# Easy Money, Cheap Talk, or Spuds:
# Inducing Risk Aversion in Economics Experiments

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**Abstract**

Experiments typically rely on small payments to incentivize participants. This works if participants view these payments as fungible with their own money, but if participants view the payments as a windfall, they may behave differently in experiments than in real life. We modify standard risky choice protocols by making participants earn their money at risk by completing manual tasks such as peeling potatoes. This leads to less risk-taking and to choices more consistent with those online survey respondents anticipate making with their own money. When realistic levels of risk aversion are important, experiments should require participants to earn their stakes.

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## 1. Introduction

The proverb "easy come, easy go" tells us that the regret from losing something depends upon how hard we worked to get it. Normative economic theory assumes, however, that liquid wealth is fungible irrespective of its source; how a dollar is obtained should not affect what we buy with that dollar or the risk we are willing to take investing that dollar. Thaler and Johnson (1990) dispute that claim with a series of experiments demonstrating that people make different choices with money that has been easily or unexpectedly obtained. Thaler argues that people behave as if income and expenses are assigned to separate mental accounts with limited fungibility between accounts (Thaler 1999, Shefrin and Thaler 1988). Money easily gained is likely to end up in a mental account from which money is easily spent and readily wagered. Hard earned money is likely to land in a mental account from which money is more carefully spend and less readily wagered. For most people, most money is of the earned variety.

In economics laboratory experiments, participants are typically given an endowment equivalent to a couple of hours' wages. Such endowments encourage participants to pay attention, exert more effort, and try to make choices that lead to higher earnings within the design of the experiment. However, Thaler and Johnson (1990) argue that when people lose money they consider to be a windfall gain, the loss is likely to be coded as a reduction in the gain which "doesn't hurt as much as losing one's own cash" (p. 657). Thus laboratory participants who mentally code money given to them in a laboratory as a windfall gain, distinct and separate from their earned income and savings, may display much less risk aversion in the laboratory than they do in their daily lives.

In this paper, we propose that requiring participants to work for money that they can potentially lose in an experiment induces more realistic levels of risk aversion than simply endowing them with money. We test a protocol in which participants work for their experimental stakes and show that this approach induces much more realistic levels of risk aversion than does endowing stakes. Just as the source of money matters, so too does size (Binswanger, 1980, Kachelmeier and Shehata, 1992, Holt and Laury, 2002). Our second contribution is to the debate about the advantages of incentivized experiments over unincentivized hypothetical questions. We present evidence that asking people questions about how they would behave in high stakes hypothetical situations, while not a perfect substitute for observing their actual high stakes behavior, is likely better than trying to infer such behavior from experiments in which they are endowed with low stakes.

## 2. The experiments

We conducted two risky choice experiments in which participants were either endowed with (i.e., given) a monetary stake or earned their stake by completing a manual task, i.e., peeling potatoes or making envelopes. Both experiments elicited preferences using the multiple price list (MPL) method modified from Holt & Laury (2002) (see Charness et. al. 2013 for a discussion of different methods of eliciting risk aversion). Both experiments were run at the Sogang University in South Korea. Instruction sheets for participants can be found in the online appendix. Datasets and analysis procedure (do-files) are available.

The first experiment was run over 8 sessions with a total of 83 participants from the student population at Sogang. Participants were invited to take part in a research project but were not told the purpose of the experiment. They were promised a minimum earning and told possible maximum earnings from participation. Participants were asked to pick three alternative sessions and were randomly allocated between sessions. Participants were paid in cash at the end of experiment.

Experiment 1 consisted of two stages. In the first stage, participants were split into two treatment groups; Treatment 1, the endowed group, and Treatment 2, the earned group. Both groups received a payment of 10000 KRW (= approx. $10) for showing up for the experiment. The endowed group was also given a starting payment of 5,000 KRW for use in the risk choice experiment. The earned group earned the same starting payment by making envelopes. The participants in the earned group were required to meet a performance target (making nine envelopes within 30 minutes) in order to earn their starting payment. They were told that the completed work would not be wasted. If they failed to meet the performance target they would receive their show-up payment but would not be able to further participate in the experiment.

Task time and performance targets were chosen such that the earned group was reasonably well paid---slightly more than the typical hourly rate in South Korea---but not excessively as we wished to avoid the pay being perceived as a windfall. 5,000 KRW corresponds to about half-day of expenditure for the participants. The relatively short working time was chosen to avoid any fatigue that could lead to a bias.

