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It's Not Only What You Know but also How Knowledgeable You Feel:

Subjective Knowledge in Consumer Financial Decisions

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ABSTRACT

We propose that attempts to increase consumers' objective knowledge concerning investment opportunities can deter their willingness to participate when they diminish consumers' subjective level of knowledge. In three studies, using different manipulations of subjective knowledge and various financial products, we show that consumers' subjective knowledge about financial products influences choice independently of available objective financial knowledge or information. Specifically, we find that: willingness to pursue a risky investment is increased (decreased) when consumers are presented with less (more) information concerning a prior set of investments (Study 1); willingness to participate in a 401(k) program can be enhanced (diminished) by asking consumers an easy (difficult) question about investments (Study 2); and technically elaborating information concerning a "lifestyle" mutual fund diminishes its attractiveness (Study 3). Further, we find that these effects are mediated by subjective level of knowledge (Studies 2 and 3). We propose that methods that enhance subjective knowledge may be used to aid financial education programs to promote wiser financial decisions.

Keywords: Consumer choice, financial decision making, metacognition, subjective knowledge, financial education

Among the most important decisions that consumers face are those that involve financial products—from the choice of a retirement savings portfolio to the terms of a mortgage to the lease parameters on a car. In recent years there has been a proliferation of new and complex financial products that have come available to consumers. Unfortunately, a growing body of research suggests that many consumers lack the financial literacy to adequately evaluate and choose wisely among financial products (Benartzi and Thaler 2001; Benartzi et al. 2007; Choi, Laibson, and Madrian 2005a, 2005b; Choi et al. 2002; Lusardi 2008; Lusardi and Mitchell 2007). Recognizing that many consumers fail to make well-informed financial decisions, governments, employers, and financial institutions have turned to various forms of financial education to help consumers choose more wisely. However, evidence concerning the effectiveness of financial education in improving financial conduct is mixed (Choi et al. 2002; Lusardi and Mitchell 2007).

We assert that financial education programs fail because they focus almost exclusively on enhancing objective knowledge and overlook the subjective experience of financial decision makers. In this research, we explore the role of *subjective knowledge*, the perceived level of knowing, in financial decision making. We propose that holding objective knowledge or information about financial products constant, consumers feel more comfortable making investment decisions as they feel more confident in their knowledge about relevant financial instruments. We provide empirical support for the impact of subjective knowledge on financial decisions in three studies that manipulate the extent to which one feels knowledgeable while holding relevant objective knowledge or information constant. We suggest that attempts to provide consumers with relevant product information may enhance their objective level of knowledge while paradoxically diminishing their level of subjective knowledge. Thus, such

well-meaning efforts can actually deter consumers from choosing more speculative or complex investments that may better suit their needs.

We proceed as follows. First, we review the literatures on financial illiteracy and subjective knowledge. Next, we present the results of three experimental studies that illustrate the relationship between consumer subjective knowledge and financial decisions. We close with a discussion of implications of our results for financial literacy programs.

THEORETICAL BACKGROUND

Financial Well-Being and Financial Illiteracy

A growing body of research suggests that many consumers lack basic financial literacy necessary to evaluate financial choice options and choose wisely, even when full information is provided to them (Benartzi and Thaler 2001; Benartzi et al. 2007; Choi, Laibson, and Madrian 2005a, 2005b; Choi et al. 2002; Lusardi 2008; Lusardi and Mitchell 2007; Stango and Zinman 2009a; 2009b). For example, Benartzi et al. (2007) reported that 20% of their survey respondents said they would rather have \$1,000 of employer stock that they could not diversify until the age of 50 than \$1,000 that they could invest without restrictions. Likewise, employees typically diversify their investment portfolios in a naïve way over the available options, with little regard to the nature of the investments over which they are diversifying. Benartzi and Thaler (2001) find in experiments and archival data that consumers strongly tend toward spreading their money evenly among investments offered in their retirement savings plans. Langer and Fox (2010) show that this can lead to portfolio choices that systematically depend on whether investments happen to be grouped by vendor and whether consumers designate their

investments in dollars or number of shares. They further find that this tendency is attenuated when consumers choose portfolios directly rather than allocate money among investments.

