A DESCRIPTION OF THE TEMPLETON-CHICAGO MBAS LONGITUDINAL STUDY *

ERNESTO REUBEN
Northwestern University
PAOLA SAPIENZA
Northwestern University, NBER, and CEPR
LUIGI ZINGALES
University of Chicago, NBER, and CEPR

ABSTRACT

This document describes the data analyzed in the Templeton-Chicago MBAs longitudinal study. The study is based on the entire 2008 generation of MBA students from Chicago University's Graduate School of Business. The data described in this document are obtained from three different sources: surveys, laboratory experiments, and the GSB's admission department. We give a brief overview of each data source, in addition to a detailed description of the data-collection procedures.

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1. Introduction

This document describes the data and methodology of the Templeton-Chicago MBA longitudinal study (TCMLS). The TCMLS investigates an entire generation of MBA students from the Graduate School of Business of the University of Chicago (GSB) over 40 years. The purpose of the study is to follow up these individuals over time to observe how several of their individual characteristics affect their career choices, overall job performance, and investment decisions, distinguishing educational factors from other ones (e.g. biological determinants). We link the individuals' attitudes to their backgrounds, including education, economic conditions, religion, and place of origin, family circumstances, and ethnicity.

The study is currently based on data from three different sources: surveys, laboratory experiments, and the GSB's admission department. Each of these data sources is described in detail in a section in this document. However, this is an ongoing study therefore new data from various other sources will be collected and used in the future. At that time this document will be updated.

Volunteers for the study are all drawn from the GSB's 2009 generation of MBA students who take part in the Leadership Effectiveness and Development (LEAD) program. LEAD is a class where students practice and perfect key communication skills such as negotiation, team-building, and giving feedback. Since 2006, all first year MBAs, as part of their CORE program, participate in LEAD to understand about business success.

Participation in the study by all individuals is entirely voluntary. Before the study began, the MBA students were explained the general purpose of the study and asked if they wanted to take part in it. If they wanted to, they could decide to participate in some parts of the experiment and not in others. Specifically, each individual could consent or deny the use of the data collected by each data source. Furthermore, individuals who did consent can still opt out of the study at any point in time. In total, the entire MBA class consists for 550 students. Of these, 85.6% consented for all their data to be used in the study. Larger fractions consented to the use of some of the data. This is seen in detail in Table 1.

TABLE 1 – NUMBER OF INDIVIDUALS CONSENTING TO THE STUDY

Data Source	Individuals Consenting	% of the Total
Survey	525	95.5%
Experiment	513	93.3%
Admission department	487	88.6%
All	471	85.6%
Survey and experiment	502	91.3%

1.1 Subject Pool

GSB's MBA population is ideal for the purposes as there is a large amount of data describing their background and in particular their educational experience. Furthermore, they are relatively easy to track as they generally keep close ties with school's alumni association. One must be aware, however, that they are a highly selected sample and hence caution is warranted when extrapolating some of the study's findings to other populations. On the other hand, given that GSB is one of the top business schools in the US, studying this population has the added value that they are highly influential group of people whose decisions can affect the lives of many more individuals.

In Table 2 a few basic demographic characteristics of our sample are presented. As one would expect, subjects are relatively young and single. There is an over-representation of males which consist of almost 70% of the sample. The most common ethnicity is white or Caucasian with about 40% and the most common country of birth is the US with 60% of the total, although, other ethnicities and nationalities are well represented. Interestingly, the majority of them are firstborns.

The document is organized as follows: Section 2 describes the surveys used in the study; Section 3 describes the design and procedures of the laboratory experiment; finally, Section 4 describes the data obtained from the GSB's admission department. In addition, there are various appendixes containing the materials given to the students during data collection.

TABLE 2 – DESCRIPTIVE STATISTICS OF THE SUBJECT POOL

Variable	Frequency	Variable	Frequency
Age		**Gender**	
21 – 25	15.82%	Male	69.35%
26 – 30	59.27%	Female	30.65%
31 or more	24.91%		
Marital Status		**Birth order**	
Single	69.64%	First	54.55%
Married / Partner	25.64%	Second	31.82%
Unspecified	4.73%	Third or higher	12.36%
		Unspecified	1.27%
Ethnicity		**Number of siblings**	
White	42.55%	0	10.73%
East Asian	18.91%	1	48.73%
South Asian	16.91%	2	24.91%
Black	7.64%	3 or more	14.36%
Hispanic	7.27%	Unspecified	1.27%
Other	6.73%		
Nationality / Region		**Undergraduate Education**	
United States	60.55%	Engineering	24.73%
India	10.91%	Economics	20.18%
China (with Taiwan)	5.64%	Business admin.	14.55%
European Union	4.73%	Finance	10.73%
Latin America	4.73%	Other social science	6.18%
Other East Asia	4.55%	Humanities	5.45%
Other	8.89%	Other	13.09%
		Unspecified	5.09%

2. Surveys

As part of the LEAD course of the MBA program, students completed two online surveys. The first survey was compulsory as it was one of the requirements to pass the course. This survey was quite general and included various tests designed to measure different personality traits and to collect demographic characteristics. We refer to this survey as the *general survey*. The second survey was voluntary and more specific as it consists of the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). Nevertheless, in order to provide students with an incentive to complete the survey, they were given the test's personalized feedback which has a market price of $35. We refer to the second survey as the *MSCEIT survey*.

2.1 Procedures

The general survey was conducted between the 18th of September and the 5th of October 2006. Students filled in the survey online by clicking on a link that was provided to them via email. The deadline to complete the survey corresponded to the day and time at which they had to participate in the laboratory experiment (see Section 3). Filling in the survey was mandatory as it was a requirement to pass their LEAD course. However, students had the option to not consent to their data being analyzed. Before receiving their first email, students where informed that they had to complete the survey and to look for it in their email. Completing the survey took approximately one hour. However, subjects had the option to stop at any moment and complete it in parts. During the two weeks in which students had to finish the general survey, up to five reminders were sent to students who had yet not completed it.

The MSCEIT survey was conducted between the 20th of October and the 17th of December 2006. Again students filled in the survey online, but this time by going to a website address and filling in a code provided to them by email. The deadline to complete the survey was the 17th of December. In this case, completing the survey was voluntary. However, those that did complete it, received feedback of their performance in the MSCEIT test. Again, students had the option to not consent to the analysis of their data. Students where informed

of the possibility to take the survey through email. Completing the survey took approximately 45 minutes, which had to be taken continuously. Students who had not completed the survey we sent up to two reminders.

2.2 Contents

The general survey included a series of questions asking students for demographic characteristics as well as standard psychological tests to measure some of the students' personality traits and abilities. The second survey consisted on a standard test to measure emotional intelligence. Below we describe in more detail the contents of each survey.