After the instruction session, the participants in the endowed group went directly on to Stage 2 of the experiment. Participants in the earned group waited for 5 minutes, practiced their physical task for 5 minutes, and then spent 30 minutes completing the task before proceeding Stage 2. The procedures for Stage 2 were the same for the endowed and the earned groups.

Stage 2 consisted of a risk choice experiment, adapted from Holt & Laury (2002). Participants were shown a table with nine rows of choices. For each row, participants chose between keeping their starting payment of 5,000 KRW or participating in a lottery that paid 11,000 KRW or 200 KRW. The lotteries in the nine rows differed in the probability for the two payoffs. For Lottery 1 (i.e., row 1), the probability of the 11,000 KRW payoff was 10 percent and the probability of 200 KRW was 90 percent. In each subsequent row the probability of the 11,000 KRW payment increased by 10 percent. Thus for Lottery 9 (row 9) the probability of the 11,000 KRW payment was 90 percent and the probability of the 200 KRW payment was 10 percent. After participants made their nine choices, the outcome of the lotteries was randomly determined and one of the nine rows was randomly selected. Participants were paid based on the choice they made for a randomly selected row and randomly selected outcome of the lottery in that row.

In Experiment 1, participants in the endowed group were given 5,000 KRW with which they could participate in the lotteries and participants in the earned group earned 5,000 KRW by making envelopes. After the instruction session, the endowed group proceeded directly to stage 2 of the experiment, while the earned group had a 5 minute wait, 5 minutes spent practicing their task, and 30 minutes completing their task. Thus it is possible that the observed treatment effects were not the result of one group being given money while the other earned it, but simply that the endowed group was in a more aroused state because they had just arrived at the lab when making their lottery choices, while the earned group had more time to relax and settle down before making the choices.

To control the possibility of a settling in effect, we ran Experiment 2. 124 participants were recruited for Experiment 2. Three participants were dropped from the reported analyses because they made inconsistent choices. The experiment was run in 8 sessions.[1] The design of Experiment 2 was identical to that of Experiment 1 in all but two respects. First in Experiment 2, the endowed group waited in the lab for 40 minutes after the initial instructions before proceeding to Stage 2. While waiting they could read or simply sit but were not allowed to use mobile phones or computers or to talk with each other. Second, the manual task in Experiment 2 was peeling potatoes with a required target of peeling 25 potatoes in 30 minutes.

## 3. Results

The degree of a participant's risk-taking can be inferred from the row in which the participant switched from choosing riskless Option A to choosing lottery Option B. Figure 1a plots the

[1] This experiment was preregistered at the American Economic Association's registry for randomized controlled trials. https://www.socialscienceregistry.org/trials/4149.

choices made for each probability of winning the lottery by the endowed group and the earned group for Experiment 1; Figure 1b plots these choices for Experiment 2.

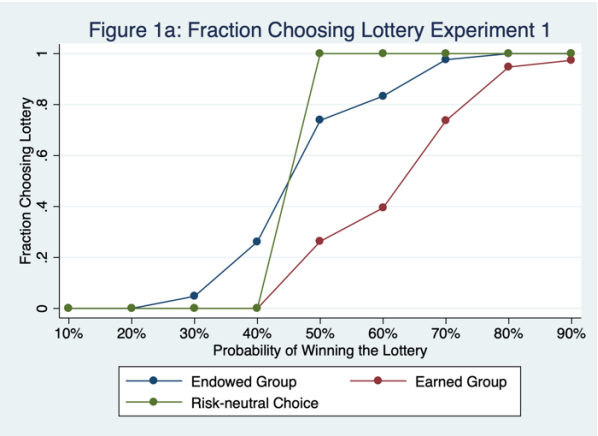


Figure 1a

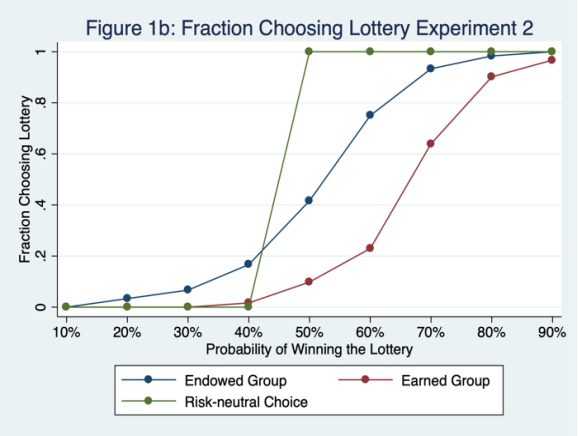


Figure 1b

Figure 1. The proportion of the endowed group and the earned group choosing the risky lottery rather than the riskless option for each probability of winning the lottery.

