Virginia Commonwealth University
VCU Scholars Compass

Healthcare Policy and Research Publications   Dept. of Healthcare Policy and Research

2012

One Fish, Two Fish, Red Fish, Blue Fish: Effects of Price Frames, Brand Names, and Choice Set Size in Medicare Part D Insurance Plan Decisions

Andrew J. Barnes
Virginia Commonwealth University, abarnes3@vcu.edu

Yaniv Hanoch
University of Plymouth

Stacey Wood
Scripps College

Pi-Ju Liu
Claremont Graduate University

Thomas Rice
University of California - Los Angeles

Follow this and additional works at: http://scholarscompass.vcu.edu/hcpr_pubs

🎨 Part of the Health Economics Commons, and the Medicine and Health Sciences Commons

One Fish, Two Fish, Red Fish, Blue Fish: Effects of Price Frames, Brand Names, and Choice Set Size in Medicare Part D Insurance Plan Decisions

Andrew J. Barnes,*[1] Yaniv Hanoch,[2] Stacey Wood,[3] Pi-Ju Liu,[4] and Thomas Rice[5]

[1] Department of Healthcare Policy and Research, VCU School of Medicine, PO Box 980430, Richmond, VA 23298-0430. E-mail, abarnes3@vcu.edu

[2] University of Plymouth, School of Psychology, Drake Circus, Plymouth, UK, PL4 8AA. E-mail, yaniv.hanoch@plymouth.ac.uk

[3] Department of Psychology; Scripps College; 1030 Columbia Avenue, Claremont CA 91711; E-mail: swood@scrippscol.edu

[4] School of Behavioral and Organizational Sciences; Claremont Graduate University; 150 E. 10th St., Claremont, 91711; E-mail: pi-ju.liu@cgu.edu

[5] Department of Health Services, UCLA School of Public Health, P.O. Box 951772, Los Angeles, CA 90095-1405. E-mail, trice@ucla.edu

*Correspondence to: Andrew J. Barnes, Ph.D.

Abstract

Because many seniors choose Medicare Part D plans offering poorer coverage at greater cost, we examined the effect of price frames, brand names, and choice set size on participants' ability to choose the lowest cost plan. A 2x2x2 within-subjects design was used with 126 participants ages 18-91. Mouselab, a web-based program, allowed participants to choose drug plans across eight trials that varied using numeric or symbolic prices, real or fictitious drug plan names, and three or nine drug plan options. Results from our multi-level models suggest numeric versus symbolic prices decreased the likelihood of choosing the lowest cost plan (-8.0 percentage points, 95% CI -14.7, -0.9). The likelihood of choosing the lowest cost plan decreased as the amount of information increased suggesting decision cues operated independently and collectively when selecting a drug plan. Redesigning the current Medicare Part D plan decision environment could improve seniors' drug plan choices.

Millions of senior citizens report difficulties in choosing their Medicare Part D prescription drug insurance plan (Konrad, 2009). With dozens of different insurance plans selling prescription drugs for Part D and a lack of standardized benefits, it is no wonder that older adults report difficulties. Despite its financial and health ramifications, little is known regarding how older adults navigate the current maze of choices under the Part D program. We do know, however, that saving money is the most important factor in their decision-making (MedPAC, 2007). Yet, the evidence shows that only a small minority are actually choosing the lowest-cost plan available to them with potential individual losses of hundreds of dollars annually (Gruber, 2009).

As reported by Hanoch et al. (2009 & 2011) and others, the difficulty in choosing the lowest cost plan for seniors is in part due to the sheer size of the choice set they face. Beyond cost, medical decision-making research has demonstrated that how numeric information is presented to consumers (e.g. quantitative or symbolic) can affect decision outcomes (Hibbard et al., 2007; Dudley, Hibbard & Schaler, 2010). Factors such as company reputation play an important role in consumers' medical decisions as well (MedPAC, 2007). However, little is known about how numeric information, like price, affects older adults' Medicare Part D decisions and how, if at all, older adults trade off between company reputation and costs. The aim of this article is to investigate the effect of price frames (e.g., the use of symbols such as $$$$ vs. numeric dollar amounts), real vs. fictitious company name (i.e., brand effects), and choice set size on whether consumer choose the lowest cost Medicare Part D plan and, if they do not, the dollar amount of the "loss."