General Survey

The list of questions employed in the survey are available in choice are found in *Appendix A.1*. Here we give a brief description of the students' characteristics that we attempt to capture through the various set of questions.

The questions asked in the general survey can be broadly categorized into nine different areas. Note that we did not place similar questions one after the other in the survey to reduce any tendency to be consistent across questions and increase the chance that subjects consider each question independently. The different areas are:

- Demographic characteristics: parental upbringing and religion
- Cognitive ability
- Risk aversion and time discounting
- Social or moral preferences
- Happiness and optimism
- Trust
- Social desirability
- Empathy and influence
- Identity

Demographic characteristics: parental upbringing

In addition to various demographic characteristics obtained from the GSB's admission department, we asked students to answer questions regarding their

upbringing. The questions consisted mainly of the Parental Authority Questionnaire (PAQ) used in Buri (1991) and revised in Reitman et al. (2002). In addition we asked a few questions regarding the students' number of siblings, birth order, whether they were their mother/father's favorite, and religion.

Cognitive ability

Due to the growing interest in cognitive ability in relation to the prevalence of psychological biases (e.g. Benjamin, Brown, and Shapiro, 2006; Dohmen et al., 2007), we measure this with a variation of the Cognitive Reflection Test (CRT) used by Frederik (2005).

Risk aversion and time discounting

In the TCMLS we measure risk aversion in several ways. In addition to an incentivized measurement during the laboratory experiment (see Section 3), we asked subjects a series of questions to get an indication of their willingness to take risks. These included demographic characteristics such as amount of money spent gambling as well as a general question asking for their wiliness to take risk (used by, among others, Dohmen et al., 2005). Furthermore, given that the elicitation of risk aversion might be susceptible to framing (see Croson and Gneezy, 2004), we also asked three questions eliciting the certainty equivalent of a fair lottery framed in three different ways: as an abstract lottery, as a financial investment, and as an investment in education.

As with risk aversion, we use the laboratory experiment to get an incentivized measure of time discounting. In addition, during the survey we asked subjects a few questions of their behavior that could be related to time discounting. These include questions about credit card use, procrastination, and impatience.

Social or moral preferences and trust

As research has shown the willingness of individuals to deviate from purely selfish behavior (Fehr and Gächter, 2000), we also use a series of questions to get an indication of what kind of other-regarding preferences subjects might possess. For this purpose we asked them various questions related to their preferences

over income allocations. We ask two fairly general questions concerning governmental redistribution and foreign aid as well as two specific questions where subjects chose between hypothetical allocations of money (similar to van Lange, 1997). In addition, we ask subjects to report behavior that is related to preferences for the wellbeing of others such as volunteering and wiliness to donate money and organs. Finally, we also asked subjects on the morality of various actions such as free-riding on public transportation or bribery.

Although related to social preferences, given its importance in the literature and its relation to macroeconomic variables (Knack and Keefer, 1996; Knack and Zak, 2001), we also obtain specific measures of trust. To measure trust we ask the commonly-used question from the World Values Survey, which seems to be a good indicator of how much individuals trust strangers. Additionally, we ask questions concerning trust in slightly different contexts. In one case it is with respect to the University of Chicago as an institution, and in a second case it is with respect to strangers in the city of Chicago. Finally, we ask subjects to report how good they think they are in detecting untrustworthiness.

Happiness and optimism

Another set of questions are related to the subjects' subjective wellbeing and their level of optimism. We ask the standard World Values Survey question that measures happiness plus the related questions of the subjects' personal assessment of their health and life expectancy. To measure optimism more directly we use the revised version of the Life Orientation Test (LOT) which is found in Scheier, Carver, and Bridges (1994) and the self-efficacy scale of Sherer et al. (1982). In addition we also ask subjects whether they think they are particularly lucky. To construct a behavioral measure of optimism (or overconfidence), we asked subjects to predict their performance in the core GSB courses, which we can later compare to their actual performance.

Social desirability

Measuring the importance individuals give to doing or saying what they consider to be socially desirable can be useful for two reasons. First a strong desire to say what others want to hear can bias data collection, particularly for

un-incentivized questionnaires. Hence, measuring social desirability can help correct for this type of biases. Second, the urge to conform to what others deem acceptable could influence individuals' career choices and the type of activities in which they excel at. Individuals who do not particularly care about the opinion of others tend to behave more independently. On the other hand, individuals who have a strong preference for social desirability, tend to consult others before making decisions. Independence can be an asset, but in many other cases it is more important to act in concordance with others.

To measure social desirability we use a shorted version of the Crowne-Marlowe social desirability scale (Crowne and Marlowe, 1960). Furthermore, as a special case, we asked a couple of questions to determine whether the subjects' opinion concerning aid to the poor is affected by endorsement by others.

Identity

Recently, both economists and psychologists have demonstrated the importance of an individual's identity in decisions such as career choice (Akerlof and Kranton, 2000; 2005) and in his or her performance in various tasks (Shih, Pittinsky, and Ambady, 1999; Spencer, Steele, and Quinn, 1999). For this reason, we gather information as to the subjects' identities (e.g. gender, ethnicity, nationality, religion, and others) as well as their self-rported perception how important the different identities are.

In addition, we also measure the degree of importance that subjects give to individuals versus groups, or to use Triandis' (1995) terminology, whether an individual is collectivist or individualistic. According to Triandis (1995), people that are individualistic will usually consider how their actions affect other individuals but will tend to ignore how their actions might affect group identity or the group as a whole. Conversely, collectivists tend to think of the group's welfare independently of the welfare of individual members and are more likely to act in the benefit of the group. This ought to affect their willingness to cooperate or act altruistically towards in-group members and hence their success in team-oriented industries. For this measurement, we use a three-question version of the Collectivism and Individualism questionnaire used by Triandis (1995).

Empathy/Emotional Intelligence

Even though it is ubiquitous in popular business books, there are few systematic studies in economics of what is commonly known as emotional intelligence. Although emotional intelligence is sometimes hard to define, some aspects have been shown to be important personal characteristics that have the potential to affect people's performance in particular in jobs that require cooperation. We concentrate on one such characteristic, namely empathy. The ability to put oneself in another person's shoes is not only important to promote pro-social behavior between individuals but also to understand strategic situations. According to Baron-Cohen (2002), empathy might be one of the most important determinants of gender differences in the workplace and even society in general.

We measure empathy in four ways. One is with a four-question version of the Interpersonal Relativity Index developed by Davis (1980; 1983). We concentrate on his perspective-taking scale (important for strategic interaction) and his empathic-concern scale (important for pro-sociality). A second measure is concerned with the ability to recognize emotions in the faces of others. Specifically, we use the "Reading the Mind in the Eyes" test of Baron-Cohen (2002). As a third measure, we use the Influence Quotient test developed by Cialdini (1993), which concentrates on a person's ability to recognize how to better influence other people's actions. Lastly, our forth measure was done as a separate survey which is described in the next subsection.

