suggesting that small hassles can have a major impact on health insurance take-up. Another paper shows that default enrollment of parents in Washington D.C. in an education technology platform that alerts them about their child’s academic performance increases parental adoption of the platform and student academic achievement as measured by GPA and course passing (Bergman et al., 2020). Studies on organ donation programs have found that policies such as presumed consent legislation increase donation rates (Abadie & Gay, 2006; Johnson & Goldstein, 2003). Welfare take up increases with automatic enrollment, although targeting may decline as a consequence (Alatas et al., 2016).

Fourth, social networks can play a role in reducing the costs of participation and thereby increasing take-up of opportunities (Currie, 2004). Social networks can affect individual decision-making through norms and information. Three instructive papers examine the effects of social networks on take-up via these two channels. Gerber and Rogers (2009) conducted two randomized field experiments on the effect of descriptive social norms on voter turnout. The authors designed two get-out-the-vote scripts, which were delivered to voters via phone calls in the days prior to the November 2005 general election in New Jersey and the June 2006 primary election in California.

The first script was a “high-turnout” script, which was intended to influence participants perception of voter turnout as being high. The high turnout script used statements such as, “highest election turnout ever” and “we encourage you to join your fellow citizens.” The second script was a “low-turnout” script, which was intended to influence participants perception of voter turnout as being low. In the low turnout script, statements such as “millions of citizens have failed to vote in past elections” and “we encourage you to buck this trend among your fellow citizens.” In both New Jersey and California, the high turnout script increased the share of turnout intention relative to the low turnout script. Specifically, the high turnout script was over 7 percentage points more likely to lead to a response of 100% likely to vote in the upcoming election. Not surprisingly, there was heterogeneity in the effect based on the subgroup of the population. For instance, citizens who were infrequent voters were affected by the high turnout

script relative to the low turnover script, while citizens who were frequent voters were unaffected. This research suggests that people's actions (or rather, intentions in the case of this paper) are directly affected by their perception of what their social network is doing.

Relatedly, Bertrand et al. (2000) examine how social networks affect welfare take-up via information sharing. They explore whether being surrounded by people who speak the same language (i.e., their social network) increases welfare utilization more for individuals from language groups that have higher welfare utilization (relative to individuals from language groups that have low welfare utilization). Specifically, the authors use the 5% 1990 Census Public Use Micro Sample to measure the size of social networks by "contact availability." Contact availability is defined as the proportion of people in one area that belong to the same language group divided by the proportion of people in the U.S. that belong to that language group. The intuition is that as the share of people who speak one's language increases, so does the ability to gain access to information about welfare programs in one's native language from one's immediate community. They regress an indicator for welfare use – which equals one if the individual received any form of public assistance other than social security – on contact availability. The results confirm the importance of networks in welfare participation: they find highly significant and positive coefficients on the interaction between contact availability and mean welfare participation of a language group.

Finally, Duflo and Saez (2003) examine the role of information and social interactions within a network on employee decisions to enroll in a retirement plan within a large university. In their experiment, they introduce small incentives of \$20 to a randomized subset of nonfaculty employees to attend a benefits fair where they learned about the retirement plan. They find that individuals who are directly offered the incentive are more likely to enroll in the retirement plan after attending the fair. Perhaps more interesting, the authors find that employees who are not directly offered the incentive but are within the working group of the employee who was offered the incentive are just as likely to subsequently enroll in the retirement plan. This suggests that providing information to one person within a group can generate spillover effects and affect the behavior of other members of the group.

