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Choosing the right Medicare prescription drug plan: The effect of age, strategy selection and choice set size

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Abstract

Objective—The Medicare Modernization Act of 2003 (better known as Medicare Part D) represents the most important change to Medicare since its inception in the mid-1960s. The large number of drug plans being offered has raised concern over the complex design of the program. The purposes of this article are to examine the effect of age and choice set size (three vs. nine drug plans) on decision processes, strategy selection, and decision quality within the Medicare Part D program.

Methods—One hundred and fifty individuals completed a MouselabWeb study, a computer based program that allowed us to trace the information acquisition process, designed to simulate the official Medicare website.

Results—The data reveal that participants identified the lowest cost plan only 46% of the time. As predicted, an increase in choice set size (3 vs. 9) was associated with 0.25 times the odds of correctly selecting the lowest cost plan, representing an average loss of \$48.71. Older participants, likewise, tended to make poorer decisions.

Conclusion—The study provides some indication that decision strategy mediates the association between age and choice quality, and provides further insight regarding how to better design a choice environment that will improve the performance of older consumers.

Keywords

Attribute/alternative processing; choice; prescription drugs; Medicare; older adults

The Medicare Modernization Act of 2003 (better known as Medicare Part D) represents the most important change to Medicare since its inception in the mid-1960s. The program offers millions of older adults the ability to purchase subsidized prescription drug coverage. One feature that has attracted much attention (Hanoch & Rice, 2006) is the large number of drug plans being offered (a median number of 48 among the states; Kaiser Family Foundation,

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2009). This large choice set, however, is only one factor rendering the Medicare Part D program one of the most complex health decision environments ever designed (Frank, 2004). As drug plans can also differ in their key features, such as which drugs are included in the formulary, premiums, and cost-sharing requirements, beneficiaries find it difficult to choose among the dozens of drug plans available.

The purposes of this article are to examine the effect of age and choice set size (three vs. nine drug plans) on decision processes, strategy selection, and decision quality by using a process-tracing method, Mouselab (Bettman, Johnson, & Payne 1990; Payne, Bettman, & Johnson, 1993). Mouselab allows us to examine the information being sought, the time spent on each piece of information – both the total amount of information and the order in which information is acquired – as well as how age and the decision environment (3 vs. 9 plans) affect the decision strategy. Using mouselab allow us to have better understanding of how consumers navigate this decision environment and what decision strategies they employ to pick a Medicare drug plan.

Age, decision making, and strategy selection

A growing body of evidence suggests that age effects are most likely to emerge on deliberative-type tasks (Hanoch, Wood & Rice, 2007), especially ones that are cognitively demanding or lack a fit between the person and the decision environment (Finucane, Mertz, Slovic, & Schmidt, 2005; Yoon, Cole, & Lee, 2009). Furthermore, aging is associated with declines in fluid abilities, speed of processing, working memory, and executive functioning (Schaie & Willis, 2002). Thus, one might wonder how age and cognitive changes affect decision-making abilities and strategy selection.

One area that has attracted much attention is older adults' medical decision-making abilities. In one study, researchers (Hibbard, Slovic, Peters, Finucane, & Tusler 2001) investigated older and younger adults' abilities to understand the health and financial information of health care plans. They found that older individuals were significantly more likely to make errors compared to younger adults. Others (Finucane et al., 2005) examined the link between age and competence by increasing the complexity of tasks concerning health, financial, and nutritional information. The results indicated that as the complexity of the task increased so did the number of errors, with older adults faring worse than their younger counterparts.

Do older and younger adults also differ in decision strategy selections and are they equally able to adjust their decision strategies to changing environmental structures? Johnson (1990, 1993) has provided evidence that when asked to select an apartment or a car older adults examined less information, reevaluated information more frequently, reviewed the information for longer time periods, and used more simplified search strategies. Others (Mata, von Helversen, & Rieskamp, 2010; Mata, Schooler, & Rieskamp, 2007) have investigated the effect of aging on the ability to select adaptive decision strategies in relation to different environmental structures. Their results show that older adults tend to use less information and take longer to process it, and they rely more often on simpler decision strategies because they lack the cognitive resources to use the more demanding ones. A meta-analysis (Mata & Nunes, 2009) evaluating age differences in predecisional information

search found that old age is associated with a moderate tendency to search for less information (Löckenhoff & Carstensen, 2007). Given the literature above, it was predicted that, all things being equal, older adults will tend to use a more simplified decision strategy—that is, attribute (vs. alternative) base processing—especially as cognitive demands increase.