To investigate these questions, we used a computer based process-tracing program called "Mouselab" (Bettman, Johnson, and Payne 1990; Payne, Bettman, and Johnson, 1993). Mouselab is a web-based decision environment which presents information about choices in a grid but, akin the game "Memory", the information in each cell is hidden. When the cursor moves over the cell, the information is revealed allowing researchers to trace the decision-making process and record participants' decisions.

In recent years a number of researchers have come to question the idea that increased choice benefits consumers. Iyengar and colleagues, for example, have shown that offering more choices—whether chocolate, jams, or job offers—can negatively affect performance and reduce satisfaction (Iyengar and Lepper, 2000; Iyengar, Huberman, and Jiang, 2004; Iyengar, Wells, and Schwartz, 2006). In one illustrative study, Iyengar, Huberman, and Jiang (2004) examined 80,000 individuals' willingness to join a 401(k) retirement plan in relationship to the number of plans to choose from. The authors found that the more choices employees had, the less likely they were to join the program, a phenomenon referred to as "decision fatigue." Decision fatigue has also been shown to affect health insurance and retirement saving plans decisions domestically (Besedeš et al. in press) and in other countries (Schram and Sonnemans, 2011).

The Medicare Part D program offers a policy relevant, real world setting to examine the effect of choice set size on older adults' performance. Capitalizing on this idea, Bundorf and Szrek (2010) have found that on the one hand having a larger number of drug plans to choose from (2, 5, 10, and 16) increased participants' satisfaction with their decision; on the other hand, it also amplified their desire to see fewer options on the menu. Other studies found that offering a greater array of plan choices size negatively affected both older and younger participants' performance (Hanoch et al., 2009 & 2011).

In our earlier investigations (Hanoch et al., 2009 & 2011), however, we did not examine the questions of how brand name and price frame might affect older adults' decision performance. These are important factors to address, as a large body of research has shown that consumers are sensitive to both brand name and the framing of numeric information (e.g., Grewal, et al., 1998; Smith and Brynjolfsson, 2001, Hibbard et al. 2007; Dudley, Hibbard, and Shaller, 2010). More significantly, it has been shown that consumers often use brands names as a proxy for product quality and thus create decision shortcuts (or heuristics) in making decisions. A study comparing risk perception of generic vs. brand name drugs found that between 14-53% of respondents perceived the generic drug as posing greater risk, and that a large financial discount was required to convince consumers to purchase generic prescription drugs (Ganther and Kreling, 2000). Looking at judgments and choices about an unknown product, Brucks, Zeithaml, and Naylor (2000) showed that while brand names play a pivotal role in decision making, consumers use price and brand name as independent factors in their decision process. A Meta-analysis by Roa and Monro (1989) found that both brand name and price positively predicted consumers' perceived product quality.

Moreover, research by Hoyer and Brown (1990) and Maheswaran, Mackie and Chaiken (1992) provide important insights regarding the relationship between brand name and decision strategy. Brand name, it was found, was associated with sampling or evaluating fewer choices—that is, reliance on more simplified decision strategy (Hoyer and Brown 1990; Maheswaran, Mackie and Chaiken, 1992). Making a decision based on brand name, in addition, carried a price: those who used brand name as a cue made inferior decisions.

A large corpus of data shows that brand names play a role in the decision processes and outcomes. Whether price frame (symbol vs. numeric) has a similar effect is an open question. To

our knowledge, only two studies have used symbols instead of numbers to examine consumer's decision performance in the health domain (Hibbard et a., 2007; Peters et al., 2007). Unfortunately, these two studies did not examine how price frame affects participants' performance. The researchers did find that presenting symbols instead of numbers with regard to hospital quality did influence the participant's choice (Hibbard, et al 2007; Peters et al. 2007).

New Contribution

To bridge the gap between prior work on price frames and brand effects in other medical decision settings and Medicare Part D decisions, we investigated the role of these decision cues as well as choice set size on whether participants chose the lowest cost plan and, conditional on not choosing this plan, the amount of money they would have lost. We used four hypotheses to guide our analysis. First, we hypothesized that numeric (vs. symbol) price frames make it more difficult to choose the lowest cost plan and larger dollar losses conditional on choosing an alternate plan (H1). Second, we predicted that having real (vs. fictitious) brand names are associated with a lower likelihood of choosing the lowest cost plan and greater monetary loss (H2). Third, we hypothesized increases in the size of the choice set also lowers the probability of choosing the cheapest plan and increases dollar losses (H3). Finally, we predicted increasing the amount of information in the decision environment, through combinations of the three conditions above, is associated with lower likelihood of choosing the cheapest plan and higher financial losses if an alternate plan was chosen (H4).