Table 2: Approaches to increase take-up

Cost	Cost-minimizing response and relevant experiments
<i>Learning</i>	<ul style="list-style-type: none"> - Make information easily accessible through advertising campaigns (Bertrand et al., 2005, 2010; Daponte et al., 1999) - Simplify information about program, eligibility requirements, nature of benefits, conditions that must be satisfied (Bertrand et al., 2006) - Send repeated reminders with accessible information on the program and clear steps regarding what needs to be done (Bhargava & Manoli, 2015; Karlan et al., 2016)
<i>Compliance</i>	<ul style="list-style-type: none"> - Reserve a spot for individuals (Milkman et al., 2011; Patel et al., 2022) - Provide information frequently and repeatedly (Hassan & Barber, 2021; Patel et al., 2022) - Optimize screening intensity (Kleven & Kopczuk, 2011) - Burden and hassle reduction (Bertrand et al., 2006; Milkman et al., 2011) - Reduce recertification requirements (J. M. Currie & Grogger, 2001) - Sludge audit application process to minimize excessive frictions that may deter individuals from applying (Sunstein, 2022)
<i>Psychological</i>	<ul style="list-style-type: none"> - Design program benefits to reduce personal and social stigma (Ratcliffe et al., 2008) - Offer fewer options (Beshears et al., 2013; Iyengar & Lepper, 2000) - Framing messages that emphasize the cost/benefit of not taking/taking action, stronger evidence for loss framing being effective (Banks et al., 1995; Hossain & List, 2012) - Use commitment devices (Rogers et al., 2014) - Intertemporal incentives such as “fresh starts” (Dai et al., 2014) - Showcase social network participation, including trusted community members (Bertrand et al., 2000; Duflo & Saez, 2003; Gerber & Rogers, 2009) - Showcase emerging trend (based on discussion in HLS4859) - Choice architecture to encourage certain decisions (Thaler & Sunstein, 2008) - Nudge “default” or automatic enrollment options to counter present bias and procrastination (Bergman et al., 2020; Madrian & Shea, 2001; Shepard & Wagner, 2023) - Paternalistic guidance when judgment leads to fallible choices (Conly, 2012)

c. Improving decision-making broadly using System 1 and System 2

To summarize the discussion thus far, we have shown how learning, compliance, and psychological costs can discourage the take-up of opportunity. Using evidence from field experiments aiming to increase take-up of a diverse array of opportunities, we have explored creative approaches to increase take-up of opportunities among eligible populations, including ease of access to information, simple presentation of information, framing, minimizing unnecessary hassle and reducing sludge in the application process, creating a sense of ownership for the desired outcome, and enlisting norms and information sharing through social networks. From these studies, it is clear that small changes in choice architecture of programs can have a large impact on the take-up of opportunity.

Most of the discussion up to this point has focused on what choice architects can do to encourage take-up. Yet, it is also instructive to consider how individual effort to move from System 1 to System 2 thinking could impact decisions to participate in a program. In terms of the initial

presentation Stanovich and West (2000) and the elaboration in Kahneman (2011), System 1 refers to reasoning based intuition; it is quick, automatic, implicit, and emotional. System 2 refers to reasoning that is slower, analytical, logical, and conscious. If an individual faces time and cost constraints, fails to notice available information, or retains a relatively small amount of information in their usable memory, they are more likely to use System 1 thinking, potentially resulting in costly errors (Milkman et al., 2009).

As a thought experiment, consider a program that successfully addresses the common costs discussed above that prevent complete take-up. Invoking findings from economics and behavioral science, the program administrators greatly reduce or eliminate learning, compliance, and psychological costs. They expect that this will result in complete take-up among eligible individuals. Yet, they find that there is still incomplete take-up. In this context, the question becomes: how might moving from System 1 to System 2 thinking affect an individual's decision to participate in a program?

Milkman et al. (2009) discuss several notable approaches to move decisions from System 1 to System 2. First, System 2 thinking relies on replacing intuition with formal analytical processes. Second, taking an outside perspective has been shown to improve decision-maker judgement. Relatedly, encouraging people to explore the perspective opposite to theirs has been shown to reduce errors in judgment. Third, moving from separate to joint decision making can move people from suboptimal System 1 decision-making to better System 2 thinking. All of these approaches have been shown to move System 1 decision making in the direction of System 2. Yet, if the root cause of System 1 decisions is scarcity and a resulting bandwidth tax on cognitive capacity, it is unclear if these approaches will significantly affect thinking (Mullainathan & Shafir, 2013). In this case, "nudges" may be leveraged as a mechanism to guide System 1 decisions to achieve better results (Thaler & Sunstein, 2003, 2008).

IV. Conclusion

In this article, our goal has been to make two contributions to the literature on individual decision-making. The first is to understand why individuals choose not to participate in programs that offer opportunities that seem unambiguously valuable for them. The second is to explore the consequences of approaches to increase take-up of these types of opportunities broadly.

We have pointed to three primary barriers that bridge the gap between the economics and behavioral science literature on take-up: learning, compliance, and psychological costs. When these costs lower the net expected benefit associated with participation, fewer individuals opt to take-up opportunity even if participation would likely be advantageous. Additionally, take-up is affected by complexity, hassles, and sludge, all of which can produce significant problems in the face of scarcity. Rational agents might well be deterred by administrative burdens, broadly understood. However, if people suffer from behavioral biases, the effects of administrative burdens can be especially severe; consider the ways that these burdens amplify present bias, procrastination, inertia, and misperception of risk. Reducing these barriers would significantly increase participation in a wide range of programs that seek to increase individual well-being and social welfare.

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