Too much choice and Medicare part D

When designing the Medicare Part D program, policy makers assumed that offering older adults a wide range of drug plan choices would be beneficial. Offering more choice, however, often increases task complexity, time demand, and cognitive load (Jacoby, 1984). It can also lead to a greater sense of regret and dissatisfaction with one's decision (e.g., Iyengar & Lepper, 2000; Schwartz, 2004; Schwartz et al., 2002). In one illustrative study (Iyengar, Huberman, & Jiang, 2004) that examined the 401(k) retirement plan data of close to 800,000 employees, researchers found a negative relationship between the number of choices available and the probability that an employee would join a retirement plan.

The Medicare Part D program offers a natural setting to examine this notion. Indeed, a number of earlier studies have extended this line of thinking to the Medicare Part D program. One investigation (Bundorf & Szrek, 2010) has shown that increasing the number of drug plans available (2, 5, 10, and 16) boosted participants' satisfaction with their choice; however, it also amplified their desire to see fewer options on the menu. Another study (Hanoch, Rice, Cummings, & Wood, 2009) found that larger drug plan choice-set size (10 and 20 compared to 3) reduced both older and younger participants' performance. It is perhaps not surprising, then, that earlier surveys found that the majority of older adults thought the Medicare Part D program was too complicated (Kaiser Family Foundation, 2006) and had too many choices (Cummings, Rice, & Hanoch, 2009).

While the above studies examined the effect of increasing choice size on performance, their research design precluded them from evaluating how it might determine strategy selection. This is an important omission as the strategies employed could have important implications with regard to performance (Payne, Bettman, & Johnson, 1993). Previous investigations have demonstrated that as task complexity (e.g., Payne, 1976) and time pressure increase (Payne, Bettman, & Johnson, 1988; Dhar, Nowlis & Sherman, 2000) individuals tend to use non-compensatory decision strategies and fail to make trade-offs among pertinent decision information. What results from this attempt to reduce decision demands is a heavier reliance on attributes, rather than alternatives, during decision making (Payne, Bettman, & Johnson, 1988).

Shifting decision strategies in response to greater cognitive demand has been placed within a cost-benefit framework (Einhorn & Hogarth, 1981; Payne et al., 1993; Reutskaja & Hogarth, 2009), where the decision maker's expected gains and expected costs determine their chosen strategy. Viewed from this framework, the benefit of having more choice rests with the ability to find a better option. It is, however, costly, as it creates a greater demand on the cognitive system. Thus, one would expect that increasing the number of drug plans from

three to nine would not only alter the amount and rate of information acquisition, but, more importantly, change the decision strategy utilized from alternative base to attribute based.

Aside from looking at a real-world and topical problem, the present study augment previous research by (a) varying the number of Medicare drug plans participants evaluated (either 3 or 9) and (b) including objective outcome criteria—namely, whether the participant chose the plan with the lowest estimated annual cost and the amount of money lost if a higher cost plan was chosen. These changes allowed us to investigate several hypotheses. Specifically, it was predicted that increasing age would be associated with (1) acquisition of less information; (2) reliance on attribute decision strategies; and (3) poorer decision quality. It was also hypothesized that more drug plan choice would be linked to (4) acquisition of a lower proportion of available information; (5) utilization of attribute decision strategies; and (6) poorer decision quality for both younger and older adults. Finally, the study tested the mediation hypotheses that (7) poor decision quality associated with increasing age is mediated by decision strategies; and (8) poor decision quality associated with the number of choices is mediated by decision strategies.

Method

Participants

One hundred and fifty individuals participated in the study. Aiming to recruit a sample across lifespan, older participants were recruited from an existing senior participant pool and through advertisements at senior centers in Claremont, California. Younger participants were recruited from the staff and student body of the Claremont Colleges and community boards. Of the 150 participants recruited, 129 completed all of the materials presented below and represent the final study sample (see Table 1). Of these, 38% were 18–29 years of age, 11% were 30–59, 40% were 60–79, and 11% were 80 years or older.