Not only do consumers have difficulty making decisions about how to invest their retirement money, they also have difficulty making decisions about how much money to contribute. Choi, Laibson, and Madrian (2005b) examined seven companies that matched employee contributions in their 401(k) retirement; that is, for every dollar employees contributed up to a certain threshold, their employer made a proportional matching contribution. Additionally, these plans allowed employees to make withdrawals for any reason without penalty. Thus, for these employees, making the maximum matched contribution was the dominant option. Nevertheless, between 20% and 60% of these employees contributed less than the maximum amount, forgoing as much as 6% of their annual pay in matched contributions. Further investigation revealed that employees who failed to exploit the employer match were less financially literate than those at or above the match threshold.

In light of the importance of consumer financial decisions and the recognition of such deficiencies in consumer financial decision making, governments, employers, and financial institutions have begun to engage in financial education through such means as paycheck stuffers, newsletters, summary plan descriptions, seminars, individual consultations with financial planners, and access to Internet based education and planning tools. Unfortunately, studies of such interventions have turned up mixed results. Although some papers have found a positive effect of financial education on financial decisions (Bayer, Bernheim, and Scholz 2008; Lusardi 2008; Lusardi and Mitchell 2007), others have critiqued this work for use of nonrepresentative samples, reliance on statements of intention rather than actual behavior, or confounds between a firm's provision of financial education and other factors that influence

saving behavior such as the level and structure of compensation (Choi et al., 2002; Lusardi 2008; Lusardi and Mitchell 2007; Madrian and Shea 2001a).

In an attempt to overcome some of these issues, Madrian and Shea (2001b) examined the impact of financial education seminars on retirement saving behavior in 42 different locations of a particular company in which seminar attendance and actual saving behavior were tracked both before and after seminars. At the conclusion of the seminar, virtually all of the seminar attendees who were not already participating in a 401(k) plan said they planned to enroll. However, a scant 14% actually joined the plan following the seminar, compared to 7% of the employees who enrolled but had not attended a seminar. Apparently, educating employees about investment programs and options is not sufficient to induce high rates of enrollment.

Subjective Knowledge

The provision of financial education is based on the premise that increasing consumers' objective knowledge about available options will generally increase their tendency to choose wisely, a premise that has received ample empirical support in a variety of consumer choice contexts (see Alba and Hutchinson 1987 for an expansive review of research on consumer knowledge). For instance, researchers have found that when consumers are more knowledgeable about the product category they can better detect product-related information (Johnson and Russo 1984; Punj and Staelin 1983) and they require less attention to understand product-related information (Alba and Hutchinson 1987). Also, knowledgeable consumers rely more heavily on abstract product features than on "nonfunctional" attributes such as brand name or price (Park and Lessig 1981), and they tend to be more confident in their ability to make a good choice (Brucks 1985; Park and Lessig 1981; but see Carlson et al. 2009).

Consumer researchers frequently distinguish between objective knowledge, product-related information stored in memory such as relevant attributes or terminology, and subjective knowledge, or the feeling of knowing (e.g., Brucks 1985; Carlson et al. 2009). A dissociation between objective and subjective knowledge has been documented across a wide range of research domains—for example, it is evident in people’s tendency to be overconfident in the accuracy of their likelihood judgments (Lichtenstein, Fischhoff, and Phillips 1982; see also Alter and Oppenheimer 2009; Novemsky et al. 2007; Schwartz 2004). More to the point, Graham, Harvey, and Huang (2009), using data from several USB/Gallup investor surveys, find that investors who rated themselves “more comfortable” in their “ability to understand investment product alternatives and opportunities” tended to trade more often and diversify more internationally.

