

Investment Decision Making: Do Experienced Decision Makers Fall Prey to the Paradox of Choice?

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Psychology research suggests that decision makers fall prey to the paradox of choice phenomenon, where individuals are less likely to make a decision when faced with an extensive choice set than when faced with a limited choice set. This research may have important implications for investment decision makers in circumstances in which many investment options are available. However, the studies in psychology have typically examined the decisions of individuals who have no particular experience in the decision task. In this study, we examine whether individuals' investment decisions are affected by choice-set size (i.e., a limited vs. extensive choice set) and whether the effect is mitigated or changed for individuals who are more experienced with investment decisions. We find that the paradox of choice phenomenon is evident for participants who are less experienced with investing but not for more experienced participants. In fact, individuals who are more experienced with investment decisions were actually less likely to invest when faced with a limited choice set, contrary to the paradox of choice phenomenon. These findings suggest that the paradox of choice may not exist when individuals with investment experience make their decisions.

Keywords: Investor decision making, Paradox of choice, Experienced decision makers, Choice-set size

INTRODUCTION

Investors often have a wide array of choices available to them when making investment decisions. For example, one review of Vanguard administered employee profit-sharing and retirement plans reported that across nearly 650 plans, employees were offered 15 funds, on average, ranging from a low of 2 to a high of approximately 60 funds (Mottola and Utkus [2003]). In addition, investment houses typically offer their clients a large number of fund options, with the largest investment houses offering clients hundreds of funds from which to choose. Given such a wide array of investment options,

it appears that decision makers in investment contexts are likely to be affected by a phenomenon known as the paradox of choice.

While it is believed that having more options from which to choose is preferable to having fewer options, the paradox of choice phenomenon suggests that this may not always be true. More specifically, while more options may provide decision makers with the opportunity for a better decision outcome, the presence of an extensive number of options may result in choice overload and prove to be demotivating, leading to a state of "decision paralysis" in which decision makers may simply choose not to choose (Iyengar and Lepper [2000]). This effect has been found in psychological research in a number of decision contexts, including the purchasing behavior of consumers in a retail setting, decisions by university students concerning the completion of an extra-credit assignment, and decisions by employees concerning

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their participation in employer-sponsored retirement plans (Iyengar, Jiang, and Huberman [2004], Iyengar and Lepper [2000]). This growing body of research in psychology could have important implications for investment decision makers, particularly in contexts in which investment choices are made from a large number of investment options. These may include contexts as varied as the management of personal investment portfolios or the design and administration of mutual fund investment programs.

Notably, however, the findings in psychology concerning the paradox of choice phenomenon are based largely on studies that examined the choice behaviors of decision makers who possessed no particular task-related experience or expertise. This is important because research suggests that many biases in human judgment may be reduced when experienced decision makers perform tasks about which they have considerable knowledge and familiarity (Smith and Kida [1991], Fischhoff [1987, 1982], Funder [1987], Berkeley and Humphreys [1982], Ebbesen and Konecni [1980], Edwards [1983], Hogarth [1981], Einhorn [1976]). For example, Smith and Kida [1991] present evidence from a body of research on professional auditor judgments, which suggests that commonly found heuristics and biases are often mitigated, or even changed, in contexts in which there is a match between the decision maker and the decision task. In this light, it is not clear that the early empirical findings in support of the paradox of choice phenomenon are readily generalizable to decision contexts in which experienced decision makers perform familiar tasks.

The purpose of this study is to empirically examine whether the paradox of choice phenomenon occurs in investment decision making, and whether a decision maker's level of experience with investments affects the paradox of choice. More specifically, we test whether individuals' decisions to invest in mutual funds are affected by choice-set size (i.e., a limited vs. extensive option set) and whether the effect is mitigated or changed for individuals who are more experienced with investment decisions. In addition, we examine whether a more structured investment task (using categorized investment options), which is more representative of what is found in practice, influences the effect of choice-set size on the decision process.

The results indicate that the less experienced participants exhibit behavior consistent with the paradox of choice. That is, a larger percentage of less experienced participants chose to invest in the small choice-set condition than in the large choice-set condition. However, the findings are reversed for more experienced participants, where a larger percentage of participants chose to invest in the large choice-set condition than in the small choice-set condition. These results are contrary to the early findings on the paradox of choice and suggest that more experienced investment decision makers may not readily fall prey to the paradox of choice phenomenon. In fact, in contexts in which decision makers expect to have an extensive choice set, as is typically the case for mutual fund

investing, they may be less likely to choose if they consider the option set to be limited.

In the next section, we discuss the relevant literature. Next, we describe our methodology and findings. We conclude by discussing the implications of our results for the growing body of literature on the paradox of choice and investment decision making.

BACKGROUND LITERATURE

The Effects of Choice-set Size

Iyengar and Lepper [2000] were among the first to empirically examine the specific effects of choice-set size on the behavior of decision makers. They conducted a series of studies in different decision contexts, using both laboratory and field experiments, the results of which suggest that the mere presence of additional options may hamper decision makers' ability to identify the option that best matches their preferences, rendering them less likely to make decisions. For example, when they presented shoppers in a specialty food store displays that featured 6 or 24 flavors of jam, a significantly larger percentage of shoppers (30%) made a purchase when choosing from the limited set size than from the extensive set size (3%). In a second study, they provided students with the opportunity to write a two-page essay as an extra-credit assignment on a topic that was to be selected from a choice set of 6 or 30 topics. A greater percentage of students assigned to the limited choice condition decided to complete the assignment (74%) than did students in the extensive choice condition (60%). Finally, in a third study participants were led to believe they were taking part in a marketing research study concerning how people select chocolates and were asked to make a selection from either a limited array (6 different choices) or an extensive array (30 different choices) of Godiva chocolates. After sampling the chocolate, participants were asked to choose between receiving five dollars or a box containing four Godiva chocolates (ordinarily priced at five dollars). The participants who were presented with a limited selection of chocolates were more likely to choose chocolates as their compensation (48%) than were participants with an extensive selection (10%).