Materials and Procedure

Medicare Part D materials—MouselabWeb (<http://mouselabweb.org/>; Willemsen, & Johnson, 2009), an updated version of the original Mouselab (Payne, Bettman, & Johnson, 1988), which allowed us to trace the information acquisition process, was used. Mouselab has been used extensively to understand how individuals acquire information and make choices in a range of decision-making settings (Bettman et al., 1990; Johnson et al., 1988). In the investigation, the MouselabWeb design was adopted to simulate the official Medicare website to study individuals' decision-making processes and strategies, and decision quality.

A hypothetical scenario about a friend, “Bill,” was presented, and all participants were asked to help Bill choose the least expensive Medicare prescription drug plan. More specifically, participants read the following paragraphs, and were asked to choose a Medicare drug plan based only on the information presented to them:

Imagine that one of your friends, whom we'll call Bill, has asked you to help him in choosing a Medicare prescription drug plan. He has made it clear that he is not sure how to choose among the different drug plans, and therefore would like you to make the choice for him.

However, Bill has told you a little about the type of drug plan he would like. He does not want to spend a lot of money. That is, he wants to keep his annual cost, monthly premium, and annual deductible as low as possible. He is, however, not sure whether he should get a plan that offers coverage in the gap. He is also interested in a company that he knows and feels he can trust. Finally, he expects to get all of his drugs by calling a toll-free phone number, and having them mailed to his home. In the screens that follow, you will see information about a range of drug plans (their name, their estimated annual cost, their monthly drug premium, the number of network pharmacies, whether they offer coverage in the gap, and their annual deductible). Please try to make the best choice for Bill.

Information about drug plans was presented on a computer screen and varied along six dimensions: plan name, estimated annual cost, monthly drug premium, annual deductible, coverage in the gap, and number of network pharmacies. Intentionally, not all attributes were relevant to performing the decision task. Information on various plans and dimensions was presented in a grid. Participants needed to move the computer mouse to see the information hidden underneath labeled boxes (see Figure 1). Once they moved the cursor from one box to the next, the previous box closed and the new one opened. Participants were randomly assigned to a decision task with either three or nine drug plan options from which to choose the lowest cost plan. The two conditions were randomly presented through computerized design; thus the order was counter-balanced. In total, participants underwent four trials of each choice-set-size treatment. Because not all participants completed all eight trials, the 129 participants represent 979 decision trials.

Demographic—Participants reported their age, gender, ethnicity, education, and marital status.

Procedure

The study protocol was approved by the appropriate IRBs. All participants were tested individually at Scripps College in Claremont, California. Prior to the start of the study, written informed consent was obtained. Next, the Mini-Mental State Exam (MMSE) was used to screen for cognitive impairment and signs of early dementia. Those scoring below 26 out of 30 would have been ineligible for participation; however no participants met this criterion.

After completing the MMSE, participants were given the Mouselab computerized task. Before choosing Medicare prescription drug plans, a practice session of choosing cameras using Mouselab was presented. The practice was designed to allow participants to gain familiarity with the program—for example, moving the mouse cursor around and clicking the boxes. Once participants felt ready, they clicked a button to start the study.

The main task is a within subject design. After reading a scenario description on the Medicare prescription drug plan, participants were instructed to choose the least expensive prescription drug plan for Bill and to click “next page” to proceed to the next web page. They were also told that definitions of insurance terms were available. Note taking was allowed to minimize working memory load and was controlled for in the regression

analyses. After clicking the “next page” button, participants were faced with one out of eight possible different screens. Since the trials were randomized, participants faced a screen with 9 plans (see Figure 1), or ones with only 3 plans. To reveal the information underneath each cell, participants were required to move the mouse cursor to the desired cell. When participants were ready to make a decision, they clicked the circle underneath the attributes of the plan, and a new trial appeared automatically. After the eight trials were completed, participants read a thank-you page that showed up on the screen, indicating the end of the study. Finally, participants completed the demographic questionnaire. All individuals were paid \$20 per hour for their participation.

Measures

Average task time—Average time was defined as the total time in seconds divided by the total number of acquisitions.