Methods

Sample

6

The study was conducted in Claremont, California, a community 30 miles east of Los Angeles. One hundred and twenty-nine individuals participated in the study. Of these, 126 had complete data and were used in the main analysis. Aiming to recruit a sample across lifespan, older participants were recruited from an existing senior participant pool and through advertisements at senior centers. Younger participants were recruited from the staff and student body of the Claremont Colleges and from community boards.

Study Design

MouselabWeb, an updated version of the original Mouselab, was used to examine differences in participants' decision outcomes across experimental conditions (Payne, Bettman, and Johnson, 1988; Willemsen and Johnson, 2009). Mouselab has been used extensively to understand how individuals acquire information and make choices in a range of decision-making settings (Bettman, Johnson, and Payne, 1990; Johnson, Payne, and Bettman 1988). In this study, the MouselabWeb design was adopted to simulate the official Medicare website.

A hypothetical scenario about a friend, "Bill," was presented and all participants were asked to help Bill choose a 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.

After reading a scenario description on the Medicare prescription drug plan, participants were instructed to choose the prescription drug plan that suits Bill's needs. 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. The information presented for each plan was based on actual Part D plans obtained from the Medicare website. Information on various plans and their attributes 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. 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 faced one of eight possible decision trials.

The eight trials represented all combinations of the three treatment conditions (price frame, brand effects, choice set size). To avoid learning effects, the trails were randomly presented through computerized design; thus the order was counter-balanced between subjects. Because not all participants completed all of the trials, the 126 participants with complete data represented 955 decision trials. After each trail, participants were asked to rate the most and least important information across the six dimensions that affected their choice. The study protocol was approved by the appropriate Institutional Review Boards and prior to the start of the study, written informed consent was obtained. Participants also completed a demographic questionnaire and were paid $20 per hour for their participation.

<u>Measures</u>

Decision outcomes: We included two decision outcomes- whether the participant chose the lowest cost plan and the dollar amount of loss if the participant did not choose the lowest cost plan.

Primary regressors: We examined the amount of information in participants' decision environment using indicators for whether the trial had numeric or symbolic price frame information, real or fictitious drug plan names, and three or nine drug plans to chose from. Four categories of symbolic prices ranging from one dollar sign ($) to four dollar signs ($$$$) were created based on the numeric prices of the plan in the complementary experimental condition.

Control variables: We controlled for demographics, note taking, and numeric literacy. Demographic controls included an indicator for whether or not the respondent was over age 65, gender (female or not), race/ethnicity (a dummy variable where Caucasian is the referent group), education (at least some college or not), marital status (married or not), and mental and physical component scores (MCS and PCS from the SF-12v2). Whether participants chose to take notes during the task was also controlled for. Numeric literacy was controlled for using an 11- item numeracy scale, which consists mostly of questions on the calculation of basic probabilities (Lipkus, Samsa, and Rimer 2001).

Stated preferences about decisions: After each decision trial, participants were asked which of the plan attributes (drug plan name, total annual cost, monthly premium, number of pharmacies, coverage in the gap, annual deductible) was most and least important to them while making their decision.

Data Analysis

To examine associations of our experimental conditions with the decision outcomes while controlling for observed confounders (i.e., demographics, note taking, numeric literacy) and accounting for the within-subject repeated-measures design, we used multi-level regression. Level-1 modeled information from each trial for each participant as separate observations. Level-2 included a random intercept term for each individual to capture differences among trials across participants. Interaction effects between the three experimental conditions were included in the models.

To estimate the adjusted association price frames, brand effects, and choice set size with the choosing the lowest cost plan, multi-level logistic models were used. Multi-level linear regression models were used to estimate the adjusted associations of the experimental conditions and the dollar value of loss if participants did not choose the lowest cost plan. Risk differences were calculated representing the percentage point difference in the probability of choosing the lowest cost plan between experimental conditions while holding the model covariates at their original values. A similar approach was used to calculate the predictive margin of monetary loss. Model predictions used to construct risk differences and predictive margins consider only the fixed effect, or within person, portion of the multi-level logistic models and not the individual random effect. Bias-corrected standard errors for risk differences and monetary loss margins were obtained by bootstrapping using 1,000 replicates. An alpha-level of 5% was used to determine the statistical significance of model estimates.