MSCEIT Survey

All questions of the second survey correspond to the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). Due to copyright restrictions they cannot be reproduced in this document. More information can be found at the following website: *https://www.mhs.com/*.

3. Laboratory Experiments

Also, as part of the LEAD course of their MBA program, students participated in one laboratory experiment. In the experiment, they made a series of decisions in various strategic and non-strategic situations. Participation in the experiment was one of the requirements to pass the course and thus it was mandatory. However, in order to give students an incentive to take their decisions seriously, they were paid according to their performance. In total, 544 MBA students participated in the experiment and earned on average $98.32.[1]

3.1 Procedures

The experiment was run during Tuesday the 3rd and Thursday the 5th of October 2006. Two sessions were run each day during the afternoon, one starting at 1 o'clock and the other one at 3 o'clock. The experiment lasted around one and half hours. All sessions used an identical protocol.

As part of the MBA program, students are randomly assigned to groups (called cohorts). The assignment of students to different sessions was done by assigning cohorts to either the Tuesday or Thursday sessions. Due to scheduling conflicts with other activities, all national students (US citizens) participated in the 1 o'clock sessions and international students in the 3 o'clock sessions. In addition to being assigned to a specific session, students were assigned to one of the four rooms in which the experiment took place. The room assignment was done alphabetically using their last names. The session and room assignment was communicated to the students five days before the experiment via email. In the same email, students were given preliminary instructions describing the general structure of the experiment, the payment procedure, and the instructions for one of the games (see *Appendix B.1*). They were also informed that they would receive a $20 participation fee.

Upon arrival to their assigned room students received a set of materials which included: a bill of $20 as their participation fee, a copy of the instructions

[1] Earnings, ranged from -$3.00 to $297.13. The four subjects who earned a negative amount had to pay the difference with money from their own pockets.

they had received via email, a few blank sheets of paper, consent forms, a couple of vials, and a unique randomly assigned number that is used to identify each subject. Once all students had arrived and were seated, an experimenter in each room reminded them of the experiment's rules. In particular, they were asked not to communicate with one another and reminded that their interaction with others will remain anonymous. After the experimenter finished talking, students were asked to sign the consent forms and fill one of the vials with their saliva. As was mentioned, consenting to the different aspects of the study was voluntary as well as the provision of saliva.

At this point, the students played the different parts of the experiment via the computer. The experiment was programmed and run using zTree (Fischbacher, 2007). Without the students knowing, seats had been randomly assigned to groups of eight.[2] In the experiment, interaction occurred only within these groups and thus each group constitutes an independent observation.[3] One hour later, when the majority of students had finished all of the games, students were asked to fill the second vial with saliva. Once all students finished playing the games, they were informed of their earnings and dismissed. Students received feedback on specific games and on the behavior of other students a few days later through an email.

For those students who earned more than their $20 participation fee, the payment of the additional money was done with a check which was delivered to the students' mailfolder.

3.2 Design

The experiment consisted of eight parts: five different games and three individual choices. Each part was included to study the subjects' behavior in different environments. The parts, in the order they were played, are:

[2] The only restriction on the assignment of seats to groups was that seats in the same group would not be next to each other.

[3] Due to the eight-person structure of the experiment, not all students participated in groups with only MBA students. In two groups, we asked non-MBA students to fill in missing seats to complete the group. These groups are excluded from the data analysis of the experiment.

- Lottery choice with losses
- Asset market game
- Trust game
- Competition game
- Chocolate auction
- Social dilemma game
- Lottery choice without losses
- Time preferences choice

Five days before participating in the experiment, subjects received instructions describing the experiments general structure and rules (these instructions are found in *Appendix B.1*).[4] Subjects were told they would participate in an experiment where they would play five different games. At the end of the experiment one of the five games would be randomly selected and paid. The five different games correspond to: the asset market game, the trust game, the competition game, the social dilemma game, and the lottery choice without losses. Thus on top of to the five games, subjects completed the other parts as extra decisions during the experiment. These additional parts where not subject to the final randomization a thus always affected the subjects' earnings.

Subjects played the different parts with as little feedback as possible. Thus with the exception of the asset market game, subjects were not aware of how much they had earned in each part until the experiment had ended. Similarly, subjects received no feedback with respect to the actions of others until they had made all their decisions. This procedure minimizes any spillovers between parts such as income effects. Next, each part is described in detail.

Lottery choice with losses

As their first choice in the experiment, subjects had to accept or reject 10 lotteries. The lotteries used are an extension of the ones used by Fehr and Goette (2007), which are designed to elicit subjects' preferences over risk when a loss is

[4] Although we asked subjects to read the instructions beforehand, they also received a copy of the instructions when they arrived to the experiment (see *Appendix B.2*). Subjects who wished to read the instructions once again had enough time to do so.

involved. Each lottery consists of a ½ probability of loosing $20 and a ½ probability of winning x dollars. If the lottery is accepted a random draw determines the outcome. If the lottery is rejected, subjects neither gain nor lose money. In the experiment, x varied from $15 to $60 in steps of $5. We conjectured that most people would reject the lottery when x equals $15 and that as x increases in value there would be a point at which they would switch to accepting it. The value of x at which a subject switches from rejection to acceptance provides us with a measure of their risk preferences. At the end of the experiment, one of the lotteries was randomly chosen to determine each subject's earnings.

In order to ensure subjects saw the $20 loss as a 'real' loss, they were told, five days before the experiment, that they would receive a $20 participation fee. Furthermore, when the subjects arrived to the experiment they were given the $20 in cash along with the experiment's materials. We believe that knowing in advance that they would receive the $20 and having the money in their pockets, makes it likely that subjects adjusted to the additional money, and thus, giving it back feels like they are indeed incurring a loss. Note that, unlike the other games or choices in the experiment, this choice was always paid out. Thus, subjects who suffered a loss could not avoid paying back the $20. The instructions for this choice are found in *Appendix B.3*.

Asset Market Game

To study their trading behavior, subjects participated in an experimental asset market. We use the experimental design of Smith, Suchanek, and Williams (1988). In these markets asset-price bubbles and crashes usually occur in spite of the fact that the fundamental value of the asset is known at all times (see Porter and Smith, 2003).

Each market consists of eight randomly-matched subjects who trade with each other for 10 periods. Each period lasts 2 minutes. At the end of a period, each unit of the asset pays a dividend. The dividend payment is independently drawn each period but is the same for all market participants and for all units of the asset. In the experiment, the dividend equaled $4.00, $1.50, $1.00, or $0.00, each with equal probability. After the dividend payment of the last period the

asset expires worthless. Note that the fundamental value of the asset in period t equals the expected dividend payment multiplied by the number of remaining periods: \$1.50 × (11 – t).