Information acquisition—Two information acquisition measures were included in the analyses: search percentage and reacquisition rate. Search percentage measured the proportion of information boxes examined at least once. Reacquisition rate was defined as the proportion of boxes examined more than once over the number of unique acquisitions. Both search percent and reacquisition rate ranged from 0 to 100.

Decision strategies—To measure decision strategy, two variables were examined. Search pattern, previously used in process tracing methods studies (Lhose & Johnson, 1996), was defined as the relative degree to which individuals made alternative-based versus attribute-based decisions (Mourali & Pons, 2009). More formally, search pattern was defined as the number of attribute-based transitions (e.g., moving the cursor from premiums to number of pharmacies within Plan A) subtracted from the number of alternative-based transitions (e.g., moving the cursor from Plan A to Plan B within the premium attribute) divided by the sum of attribute- and alternative-based decisions and ranged from –100 to 100 (Payne et al., 1988; Lhose & Johnson, 1996). Because the choice task included information (i.e., number of pharmacies in network and plan name) that was irrelevant to the objective of choosing the lowest cost plan, a measure called “focus” was included to ascertain the extent to which extraneous information affects choice quality as the choice environment becomes more complex. Focus, which ranged from 0 to 100, was measured as the proportion of information acquired related to total estimated annual cost, monthly drug premium, annual deductible, and coverage in the gap.

Decision quality—The task objective was to choose the plan that minimizes total annual plan costs. A dichotomous measure was used to indicate whether the participant chose the lowest cost plan during the task. As a second decision quality outcome, the dollar amount of the loss was included for participants who did not choose the lowest cost plan.

Primary regressors—The primary interest was the associations of age and choice set size with decision processes and quality. Age was measured in years. Non-linear age effects were examined but no evidence was found of an association between a quadratic term for age and

the decision process and quality measures. Choice set size was included in the analyses as a dichotomous measure of the nine-plan or three-plan condition.

Control variables—The study controlled for the following potential confounders of the association between age, choice set size, decision processes, strategies, and quality: gender (female or not), race/ethnicity (we included a dummy variable where Caucasian is the referent group), education (at least some college or not), marital status (married or not), and whether participants chose to take notes during the task.

Data Analysis

Given the within-subject repeated-measures design, multi-level models were used to examine the adjusted association of age and choice set size with decision processes, strategies, and quality while controlling for observed confounders (e.g., education, note taking) (Carey, 2000; Rice & Jones, 1997). The first level of data models information from each trial for each participant as separate observations. The second level includes a random intercept term for each individual to capture differences among trials across participants. Multi-level linear regression models were used to estimate continuous outcomes. A multi-level logistic regression model was used to estimate the only dichotomous outcome (i.e., choosing the lowest cost plan). To understand the potential mediating role of decision strategy two decision quality models were specified. The first (Model 1) regressed decision quality on age, choice set size, and demographic covariates. The second regression (Model 2) added decision process and strategy variables as regressors. The significance of indirect age and choice-size effects in the mediation models was tested in Mplus with standard errors estimated using the delta method (Kenny, Korchmaros, & Bolger 2003; Zhao, Lynch, & Chen 2010). The remaining analyses were conducted using Stata 11. To indicate the variance around the point estimates, 95% confidence intervals were reported.

Results

Participant characteristics

Participants spent 1.31 seconds per acquisition (Table 1). On average, participants examined 79% of the available information. Two-thirds (66%) of the information previously examined was reacquired. On average, participants were marginally more likely to use alternative-based rather than attribute-based decision strategies (search pattern = 17.62). Most of the information examined (71%) focused on total estimated annual costs, monthly drug premium, annual deductible, or coverage in the gap. Of the 979 trials, participants correctly identified the lowest cost plan 46% of the time. Among the 54% who did not identify the lowest cost plan, the average dollar amount lost was \$160.24. Participants were about 52 years of age on average. Most participants were female (63%) and Caucasian (61%), while 39% had some college or more, 31% were married, and 40% took notes.