Results

Sample Characteristics

Across the 955 trials, participants chose the lowest cost plan 46.0% of the time (Table 1). On average, the loss associated with choosing a more expensive plan was $168.43 (SD = $84.07) per year.

The participants were mostly female (63.2%). Less than half were over age 65 (42.0%), of non-Caucasian race/ethnicity (39.6%), completed college (36.9%), were married (31.4%), or took notes during the tasks (39.4%). The average mental component score (MCS) was 48.86 (SD 10.17) and participants had an average physical component score (PCS) of 49.33 (SD = 10.49). On average, participants scored 8.32 (SD = 2.27) on the numeracy scale. (The ranges for these variables appear in Table 1).

Regarding participants' preferences about what drug plan attributes were viewed as the most and least important when making their decision, 44.1% of the overall sample indicated estimated annual cost was most important, followed by coverage in the gap (18.5%) and monthly premiums (16.7%); 4.9% of participants reported drug plan names were most important (table available upon request). In line with the prompt that Bill would receive his prescriptions through the mail, only 6% thought the number of pharmacies was most the important plan attribute. For participants who did not choose the lowest cost plan, 28.3% reported coverage in the gap was most important in making their decision suggesting a possible tradeoff between overall costs and drug coverage. Conversely, 41.6% of the overall sample reported drug plan names were least important when making their decision followed by the number of pharmacies (27.0%) and coverage in the gap (21.1%).

Adjusted Associations of Decision Quality and Amount of Information

After adjusting for observed confounders (Table 2), we found support for our first hypothesis (H1) that participants facing a numeric versus symbolic price frame found it harder to choose the lowest cost drug plan and, conditional on not choosing it, experienced larger monetary losses. Participants in trials that used numeric (vs. symbolic) costs had an 8.0 (95% CI -14.7, -0.9) percentage point lower probability of choosing the lowest cost plan while holding model covariates at their original values. Participants in the experimental condition using numeric prices who did not choose the lowest cost plan lost $55.29 (95% CI 43.16, 67.06) more dollars after adjustment than those in the symbolic price condition.

The evidence did not support the hypothesis (H2) that real versus fictitious drug plan names would lower the adjusted probability of choosing the lowest cost plan and higher losses. Participants in trials using real rather than fictitious drug plans were equally likely to choose the lowest cost plan (risk difference= -6.4 percentage points; 95% CI -12.7, 2.4) but experienced smaller losses if they did not choose the lowest cost plan (-$17.80; 95% CI -29.79, -5.99).

Evidence from our adjusted models supported our third hypothesis (H3) that choosing from among nine versus three drug plans would lower the likelihood of choosing the cheapest plan and larger monetary losses if a more expensive plan was chosen. Nine versus three plans was associated with a 30.9 (95% CI -35.6, -20.9) percentage point lower probability of choosing the lowest cost plan while holding covariates at their original values. Participants choosing from nine rather than three plans lost $40.31 (95% CI 24.79, 52.39) more dollars if they did not choose the cheapest plan.

We next examined combinations of experimental conditions to test the hypothesis that increasing the amount of information in the decision environment was associated with a lower likelihood of choosing the lowest cost plan and larger losses conditional on choosing an

alternative plan (H4). The results supported our fourth hypothesis in that, relative to a trial with symbolic prices, fictitious brand names, and three drug plans, increasing the amount of information by switching combinations of the experimental conditions resulted in lower probabilities of choosing the cheapest plan and larger losses if an alternate plan was chosen. For example, participants in a decision environment with numeric prices, real drug plan names, and nine plans had a 56.0 (95% CI -63.4, -34.5) percentage point lower probability of choosing the lowest cost plan compared to those facing symbolic prices, fictitious drug plan names and three plans. They also lost $96.70 (95% CI 66.89, 119.15) if the lowest cost plan was not selected. One exception to this finding was, as noted above, switching from fictitious to real brand names while holding prices as symbolic and the number of choices at three plans was associated with lower losses (-$30.46; 95% CI- 56.82, -8.37).

Although minimizing costs was considered the primary objective of the decision tasks in our analysis, the prompt suggested participants may care about choosing a plan with coverage in the gap and were interested in a drug plan they knew and could trust. Thus, a priori, participants may have been willing to spend more money in order to choose a plan with coverage in the gap or with a particular brand name. The preferences for plan attributes presented earlier suggest individuals found drug plan names the least important regardless of whether they chose the lowest cost plan suggesting individuals were not choosing more expensive, branded drug plans. However, those who did not choose the lowest cost plan may have done so because they felt coverage in the gap was important. To determine if some participants were making tradeoffs between cost and coverage, we subdivided the sample to the 43 participants, representing 146 trials, who indicated coverage in the gap was most important and who did not choose the lowest cost plan. We then created an indicator for whether or not these individuals chose the lowest

cost plan among the subset of plans that included coverage in the gap and then repeated the multi-level model analyses above. Due to sample size limitations, the interaction terms were not included in the sub-analyses.