No participants in either experiment or group chose the lottery when the probability of winning was 10 percent. In both experiments, for every probability of winning above 10 percent, a higher fraction of the endowed group than the earned group chose the risky lottery. The figures also graph the choices that would be made by a risk-neutral agent. For probabilities of winning of 40 percent or less, a risk neutral-agent does not choose the lottery because the expected value of the risky lottery is less than the safe choice. 11 of 42 participants in the endowed group in Experiment 1 and 10 of 60 of the endowed group in Experiment 2 chose the risky lottery when the probability of winning was 40 percent; only one participant in the earned group did so in either experiment. For both experiments many participants in the earned group chose the riskless Option B amount even when the expected value of the lottery exceeded it considerably.

**Table 1: Risk Choice Switching Point Regressions**

Regression of the row at which a participant switched to choosing the lottery on indicator variables for Earned Treatment Group (1 = earned) and Gender (1 = male).

| | Experiment 1 | | Experiment 2 | |
|---|---|---|---|---|
| Model: | (1) | (2) | (1) | (2) |
| Treatment (Earned Group) | 1.54*** | 1.55*** | 1.50*** | 1.44*** |
| | [5.66] | [5.64] | [6.36] | [6.35] |
| Gender (Male) | | -0.38 | | -0.74*** |
| | | [-1.39] | | [-3.24] |
| Constant | 5.14*** | 5.36*** | 5.65*** | 6.03*** |
| | [27.4] | [18.1] | [33.8] | [30.29] |
| Observations | 80 | 79 | 121 | 121 |
| R-Squared | 0.29 | 0.306 | 0.254 | 0.315 |

t-statistics in brackets

*** p<0.01, ** p<0.05, * p<0.10

To test the statistical significance of the differences in behavior between the endowed and the earned group, we regress $s_i$, the first row number at which each participant switched to the risky choice (we let $s_i$ equal 10 for participants that always chose the safe option), on an indicator variable for the participant's treatment group (earned group = 1 and endowed group = 0). Table 1, Column 1, reports coefficients for Experiment 1 when $s_i$ is regressed only on the treatment group indicator variable. Column 2 adds an indicator variable for the participant's gender (male = 1; female = 0). We include the gender control because of the substantial literature indicating that men tend to be less risk averse than women (see Croson and Gneezy 2009 for a review). Columns 3 and 4 report results for Experiment 2.

The intercepts of 5.14 and 5.65 in Columns 1 and 3 tell us that on average, in both experiments, participants in the endowed group switched to the risky lottery between the fifth row and the sixth row; that is, as soon as the expected value of the lottery was somewhat higher than the safe choice. The coefficient of 1.54 (Column 1) and 1.50 (Column 3) on the indicator variables for the earned group are highly significant and tell us that, on average, the earned group needed a 15 percentage points higher probability of winning before switching to the lottery. Controlling for gender in columns 2 and 4 does not materially change these results. In both experiments, participants who earned their stakes behaved in a much more risk averse fashion than those who were given their stakes.

## 4. Online survey

In the experiments described above, the amount of risk participants are willing to take is strongly affected by whether they are making decisions about money they were given or money that they earned. Kahneman and Tversky (1979) suggest that rather than inferring the choices people would make in real life situations from the choices made for small stakes in the laboratory, researchers should simply ask people what choices they would make in hypothetical situations. Holt and Laury (2002) counter that people make less risk averse choices for hypothetical high stakes gambles than the choices they actually make when faced with the same gamble for real stakes.

While people underestimate their true risk aversion when answering hypothetical questions involving high stakes, how do their answers to hypothetical questions compare to behavior observed for low stakes endowed in a laboratory setting? And how do their answers compare to the behavior observed when low stakes are earned in the laboratory?