Adjusted associations of decision processes and strategies with choice set size and age

Age—Mixed evidence for Hypothesis 1 was found that older adults would acquire less information during the decision task. Specifically, an increase in one year of age was associated with spending 0.02 (−0.02, −0.01) fewer seconds per acquisition (Table 2). The

data provided weak evidence that a 1-year increase in age was associated with searching 0.08% (−0.01, 0.17) more of the available information and reacquiring 0.14% (0.02, 0.26) more of the information previously examined. The results supported the prediction that older adults were more likely to use less cognitively demanding (and suboptimal) search strategies (Hypothesis 2). Increasing age was associated with decreasing ability to focus on cost information during the task (−0.10% per additional year of age, −0.15, −0.05) and increased propensity to make more attribute- rather than alternative-based decisions (search pattern= −0.32; −0.56, −0.08).

Choice set size—The regression estimates supported Hypothesis 4 that increasing choice-set size was associated with acquiring less available information (Table 2). Specifically, participants in the more complex choice environment examined each piece of information for 0.15 fewer seconds (−0.19, −0.11). Compared to participants in the three-plan treatment, participants choosing from among nine plans searched 22.74% (24.43, 21.06) less of the available information and reacquired 5.34% (−7.55, −2.92) less of the information. However, the results found mixed evidence for Hypothesis 5 that increasing choice-set size was associated with suboptimal search strategies. For example, increasing choice set size was associated with an increase of 1.11% (0.10, 2.12) of boxes opened related to the choice objective. The results indicated weak evidence that increasing choice set size was related to employing a more attribute-based search strategy (search pattern = −3.02; −6.49, 0.44).

Adjusted associations of decision quality with age and choice set size

Age—The data supported Hypothesis 3 that increasing age was associated with declining decision quality (Table 3). In the first model, a 1-year increase in age was associated with 0.98 (0.97, 1.00) times the odds of correctly choosing the lowest cost plan after adjusting for choice set size and demographic covariates. The results also indicated an adjusted positive association with age and amount of loss among participants who did not choose the lowest cost plan. Specifically, in Model 3, each additional year of age was associated with \$0.50 (0.12, 0.88) of loss.

The results also revealed weak evidence for Hypothesis 7 that age-associated declines in decision quality were mediated by differences in decision strategies between older and younger adults. Specifically, results showed that age was no longer associated with choosing the lowest cost plan after controlling for decision processes and strategies (OR=0.99, $p=0.121$) in Model 2. Results testing the indirect effect suggested that age impacts the odds of choosing the lowest cost plan via search pattern (−0.003, $p=0.055$). This was not surprising given the earlier finding that age was associated with search pattern and the finding in Model 2 that using alternative-based decision strategies improved the odds of selecting the lowest cost plan (1.02, 95% CI 1.00, 1.04). Those who employed a purely alternative-based approach (e.g., search pattern=100, or only comparing total annual costs across plans) had 2.46 (1.35, 4.06) the odds of picking the lowest cost plan compared to those who used a mixed strategy (e.g., search pattern=0, or examining an even mix of attributes and alternatives). The results also provided weak evidence that individuals who focused only cost-related attributes had 7.39 (0.90, 59.60) the odds of choosing the lowest cost plans compared to 2.72 (0.95, 7.38) the odds of picking the lowest cost plan had they

spent half of their acquisitions on cost-related attributes. However, the results show no evidence that decision strategy mediated the increased age-related losses among those who did not choose the lowest cost plan.

Choice set size—The adjusted association results supported Hypothesis 6 that more choice was associated with worse decision outcomes when only adjusting for participant demographics. Choosing from nine versus three plan options was associated with 0.25 (0.18, 0.35) times the odds of correctly selecting the lowest cost plan in the first model. Similarly in Model 3, facing nine versus three choices was associated with a \$48.71 (37.98, 59.44) average loss after controlling for participant demographics. While the strength of the association of choice set size with choice quality diminished when the model controlled for decision processes and strategies, the results found no support for Hypothesis 8 that decision strategy mediated the association between choice set size and choice quality.

Discussion

There is little doubt that the Medicare prescription drug program has been financially beneficial for millions of older adults. Of import, however, is whether a more simplified decision environment, which takes into account the age of its intended beneficiaries, would be even more beneficial. For example, would older adults benefit from having fewer insurance plans to choose from? Following this line of reasoning, this study was designed to examine the effect of age and choice size on decision process, strategy selection, and decision quality.