In the present paper we suggest that manipulating subjective knowledge (independently of objective knowledge) can affect financial decision making because a consumer’s level of confidence influences his or her willingness to pursue investment opportunities. In a related vein, studies of decisions under uncertainty (e.g., Fox and Tversky 1995; Fox and Weber 2002) have found that decision makers’ relative level of knowledge can exert a strong impact on willingness act, holding objective level of knowledge constant. For example, Fox and Weber (2002, Study 2A) asked American participants which of two candidates they thought would win the upcoming Russian election (a medium-knowledge item for most) and whether they would prefer receiving \$50 for sure or \$150 if they were correct. Half the participants received this item after being asked who they thought would win the upcoming American election (so the contrast with the American election would make them feel less competent predicting the Russian election result) and half received this item after being asked who they thought would win the

upcoming Dominican Republic election (so that the contrast with the Dominican Republic election would make them feel more competent predicting the Russian election result). Although both groups presumably had on average the same objective level of knowledge concerning the Russian election, the group that felt less knowledgeable was much less likely to bet on their forecast.

In summary, studies of decision making cited above suggest that subjective knowledge can have a profound impact on consumers' willingness to invest, even if a potential investment is more speculative or less familiar. We propose that interventions designed to promote a subjective feeling of financial competence can influence willingness to invest under uncertainty, holding objective knowledge constant. Furthermore, we assert that when the less familiar and more speculative options are more suitable for consumers interventions designed at enhancing not only objective but also subjective knowledge may improve decisions.

In this paper we test the following hypotheses:

H1: Holding objective knowledge constant, increased subjective knowledge about financial products increases consumer willingness to choose a risky option.

H2: Holding objective knowledge constant, increased subjective knowledge about financial products increases consumer willingness to save for retirement.

H3: Increased objective knowledge provided in a technical format can reduce the willingness to take risk due to its negative impact on subjective knowledge.

We continue by describing three studies designed to test these hypotheses. In Study 1 we hold information constant concerning two possible investments, and manipulate subjective knowledge by contrasting the level of information provided with another set of possible investments. Study 2 explores the impact of subjective knowledge on willingness to enroll in

401(k) retirement saving plans and shows that perceived subjective knowledge mediates the effect. Finally, Study 3 shows that educating consumers about investments through technical elaboration of basic characteristics can deter them from investing in an instrument because this elaboration can undermine consumers' subjective knowledge.

Study 1: Subjective Knowledge and Willingness to Take Risk

Our first study examines the impact of subjective knowledge (SK) on preference for a safe investment option offering a constant rate of return versus a risky investment option offering a variable return (hypothesis H1). We presented participants with past quarter-by-quarter returns of hypothetical investments, varying the amount of historical information presented for different pairs of investments.

Method. Twenty-four undergraduate students participated in the study for payment. The study included two choice tasks, a reference task and the target task. Participants were asked to imagine wanting to invest money for a period of one month and to choose among two investment options: one that had consistently yielded positive returns (the "safe" fund) and another that had yielded varying positive returns (the "risky" fund). In the first (reference) choice task the safe fund consistently yielded a 5% monthly return and the risky fund yielded a 10% monthly return or 0% return with equal probabilities. In the second (target) task, the safe fund consistently yielded a 3% monthly return and the risky fund yielded a 4% monthly return with probability .8 and a 0% monthly return otherwise. Returns were drawn without replacement from distributions that were fixed in advance, in a random order for each participant.

We manipulated SK through the relative amount of information provided in the reference task that preceded the target task. All participants were provided with 20 months of past returns for the target task. Participants in the *high-SK* condition viewed the returns of each fund for the past 10 months in the reference task; participants in the *low-SK* condition viewed the returns of each fund for the past 40 months in the reference task. Note that all participants received the same sample of information about past returns of each fund of the target task (20 months) and thus had the same level of objective knowledge about the target decision. However, participants in the low-SK condition received more information about the returns of the investment options of the reference set of investments, thereby leading to the perception that they were relatively poorly-informed about the returns of the target investments; meanwhile participants in the high-SK condition received less information about the returns of the reference set of investments, thereby leading to the perception that they were relatively well-informed about the returns of the target investments.