Among this subgroup, 76.0% chose the cheapest plan with coverage in the gap from the remaining set of drug plans (Table 3). Similar to the overall sample, numeric prices and nine plans were associated with lower probabilities of choosing the lowest cost plan with coverage in the gap after adjusting for confounders. Switching from symbolic to numeric prices while holding covariates at their original values was associated with a 14.5 (95% CI -27.6, -1.4) percentage point decrease in the probability of choosing the lowest cost plan with coverage in the gap. Similarly, increasing the choice set size from three to nine plans was associated with an 18.8 (95% CI -31.7, -5.9) point decline. Both of these experimental conditions were also associated with increased monetary losses if an alternative plan was chosen (numeric prices=$41.33, 95% CI 23.34, 59.31; nine plans=$62.18, 43.95, 80.41). These results when, combined with the main analysis, suggest that whether participants primarily cared about cost or whether they cared about coverage and cost, price frames and choice set size affected their ability to choose plans in line with these preferences.

In general, age, marital status, level of education, race/ethnicity, and health controls were not significantly associated with the odds of choosing the lowest cost plan or, conditional on selecting a higher cost plan, the amount of money lost (covariate estimates available upon request). Numeracy was also not significantly associated with the decision outcomes in our regression models.

Discussion

14

Do price frame, company name and choice set size affect Medicare Part D decision performance? Our results suggest that price frames and choice set size matter. Participants in choice environments using numeric rather than symbolic price frames had an eight-percentage point lower probability of choosing the lowest cost plan. This finding is congruent with a recent policy paper by Dudley, Hibbard and Shaler (2010) suggesting that using symbols rather than numbers in health care decision tasks make data more evaluable and less cognitively burdensome. Using qualitative rather than quantitative price information is, de facto, reductionist but our results suggest reducing the price dimension from cardinal to ordinal improved participants' ability to select the lowest cost plan. Switching the presentation of cost and quality data in the Medicare Part D choice environment from numeric to symbolic could help seniors in their choice of a drug plan even if the remaining choice attributes (e.g. number of drug plans) were kept at the status quo.

Our results add further evidence that reducing choice set size improves seniors' performance in the Medicare Part D environment (Hanoch et al., 2009 & 2011). In fact, the improvements in individuals' choice performance are substantial. In addition to making an initial drug plan selection more difficult, recent evidence also suggests increased choice size can lead to "stickiness" (Frank and Lamirand, 2008; McWilliams et al., 2011). We know less than 10% of Medicare beneficiaries actually change plans during open enrolment (Neuman et al. 2007). One possibility this stickiness is that the sheer number of choices in the program reduces the likelihood of changing drug plan, even when it is financially beneficial to do so. This possibility is supported by an analysis of both the Swiss health insurance market and Medicare Advantage, where consumers who faced more choice were less likely to switch plans (Frank and Lamirand, 2008; McWilliams et al., 2011). To keep prices low and quality high in a market with

fewer drug plan options, the Centers for Medicare and Medicaid Services could act as an agent for seniors. The Medicare Part D website could allow seniors to input the plan attributes they care most about and then present them with a small subset of "preferred" options to choose from with the remainder of the choice set available if the initial set does not meet the senior's needs.

Our study has a number of limitations. First, the stakes of the choice tasks participants completed were low. If we were examining real instead of hypothetical choices, individuals might expend more mental resources to perform better. Second, given the community-based convenience sampling frame employed, state and national inferences may be limited. Further, compared to the general U.S. population of older (and younger) adults our sample was more educated and had higher income. Nonetheless, our adjusted estimates should be broadly generalizable insofar as controls for education also proxy for income. Third, better performance with a smaller choice set may be explained by the fact that, given that participants guess, they are more likely to guess correctly. An analysis of this competing hypothesis suggests this is not the case. We found participants would have to be 5 times as likely to guess in the 9 plan condition as in the 3 plan condition to account for the observed difference in the probability of choosing the lowest cost plan.