Iyengar, Jiang, and Huberman [2004] extended this work by examining archival data, provided by the Vanguard Center for Retirement Research, relating to the 401(k) retirement savings plans made available by 647 institutions to nearly 800,000 employees. Consistent with the experimental findings presented earlier, the evidence indicated that employee participation rates were lower for retirement plans that offered more fund options than for retirement plans that offered fewer fund options. Among the retirement plans examined, the number of fund options ranged from a low of 2 to a high of 59, and on average, for each 10-fund option increase, individual participation rates declined 2%. For

example, when there were 2 fund options, the participation rate was approximately 75%, while participation was about 61% when 59 funds were available. In a related finding, Kempf and Ruenzi [2006] report that as the number of fund options available increases, an individual is more likely to remain with the status quo (i.e., a previously chosen alternative).

Consistent with these findings, other consumer research suggests that increasing the size of the choice set may have adverse consequences on the strength of consumer preferences because it can confuse consumers, increasing the likelihood they will delay their choice or not choose at all (Chernev [2003a], Dhar [1997], Greenleaf and Lehmann [1995], see Simonson [1999] for a review). Schwartz [2004, 2004a, 2004b] also argues that the paradox of choice can occur because decision makers may experience a higher level of anticipated regret associated with the many alternatives that will not be chosen, some of which might be better than the options they choose, or they may feel more personally responsible for a less than perfect outcome, since with so many options available there is no excuse for anything less than perfection.

Much of the consumer behavior research discussing the adverse impact of assortment on choice focuses on the extra effort needed to evaluate the additional alternatives in a larger assortment (Chernev [2003a], Hauser and Wernerfelt [1990], Huffman and Kahn [1998], Dhar [1997], Jacoby, Speller, and Kohn [1974], Malhorta [1982], Scammon [1977], Shugan [1980]). Of particular importance to the present study, Chernev [2003a] argues that expertise may influence the level of effort needed to evaluate alternatives. That is, because consumers often make choices in areas where they lack expertise, and consequently do not have readily available decision criteria, they must construct their decision criteria—a task that can be more easily accomplished in the context of a smaller rather than a larger choice set (see also Chernev [2003b]).

Impact of Decision Makers' Level of Experience

The early findings concerning the adverse consequences of large choice sets are based largely on studies that used participants that had no particular experience or expertise in the decision task being investigated. For example, Iyengar and Lepper [2000] examined the purchasing behavior of consumers when choosing from among a large number of exotic jams, many of which they had likely not seen before. Similarly, the evidence concerning weakened consumer preferences (Chernev [2003a], Dhar [1997]) is based on laboratory experiments using student participants in generic consumer settings. Even Iyengar, Jiang, and Huberman's [2004] examination of the archival data for the 401(k) retirement savings plans concerned the investment decision behaviors of typical employees (nearly 800,000 in number, from 647 employers), the vast majority of whom, it seems reasonable to assume, are not experienced at picking investment funds.

We raise this question because of a longstanding concern regarding the generalizability of findings that point to widespread ineffectiveness of human judgment and decision processes. For example, Edwards [1983] observed that while a large body of research suggests that humans are prone to errors and biases in their reasoning processes (Kahneman and Tversky [1973, 1972], Tversky and Kahneman [1974], Edwards [1968], Phillips and Edwards [1966], Phillips, Hays, and Edwards [1966]), studies suggest that these findings do not necessarily generalize to contexts in which experienced decision makers perform familiar tasks (e.g., Murphy and Winkler [1977], Lusted et al. [1982], Berkeley and Humphreys [1982], Ebbesen and Konecni [1980], Einhorn [1976], Fischhoff [1987, 1982], Funder [1987], Hogarth [1981]).

The impression that individuals are prone to severe judgment biases may have been overgeneralized, particularly when considering that knowledgeable decision makers perform tasks that are familiar to them. Smith and Kida [1991] presented evidence on this issue by reviewing a body of experimental research that examined a number of heuristics and biases in professional auditor judgments and concluded that when experienced participants are asked to perform familiar tasks, many commonly found judgment biases are often mitigated or even changed.

For example, many studies have reported that individuals often employ confirmatory strategies (i.e., strategies that preferentially attend to evidence that confirms the hypothesis being tested), even in response to the mere framing of a hypothesis in an alternate manner by the researcher (e.g., Skov and Sherman [1986], Berman, Read, and Kenny [1983], Cohen [1981], Snyder [1981], Snyder and Campbell [1980], Snyder and Cantor [1979], Snyder and Gangestad [1981], Snyder and Swann [1978], Snyder and White [1981]). However, while evidence of confirmatory strategies has been found in audit judgment research, Smith and Kida [1991] report that when professional auditors perform job-related tasks, the results provide little support for confirmatory strategies being evoked by the mere reframing of hypotheses (Kida [1984], Trotman and Sng [1989], Anderson and Kida [1989], Butt and Campbell [1989], Anderson [1988]). In fact, the evidence suggests the use of an information-search strategy not typically found in other contexts in which auditors exhibit an overriding concern for negative outcomes, irrespective of the hypothesis auditors are given to test (Kida [1984], Trotman and Sng [1989], Anderson and Kida [1989], Anderson [1988]).