How did age effect performance? When examining the affect of age, the results show that older adults tended to search more information (i.e., opened a higher proportion of the available boxes) and reacquired more information (i.e., returned to the same boxes) but spent less time on each specific piece of information. Despite this, when looking at objective performance criteria, older adults made worse choices. However, after controlling for decision processes and strategies the data no longer revealed a significant difference in performance. While a 1-year increase in age might seem to make only a slight difference, as the age gap increases the performance gap becomes remarkably more pronounced. For example, a 1-year age difference was associated with 0.98 times the adjusted odds of choosing the lowest cost plan and a loss of \$0.50. But, when comparing a 65-year-old to an 85-year-old, the adjusted odds of choosing the lowest cost plan declines to 0.81 and the financial loss is around \$10.

While age played an important role in the decision making process, choice set size proved to be of greater significance. Participants who faced nine insurance plans had one-quarter the odds of choosing the lowest cost plan after controlling for demographics. Furthermore, those who faced nine plans were financially worse off by about \$50. The fact that participants were able to correctly identify the lowest costs plan only 46% of the time even though the task was a much simplified version of the real Medicare part D choice environment provides further indication of the decision complexity involved in the Medicare part D environment.

The findings, therefore, provide further evidence questioning the assumption that more choice would be beneficial to consumers, and this might be especially the case for older adults. That is, while all participants exhibited difficulties identifying the lowest cost plan, their difficulties were further exacerbated when the number of plans was increased from three to nine. This trend was even more pronounced for the older participants. Thus, while policy makers' might have believed that offering more choice would benefit older adults, the actual outcome had the precise opposite results: hampering older adults' decisions.

Although individuals participated in eight different choice tasks, the results indicated no evidence of a learning effect as they progressed through the tasks as other authors have (cf. Bundorf & Szrek, 2010). Specifically, no differences were found in the probability of choosing the lowest cost plan between the early, mid, and latter choice tasks within individuals. An additional sensitivity tests by including indicators for early, mid, and late trials in all regression models found no evidence of an association between learning and the outcomes. The lack of a learning effect may be attributable to the random order in which the choice tasks were presented and the discreteness of each task.

This study provides the first empirical indications of why older adults are not choosing the lowest cost plan available under Part D. In partial support of earlier work (Mata et al., 2007), older adults' information search was less effective. Specifically, they were more likely to use an attribute-based rather than an alternative-based search approach. That is, they were more likely to evaluate the attributes within a particular plan rather than compare plans or alternatives along a single factor (e.g., total estimated annual cost).

The data indicated that participants who used an alternative-based approach (e.g., comparing total annual costs across plans) were more than twice as likely to pick the best plan compared to those who used a mixed strategy (e.g., examining an even mix of attributes and alternatives). The mediation analysis suggested differences in decision quality may not have been attributed to age per se, but perhaps to differences in search pattern as we age. The results also aligned with earlier work (Payne, 1978) showing that as cognitive load increases individuals tended to rely on an attribute-based decision strategy. At the same time, one should note that earlier studies (e.g., Payne, 1978) did not necessarily include an objective performance measure. At present, therefore, it is difficult to establish whether using alternative vs. attribute search strategy will be superior in all decision environments (see, Gigerenzer, Todd, & the ABC research group, 1999).

The above, it could be argued, is a rather positive finding, as it points to the feasibility of improving older consumers' decisions about Medicare part D drug plans by creating decision environments that lead them toward alternative-based search strategies. If the results accurately represent older adults' actual decisions, and others have provided evidence to that effect, the financial consequences associated with the complex design of Medicare Part D are significant for both Medicare beneficiaries and the federal government, which sponsors the program (Hanoch et al., 2009).

The study has several limitations. First, the sample is not necessarily representative of the general population. In particular, the participants had a higher education level than the

general population. These differences were a simply a consequence of drawing a sample from the Claremont, California community. In one respect, this limitation renders the findings more conservative, as a more representative population might have been even less likely to answer correctly. Second, it was also possible that the low percentage of correct response stems from using Mouselab. Indeed, using a more conventional method, Hanoch et al., (2009) reported a much higher percentage of correct responses. Thus, it is possible that using pen and paper would have lead to better results. Two important caveats are needed here. First, the study tried to imitate as closely as possible the decision environment faced by those who use the Medicare official website, which is computer base rather than pen and paper. Second, Gruber's (2009) work provides further evidence that the results might be more representative of the actual rate of success. Looking at real world data, Gruber showed that less than 10% of enrollees chose the lowest-cost plan available under part D. Indeed, despite beneficiaries' statement that costs plays an important role in the decision making, they "are not financially optimizing in their choice of a Medicare drug plan" (Gruber 2009, p. 5). That is, the finding that less than 50% of the participants were able to provide the correct response might even be conservative by nature.