Before the market started, subjects were endowed with of units of the asset and an amount of cash. There were four different initial 'portfolios' all with the same expected value. Portfolios differed only in the number of units of the asset and the amount of cash. Two subjects in each market were randomly assigned to each portfolio. The different portfolios are described in Table 3.

TABLE 3 – THE FOUR DIFFERENT INITIAL PORTFOLIOS

Portfolio	Units of the asset	Amount of cash	Expected value	Subjects in the market
1	4	\$15	\$75	2
2	3	\$30	\$75	2
3	2	\$45	\$75	2
4	1	\$60	\$75	2

The market rules were those of a continuous double-auction. Subjects could sell units of the asset as long as they owned a positive number of them. Similarly, subjects could buy units of the asset as long as they had enough cash to pay for them. Each subject's cash and number of units of the asset carried over from one period to the next. As the game progressed, dividend payments were added to each subjects cash balance. The subjects' earnings equaled they amount of cash they were holding after the dividend payment in period 10.

The instructions for the asset market game were given to subjects five days before their participation in the experiment. Subjects were asked to read the instructions carefully and could ask questions via email. The instructions consisted of a detailed explanation of the market rules, the software interface, and of how to make bids, offers, and trades. The only information not given to subjects in this set of instructions was their initial portfolio (a copy of the instructions is found in *Appendix B.4*). The reason we gave subjects the instructions beforehand was to save time during the experiment (this was done only for this game as it was by far the most complex one).

In spite of receiving the instructions in advance, subjects were provided with a written copy of the instructions when they arrived to the experiment.

Before the game started, they had the opportunity to go one last time through the instructions and ask questions. At this point subjects were informed of their initial portfolio. They were also informed that not all subjects received the same portfolio but were not told what the other portfolios were. In order to further familiarize them with the software interface, subjects participated in a one-minute training period. Trades done during the training period did not affect their earnings. After the training period subjects played the 10 periods of the game. The instructions given to subjects during the game are found in *Appendix B.5*.

Trust Game

Subjects played the well-known trust game introduced in Kreps (1990) and Berg, Dickhaut, and McCabe (1995). In this game a first mover is endowed with an amount of money y. The first mover decides how much to send, $s \in [0, y]$, to a second mover. Any amount sent is multiplied by three. The second mover then decides how much to return, $r \in [0, 3s]$, to the first mover. Consequently, the payoff of the first mover equals $y - s + r$, and that of the second mover equals $3s - r$. The amount sent is frequently referred to as a measure of trust, whereas the amount returned as a measure of trustworthiness.[5] In the experiment, first movers were endowed with \$50 and could send any multiple of \$5.

Each subject played twice the trust game, once in the role of the first mover and once in the role of the second mover. For each game, subjects were randomly re-matched so that they played with a different person. In order to have a complete measure of each subject's trustworthiness, subjects made their second-mover decision using the strategy method (Selten, 1967). That is, they indicated how much to return for each possible sent amount without knowing how much the first mover actually sent.[6]

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[5] For a discussion on whether this game really captures trust see Glaeser et al. (2000) and Cox (2004).

[6] Although the use of the strategy method may elicit strategies that differ from those used in a strictly sequential environment, in games of low complexity, the strategy method seems to have little to no significant effect on subjects' decisions (Brandts and Charness, 2000). In our context, Vyrastekova and Onderstal (2005) find that the strategy method has no significant effect on the behavior in the trust game.

In addition to the two trust games, subjects had to indicate how much they expected the second mover to return. This was also done with the use of the strategy method. In other words, subjects indicated how much they thought the second mover would return for each possible sent amount. In order to motivate subjects to answer accurately, we paid them if they correctly anticipated the behavior of the second mover. Specifically, for every $s \in \{0, 5, 10, \ldots, 50\}$ they earned \$10 if their expectation fell within ten percent of the actual response (i.e. if $r - 0.1 \times 3s \leq \mathrm{E}[r] \leq r + 0.1 \times 3s$).

The two trust games and the expectation elicitation were played sequentially as three independent decisions. First, all subjects made the first-mover decision, second, they indicated what they expected the second mover would do, and third, they made the second-mover decision. In-between decisions, there was no feedback given with respect to the behavior of other subjects. Furthermore, when making a decision they did not know what the future decisions would be. However, subjects did know that they would make three decisions and that their actions in one would not affect their payoff in the future. This design guarantees that all subjects make their decision in the same order and with the same information. The subjects' earnings were determined by randomly selecting one of the three decisions. Finally, to facilitate any calculations subjects might want to make during the second-movers' choice, subjects had two buttons available. Given their strategy, one button calculated their payoff and the other one calculated the first mover's payoff. The instructions for the trust game are found in *Appendix B.6*.

Competition Game

To obtain measures of competitiveness and overconfidence we had subjects perform a real task under both competitive and uncompetitive payment schemes and elicited their beliefs concerning their performance relative to others. This design is based on Niederle and Vesterlund (2007).

The task consisted of adding up sets of four numbers. Subjects had 150 seconds to solve as many problems as they wished. Subjects were not allowed to use a calculator, but could use paper and pencil to make calculations. The four (integer) numbers were randomly drawn from a uniform distribution with a

support of 11 to 99. Once an answer is submitted, a new set of numbers appeared on the screen along with a message indicating whether the answer was correct or incorrect. The final score is determined by the number of correct answers. In order to avoid differences in performance due to sums of different difficulties, all subjects in a group faced the same sequence of random numbers. Subjects were randomly assigned to groups of four.

Subjects were told the game would consist of four periods in which they would perform the addition task three times. However, they were not informed how the task would be paid in each period until they reached the respective period. Furthermore, subjects were not informed of the performance of others in their group until the experiment had ended.[7]

Subjects faced two different payment schemes: an uncompetitive piece-rate scheme and a competitive tournament. Depending on the period, the payment scheme was either imposed by the experimenter or chosen by the subject. The specific payment schemes in each period were as follows:[8]

- Period 1: Subjects earned \$4 for every correct answer (uncompetitive payment).
- Period 2: Subjects earned \$16 for every correct answer if they happen to be the subject in their group who answered the most questions correctly. Otherwise subjects earned \$0 (competitive payment). Ties were resolved by randomly selecting a winner.[9]
- Period 3: Subjects had to choose how they wished to be paid before they performed the addition task. They could choose the \$4 per answer uncompetitive scheme or the \$16 per answer competitive scheme. In the case of the competitive scheme, subjects competed against the

[7] Unlike Niederle and Vesterlund (2007), at the end of the experiment, we did provide subjects with information concerning the performance of others in all periods. Thus, aversion to feedback on relative performance is not a factor that should influence the subjects' decision to compete or not.