We attempt to gather insight into these questions through an online survey. With the assistance of Norstat Norge AS (www.norstat.no), we surveyed 1,859 Norwegian adults who are paid to participate in Norstat's survey panel.[2] Using a between participant design, we asked respondents hypothetical questions about whether, in a laboratory setting, they would choose a 50/50 lottery with a small positive expected value under different scenarios.

We chose a between-subject design because for series of similar questions varying on one or two dimensions, respondents are likely to anchor on their initial answer, adjusting subsequent answers so as to appear reasonable and consistent between questions (Ariely, Lowenstein, and Prelec 2003).[3] We asked each participant to make a hypothetical choice for one of six different treatment scenarios. Each participant saw only one scenario. Slightly more than 300 participants responded for each of the six scenarios. Limiting the scenario to a single lottery with even odds kept our questions short and easy to understand. Limiting the survey to a single response from each participant also reduced the cost of the survey.

[2] The sample consisted of 927 men and 933 women; 371 respondents were 18 to 29 years old; 306 30 to 39 years old; 311 40 to 49 years old; and 869 50 or more years old.

[3] For example, after answering a question about how much risk they would take with money earned for 30 minutes of work, respondents might feel they should take less risk with money earned for 60 minutes of work. Thus, a within-subject design is more likely to yield statistically significant differences in choices that vary on a salient dimension. However, these choices may be less reflective of what the respondent would actually do if faced with a single choice.

Our baseline scenario, or first treatment, was the following:

"The University of Bergen has an experimental economics laboratory. Imagine that you are a participant in a choice experiment at this laboratory. You arrive at the laboratory and are asked to choose between the following two options:

Option A: No lottery

Option B: Lottery

If you choose "No Lottery" (Option A) you will receive NOK 200. If you choose Lottery (Option B) you will either receive NOK 440 or NOK 15. So, if you choose the lottery you may receive NOK 240 more than the NOK 200 that you will receive if you choose "No lottery" or you may receive NOK 185 less than the NOK 200 you will receive if you choose "No lottery". Each of these outcomes is equally likely and determined by the flip of a fair coin. Which would you choose? "

**Table 2: Fraction Choosing Safe Option by Experiment and Survey Treatment**

Column 1 is the percent of participants, by treatment, who chose the safe option instead of a 50-50 lottery in the combined experiments and in the survey. Columns 4 through 10 report the differences in the percent of participants who chose the safe option in the treatment group for that column minus the percent who chose the safe option in the treatment group for that row. t-statitics for a two-sided test of the null hypothesis that the difference in the fractions is equal to 0 appear below the differences in percents.