In a similar vein, research in psychology, consumer choice, and audit judgment indicates that while the presence of irrelevant information sometimes weakens the implication of relevant information in individuals' decision processes (Nisbett, Zukier, and Lemley [1981], Glover [1997], Hackenbrack [1992], Hoffman and Patton [1997]), this effect seems to diminish with experience (Shelton [1999]), as more experienced individuals appear to be better

able to focus on the information critical to the task and discount what is irrelevant (Bhattacharjee and Moreno [2002], Alba and Hutchison [1987], Lesgold et al. [1988]).

This body of evidence raises the question whether the early empirical findings in support of the paradox of choice phenomenon, based largely on studies that examined choice behaviors in contexts in which decision makers possessed no particular task-related experience, will generalize to investment decision contexts when decision makers possess task-relevant experience. The findings of Agnew and Szykman [2005] underscore this concern. Examining the investment allocation decisions of individuals in a retirement savings scenario, they found that participants' financial literacy (i.e., level of basic financial knowledge) affected whether they chose to put their money in a default option (allocate all resources to a money market account) or to invest in other nondefault options. In the current study, we investigate a general mutual fund investment context to explicitly examine the impact of a decision maker's level of investment related experience on the paradox of choice phenomenon.

METHODOLOGY

Participants

In order to investigate the effect of investment experience on the paradox of choice, we gathered data from participants who would have relatively less, and more, experience with investment decision making. One hundred and seventy-four undergraduate business students and 93 graduate students from MBA and professional MBA programs participated in the study. Demographic data (reported later) indicated that these two groups differed significantly on their level of experience with stock market investing.

Overview

Participants were asked to decide whether they wanted to invest in mutual funds, given a small versus large option set from which to choose. We first tested for the presence of the paradox of choice phenomenon under conditions similar to prior research in psychology, that is, asking less experienced decision makers to complete the investment task. In practice, mutual funds are often presented in a structured format using labeled categories that reflect different risk levels (e.g., aggressive growth funds, growth funds, growth and income stock funds, growth and income stock and bond funds, bond funds). However, because prior studies on the paradox of choice have typically presented the choice set without a particular structure (e.g., Iyengar and Lepper [2000]), we first presented less experienced participants with a choice set without labeled categories. Undergraduate business students (the participants with less investment experience)

were randomly assigned to a small set/uncategorized condition or a large set/uncategorized condition. The small set/uncategorized group received an option set of 5 mutual funds, while the large set/uncategorized group received a set of 50 funds. Both option sets were presented without labeled categories.

We next tested whether using an investment task that is more representative of what is found in practice (i.e., option set presented with labeled investment risk categories) influences the effect of choice-set size on the decision process. Undergraduate business students were randomly assigned to either a small set/categorized condition (option set contained 5 mutual funds, 1 fund from each of the 5 categories) or a large set/categorized condition (option set contained 50 mutual funds, 10 from each of the 5 categories). In both conditions, the mutual fund option set had the same labeled categories (i.e., aggressive growth funds, growth funds, growth and income stock funds, growth and income stock and bond funds, bond funds). Finally, we used this more realistic investment task (i.e., mutual fund option set presented with labeled investment categories) to examine whether more experienced investors are susceptible to the paradox of choice phenomenon when presented with a decision task with which they have experience. MBA participants were randomly assigned to the small set/categorized condition or the large set/categorized condition.

After receiving their investment choices, all participants were asked to indicate whether they wanted to invest in one or more of the mutual funds, their strength of preference for their choice, and the amount of money they wanted to invest.¹ This was followed by a series of questions concerning the participants' level of experience with investing and mutual funds, along with other demographic and post-experimental questions.

Development of Experimental Materials

The mutual funds option set was developed using actual investment data from a large mutual fund company, with the risk category for each fund determined based on the following published fund data: the fund's stated objective/strategy; its 3-month, one-year, five-year, and ten-year annualized returns; and its beta value (variance) (see Appendix for the complete set of mutual funds listed by risk category). To ensure that differences in decision behavior between the small and large set conditions would not be driven by the specific options provided in the small set condition, each participant in the small set condition received a different set of 5 funds chosen randomly, 1 from each of the 5 investment categories. The names of the mutual funds were changed to prevent their being identified by the participants. The investment data provided to the participants consisted of the actual one-year, three-year, five-year, and ten-year annual return data for each fund in the option set.

Task Procedures

Participants were told to assume they had \$20,000 in the bank and that, as in the real world, there were many things they could do with their money. They were told that they had recently found a reputable investment house that offers a variety of different mutual fund options. Participants were then provided with the list of mutual fund options. Participants in the uncategorized conditions received the fund options without categorized labels while participants in the categorized conditions received the fund options in 5 categories. The funds in the categorized and uncategorized sets were presented in the same order. Participants in the large set conditions received the set of 50 funds, 10 from each of the 5 categories. Participants in the small set conditions received a randomly chosen set of 5 funds, 1 from each of the 5 mutual fund categories.