In our study, brand names followed closely by number of pharmacies were the least important factors in individuals' choice of drug plans suggesting individuals were not choosing more expensive plans due to brand effects or in order to purchase from more pharmacies. However, respondents in 146 of the 516 trials in which participants did not choose the lowest cost plan indicated that coverage in the gap was the most important factor in their decisions. This subset represents an interesting case, as they might have been willing to pay a higher price for more extensive drug coverage. Trading cost for coverage could indicate two (not mutually

exclusive) possibilities. First, this subset might have greater drug utilization and thus their choice represents their actual needs (rather than the factitious character Bill). Second, this group might be more risk averse (or face greater health risks), and hence willing to pay more for greater coverage. Interestingly, being risk averse might prove to be financially beneficial in the Medicare part D environment. Looking at real drug utilization among Medicare beneficiaries, Domino and colleagues (2008) found that many would incur financial loss, due to changes in drug use and drug coverage, if they stick to the cheapest drug plan. That is, as it is difficult to foresee what medications one might require in the future, picking a less generous drug plan (which tends to be cheaper) could carry a financial cost. Domino et al.'s (2008) research captures nicely the possible trade-off that beneficiaries must make between price and coverage. Indeed, about a quarter of the sample who indicated coverage in the gap as the most important factor in their decisions failed to choose the cheapest drug plan on the menu. At the same time, as with our general results, this subset also made better decisions when faced with fewer choices and symbolic prices.

Our finding, coupled with others (Domino et al.'s, 2008; McWilliams et al., 2011) further illustrates the complex nature of choosing a Medicare part D drug plan, and the need to provide beneficiaries with a more user friendly decision environment. In the midst of a broadening concern over the national debt, entitlement reform has again come into the spotlight with all sides aiming to control Medicare costs. This research suggests minor changes to the Medicare Part D website, in particular the presentation of price, may lead to cost savings for beneficiaries as well as the government. While further research is needed to determine the potential scope of the savings, policies aimed at price frames appear to be low-hanging fruit with little political risk and should be considered further.

References

Besedeš, T., Deck, C., Sarangi, S., and Shor, M. (in press). Age effects and heuristics in decision

making. *Review of Economics and Statistics*.

Betteman, J. R., Johnson, E. J., and Payne, J. W. (1990). A componential analysis of cognitive

effort in choice. <u>*Organization Behavior and Human Decision Processes*</u>, 45(1), 111-39.

Brucks, M., Zeithaml, V. A., and Naylor, G. (2000). Price and brand name as indicators of

quality dimensions for consumer durables. *Journal of the Academy of Marketing Science*,

28(3), 359-74.

Bundorf, K. M., and Szrek, H. (2010). Choice set size and decision making: The case of

Medicare Part D prescription drug plans. *Medical Decision Making*, 30(5), 582-93.

Domino, M. E., Stearns, S. C., Norton, E. C., and Yeh, W. (2008) Why using current

medications to select a Medicare Part D plan may lead to higher out-of-pocket payments.

Medical Care Research and Review, 65(1), 114-26.

Dudley, R. A., Hibbard, J. H., and Shaller, D. Model public report elements: A sampler.

Rockville, M.D.: Agency for Healthcare Research and Quality; 2010. AHRQ Publication

No. 10-0088.

Frank, R. G., & Lamirand, K. (2008). Choice, price competition and complexity in markets for

health insurance. NBER Working Paper No. 13817

Ganther, J. M., and Kreling, D. H. (2000). Consumer perceptions of risk and required cost

savings for generic prescription drugs. *Journal of the American Pharmaceutical*

Association, 40(3), 378-83.

Grewal, D., Krishnan, R., Baker J., and Borin, N. (1998). The effect of store name, brand name and price discounts on consumers' evaluations and purchase intentions. *Journal of Retailing*, 74(3), 331-52.

Gruber, J. (2009). Choosing a Medicare Part D plan: Are Medicare beneficiaries choosing low-cost plans? http://www.kff.org/Medicare/upload/7864.pdf (accessed March 10, 2009)

Hanoch, Y., Wood, S., and Rice, T. (2007). Bounded rationality, emotions and older adult decision making: Not so fast and yet so frugal. *Human Development,* 50, 333-58.

Hanoch, Y., Rice, T., Cummings, J., and Wood, S. (2009). How much choice is too much? The case of the Medicare prescription drug benefit. *Health Service Research*, 44(4), 1157-68.