Finally, the results could inform both decision makers and policy makers. Knowing which decision strategy leads to better decision could help educate older adults on how to approach the decision-making process. For example, the Center for Medicare Service sends all Medicare beneficiaries a brochure once a year that contain valuable information about the Medicare program. It could use this venue to educate consumers about the advantages of using alternative-based (vs. attribute-based) search strategies. Policy makers, in addition, could decide to drastically reduce the number of plans available and thus facilitate the decision-making process as well as aid in helping older adults (and the government) manage their money. Though not exhaustive, following one of these proposals could prove to be financially advantageous for both the U.S. government and Medicare beneficiaries.

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Medicare prescription drug plan

Plan Name	Plan Name	Plan Name	Plan Name	Plan Name	Plan Name	Plan Name	Plan Name	Plan Name
Estimated annual cost	Estimated annual cost	Estimated annual cost	Estimated annual cost	Estimated annual cost	Estimated annual cost	Estimated annual cost	Estimated annual cost	Estimated annual cost
Monthly drug premium	Monthly drug premium	Monthly drug premium	Monthly drug premium	Monthly drug premium	Monthly drug premium	Monthly drug premium	Monthly drug premium	Monthly drug premium
Annual deductible	Annual deductible	Annual deductible	Annual deductible	Annual deductible	Annual deductible	Annual deductible	Annual deductible	Annual deductible
Coverage in the gap	Coverage in the gap	Coverage in the gap	Coverage in the gap	Coverage in the gap	Coverage in the gap	Coverage in the gap	Coverage in the gap	Coverage in the gap
Number of Network pharmacies	Number of Network pharmacies	Number of Network pharmacies	Number of Network pharmacies	Number of Network pharmacies	Number of Network pharmacies	Number of Network pharmacies	Number of Network pharmacies	Number of Network pharmacies

☐ Plan 1
 ☐ Plan 2
 ☐ Plan 3
 ☐ Plan 4
 ☐ Plan 5
 ☐ Plan 6
 ☐ Plan 7
 ☐ Plan 8
 ☐ Plan 9

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Figure 1.

A trial of Mouselab screenshot: choosing a Medicare prescription drug plan for Bill from nine different plans. Information hidden underneath a box would only be presented if participants moved the mouse over that box

Table 1

Descriptive statistics

Variable	Entire sample		
	Mean	SD	Range
Average time ^a	1.31	0.62	(0.08, 3.20)
Search percentage ^a	79%		(15%, 100%)
Reacquisition rate ^a	66%		(0%, 100%)
Pattern ^a	17.62	38.61	(-100, 100)
Focus ^a	71%		(13%, 95%)
Picked lowest cost plan ^a	46%		(0%, 100%)
Amount lost if picked inferior plan ^b	\$160.24	\$72.42	(\$50.00, \$338.00)
Age ^c	52.07	25.02	(18.00, 91.00)
Nine plans ^b	50%		(0%, 100%)
Female ^c	63%		(0%, 100%)
Other race/ethnicity ^{c,d}	39%		(0%, 100%)
College ^{c,e}	39%		(0%, 100%)
Married ^c	31%		(0%, 100%)
Took notes ^c	40%		(0%, 100%)

Note.

^a *n*=979,

^b *n*=530,

^c *n*=129,

^d Caucasian is the referent group,

^e high school or less is the referent group.