After reviewing the investment fund choices, participants were asked whether they wanted to invest at the present time in one or more of the funds, and how strongly they preferred the option that they chose, on a 7-point scale (7 = strong preference and 1 = slight preference). If participants indicated they wanted to invest in one or more of the mutual funds, they were then asked to indicate how much money, out of the \$20,000 available, that they wanted to invest. In addition, they were asked to indicate the mutual fund(s) in which they would choose to invest, and how much they would invest in each fund. Participants then responded to a series of questions concerning their degree of experience with investing and mutual funds, along with other post-experimental questions.²

RESULTS

Participant Characteristics

To determine whether there were differences across participant groups in their level of experience with investment decisions, we asked a series of questions relating to stock market investing and mutual funds. As expected, the MBA participants reported having more experience with investment decisions than the undergraduate participants. More specifically, as can be seen in Table 1, a greater percentage of the MBA participants (78.50%) compared with the undergraduate group (36.78%) reported having previously invested in the stock market ($X^2 = 42.21$, $p = .001$). In addition, the more experienced investors (i.e., the MBA group) also reported a greater number of courses taken that discussed investing (means = 1.58 vs. 0.95, $t = 3.57$, $p = .001$), a higher level of familiarity with mutual funds (means = 4.59 vs. 3.63, $t = 2.32$, $p = .011$) and a higher rating of the importance of investing in the stock market, both as a self-perception (means = 5.61 vs. 5.24, $t = 2.15$, $p = .016$) and its desirability among peers (means = 5.14 vs. 4.64, $t = 2.41$, $p = .009$). Further, the demographic data reveals

TABLE 1
Participant Characteristics.

Variables	More Experienced Investors	Less Experienced Investors	P-Value*
Percentage who had previously invested in the stock market	78.50%	36.78%	.001
Years of business work experience	6.35 (6.00)	1.28 (2.14)	.001
Age	30.46 (5.83)	20.11 (2.67)	.001
Number of courses taken that discussed investing in mutual funds or the stock market	1.58 (1.70)	.95 (1.16)	.001
Familiarity with mutual funds (1 = not at all familiar, 7 = very familiar)	4.59 (1.61)	3.63 (4.96)	.011
Importance in investing in mutual funds or the stock market (1 = not at all important, 7 = very important)	5.61 (1.39)	5.24 (1.31)	.016
Peers' views of investing in mutual funds or the stock market (1 = not at all desirable, 7 = very desirable)	5.14 (1.26)	4.64 (1.71)	.009

*All tests are t-tests (one-tailed) except for the percentage investing, which is a chi-square test.

that the more experienced investors were older (means = 30.46 years vs. 20.11, $t = 10.02$, $p = .001$) and had a greater number of years of business experience (means = 6.35 vs. 1.28, $t = 19.80$, $p = .001$). These results indicate that the MBA participants were significantly more experienced with investment decision making compared with the undergraduate participants. On this basis, we can now test whether a decision maker's level of experience with the decision task affects the paradox of choice phenomenon.

Investment Behavior

Table 2 presents an analysis of participants' investment behaviors. Panel A shows the percentage of participants in each group who chose to invest in the mutual fund options, across option-set conditions, while Panels B and C show relevant across group comparisons for the small and large option-set conditions, respectively.

To investigate whether the paradox of choice influences investor decision making in a context similar to much of the prior research in psychology, we first examine the choice behaviors of less experienced investors when choosing from an uncategorized choice set. Panel A shows that 93.1% of the less experienced investors in the small set/uncategorized group were willing to invest in the mutual funds, while only

TABLE 2
Analysis of Participants' Investment Decisions¹.

Panel A: Percentage of Participants Willing to Invest in Mutual Funds					
	Small Set Condition ²	Large Set Condition	Difference	Chi-Square	P-Value
Less experienced investors/no categories ³ (n = 61)	93.1%	71.9%	21.2%	4.64	.031
Less experienced investors/categories (n = 113)	86.0%	78.6%	7.4%	1.06	.303
More experienced investors/categories (n = 93)	66.7%	81.3%	−14.6%	2.58	.108
Panel B: Comparisons of the Small Set Conditions					
Comparison	Chi-Square	P-Value			
More experienced investors/categories vs. less experienced investors/no categories	6.97	.008			
More experienced investors/categories vs. less experienced investors/categories	5.36	.021			
Panel C: Comparisons of the Large Set Conditions					
Comparison	Chi-Square	P-Value			
More experienced investors/categories vs. less experienced investors/no categories	.97	.325			
More experienced investors/categories vs. less experienced investors/categories	.12	.734			

¹After reviewing the investment fund choices, participants were asked whether or not they wanted to invest in one or more of these mutual funds at the present time.

²Participants in the small (large) set condition were presented with 5 (50) mutual funds from 5 categories: aggressive growth funds, growth funds, growth and income stock funds, growth and income stock and bond funds, and bond funds.

³Participants in the No Categories (Categories) condition received the mutual funds without (with) risk category labels.

71.9% of the less experienced investors were willing to invest in the funds in the large set/uncategorized group ($X^2 = 4.64$, $p = .031$). This difference of 21.2% is similar to the effect size found in much of the prior research in psychology on the paradox of choice. Therefore, these results demonstrate the paradox of choice phenomenon for less experienced investors.

To determine whether the paradox of choice will persist in a more realistic context, we next investigate the less experienced investors' decision making when investment choices are presented in categories, as is often the case in the real world. As can be seen in Panel A of Table 2, while in the direction predicted by the paradox of choice, the percentage of less experienced investors willing to invest in mutual funds in the small set/categorized group (86.0%) was not significantly different from the percentage of less experienced investors willing to invest in the large set/categorized group (78.6%, $X^2 = 1.06$, $p = .303$). These results support the notion that the paradox of choice may be mitigated when decision makers are performing tasks that categorize large option sets into smaller subsets, as is often found in practice.

Table 2 shows that for more experienced decision makers, there is a reversal of the paradox of choice phenomenon. When the investment fund choices were presented by risk category, as is found commonly in practice, a *smaller* percentage of the more experienced investors decided to invest in the funds when given a small set (66.7%) from which to choose than when given a large set (81.3%). These results actually demonstrate a reversal of the paradox of choice for more experienced investment decision makers.