We hypothesized that participants would be more likely to choose the risky investment in the high-SK knowledge condition. Table 1 summarizes the return distribution and the amount of information provided about each fund in the reference and target choice tasks, by condition.

Insert Table 1 about here

Results and Discussion. Results conformed to the prediction of hypothesis H1. In support of our hypothesis, 62% of the participants in the high-SK condition, but none of the participants in the low-SK condition, chose to invest in the risky fund in the target task ($p < .002$ by Fisher's exact test). Since all participants received the same information about the choice alternatives of the target choice task, the difference in preference between the high- and low-SK conditions cannot be attributed to objective information about the funds.

In sum, Study 1 demonstrates that holding objective knowledge constant, subjective knowledge can influence willingness to take risk. Although we believe that the contrast between the number of monthly returns provided in the reference task versus the target task led to stronger feelings of subjective knowledge, we did not measure this directly. In Study 2 we directly measure subjective knowledge in the context of 401(k) retirement saving plans and examine whether subjective knowledge mediates the willingness to join a retirement plan.

Study 2: Subjective Knowledge as a Mediator for Willingness to Invest

In Study 2 we examine subjective knowledge in a different financial context, whether or not consumers would be willing to join a 401(k) retirement plan. About a quarter of American employees eligible to participate in 401(k) retirement saving plans fail to do so, even when offered valuable employer matching contributions and tax advantages for contributing (www.retirementsecurityproject.org). Policy makers are thus striving to find ways to encourage employees to join retirement saving plans, and many programs involve education to enhance objective knowledge. In this study we examine whether enhancing employees' subjective knowledge about 401(k) retirement saving plans increases the likelihood that they join these plans (hypothesis H2).

In Study 2 we also use a different type of manipulation of subjective knowledge to demonstrate how sensitive consumers are to feelings of ignorance. Participants in the low-SK condition were asked a difficult-to-answer question about finances whereas participants in the high-SK condition were asked an easy-to-answer question about finances. We predicted that the difficulty to answer the question in the low-SK condition would call attention to participants' ignorance and would therefore diminish SK; in contrast, the ease of answering the question in the

high-SK condition would emphasize participants' knowledge and would therefore enhance SK. We further expected that the higher participants' SK the more willing they would be to join 401(k) plans.

Method. Two hundred undergraduate students at a major West Coast university answered a brief survey as part of a larger packet of unrelated items in exchange for \$20. We provided participants with the following brief information on 401(k) retirement plans:

A 401(k) plan is a type of employer-sponsored retirement plan under section 401(k) of the Internal Revenue Service. The plan allows a worker to save for retirement while deferring income taxes on the saved money and earnings until withdrawal. The employee elects to have a portion of his or her wage paid directly, or "deferred", into his or her 401(k) account. In most cases, the employee can select from a number of investment options that emphasize stocks, bonds, money market investments, or some mix of the above. The employee can generally re-allocate money among these investment choices at any time.

We next asked participants a question allegedly designed to evaluate their general financial knowledge. Half the participants (high-SK condition) were asked an easy-to-answer question (*"Which is expected to yield a higher return over a period of 10 years, a savings account or a stock investment?"*) and the other half of participants (low-SK condition) were asked a difficult question (*"What was the annual change in value of the NASDAQ 100 index in 2008? ___%"*). Finally, we asked participants to rate their knowledge of saving plans in general, their knowledge of 401(k) retirement plans, and the likelihood they would join a 401(k) plan once they were eligible to do so on a 7-point scale (1 = Very low, 7 = Very high). Note that the objective information provided on 401(k) plans was identical in the two SK conditions.

Results and Discussion. A manipulation check confirmed that a much higher proportion of participants correctly answered the easy question (62%) than the difficult question (2%) ($p < .001$ by Fisher's exact test).