[8] In fact, for half of the groups, the payment scheme of periods 1 and 2 are reversed. That is, in these groups subjects first faced a competitive payment scheme in period 1 and an uncompetitive scheme in period 2. This allows us to disentangle any differences in performance caused by experience and not by the payment scheme itself.

[9] The competitive scheme is designed so that subjects who believe they have a 25 percent chance of being the best in their group receive the same expected payoff from the two payment schemes.

performance of others in period 2. This has the advantage that subjects' decision to select the competitive scheme will not be affected by their beliefs on the number of other subjects also selecting competitive payment. Furthermore, it prevents subjects from selecting the uncompetitive payment scheme simply because they wish to avoid imposing a negative externality on other subjects.

- Period 4: In this period subjects do not perform the addition task. Instead they simply have to select how they wish to be paid (once again) for their performance in period 1. Again, they could choose either the uncompetitive scheme or the competitive one. Before deciding, subjects were reminded of their performance in period 1. As in period 3, a subject's decision does not depend on the decisions of others nor does it affect the earnings of other subjects. Choices in period 4 allow us to see to what extent the choice to compete is affected by the thrill (or stress) one might experience when performing a task in a competitive environment.

After period 4, we elicited the subjects' beliefs on their relative performance. Specifically, we asked subjects to guess their rank in each of the periods in which they performed the addition task. Each subject selected a rank between 1 and 4, and received \$2 if their guess was correct.[10] Comparing the subjects' beliefs with their actual relative performance gives us a measure of how overconfident subjects are. At the end of the experiment, one of the periods was randomly selected for payment. The instructions for this game are found in *Appendix B.7*.

Chocolate Auction

The chocolate auction was designed to measure the subjects' time preferences with respect to a specific good: a large Toblerone chocolate bar (market value of approximately \$3.00). Subjects were randomly divided into groups of eight and one such bar was auctioned in each group.

[10] In case of ties in the actual ranks, we counted every answer that could be correct as correct. For example, if the performance in the group was 10, 10, 11, 11, then an answer of last and third was correct for a score of 10, and an answer of best and second was correct for a score of 11.

In fact, although only one chocolate was auctioned, subjects participated in three second-price seal-bid auctions. The first auction was for a chocolate bar delivered the day of the experiment, the second auction was for a chocolate bar delivered one week later, and the third auction was for a chocolate bar delivered two weeks later. After the third auction, one of the auctions (and thus a delivery time) was chosen at random. Subjects submitted a bid, in dollars, for each of the three auctions. Bids were made sequentially but with no feedback in-between bids. The chocolate was given to the highest bidder in the randomly-chosen auction.

The chocolate delivery was organized in the following way: chocolates delivered the day of the experiment were delivered when the experiment finished. Chocolates delivered in later weeks were distributed at the end of a class that coincided with the weekday and time of the experiment. Since the class is mandatory, any costs associated with the consumption of the chocolate at the different delivery times are bound to be very similar. Furthermore, chocolates were distributed at similar situations. Both the experiment and the classes were in the afternoon, last the same amount of time, and require intellectual effort. Thus, for most subjects, the consumption of the chocolate ought to provide a similar utility at all delivery times.

The difference between the bid for the chocolate delivered "today" and the bids for the one and two-week deliveries gives us a measure of how much subjects discount the consumption of the chocolate bar. For example, an individual who assigns the same present-value to the chocolate bar at all delivery times should bid the same amount in the three auctions.[11] The instructions for the chocolate auction are found in *Appendix B.8*.

Social Dilemma Game

In order to observe the subjects' willingness to cooperate, we had them play a social dilemma based on the commonly-used linear public good game (Marwell and Ames, 1981; Isaac, Walker, and Thomas, 1984). Subjects were randomly assigned into groups of eight and given an endowment of $50. Each subject then

[11] Note that, since we use a second-price auction, subjects have a (weakly) dominant strategy to bid their true present-value even if they think that others might bid differently at future delivery times.

decided whether to contribute c to the public good. Contributions to the public good are costly to the subject but increase the earnings of others. Specifically, subject i's earnings equal $\$50 - c_i + 0.3 \times \sum_j c_j$. Unlike in most public good experiments, the contribution decision was binary: subjects could contribute either all their endowment or nothing, $c \in \{\$0, \$50\}$. Note that overall payoffs are maximized if all eight subjects contribute \$50. However, since an individual receives only \$15 for his \$50 contribution, he maximizes his monetary payoff by not contributing.

The experiment was designed to elicit the willingness of subjects to conditionally cooperate. For this purpose we used a variation of the design employed by Fischbacher, Gächter, and Fehr (2001). Subjects made two contribution decisions: first an "unconditional" decision and after that a "conditional" one. The unconditional decision was simply to either contribute the \$50 to the public good or not. For their conditional decision, we used the strategy method (Selten, 1967) to allow subjects to condition their contribution on the number of group members contributing to the public good. Specifically, subjects had to indicate whether they would contribute their \$50 if x other group members also contributed theirs, and x varied from 0 to 7. To determine each subject's payoff, one of the two decisions was randomly selected. If the unconditional decision was chosen then that subject's payoff was given by his unconditional decision and the unconditional decision of the other seven group members. If the conditional decision was chosen, the subject's payoff was given by his conditional decision and the other's unconditional decision. All subjects made both decisions without knowing what others in their group did. Furthermore, when making their unconditional decision, subjects were not aware their second decision would be a conditional one. The instructions for the social dilemma game are found in *Appendix B.9*.

Lottery choice without losses

In order to measure risk aversion, we elicit the certainly equivalent of a lottery by having subjects make a series of 15 choices (in a similar was as Holt and Laury, 2002). Each choice consisted of selecting either a lottery where they could earn \$0 or \$200 each with ½ probability or a certain amount of money x, where x varied

from \$50 to \$120 in steps of \$5. The smallest value of x that is preferred over the lottery gives us a measure of a subject's risk aversion. At the end of the experiment, one of the choices was randomly chosen to determine each subject's earnings. The instructions for this choice are found in *Appendix B.10*.

Time Preferences Choice

Unlike in most laboratory experiments, we did not pay subjects in cash when the experiment ended. Instead, we used the following payment procedure. The 495 subjects who earned a positive amount of money and thus required further payment received their earnings either the day in which they participated in the experiment or two weeks later. In both cases, the payment was done by dropping a check into their mailfolder. Note that, payment was always done during a day in which subjects had to attend class and thus be present at the university. Mailfolders are easily accessed and are usually checked on a daily basis. This procedure was used so that the transaction cost of collecting their earnings was exactly the same irrespective of when the subject was paid.