As shown in Panel B of Table 2, when presented with a limited investment set, a significantly smaller proportion of more experienced investors (66.7%) were willing to invest in the mutual funds compared with the less experienced investors in both the uncategorized condition (93.1%) and the categorized condition (86.0%) ($X^2 = 6.97$, $p = .008$; $X^2 = 5.36$, $p = .021$, respectively). This could be because more experienced investors are likely to have had experience with an extensive choice set, as is often available in practice, and are therefore less inclined to invest when their choice set is limited. As indicated in Panel C of Table 2, no differences in investment behavior are observed between the more experienced investors (81.3%) and the less experienced investors in the uncategorized condition (71.9%) or the categorized condition (78.6%) when offered a large investment set ($X^2 = .97$, $p = .325$; $X^2 = .12$, $p = .734$, respectively). The results indicate that the reversal of the paradox of choice with the more experienced investors appears to be driven primarily by the small set condition.

We extended the analysis of investment decisions in the small set condition to investigate whether certain aspects of investor experience affected investment behavior more than other experience characteristics. We compared the investment behavior of the top third and bottom third of participants for each of the 7 experience characteristics measured. One-tailed chi-square tests revealed that if participants had previously invested in the stock market, they were less likely to invest in the limited investment set offered in the study (72.4% invested previously versus 84.0% not invested

previously, $p = .08$). In addition, participants with more business experience and older participants were less likely to invest with limited investment options (68.9% more business experience versus 83.8% less business experience, $p = .08$; 65.7% older versus 84.4% younger, $p = .025$, respectively). On the other hand, there were no significant differences for the number of courses taken that discussed investing in mutual funds, self-reported familiarity with mutual funds, and peers' views of investing in mutual funds (all $ps > .1$). Not surprisingly, if participants thought it was important to invest in mutual funds, they were more likely to invest in the study. These results indicate that prior experience with mutual fund investing, age, and business experience appear to be more significant variables in determining the effects of experience on investors' decisions.

Consistent with prior research on expert decision making (Smith and Kida [1991]), the data reported here suggest that the paradox of choice is a psychological phenomenon that may not persist, and may even change, when more experienced investors perform realistic tasks.³

CONCLUSION

Although it is believed that having more options from which to choose is preferable to having fewer options (see Lancaster [1990] and Kahn and Lehmann [1991] for reviews), prior research in psychology on the paradox of choice phenomenon demonstrates that this may not always be true. Research has shown that decision makers often have difficulty making a choice when "too many" options are available (e.g., Iyengar and Lepper [2000], Iyengar, Jiang, and Huberman [2004]). In this study, we extend our understanding of the paradox of choice by empirically examining whether this phenomenon is present in an investment decision context and whether it will persist when more experienced investment decision makers perform more realistic tasks.

We find that the phenomenon is evident in the investment domain for less experienced participants, but actually reverses for more experienced decision makers. That is, contrary to the findings reported in prior research in psychology on the paradox of choice, more experienced investors were less likely to invest in mutual funds when provided with a small choice set compared with a large choice set. The results suggest that more experienced decision makers may have an expectation of having an extensive set of mutual funds available to them, as is commonly found in practice. When these expectations were not met in the small set condition, the more experienced investors were less inclined to invest when provided an impoverished option set. These findings lend insight into the applicability of the paradox of choice phenomenon to more experienced investment decision makers.

We also examined whether task structure can mitigate the paradox of choice phenomenon. Our results indicate that while less experienced investors fall prey to the paradox of

choice when the option set is presented without category labels, the paradox of choice is somewhat mitigated for less experienced investors when they are presented with a categorized option set. These findings suggest that decision aids that provide structure to more complex tasks may reduce paradox of choice effects for less experienced decision makers, again adding to our understanding of the paradox of choice.

This study adds to a growing body of recent research on the effects of experience on investor decision making. For example, research has found that novice investors' judgments are affected by the comprehensibility of the data presentation (Mulligan and Hastie [2005]). Our results are consistent with this study in that we find novice investors to be less susceptible to the paradox of choice when the information set is presented in a more coherent categorized form than an uncategorized form. Recent research has also found that investors who trade more often suffer less from a disposition effect (i.e., selling winners too early and riding losers too long) (Chen, Kim, Nofsinger, and Rui [2007]). These investor studies suggest that more experienced investors do not appear to be as susceptible to biases as less experienced investors, a finding consistent with our results reported here. In fact, Gregan-Paxton and Cote [2000] argue that more experienced investors frequently utilize existing knowledge as a basis for their investment decisions rather than just relying on available information. It is perhaps their existing knowledge of a typically larger set of available investment options in the real world that the more experienced investors brought to the current study, which led them to invest less in the small set condition.

Finally, the current study adds to our understanding of decision making in general. Prior research has found that the notion that individuals readily fall prey to judgment biases may have been overgeneralized, particularly when one considers knowledgeable decision makers performing realistic tasks (see Smith and Kida [1991] for a review). The current study's findings are in line with this research in that the paradox of choice phenomenon may not generalize to more experienced decision makers who are performing more realistic tasks.

As a consequence, the findings of this study add to a growing body of literature on the paradox of choice, the effect of experience on decision making in general, and investor decision making in particular. Given that our results demonstrate that, in an investment decision context, a decision maker's investment experience can impact the paradox of choice phenomenon, future research is needed to examine specific contextual and individual factors underlying the paradox of choice.