Participants' ratings of their knowledge about saving plans in general and about 401(k) retirement plans revealed that they were highly correlated and were therefore averaged to form a composite SK ratings scale (Cronbach's $\alpha = .91$).

An examination of the impact of the SK manipulation confirmed that participants who were asked an easy question rated their SK higher than participants who were asked a difficult question ($M_{Easy} = 3.06$, $M_{Difficult} = 2.14$, $t(173) = 4.36$; $p < .0001$) and indicated that they were more likely to join 401(k) plans ($M_{Easy} = 5.5$, $M_{Difficult} = 5.04$, $t(173) = 2.06$; $p < .05$).

We conducted a mediation analysis to test the hypothesis that the difficulty to answer the financial question influences willingness to join 401(k) plans through its impact on SK (Barron and Kenny 1986). In the first regression SK ratings were found to be significantly predicted by difficulty to answer the financial question (SK-condition) ($\beta = -.31$, $t = -4.36$, $p < .0001$). Next, Willingness to join 401(k) plan was found to be significantly predicted by the difficulty to answer the financial question ($\beta = -.15$, $t = -2.06$, $p < .05$). Finally, when willingness to join 401(k) plan was regressed on difficulty to answer the financial question as well as on SK ratings, the effect of difficulty to answer the financial question was no longer significant ($\beta = -.02$, $t = -0.22$, *NS*), while the effect of SK ratings remained significant ($\beta = .44$, $t = 6.13$, $p < .0001$; Sobel $z = -3.56$, $p < .001$). This suggests that the effect of the difficulty to answer the financial question on willingness to join 401(k) plan was fully mediated by SK. In other words, participants who easily answered the financial question believed they knew more about 401(k) plans and were thus more willing to join them.

Studies 1 & 2 provided empirical support for hypotheses H1 and H2, showing that subjective knowledge about financial products influences choice independently of objective knowledge. Study 3 examines objective knowledge more directly and tests the implications for financial education.

Study 3: Providing More Information Can Diminish Subjective Knowledge and Willingness to Invest

Attempting to promote financial literacy, the primary focus of consumer financial education programs has been to increase consumers' objective financial knowledge. Through various means such as paycheck stuffers, newsletters, summary plan descriptions, seminars, individual consultations with financial planners, or access to Internet-based education and planning tools, financial education provides consumers with more financial information (Bayer, Bernheim, and Scholz 2008; Lusardi 2008; Lusardi and Mitchell 2007).

While subjective knowledge generally increases with the actual amount of information provided, this is not always the case (see Carlson et al., 2009 for a meta-analysis). Imagine having to decide between two investment options. The information concerning investment A is easily understood by most people; the information concerning investment B is equivalent to the information concerning investment A, only it is described in more technical terms and includes additional advanced information that elaborates the basic information. From a normative standpoint, an elaboration of existing information that can be derived by participants should not affect the attractiveness of an investment. However, we propose that receiving information in a more technical form will cause consumers to feel less subjectively knowledgeable and render the investment less attractive.

Preliminary support for this assertion comes from a study by Fox and Weber (2002, Study 4a) in which Stanford undergraduates were first asked whether they thought inflation rate in Holland over the previous year was greater than or less than 3.0%, then asked to choose between (a) \$50 for sure or (b) \$150 if they were correct about the inflation rate. Half the participants were provided additional macroeconomic data that could have been useful to someone with extensive training in economics, but presumably was not useful to undergraduates (indeed, it did not significantly change their assessment of inflation). Nevertheless, participants provided with the additional information were much less likely to bet on their assessment of inflation.

Study 3 examined this hypothesis by asking participants to choose between two mutual funds. We provided summary fund descriptions, a prevalent financial education method (Bayer, Bernheim, and Scholz 2008; Lusardi 2008; Lusardi and Mitchell 2007). Specifically, student participants were asked to choose between two “lifestyle” mutual funds that gradually shift from a stock-heavy portfolio to a bond-heavy portfolio over the course of one’s working life. For each participant one fund was described in basic terms that include its most important elements; the other fund was described in a more advanced terms, elaborating information in a more technical and jargon-laden manner. We hypothesized that providing advanced and more technical information concerning an option would diminish consumers’ subjective knowledge and deter them from choosing it (hypothesis H3).