Hanoch, Y., Wood, S., Barnes, A., Liu, P.-J. and Rice, T. (2011). Choosing the right Medicare prescription drug plan: The effect of age, strategy selection, and choice set size. *Health Psychology,* 30(6): 719-27.

Hibbard, J. H., Slovic, P., Peters, E., Finucane, M. L., and Tusler, M. (2001). Is the informed-choice policy approach appropriate for Medicare beneficiaries? *Health Affairs*, 20(3), 199-203.

Hoyer, W. D., and Brown S. P. (1990). Effects of Brand Awareness on Choice for a Common, Repeat-Purchase Product. *The Journal of Consumer Research*, 17(2), 141-48.

Iyengar, S., Huberman, G., and Jiang, W. (2004). How much choice is too much? Contributions to 401(k) retirement plans. In O. S. Mitchell & S. Utkus (Eds.), *Pension design and structure: New lessons from behavioral finance* (pp. 83-95). Oxford: Oxford University Press.

Iyengar, S. S., and Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology,* 76(6), 995-1006.

Jacoby, J. (1984). Perspective on information overload. *Journal of Consumer Research*, 10(4), 432-35.

Johnson, E. J., Payne, J. W., and Bettman, J. R. (1988). Information displays and preference

reversals. *Organizational Behavior and Human Decision Processes*, 42(1), 1-21.

Konrad, W. (2009, October 14). Nearly 65? Time for the Medicare maze. *New York Times*,

http://www.nytimes.com/2009/10/15/your-

money/15CARE.html?scp=3&sq=medicare+part+d+WALECIA+KONRAD&st=nyt

Lipkus, I. M., Samsa, G., and Rimer, B. K. (2001). General performance on a numeracy scale among

highly educated samples. *Medical Decision Making*, 21(1), 37-44.

Maheswaran, D., Mackie, D. M., and Chaiken, S. (1992). Brand name as a heuristic cue: The

effects of task importance and expectancy confirmation on consumer judgments. *Journal

of Consumer Psychology*, 1(4), 317-36

Mata, R., von Helversen, B., and Rieskamp, J. (2010). Learning to choose: Cognitive aging and

strategy selection learning in decision making. *Psychology and Aging*, 25(2), 299-309.

Mata, R., and Nunes, L. (2010). When less is enough: Cognitive aging, information search, and

decision quality in consumer choice. *Psychology and Aging,* 25(2)*,* 289-98.

Mata, R., Schooler, L., and Rieskamp, J. (2007). The aging decision maker: Cognitive aging and

the adaptive selection of decision strategies. *Psychology and Aging*, 22(4), 796-810.

McWilliams, M. J., Afendulis, C. C., McGuire, T. G., and Landon, B. E. (2011). Complex Medicare

advantage choice may overwhelm seniors—especially those with impaired decision making.

Health Affairs, 30(9), 1-9.

MedPAC (2006) Report to Congress: Increasing the value of Medicare.

http://medpac.gov/publications%5Ccongressional_reports%5CJun06_Ch08.pdf (accessed

January 15, 2010).

Neuman, P., Strollo, M. K., Guterman, S., Rogers, W. H., Li, A., Rodday, A. M., and Safran,
D. G.. (2007). Medicare Prescription Drug Benefit Progress Report: Findings from a 2006
National Survey of Seniors. *Health Affairs,* 26(5), 30-43.

Payne, J. W. (1976). Task complexity and contingent processing in decision making: An
information search and protocol analysis. *Organizational Behavior and Human
Performance,* 16(2)*,* 366–87.

Payne, J. W., Bettman, J. R., and Johnson, E. J. (1988). Adaptive strategy selection in decision
making. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14(3),
534-52.

Payne, J. W., Bettman, J. R., and Johnson, E. J. (1993). *The adaptive decision maker*. New York:
Cambridge University Press

Peters, E., Dieckmann, N., Dixon, A., Hibbard, J. H., and Mertz, C. K. (2007). Less is more in
presenting quality information to consumers. *Medical Care Research and Review*, 64 (2),
169–190.

Roa, A. R. and Monro, K. B. (1989). The effect of price, brand name, and store name on buyers'
perception of product quality: An integrative approach. *Journal of Marketing Research*,
26(3), 351-57.

Schram, A., and Sonnemans, J. (2011) How individuals choose health insurance: An
experimental analysis. *European Economic Review*, 55, 799-819.