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NOTES

1. Based on prior research, we also investigated whether feelings of responsibility would exacerbate the paradox of choice phenomenon. Participants in the low responsibility condition were told that an investment advisor from the investment house personally selected a group of funds for them, and participants in the high responsibility condition were simply presented with a list of mutual funds offered by the investment house. Results indicate that responsibility did not influence investment behavior and so the analyses presented in the paper are collapsed over this variable.
2. We asked a series of post-experimental questions that prior research suggests may be an explanation for the paradox of choice to assess whether these variables affected participants' investment behavior. These variables included participants' level of frustration, satisfaction, and satisficer/maximizer tendencies. No differences were observed across conditions for these variables, and the results are not presented.
3. After they responded whether they would invest in any of the mutual funds, participants were asked to rate their level of preference for their chosen alternative. Results of the participants' choice preferences are consistent with their investment choice behavior and are therefore not reported. In addition, participants were asked to indicate how much money they would invest in the mutual funds. No differences were found across the experimental conditions for this variable.

REFERENCES

- Agnew, J. and L. Szykman. "Asset Allocation and Information Overload: The Influence of Information Display, Asset Choice, and Investor Experience." *Journal of Behavioral Finance*, 6(2), (2005), pp. 57–70.
- Alba, J. and J. W. Hutchinson. "Dimensions of Consumer Expertise." *Journal of Consumer Research*, 13(4), (1987), pp. 411–454.
- Anderson, B. *An Examination of the Factors Affecting Auditors' Hypothesis Testing Strategies*, (1988), Unpublished Doctoral Dissertation, University of Massachusetts.
- Anderson, B. and T. Kida. *An Examination of the Strategies Used by Auditors' to Test Inherited Hypotheses*, (1989), Working Paper, Boston University.
- Berkeley, D. and P. Humphreys. "Structuring Decision Problems and the 'Bias Heuristic.'" *Acta Psychologica*, 50, (1982), pp. 201–252.
- Berman, J., S. Read, and D. Kenney. "Processing Inconsistent Social Information." *Journal of Personality and Social Psychology*, 45, (1983), pp. 1211–1224.
- Bhattacharjee, S. and K. Moreno. "The Impact of Affective Information on the Professional Judgments of More Experienced and Less Experienced Auditors." *Journal of Behavioral Decision Making*, 15(4), (2002), pp. 361–377.
- Butt, J. and T. Campbell. "The Effects of Information Order and Hypothesis-testing Strategies on Auditors' Judgments." *Accounting, Organizations and Society*, 14(5/6), (1989), pp. 471–479.
- Chen, G., K. Kim, J. Nofsinger and O. Rui. "Trading Performance, Disposition Effect, Overconfidence, Representativeness Bias and Experience of Emerging Market Investors." *Journal of Behavioral Decision Making*, (forthcoming).
- Chernev, A. "When More Is Less and Less Is More: The Role of Ideal Point Availability and Assortment in Consumer Choice." *Journal of Consumer Research*, 30(2), (2003), pp. 170–183.
- Chernev, A. "Product Assortment and Individual Decision Processes." *Journal of Personality and Social Psychology*, 85(1), (2003), pp. 151–162.
- Cohen, C. "Person Categories and Social Perception: Testing Some Boundaries of the Processing Effects of Prior Knowledge." *Journal of Personality and Social Psychology*, 40, (1981), pp. 441–452.
- Dhar, R. "Consumer Preference for a No-choice Option." *Journal of Consumer Research*, 24(2), (1997), pp. 215–231.
- Ebbeson, E. and V. Konecni. "On the External Validity of Decision-making Research: What Do We Know About Decisions in the Real World." In *Cognitive Processes in Choice and Decision Behavior* (pp. 21–45), Wallsten, T. S. (ed.), (1980), Hillsdale, NJ: Erlbaum.
- Edwards, W. "Conservatism in Human Information Processing." In *Formal Representations of Human Judgment* (pp. 17–52), Kleinmuntz, B. (ed.), (1968), New York: Wiley.
- Edwards, W. "Human Cognitive Capabilities, Representativeness, and Ground Rules for Research. In *Advances in Psychology: Analyzing and Aiding Decision Processes* (pp. 507–513), Humphries, P. C., O. Svenson, and A. Vari (eds.), (1983), Amsterdam: North Holland.
- Einhorn, H. "A Synthesis: Accounting and Behavioral Science." *Journal of Accounting Research*, 14 (Supplement), (1976), pp. 196–206.
- Fischhoff, B. "Debiasing." In *Judgment Under Uncertainty: Heuristics and Biases* (pp. 422–444), Kahneman, D., P. Slovic, and A. Tversky (eds.), (1982), New York: Cambridge University Press.
- Fischhoff, B. "Judgment and Decision Making." In *The Psychology of Human Thought* (pp. 153–187), Sternberg, R. and E. Smith (eds.), (1987), New York: Cambridge University Press.
- Funder, D. "Errors and Mistakes: Evaluating the Accuracy of Social Judgment." *Psychological Bulletin*, 101, (1987), pp. 75–90.
- Glover, S. "The Influence of Time Pressure and Accountability on Auditors' Processing of Nondiagnostic Information." *Journal of Accounting Research*, 35(2), (1997), pp. 213–226.
- Greenleaf, E. and D. Lehmann. "Reasons for Substantial Delay in Consumer Decision Making." *Journal of Consumer Research*, 22(2), (1995), pp. 186–199.
- Gregan-Paxton, J. and J. Cote. "How do Investors Make Predictions? Insights from Analogical Reasoning Research." *Journal of Behavioral Decision Making*, 13(3), (2000), pp. 307–327.
- Hackenbrack, K. "Implications of Seemingly Irrelevant Evidence in Audit Judgment." *Journal of Accounting Research*, 30(1), (1992), pp. 126–136.
- Hauser, J. and B. Wernerfelt. "An Evaluation Cost Model of Consideration Sets." *Journal of Consumer Research*, 16, (1990), pp. 393–408.
- Hoffman, V. and J. Patton. "Accountability, the Dilution Effect and Conservatism in Auditors' Fraud Judgments." *Journal of Accounting Research*, 35(2), (1997), pp. 227–237.
- Hogarth, R. "Beyond Discrete Biases: Functional and Dysfunctional Aspects of Judgmental Heuristics." *Psychological Bulletin*, 90, (1981), pp. 197–217.
- Huffman, C. and B. Kahn. "Variety for Sale: Mass Customization or Mass Confusion?" *Journal of Retailing*, 74(4), (1998), pp. 491–513.
- Iyengar, S., W. Jiang and G. Huberman. "How Much Choice is Too Much?: Contributions to 401(k) Retirement Plans." In *Pension Design and Structure: New Lessons from Behavioral Finance* (pp. 83–95), Mitchell, O. and S. Utkus (eds.), (2004), Oxford: Oxford University Press.
- Iyengar, S. and M. Lepper. "When Choice Is Demotivating: Can One Desire Too Much of a Good Thing?" *Journal of Personality and Social Psychology*, 79(6), (2000), pp. 995–1006.
- Jacoby, J., D. Speller and C. Kohn. "Brand Choice Behavior as a Function of Information Load." *Journal of Marketing Research*, 11(1), (1974), pp. 63–69.