Method. We recruited 143 senior management undergraduate students at an Israeli college to participate in a brief survey for course credit. Participants were asked to imagine that they wanted to start saving for retirement at the age of 30 until they are 70, and that they have been offered two mutual funds especially designed for retirement saving. They were presented

with brief descriptions of the funds and were asked to indicate which fund they would prefer saving in, and to rate their knowledge about each fund, the extent to which they understood the saving mechanism of each fund, and how comfortable they would be investing in each fund, on a 7-point scale (1 = Not at all, 7 = Very much).

The funds participants were asked to choose from differed in risk level (low, high) and in the description provided (basic, advanced). The proportion of assets invested in stocks (and otherwise in bonds) in the high-risk fund began at 80% and gradually decreased to 30%, whereas the proportion of assets invested in stocks in the low-risk fund began at 50% and decreased to 10%. The *basic* fund description explained the parameters in relatively simple terms. For example, the basic description of the low risk fund was as follows:

The fund consists of two elements: (1) a diversified stock Index fund, designed to mirror the composition of the S&P 500 index, a risky but a more profitable long-term investment option, and (2) bonds in the form of 30-year U.S. Treasury Bills, a conservative saving option yielding lower long-term return. In the beginning of the saving period 50% of your savings will be invested in stocks (and 50% will be invested in bonds). This mix will gradually shift, at a fixed rate once a year, from stocks to bonds until you retire, at which point 10% will be invested in stocks (and 90% in bonds).

The *advanced* information explained the same parameters in more technical terms as well as additional information on the investment's Standard Deviation and Beta, two commonly used parameters of investment risk. For example, the advanced description of the low risk fund was as follows:

The fund consists of two elements: (1) a diversified stock Index fund, designed to mirror the composition of the S&P 500 index, a risky but a more profitable long-term investment

option, and (2) bonds in the form of 30-year U.S. Treasury Bills, a conservative saving option yielding lower long-term return. The rate of exposure to equity at any given time will not exceed $80-A$ where A = the insured's age (in years). The risk level of the investment equals a standard deviation of 20% in the beginning of the saving period and will gradually diminish, at a fixed rate once a year, to a standard deviation of 12% at retirement. The fund's Beta will be 0.6 at the beginning of the saving period and will gradually diminish, at a fixed rate once a year, to 0.1 upon retirement.

Note that our participants, all of whom had completed several courses in economics and finance, were familiar with the concepts and measures presented in the basic as well as the advanced descriptions. Despite the variations in content, the basic and advanced information were equal in length when translated into Hebrew (about 5 lines).

We varied, between-subjects, whether the high-risk fund was described in basic or advanced terms and whether the low-risk fund was described in basic or advanced terms. Participants were randomly assigned to one of four conditions: (1) both funds were described in basic terms; (2) both funds were described in advanced terms; (3) the high-risk fund was described in basic terms and the low-risk fund was described in advanced terms; (4) the high-risk fund was described in advanced terms and the low-risk fund was described in basic terms. The order of presentation of the funds was counterbalanced.

Results and Discussion. An examination of the choice data reveals that the choice of the high- versus the low-risk fund depended on the funds' descriptions ($\chi^2(3) = 11.76; p < .01$): when both funds were described in basic or in advanced terms (conditions 1 & 2) the majority of participants preferred to invest in the low-risk fund (61% and 58%, respectively). When the high-risk fund was described in advanced terms and the low-risk fund was described in basic

terms (condition 4), the tendency to choose the low-risk fund increased (84%). However, when the high-risk fund was described in basic terms and the low-risk fund was described in advanced terms (condition 3), the tendency to choose the low-risk fund decreased (46%). The proportion of participants choosing the low-risk fund in each of the four experimental conditions is presented in Figure 1.