| | | | | Difference in fraction choosing the safe (non-lottery) option. Column treatment group fraction minus row treatment group fraction. | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | | Column 1 Fraction choosing safe option | Column 2 Number of participants in treatment group | Column 3 Endowed Money: Experiment 2 | | Column 4 Earned Money: Eperiment 2 | | Column 5 Endowed Money: Survey Treatment 1 | | Column 6 Earned Money (25 potatoes): Survey Treatment 2 | | Column 7 Earned Money (50 potatoes): Survey Treatment 3 | | Column 8 Earned Money (25 or 50 potatoes): Survey Treatments 3 & | | Column 9 Own Money--potential losses: Survey Treatment 4 | | Column 10 Own Money--higher stakes & potential losses: Survey Treatment 5 | | | |
| 1 | Endowed money: Experiment 2 | 58.3% | 60 | | | | | | | | | | | | | | | | | | | | |
| 2 | Earned money: Experiment 2 | 90.2% | 61 | -31.8% | *** | | | | | | | | | | | | | | | | | | |
| | | | | -4.29 | | | | | | | | | | | | | | | | | | | |
| 3 | Endowed money: Survey Treatment 1 | 59.9% | 320 | -1.6% | | 30.3% | *** | | | | | | | | | | | | | | | | |
| | | | | -0.23 | | 6.45 | | | | | | | | | | | | | | | | | |
| 4 | Earned money (peel 25 potatoes): Survey Treatment 2 | 68.1% | 307 | -9.8% | | 22.1% | *** | -8.2% | ** | | | | | | | | | | | | | | |
| | | | | -1.42 | | 5.75 | | -2.15 | | | | | | | | | | | | | | | |
| 5 | Earned money (peel 50 potatoes): Survey Treatment 3 | 66.7% | 303 | -8.4% | | 23.5% | *** | -6.8% | * | 1.4% | | | | | | | | | | | | | |
| | | | | -1.21 | | 5.02 | | -1.77 | | 0.37 | | | | | | | | | | | | | |
| 6 | Earned money (peel 25 or 50 potatoes): Survey Treatments 2 & 3 | 67.4% | 610 | -9.1% | | 22.8% | *** | -7.5% | ** | | | | | | | | | | | | | | |
| | | | | -1.37 | | 5.35 | | -2.25 | | | | | | | | | | | | | | | |
| 7 | Own money--potential losses: Survey Treatment 4 | 74.6% | 310 | -16.3% | ** | 15.6% | *** | -14.7% | *** | -6.5% | * | -7.9% | ** | -7.2% | ** | | | | | | | | |
| | | | | -2.38 | | 3.43 | | -3.98 | | -1.79 | | -2.15 | | -2.31 | | | | | | | | | |
| 8 | Own money--higher stakes & potential losses: Survey Treatment | 88.6% | 309 | -30.3% | *** | 1.6% | | -28.7% | *** | -20.5% | *** | -21.9% | *** | -21.2% | *** | -14.0% | *** | | | | | | |
| | | | | -4.57 | | 0.37 | | -8.74 | | -6.37 | | -6.73 | | -8.09 | | -4.57 | | | | | | | |
| 9 | Endowed money paid in advance: Survey Treatment 6 | 54.1% | 310 | 4.2% | | 36.1% | ** | 5.8% | | 14.0% | *** | 12.6% | *** | 13.3% | *** | 20.5% | *** | 34.5% | *** | | | | |
| | | | | 0.61 | | 7.60 | | 1.47 | | 3.60 | | 3.22 | | 3.90 | | 5.46 | | 10.27 | | | | | |

*** p<0.01, ** p<0.05, * p<0.10

To compare the survey responses to the risk choice experiment results, we focus on Row 5 of the risk choice experiment. This is the row for which the probabilities of winning and losing the lottery were equal. Table 2, Column 1 reports the percent of the endowed group and earned group (from Experiments 1 and 2 combined) choosing the safe option at Row 5 and the fraction of survey respondents answering that they would choose the safe option in the 50/50 lottery for each survey treatment. In the risk choice experiment only 45.1% of the endowed group chose the safe option rather than a lottery, while 83.8% of the earned group chose the safe option. In Column 3, Row 2, we see that the -38.7 percentage points difference is statistically significant.

Columns 3 to 10 report the percent choosing the safe option for the column treatment minus the percent choosing the safe response for the row treatment. Below the difference in percentages we report t-statistics for a two-sided test of the null hypothesis that the difference in percentages is equal to 0.

In Survey Treatment 1, respondents were asked whether they would participate in a lottery with money they were given in a laboratory experiment. 59.9% of Survey Treatment 1 respondents chose the safe option. This percentage was higher than the percentage choosing the safe option with endowed money in the experiments. There are several possible reasons why the survey respondents chose the safe option more often than the "endowed group" in the experiment. 1) The survey respondents and experiment participants differed in age, nationality, and occupation. 2) Survey respondents may not have anticipated that they might choose a lottery to divert themselves from boredom in the laboratory. 3) Participants in the experiment chose from list of choices while survey respondents made only one choice. 4) Though the lotteries and safe choices offered in the experiment and lottery were quite similar, they were not identical.

In Survey Treatments 2 and 3, respondents were asked whether they would choose the safe option or the lottery with money they had earned by peeling either 25 (Treatment 2) or 50 (Treatment 3) potatoes. There was virtually no difference in the percent choosing the safe option for these treatments: 68.1% for Survey Treatment 2 and 66.7% for Survey Treatment 3. Quite possibly, survey participants anticipated being less willing to take risk with money they had earned peeling potatoes than with money they were given–but they did not focus on the number of potatoes (Ariely et. al. 2003 find that for tasks and goods for which most people do not have a price experience, between-subject reservation prices are not very sensitive to changes in the task size or number of goods but within-subject responses are).

Survey Treatment 4 asked respondents whether they would choose the safe option or the lottery if losing the lottery meant losing some of their own money. Survey Treatment 5 were asked the same question but for much higher stakes. Survey respondents in these treatments chose the lottery less often than respondents in survey Treatments 1, 2, 3 and 6. Respondents asked about high stakes chose the lottery less often than those asked about low stakes. As expected, people anticipated taking less risk when their own money was at risk and potential losses larger.