In order to measure time preferences we gave subjects a series of simple choices of the following type: receive x dollars today or receive $(1 + y)x$ dollars in two weeks, where x equals their earnings in the experiment. Each subject answered thirteen such questions where y varied from 0 to 0.12 in steps of 0.01. Thereafter one of the questions was randomly selected and paid. If, for a given y and x, a subject prefers x dollars today, we can infer that this subject is willing to sacrifice y% of his earnings in order to receive the payment today instead than in two weeks.[12] Thus, by varying y and observing the point where subjects switch from payment today to payment in two weeks we get a precise measure of each subject's discount rate. We chose this procedure as it is not only incentive compatible but it is also simple to understand. The instructions for the time preferences choice are found in *Appendix B.11*.

[12] Note that even a 1% return on a two-week wait translates into a 29.5% annual return. A 2% two-week return already equals a 67.3% annual return and our maximum value for y, a 12% two-week return, translates into an annual return of 1804.0%.

4. GSB's Admission Department

The admissions office of Chicago GSB also supplied us with data on several different variables. These included: age, gender, marital status, race, nationality, visa status, year of application, and deferred status; work experience; scholarship information (dates, values, and names); address at the time of application; undergraduate school, GPA, degree, major, and year; parents' education; interview and reader recommendations; employer, job title, salary, and industry; admittance to other schools; income in US ZIP code; and number of GSB clubs and concentrations.

Appendix A. Survey Questions

This appendix contains the questions of the two surveys subjects completed during the study. In cases in which questions from a standard survey are used we provide the appropriate reference. Questions are provided in the order in which they are presented to subjects.

A.1. General Survey

1. A biotech company is conducting a tryout for a new drug soon to be released. With 50% probability the tryout fails and the stock is worth nothing. If it succeeds, the stock is worth $5,000. What is the maximum price at which you are willing to buy this stock before the tryout is completed?
2. Are you maxed out on your credit card? (Yes / No)
3. You have in front of you two sweets, one you like more, one you like less. You are sufficiently hungry that you are going to eat them both. Which one do you typically eat first? (The one you like more / The one you like less)
4. Do you tend to procrastinate? (Yes / No)
5. Imagine you are randomly paired with another person whom we will refer to as the "other." This other person is someone you do not know and you will not knowingly meet in the future. You are presented with three possible monetary allocations for you and other. Please rank the allocations in order of your preference: (Your payout / Other's payout: $1000 / $1000, $1050 / $1250, $950 / $750)
6. Imagine you are now randomly paired with yet another person whom we will still refer to as the "other." Once again, this other person is someone you do not know and you will not knowingly meet in the future. Please rank these other allocations in order of your preference: (Your payout / Other's payout: $1000 / $1000, $1050 / $750, $950 / $1250)
7. Some people think that governments ought to reduce the income differences between the rich and the poor, perhaps by raising the taxes of wealthy families or by giving income assistance to the poor. Others think

that the government should not concern itself with reducing this income difference between the rich and the poor. What score between 1 and 7 comes closest to the way you feel? (1 = Government should do something to reduce income differences between rich and poor / 7 = Government should not concern itself with reducing income differences)

Questions 8 to 17 consist of the revised version of the Life Orientation Test (LOT) which is found in Scheier, Carver, and Bridges (1994).

18. How many volunteer associations do you belong to?
19. Until what age do you think you will live?
20. What is the probability that you will live to be 80 years old?
21. Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? (Most people can be trusted / Can't be too careful [TRANSLATION = "have to be very careful"] / Don't know)
22. Suppose that a new and very desirable dorm/apartment has become available. The University of Chicago organizes a lottery to assign it among the many applicants. How confident are you that the allocation will be fair? (Not at all / Not much / Quite a lot / A great deal / I don't know)
23. Suppose that while walking on Michigan Avenue in Chicago you lose your wallet with 1,000 dollars inside. A random person that you do not know finds it. He or she does not know you, but he or she is aware that the money belongs to you and knows your name and address. He or she can keep the money without incurring in any punishment. According to you, what do you think is the probability he or she will return the money to you?
24. How good are you in detecting people who are trustworthy? (Not good at all / Not very good / Good / Very good / I don't know)
25. Are you an organ donor? (Yes / No)
26. How much did you contribute last year to your alma mater college?
27. On an average month, how much do you spend gambling?

28. What is the maximum price you are willing to pay for a ticket in a lottery that pays you $5000 with 50% probability and nothing with 50% probability?
29. Do you think you have an ability to anticipate at better than average odds the number drawn at the roulette? (Yes / No)

Questions 30 to 32 consist of a selection of questions from the Collectivism and Individualism questionnaire used by Triandis (1995). Questions 33 to 42 are a selection of the questions from the Crowne-Marlowe social desirability scale (Crowne and Marlowe, 1960). Questions 43 to 46 are questions from the Interpersonal Relativity Index developed by Davis (1980; 1983). Specifically they correspond to two questions measuring subjects on the perspective-taking scale and two questions measuring them on the empathic-concern scale. In all these cases, in order to select a set of questions from each questionnaire, we ran a pre-test of the survey and picked the questions that were least correlated with each other and thus maximize the variation between subjects.

47. For each of the following statements, select whether you think it is acceptable, unacceptable, or something in between.
    a. Avoiding a fare on public transport.
    b. Buying a pirated DVD.
    c. A company president found that a competitor had made an important scientific discovery which would sharply reduce the profits of his own company. He then hired a key employee of the competitor in an attempt to learn the details of the discovery.
    d. A small business received one-fourth of its gross revenue in the form of cash. The owner reported only one-half of the cash receipts for income tax purposes.
    e. A company paid $350,000 “consulting” fee to an official of a foreign country. In return, the official promised assistance in obtaining a contract which should produce $10 million profit for the contracting company.