Insert figure 1 about here

To further examine the impact of fund description on choice we ran a logistic regression in which choice (of the low-risk fund) was regressed on two dummy variables – the description of the low-risk fund in advanced terms and the description of the high-risk fund in advanced terms. The results indicated that the likelihood of choosing the low-risk fund decreased with advanced description of the low-risk fund ($\beta = -.91$, $\chi^2(1) = 6.3$; $p < .02$) and increased with the advanced description of the high-risk fund ($\beta = .80$, $\chi^2(1) = 4.9$; $p < .03$).

Participants' ratings of their knowledge about each fund, the extent to which they understood the saving mechanism of each fund, and how comfortable they would be investing in each fund were highly correlated and were therefore averaged to form two composite measures of SK, one for the low-risk fund and one for the high-risk fund (Cronbach's $\alpha = .86$ and $\alpha = .83$, respectively).

We conducted a mediation analysis to directly examine our hypothesis that fund descriptions affect choice because through their influence on SK. The above logistic regression indicated that low- and high-risk fund descriptions affect choice. In order to establish that SK mediates the relationship between fund description and choice we conducted additional analyses (Barron and Kenny 1986). To begin with, we regressed SK on fund descriptions: first, we found that SK of the low-risk fund was lower with advanced than basic fund description ($\beta = -.56$,

$t(140) = -8.0; p < .0001$); second, we found the same pattern for the high-risk fund ($\beta = -.40$, $t(140) = -5.2; p < .0001$). The results of these two simple regression analyses show that fund description influenced SK in the hypothesized direction. Next, we conducted another logistic regression in which choice (of the low-risk fund) was regressed on the low-risk fund description, the high-risk fund description (the independent variables), SK of the low-risk fund, and SK of the high-risk fund (the mediators). The results revealed that when all four variables were entered into the regression analysis, the low-risk fund description ($\beta = -.03$, $\chi^2_{(1)} = .003$; *NS*) and the high-risk fund description ($\beta = -.03$, $\chi^2_{(1)} = .007$; *NS*) no longer predicted choice. However, SK of the low-risk fund ($\beta = .58$, $\chi^2_{(1)} = 7.6; p < .01$) and SK of the high-risk fund ($\beta = -.72$, $\chi^2_{(1)} = 11.5; p < .001$) still significantly predicted choice. These results support the hypothesis that SK mediates the relationship between fund description and choice.

In sum, the results support our hypothesis that a more technical description of an investment option deters consumers from choosing it. Moreover, we find that this effect is mediated by consumers' perceptions of their subjective knowledge concerning the two funds.

SUMMARY AND GENERAL DISCUSSION

Taken together, the present studies demonstrated that subjective knowledge can have a substantial impact on consumer financial decisions, holding objective knowledge constant. In particular, consumers who feel more knowledgeable about financial products were more likely to say they would invest in riskier options with higher expected long-term returns, enroll in a 401(k) retirement saving plan, invest in a mutual fund that varies its balance between stocks and bonds over time.

While past research has acknowledged the unique impact of subjective knowledge on judgment and behavior, its impact on financial consumer choice has not yet been examined. In an attempt to help consumers choose financial products more wisely, governments, employers, and financial institutions have tried to promote objective consumer financial knowledge through various forms of financial education. Unfortunately, they have not always succeeded in improving consumer financial decisions. The current findings suggest one possible reason for this curious finding: financial education programs, in their attempts to enhance consumers' objective knowledge, can actually undermine consumers' subjective knowledge.

Naturally, we do not propose that financial education programs should be abandoned. Instead, we argue that our findings suggest that financial educators ought to pay special attention to their impact on consumers' subjective feelings of confidence in what they have learned. If too much information is presented in too technical a format, consumers may be deterred from investing. On the other hand, it is also important to note that confidence is a double-edged sword. If consumers are made to feel especially confident in their understanding of a truly complex financial instrument, they may invest with due caution. Indeed, previous research on consumer goods indicates that highly knowledgeable consumers or consumers who report themselves to be highly knowledgeable search less for product information and thus learn less about products than moderately knowledgeable consumers (Bettman & Park, 1980; Johnson & Russo, 1984). Future research should further explore the impact of varying degrees of metacognitive knowledge on the quality of financial choices.