- Kahn, B. and D. Lehmann. "Modeling Choice Among Assortments." *Journal of Retailing*, 67(3), (1991), pp. 274–299.
- Kahneman, D. and A. Tversky. "Subjective Probability: A Judgment of Representativeness." *Cognitive Psychology*, 3, (1972), pp. 430–454.
- Kahneman, D. and A. Tversky. "On the Psychology of Prediction." *Psychological Review*, 90, (1973), pp. 237–251.
- Kempf, A. and S. Ruenzi. "Status-quo Bias and the Number of Alternatives: An Empirical Illustration from the Mutual Fund Industry." *Journal of Behavioral Finance*, 7(4), (2006), pp. 204–213.
- Kida, T. "The Impact of Hypothesis-testing Strategies on Auditors' Use of Judgment Data." *Journal of Accounting Research*, 22(1), (1984), pp. 332–340.
- Lancaster, K. "The Economics of Product Variety: A Survey." *Marketing Science*, 9(3), (1990), pp. 189–206.
- Lesgold, A., A. Rubinson, P. Feltovich, R. Glaser, D. Klopfer and Y. Wang. "Expertise in a Complex Skill: Diagnosing X-ray Pictures." In *The Nature of Expertise* (pp. 311–342), Chi, M., R. Glaser, and M. Farr (eds.), (1998), Hillsdale, NJ: Erlbaum.
- Lusted, L., H. Roberts, D. Wallace, M. Lahiff, W. Edwards, J. Loop, R. Bell, J. Thornbury, D. Seale, J. Steele and D. Fryback. "Efficacy of Diagnostic Radiologic Procedures." In *Practical Evaluation: Case Studies in Simplifying Complex Decision Problems*, Snapper, K. (ed.), (1982), Washington, DC: Information Resources Press.
- Malhorta, N. "Information Load and Consumer Decision Making." *Journal of Consumer Research*, 8 (March), (1982), pp. 419–430.
- Mottola, G. and S. Utkus. "Can There Be Too Much Choice in a Retirement Savings Plan?" Research Report: The Vanguard Center for Retirement Research, 2003.
- Mulligan, E. and R. Hastie. "Explanations Determine the Impact of Information on Financial Investment Judgments." *Journal of Behavioral Decision Making*, 18(2), (2005), pp. 145–156.
- Murphy, A. and R. Winkler. "Probability Forecasts: A Survey of National Weather Service Forecasters." *Bulletin of the American Meteorological Society*, 55, (1977), pp. 1449–1453.
- Nisbett, R., H. Zukier and R. Lemley. "The Dilution Effect: Nondiagnostic Information Weakens the Implications of Diagnostic Information." *Cognitive Psychology*, 13(2), (1981), pp. 248–277.
- Philips, J., W. Hays and W. Edwards. "Conservatism in Complex Probabilistic Inference." *IEEE Transactions on Human Factors in Electronics*, HFE-7, (1966), pp. 7–18.
- Philips, L. and W. Edwards. "Conservatism in a Simple Probability Inference Task." *Journal of Experimental Psychology*, 72, (1966), pp. 346–357.
- Scammon, D. "Information Load and Consumers." *Journal of Consumer Research*, 4, (1977), pp. 148–155.
- Schwartz, B. "Freedom, Choice, Wealth, and Welfare." Swarthmore College, (2004).
- Schwartz, B. "A Nation of Second Guesses." *New York Times*, (2004, January 22).
- Schwartz, B. *The Paradox of Choice: Why More Is Less* (1st ed.), (2004), New York: Ecco.
- Shelton, S. "The Effect of Experience on the Use of Irrelevant Evidence in Auditor Judgment." *Accounting Review*, 74(2), (1999), pp. 217–224.
- Shugan, S. "The Cost of Thinking." *Journal of Consumer Research*, 7(2), (1980), pp. 99–111.
- Simonson, I. "The Effect of Product Assortment on Buyer Preferences." *Journal of Retailing*, 75(3), (1999), pp. 347–370.
- Skov, R. and S. Sherman. "Information-gathering Processes: Diagnosticity, Hypothesis-confirmatory Strategies and Perceived Hypothesis Confirmation." *Journal of Experimental Social Psychology*, 22, (1986), pp. 93–121.
- Smith, J. and T. Kida. "Heuristics and Biases: Expertise and Task Realism in Auditing." *Psychological Bulletin*, 109(3), (1991), pp. 472–489.
- Snyder, M. "Seek and Ye Shall Find: Testing Hypotheses About Other People." In *Social Cognition: The Ontario Symposium* (pp. 277–304), Higgins, E., C. Herman and M. Zanna (eds.), (1981), Hillsdale, NJ: Erlbaum.
- Snyder, M. and B. Campbell. "Testing Hypotheses About Other People: The Role of Hypothesis." *Personality and Social Psychology Bulletin*, 6, (1980), pp. 421–426.
- Snyder, M. and N. Cantor. "Testing Hypotheses About Other People: The Use of Historical Knowledge." *Journal of Experimental Social Psychology*, 15, (1979), pp. 330–342.
- Snyder, M. and S. Gangestad. "Hypothesis-testing Processes." In *New Directions in Attribution Research* (pp. 171–196), Harvey, J., W. Ickes, and R. Kidd (eds.), (1981), Hillsdale, NJ: Erlbaum.
- Snyder, M. and W. B. Swann, Jr. "Behavioral Confirmation in Social Interaction: From Social Perception to Social Reality." *Journal of Experimental Social Psychology*, 14, (1978), pp. 148–162.
- Snyder, M. and P. White. "Testing Hypotheses About Other People: Strategies of Verification and Falsification." *Personality and Social Psychology Bulletin*, 7(1), (1981), pp. 39–43.
- Trotman, K. and J. Sng. "The Effect of Hypothesis Framing, Prior Expectations and Cue Diagnosticity on Auditors' Information Choice." *Accounting, Organizations and Society*, 14(5/6), (1989), pp. 565–576.
- Tversky, A. and D. Kahneman. "Judgment Under Uncertainty: Heuristics and Biases." *Science*, 185, (1974), pp. 1124–1131.