48. There's a lot of talk these days about the poverty in Africa. We'd like to get your thoughts on this issue by exploring an imaginary situation. For example, let me tell you about an international pledge that was drawn up at the second world congress. In this pledge, industrialized countries commit large amounts of money over the next 20 years for fighting poverty in Africa. Forty-two countries from Europe and Central Asia have already agreed to the pledge, but your government has not yet signed on because of ambiguities about the method by which the pledge money will be distributed. Based on your limited information, how strongly would you support an endorsement by your government? (1 = Do not support / 10 = Strongly support)
49. If you learn that Bono, the U2 rock star involved in many humanitarian pledges, endorses the program, how strongly would you now support an endorsement by your government? (1 = Do not support / 10 = Strongly support)
50. If you learn that, after a thorough study, an impartial organization has endorsed the program, how strongly would you now support an endorsement by you government? (1 = Do not support / 10 = Strongly support)
51. When you think about yourself, how important is your occupation to your sense of who you are? (Not at all important / Slightly important / Moderately important / Very important / Don't know)
52. When you think about yourself, how important is your ethnic or racial background to your sense of who you are? (Not at all important / Slightly important / Moderately important / Very important / Don't know)
53. When you think about yourself, how important is religion to your sense of who you are? (Not at all important / Slightly important / Moderately important / Very important / Don't know)
54. When you think about yourself, how important is the place where you grew up to your sense of who you are? (Not at all important / Slightly important / Moderately important / Very important / Don't know)
55. Taking all things together, would you say you are: (Not at all happy / Not very happy / Quite happy / Very happy / Don't know)

56. All in all, how would you describe your state of health these days? Would you say it is: (Very poor / Poor / Fair / Good / Very good / Don't know)
57. Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? (0 = unwilling to take risks / 10 = fully prepared to take risk) (see Dohmen et al., 2005)

Questions 58 to 72 correspond to the Parental Authority Questionnaire (PAQ) introduced by Buri (1991) and revised by Reitman et al. (2002). Due to space constraints we applied the set of questions to both parents at the same time instead of to each parent individually.

73. Were you breast fed as a baby? (Yes / No / Don't know)
74. Growing up, were you your mother's favorite child? (Yes / No / Don't know)
75. Growing up, were you your father's favorite child? (Yes / No / Don't know)
76. How many siblings did you have?
77. What is your birth order?
78. Were you raised religiously? (Yes / No / Don't know)
79. Which religion denomination were you raised in?
80. Are you religious now? (Yes / No / Don't know)
81. If yes, which religious denomination?
82. How often do you attend religious services? (Never / Less than once a year / Few times a year / Every week / More than once a week / Not applicable)
83. In your future exams at the University of Chicago, in which decile of the GPA distribution do you expect yourself to be?
84. What grade do you expect to get in the following courses: (Financial Accounting / Microeconomics / Statistics / Investment)
85. After finishing the MBA program, what type of job are you looking for?
86. You are looking for a summer job. You are told that if you take a short training course that will teach you a specific skill that has no value for you in the future, you may earn a higher salary. If you take the course,

you estimate that with 50% probability your summer salary will be 5,000 dollars more, and with 50% probability will remain unchanged. What is the maximum amount you are willing to pay for taking this course?

Questions 87 and 88 were taken from the self-efficacy scale of Sherer et al. (1982). Questions 89 to 124 correspond to the "Reading the Mind in the Eyes" test used by Baron-Cohen et al. (1997) and later revised in Baron-Cohen (2002). Questions 125 to 134 belong to the Influence Quotient developed by Cialdini (1993). Finally, questions 135 to 138 are used to measure the subjects' cognitive abilities. They correspond to a variation of the Cognitive Reflection Test (CRT) used by Frederik (2005).

A.2. MSCEIT Survey

All questions of the second survey correspond to the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). Due to copyright restrictions they cannot be reproduced in this document. More information can be found at the following website: *https://www.mhs.com/*.

Appendix B. Experimental Instructions

This appendix contains the instructions for each of the games/choices the subjects completed during the experiment.

B.1. General Instructions (given before the experiment)

Next week you will participate in the LEADERSHIP GAME. This document provides you with a general introduction to the LEADERSHIP GAME session and gives you the instructions for one of the games.

Introduction

During the session next week, you will play **five** games. The instructions for one of the games are included in this document. For the other games, you will receive instructions during the session.

During some of the games, you will interact with other participants through the computer. **Neither during nor after the games will you know with whom you have interacted**. They will not sitting close to you (some of them will be sitting in another classroom).

Please **do not talk or communicate** with anybody during the LEADERSHIP GAME. This might disturb other people and invalidate the session. Also, please turn off your mobile phone.

Logistics

This is the table indicating where and when your game session will take place. To find the classroom you should attend, look first for your cohort whether domestic or international student (with visa). **Classroom assignment is by the first letter of your last name**. It is absolutely important that you arrive on time, since your delay will jeopardize the session of other participants.

As you arrive in the classroom you should pick up at the entrance an envelope with your name on it. This envelope will contain all the required materials needed to participate in the session. In addition it will contain a **$20 bill**, which is your participation fee.

Cohorts	Day and Time
Domestic Students from Lead Cohorts: Gargoyles, Nobels, Phoenix, Stuart, and Walker	Tuesday, October 3rd, 2006 1:30 pm – 3:00 pm
Last names from:	
A to D: room C01 E to K: room C02 L to R: room C04 S to Z: room C05	

Cohorts	Day and Time
International Students from Lead Cohorts: Gargoyles, Nobels, Phoenix, Stuart, and Walker	Tuesday, October 3rd, 2006 3:30 pm – 5:00 pm
Last names from:	
A to E: room C01 F to L: room C02 M to R: room C04 S to Z: room C05	

Cohorts	Day and Time
Domestic Students from Lead Cohorts: Bond, Davis, Harper, Maroons, and Rockefeller	Thursday, October 5th, 2006 1:30 pm – 3:00 pm
Last names from:	
A to C: room C01 D to K: room C02 L to R: room C04 S to Z: room C25	

Cohorts	Day and Time
International Students from Lead Cohorts: Bond, Davis, Harper, Maroons, and Rockefeller	Thursday, October 3rd, 2006 3:30 pm – 5:00 pm
Last names from:	
A to G: room C01 H to L: room C02 M to R: room C04 S to Z: room C25	

Payment

In addition to the participation fee, in each of the five games you will have the opportunity to earn money. At the end of the last game you will be informed how much you have earned in each of the five games. **One** of the games will be randomly selected, and you will be paid the amount you earned in that game with a check delivered to your mailfolder.

For example, suppose your earnings for each game are as they appear in the table below. In this case, if the game 3 is selected, you will be paid $80 in addition to the $20 received at the beginning.

Experiment	Earnings
Game 1	$65
Game 2	$120
Game 3	$80
Game 4	$30
Game 5	$200

Time and Waiting

The session is scheduled to last one and half hours. The precise amount of time will depend on the speed at which you and others make your decisions.

In some of the games, you will have to wait while other participants make their decisions or finish reading instructions. Different people go through the games at different paces so please be patient and keep paying attention as the waiting period might end at any moment. Note that this also means that if you take very long you will delay other participants. If this is the case, a message saying "Please Hurry" will appear in the top right corner of the computer screen.

Information

You will participate in the games sequentially. However, you will **not** be informed of the outcome of a game nor of your earnings in that game until the end. After the **fifth** game has finished you will be informed of the amount earned in each game and of your final payment. Furthermore, you will receive a feedback **email** summarizing what happened in each game and detailing how your earnings were determined.