Smith, M. D., and Brynjolfsson, E. (2001). Consumer Decision-making at an Internet Shopbot:
Brand Still Matters. *The Journal of Industrial Economics*, 49(4), 541–58.

Willemsen,M. C., and Johnson,E. J. (2009) Why and when context effects. In McGill, A. and

Schavitt, S. (Eds) *Beyond 2x2x2: methodological advances in uncovering consumer*

decision processes (pp. 82 - 85). Duluth: Association for Consumer Research.

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. Sample Characteristics (N=126, 955 trials)

Variable	Mean	Std. Dev.
Chose lowest cost plan	46.0%	
Annual amount lost if did not choose lowest cost plan (range $50 - $338)	$168.43	$84.07
Numeric prices	49.7%	
Real drug plan names	49.4%	
Nine drug plans	50.2%	
Age 65 or older	42.0%	
Female	63.2%	
Other race/ethnicity	39.4%	
College	36.9%	
Married	31.4%	
Took notes	39.4%	
Mental component score (range 0-100)	48.86	10.17
Physical component score (range 0-100)	49.33	10.49
Numeracy (range 0-11)	8.32	2.27

Table 2. Risk Difference in Choosing the Lowest Cost Drug Plan, Monetary Loss Conditional on Choosing a Higher Cost Plan and Price Frames, Brand Effects, and Choice Set Size[1]

			Percentage point difference in the probability of choosing the lowest cost drug plan (N=126, 955 trials)	Monetary loss ($) conditional on choosing a higher cost plan (N=117, 516 trials)
Risk differences and monetary loss for an experimental condition holding other experimental conditions and covariates at original values				
Predicted average			43.8%	$166.38
Numeric prices			**-8.0** **(-14.7, -0.9)**	**+55.29** **(43.16, 67.06)**
Real drug plan names			-6.4 (-12.7, 2.4)	**-17.80** **(-29.79, -5.99)**
Nine drug plans			**-30.9** **(-35.6, -20.9)**	**+40.31** **(24.79, 52.39)**
Risk differences and monetary loss for combinations of experimental conditions holding covariates at original values				
Numeric prices	Real names	Nine plans		
No	No	No	80.3%	$89.66
Yes	No	No	**-21.8** **(-34.3, -6.9)**	**+158.91** **(122.02, 189.42)**
No	Yes	No	**-32.9** **(-45.6, -15.3)**	**-30.46** **(-56.82, -8.37)**
No	No	Yes	**-56.9** **(-65.8, -39.5)**	**+81.12** **(47.47, 106.57)**
Yes	Yes	No	**-30.3** **(-42.0, -15.6)**	**+76.38** **(46.86, 99.31)**
Yes	No	Yes	**-54.2** **(-63.4, -32.5)**	**+96.64** **(68.83, 119.04)**
No	Yes	Yes	**-40.1** **(-50.7, -21.5)**	**+98.62** **(70.14, 124.89)**
Yes	Yes	Yes	**-56.0** **(-63.4, -34.5)**	**+96.70** **(66.89, 119.15)**

[1]Multi-level model regressions controlled for whether the participant was 65 years or older, female, non-Caucasian race/ethnicity, completed some college, was married, mental and physical component scores from the SF-12v2, note-taking, and numeracy. Bold denotes risk difference is significantly different from zero at $p<0.05$.

Table 3. Risk Differences in Choosing the Lowest Cost Drug Plan *With Coverage in the Gap*, Monetary Loss Conditional on Choosing a Higher Cost Plan Among Individuals Who Ranked Coverage in the Gap as Most Important[1]

	Percentage point difference in the probability of choosing the lowest cost drug plan *with coverage in the gap* (N=43, 146 trials)	Monetary loss ($) conditional on choosing a higher cost plan (N=43, 146 trials)
Risk differences and monetary loss for an experimental condition holding other experimental conditions and covariates at original values		
Predicted average	76.0%	$186.71
Numeric prices	**-14.5** **(-27.6, -1.4)**	**+41.33** **(23.34, 59.31)**
Real drug plan names	+8.9 (-4.4, 22.1)	-11.26 (-29.20, 6.67)
Nine drug plans	**-18.8** **(-31.7, -5.9)**	**+62.18** **(43.95, 80.41)**

[1]Multi-level model regressions controlled for whether the participant was 65 years or older, female, non-Caucasian race/ethnicity, completed some college, was married, mental and physical component scores from the SF-12v2, note-taking, and numeracy. Bold denotes risk difference is significantly different from zero at $p<0.05$