APPENDIX: EXCERPT OF EXPERIMENTAL MATERIALS: LIST OF MUTUAL FUNDS

Average Annual Total Returns (%) for Each Fund Over the Periods Indicated

Investment Options	1 Year	3 Year	5 Year	10 Year
Aggressive Growth Funds				
Growth Ventures	1.55	22.97	3.57	8.83
Freedman Micro-Cap	-2.76	18.70	3.39	14.77
Regent Emerging Growth	0.68	19.38	-5.84	11.20
Alpha Small Cap	-6.86	16.13	10.84	13.34
Dynamics Aggressive Growth	10.36	19.54	-5.16	7.96
Bentley Aggressive Growth	-0.51	20.81	2.15	15.54
Hartley Small Cap	9.12	22.89	0.28	8.86
Logan Emerging Growth	7.59	17.53	-10.31	6.62
Kendall Small-Cap	3.44	18.42	-4.18	10.86
Stone Aggressive Growth	-3.53	18.67	3.83	7.52
Growth Funds				
Flex Growth	0.10	16.68	-1.75	10.75
Fresco Mid Cap	4.19	17.48	-1.92	9.03
Omega Growth	3.65	17.39	0.15	8.57
Premier Equity Fund	11.67	13.24	-5.39	5.50
Advance Trend	-0.94	14.06	0.14	9.22
Vance Growth	1.17	16.49	0.30	4.63
Green Mid Cap	3.34	16.02	-0.97	6.65
Third Mid Cap	5.52	16.06	0.27	7.36
Mason Growth	3.99	14.12	-1.92	8.32
New Century Growth	1.50	14.44	-5.11	4.46
Growth and Income Stock Funds				
Charter Growth & Income	2.95	8.81	-2.48	6.13
Enterprise Fund	6.94	9.62	-2.30	2.44
Sunrise Large Cap	12.70	14.07	-0.07	9.63
Drisco Large Cap	8.05	11.60	0.12	8.66
Randall Growth & Income	7.56	12.13	-1.28	4.73
Hamilton Equity	10.77	11.65	1.09	6.39
Destiny Fund	8.35	9.93	-0.17	4.96
Drew Equity	8.25	11.88	0.42	9.04
Beta Growth & Income	8.16	11.80	0.42	4.71
Highhouse Large Cap	7.94	11.57	0.15	8.72
Investment Options	1 Year	3 Year	5 Year	10 Year
Growth and Income Stock and Bond Funds				
Rock Value	6.25	9.29	0.18	8.41
Porter Growth & Income	1.32	10.82	3.27	11.05
Basic Value	2.49	11.39	3.59	10.96
DIT Growth & Income	7.25	9.32	0.43	5.40
America Allocation Fund	9.74	13.47	4.14	8.59
Fundamental Large Cap	9.87	8.91	0.00	1.93
Eastern Large Cap	5.10	10.75	1.17	6.60
Reed Growth and Income	10.79	10.33	1.30	1.49
Coastal Value	8.12	8.36	-0.34	6.75
Meyer Large Cap	6.72	11.36	1.46	6.47
Bond Funds				
Price Corporate Income	3.11	7.46	7.49	6.35
Fargo Corporate Bond	2.46	6.60	5.95	6.03
Access Bond	3.67	4.17	6.57	5.80
Treemont Bond	3.38	3.71	6.11	5.14
Advantage Bond	2.66	3.83	6.17	6.00
Hendrix Managed Income	1.78	3.41	5.75	5.74
Managers Bond	2.81	6.01	8.02	7.14
Core Plus	2.69	5.79	6.46	7.00
Broad Market	2.58	4.77	6.09	6.50
Newton Bond Fund	1.30	2.98	5.20	5.71

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