Survey Treatment 6 asked respondents what they would do if they were given an endowment for the laboratory experiment but they received this endowment two weeks before the experiment. This treatment was motivated by research suggesting that participants in experiments take less risk with money they are given, if they are given or promised that money before the experiment rather than afterwards (Rosenboim and Shavit (2011); Davis, Joyce, and

Roelofs (2008); Arkes, Joyner, Pezzo, Nash, Siegel-Jacobs, and Stone (1994)). Responses for survey Treatments 1 and 6 did not reliably differ in the percentage choosing the safe option.

For every survey question, the percentage of experiment participants in the endowed group who chose the safe response was lower than the percentage of survey respondents. And for every survey question except Survey Treatment 5–own money, high stakes–the percentage of experiment participants in the earned group who chose the safe option was higher than the percentage of survey respondents.

Holt and Laury (2002) show that choices people anticipate making for large hypothetical stakes imply less risk aversion than do the choices they actually make for such stakes. However, our findings suggest that the choices people make about large hypothetical stakes imply far more risk aversion than choices made for small endowed experimental stakes. Researchers who wish to know how people will behave in realistic situations should consider hypothetical questions as one avenue of exploration; for large risks this method may understate risk aversion and yet be much more reliable than small endowed-stakes laboratory experiments.

## 5. Conclusion

Researchers who need to induce risk aversion in their laboratory experiments or who intend to extrapolate laboratory findings to real world risky choice settings should avoid small endowments and instead consider implementing an "earned stakes" protocol. We find that this protocol–at little cost to the experimenter–elicits behavior that is less risk-taking and, likely, more reflective of ordinary life. If participants in experiments view the endowment they are given as belonging to a “windfall” mental account rather than the same mental account in which they deposit their paycheck, then laboratory experiments for endowed stakes will teach us more about how people behave in casinos than in ordinary life.

## References


Ariely, Dan, George Lowenstein, and Drazen Prelec, 2003, "Coherent Arbitrariness": Stable demand curves without stable preferences. *Quarterly Journal of Ecomomics.* 118 73-106.

Arkes, Hal R., Cynthia A. Joyner, Mark V. Pezzo, Jane Gradwohl Nash, Karen Siegel-Jacobs, and Eric Stone. 1994. *The psychology of windfall gains. Organizational Behavior and Human Decision Processes.* 59(3) 331-347.

Binswanger, Hans P. 1981. Attitudes toward risk: Theoretical implications of an experiment in rural India. *The Economic Journal*. 91 867-890.

Charness, Gary, Uri Gneezy, and Alex Imas. 2013. Experimental methods: Eliciting risk preferences. *Journal of Economic Behavior and Organization*. 87 24-51.

Croson, Rachel, and Uri Gneezy. 2009. Gender differences in preferences. *Journal of Economic Literature*. 47 448-74.

Davis, Larry R., B. Patrick Joyce, and Matthew R. Roelofs. 2010. My money or yours: House money payment effects. *Experimental Economics*. 13 189-205.

Holt, Charles A., and Susan K. Laury. 2002. Risk aversion and incentive effects. *American Economic Review*. 92(5) 1644-1655.

Kachelmeier, Steven J., and Mohamed Shehata. 1992. Examining risk preferences under high mon- etary incentives: Experimental evidence from the People's Republic of China. *American Economic Review*. 82(5) 1120-1141.

Kahneman, Daniel, and Amos Tversky. 1979. Prospect theory: An analysis of decision under risk. *Econometrica*. 47(2) 263-291

Rosenboim, Mosi, and Tal Shavit. 2012. Whose money is it anyway? Using prepaid incentives in experimental economics to create a natural environment. *Experimental Economics*. 15 145-157.

Shefrin, Hersh, and Richard Thaler. 1988. The behavioral life-cycle hypothesis. *Economic Inquiry* 26 609-643.

Thaler, Richard. 1999. Mental accounting matters. *Journal of Behavioral Decision Making*. 12 183-206.

Thaler, Richard., Eric. Johnson. 1990. Gambling with the house money and trying to break even: the effects of prior outcomes on risky choice. *Management Science*. 36(6) 646-660.