Table 2
Adjusted Associations of Participant Demographics and Decision Processes and Strategies (n=979)

	Average time		Search percentage		Reacquisition rate		Pattern		Focus	
	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Age	-0.02***		0.08*		0.14**		-0.32***		-0.10***	
	-0.02, -0.01		-0.01, 0.17		0.02, 0.26		-0.56, -0.08		-0.15, -0.05	
Nine plans	-0.15***		-22.74***		-5.24***		-3.02*		1.11**	
	-0.19, -0.11		-24.43, -21.06		-7.55, -2.92		-6.49, 0.44		0.10, 2.12	
Female	-0.22***		3.87**		-0.13		-3.15		-1.22	
	-0.35, -0.08		0.09, 7.64		-5.19, 4.92		-13.64, 7.34		-3.45, 1.02	
Other race/ethnicity	-0.13*		0.23		3.55		2.53		0.93	
	-0.26, 0.01		-3.64, 4.10		-1.63, 8.74		-8.23, 13.29		-1.36, 3.21	
College	-0.05		0.71		0.99		6.99		0.49	
	-0.18, 0.09		-3.08, 4.50		4.09, 6.06		-3.53, 17.52		-1.75, 2.73	
Married	0.00		-0.19		-2.8		17.71		0.04	
	-0.15, 0.16		-4.62, 4.25		-8.74, 3.14		5.43, 30.00		-2.58, 2.67	
Took notes	0.01		1.38		2.67		5.82		-1.07	
	-0.12, 0.14		-2.29, 5.05		-2.24, 7.59		-4.37, 16.02		-3.24, 1.11	
Constant	2.35***		83.31***		60.09***		25.41***		76.06***	
	2.14, 2.56		77.40, 89.22		52.18, 68.00		9.06, 41.76		72.57, 79.56	
Variance of second-level constant	0.11***		140.32***		79.53***		697.69***		25.58***	
Variance of first level residuals	0.11***		366.27***		178.33***		750.74***		64.03***	
Likelihood ratio test	392.34***		154.07***		174.83***		345.86***		169.29***	

Note.

*** $p < 0.01$,

** $p < 0.05$,

* $p < 0.10$

Table 3

Adjusted Associations of Decision Processes and Strategies, Participant Demographics, and Decision Outcomes

	Odds of picking the lowest cost plan ^a		Amount lost (\$) if chose a higher cost plan ^b	
	Odds Ratio	Odds Ratio	β	β
	95% CI	95% CI	95% CI	95% CI
	Model 1	Model 2	Model 3	Model 4
Age	0.98 ** 0.97, 1.00	0.99 ^c 0.97, 1.01	0.50 *** 0.12, 0.88	0.55 ** 0.12, 0.98
Nine plans	0.25 *** 0.18, 0.35	0.17 *** 0.11, 0.28	48.71 *** 37.98, 59.44	47.68 *** 33.63, 61.74
Female	0.78 0.37, 1.62	0.83 0.39, 1.74	-1.69 -19.03, 15.64	-0.88 -18.33, 16.58
Other race/ethnicity	1.12 0.53, 2.38	1.09 0.51, 2.33	-10.09 -26.99, 6.80	-10.63 -27.55, 6.30
College	1.02 0.49, 2.13	0.96 0.46, 2.02	-5.3 -22.38, 11.79	-5.7 -22.81, 11.41
Married	1.92 0.81, 4.54	1.67 0.70, 3.97	7.58 -12.03, 27.20	6.74 -13.00, 26.48
Took notes	2.36 ** 1.15, 4.83	2.41 ** 1.17, 4.94	-9.28 -25.79, 7.23	-9.78 -26.39, 6.83
Average time		0.92 0.58, 1.47		1.84 -12.42, 16.10
Search percentage		0.99 * 0.97, 1.00		0.13 -0.16, 0.41
Reacquisition		0.99 0.98, 1.00		-0.09 -0.50, 0.32
Focus		1.02 * 1.00, 1.04		0.09 -0.51, 0.69
Pattern		1.01 *** 1.00, 1.01		0.05 -0.12, 0.21
Constant			109.28 *** 82.71, 135.86	96.80 *** 31.83, 161.78
Variance of second-level constant	2.88 ***	2.88 ***	913.16 ***	900.51 ***
Variance of first-level residuals			3,591.11 ***	3,587.97 ***
Likelihood ratio test	173.79 ***	167.31 ***	26.09 ***	23.66 ***

Note.

^a n=979,

$b_{n=530},$

c the age effect is fully mediated by search pattern.

Using Mplus, the coefficient of the indirect age effect was -0.003 ($p=0.055$).

 $p<0.01,$

**
 $p<0.05,$

*
 $p<0.10$

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