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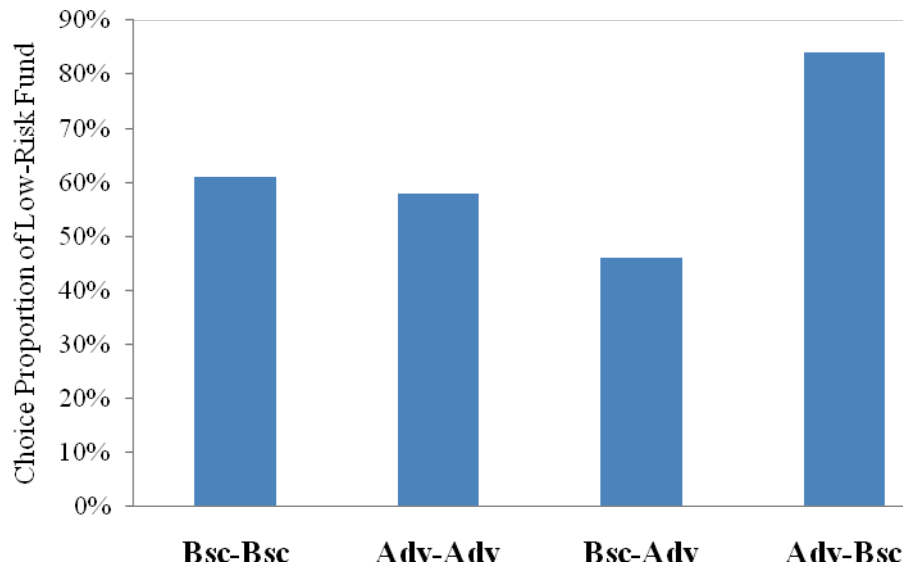


Figure 1. Choice proportion of the low-risk fund in the four conditions. *Bsc* stands for a basic description; *Adv* stands for an advanced description. The left fund description refers to the high-risk fund and the right fund description refers to the low-risk fund. For example, *Adv-Bsc* refers to condition 4, in which the high risk fund was described in advanced terms and the low-risk fund as described in basic terms.

TABLE 1: RETURN DISTRIBUTIONS AND AMOUNT OF INFORMATION PROVIDED FOR EACH FUND IN THE REFERENCE AND TARGET CHOICE TASKS.

Choice task	Amount of information about each fund	<u>Low-SK Condition</u>		Amount of information about each fund	<u>High-SK Condition</u>	
		Safe fund	Risky fund		Safe fund	Risky fund
Reference	40 months	5% return (1)	10% return (0.5); 0% returns, (0.5)	10 months	5% return (1)	10% return (0.5); 0% returns (0.5)
Target	20 months	3% return (1)	4% return, (0.8); 0% returns, (0.2)	20 months	3% return (1)	4% return, (0.8); 0% returns, (0.2)

In the reference task, the safe fund consistently yielded a 5% monthly return and the risky fund yielded a 10% monthly return or no return with equal probability. In the target task, the safe fund consistently yielded a 3% monthly return and the risky fund yielded a 4% monthly with probability 0.8 and a 0% return otherwise. The rate of return of each fund is presented and the probability of receiving each return appears in parentheses.

Participants in the low-SK condition received *more* information about the returns of the *reference* funds (40 months) compared to the *target* funds (20 months), leading to the perception that they were relatively poorly-informed about the target funds; participants in the high-SK condition received *less* information about the returns of the *reference* funds (10 months) compared to the *target* funds (20 months), leading to the perception that they were relatively well-informed about the target funds. Note that the return distribution and the amount of information about the target funds were similar across SK conditions, indicating that objective knowledge was held constant.