Remember that you should not communicate or share information with other participants until October 6th. We hope you will enjoy the LEADERSHIP GAME. If you have a question, do not hesitate to contact us.

B.2. General Instructions (given during the experiment)

Today, you will participate in **five** games. You have already received a general introduction explaining: how you will be paid, when will you receive information concerning the outcomes of the games, and the duration of the LEADERSHIP GAME session.

At the beginning of each game you will receive instructions for that specific game. The instructions are simple, read them carefully as they explain how you can earn money. If you are done reading, click on Ready. The first game will start in a few seconds.

B.3. Instructions for the Lottery Choice with Losses

To start, you will be given the option to accept or reject **ten** different lotteries. In each lottery there is a 50% probability of **losing** $20 and a 50% probability of winning a prize. The prize varies from lottery to lottery and ranges from $15 to $60.

After your decision, **one** of the lotteries will be randomly selected by the computer. If you decided to reject the selected lottery then you get to keep your $20. If you accepted the selected lottery, then a random draw determines whether you lose the $20 or you win that lottery's prize.

If you win, the prize will be added to your earnings. If you lose, we will deduct $20 from your earnings. If by the end of today's experimental session your earnings are not enough to cover the $20 loss, you will have to gives us back the difference.

B.4. Instructions for the Asset Market Game (given before the experiment)

In order to better utilize the time during the session, we ask you to read these instructions carefully. They describe in detail the first of the five games. During that game you will not have time to read these instructions. Not reading the instructions can negatively affect your earnings as you would be at a disadvantage relative to other participants.

Introduction

At the beginning of this game you will be endowed with a certain amount of stock and cash (the relative amount of stock and cash differs from person to person). During each period you can buy and sell shares in an electronic market with seven other participants. After a trial period, there will be a total of **10 periods** each lasting **two minutes**.

Each share pays a dividend at the end of **every period**, which is drawn from the following distribution: \$4.00, \$1.50, \$0.50, or \$0.00 with equal probability (hence the expected dividend payment is \$1.50). The dividend realization is independent from period to period. After the dividend is paid in the **last** period, the share will expire worthless.

In period 1 you will start with a specific amount of shares and cash. This amount will be determined randomly on the day of the LEADERSHIP GAME. The number of shares and cash that you have at the end of each period will carry over from period to period. Your earnings in this game are equal to the total amount of cash you are holding at the end of the 10^{th} period.

Example

Suppose that after trading ends in period 9 you own 5 shares and you have \$45.00 in cash. At that point you learn that each share pays a dividend of \$1.50 in that period. Your total dividend in period 9 is thus \$7.50. This means that when period 10 starts you will have 5 shares to trade and \$52.50 in cash. Now, suppose that after trading ends in period 10 you own 4 shares and you have \$55.50 in cash. At that point you learn that each share pays a dividend of \$4.00 in that period. Your total dividend in period 10 would be \$16.00. This makes your total amount of cash equal to \$71.50. Since this is the last period, that amount of cash equals your earnings in this experiment.

FIGURE 1 – SCREENSHOT OF THE TRADING SCREEN

Trading

The trading will be done through the computer. Above, you can see how the trading screen looks like.

On the top part of the screen you can see the trading period number and the number of remaining dividend payments. You can also see the number of shares that you own and the amount of cash that you have. Furthermore, you can see how much time is left for trading in this period.

Lower down you can see the area where you will be trading. We describe how to sell and buy shares in the following paragraphs.

Selling shares

In each period, you will be able to sell shares. Note that you can only sell shares that you own. You may sell shares in two ways:

1. By accepting a bid to buy from another participant.
2. By posting an offer to sell to other participants.

1. Accepting a bid

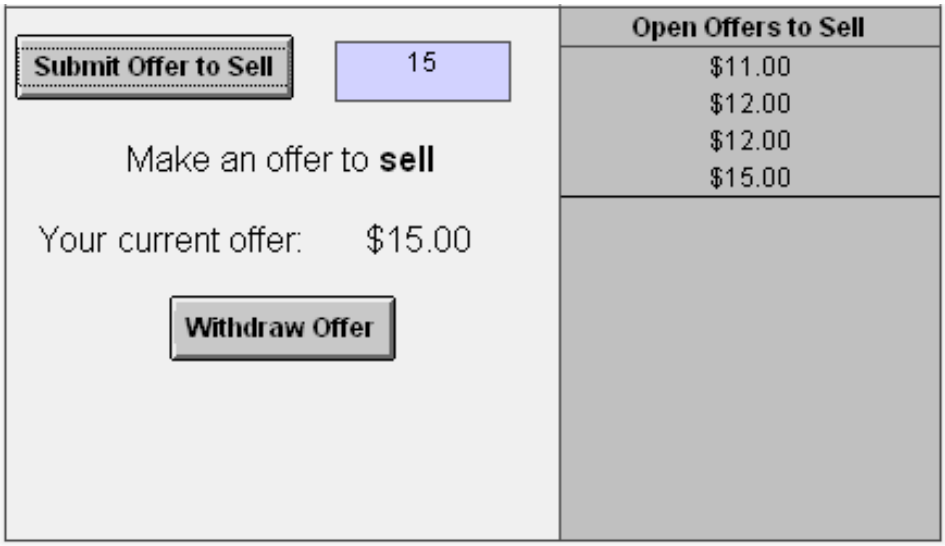
On the right side of the screen you can see the outstanding bids to buy shares at different prices. You can instantly sell a share to another participant by accepting the 'Highest Bid' (see 0). If you click on the "Sell at this price" button you will sell one share at the highest available price. That is, your total amount of shares will decrease by one and your amount of cash will increase by the price at which you sold the share. When you sell a share a message will appear on the adjoining box.

FIGURE 2 – ACCEPTING A BID

2. Posting an offer to sell

Instead of accepting the standing bid, you can also post an offer to sell one share. Simply enter the price at which you would like to sell your share and click on the "Submit Offer to Sell" button.

FIGURE 3 – POSTING AN OFFER TO SELL



Once your offer has been posted, other participants can decide whether they want to accept it. If your offer is accepted your total amount of shares decreases

by one and your amount of cash increases by the price you posted. Furthermore, a message indicating that your offer was accepted appears on the screen. Note that you can post only one offer at a time. New offers will replace existing ones.

On the screen you will be able to see all open offers sorted from high to low. If you wish to withdraw your offer you can do so by clicking on the "Withdraw Offer" button (see 0).

Buying shares

In each period, you will be able to buy shares. Again, you can only buy a share if you have enough cash to cover the price. You may buy shares in two ways:

1. By accepting an offer to sell from another participant.
2. By posting a bid to buy from other participants.

1. Accepting an offer

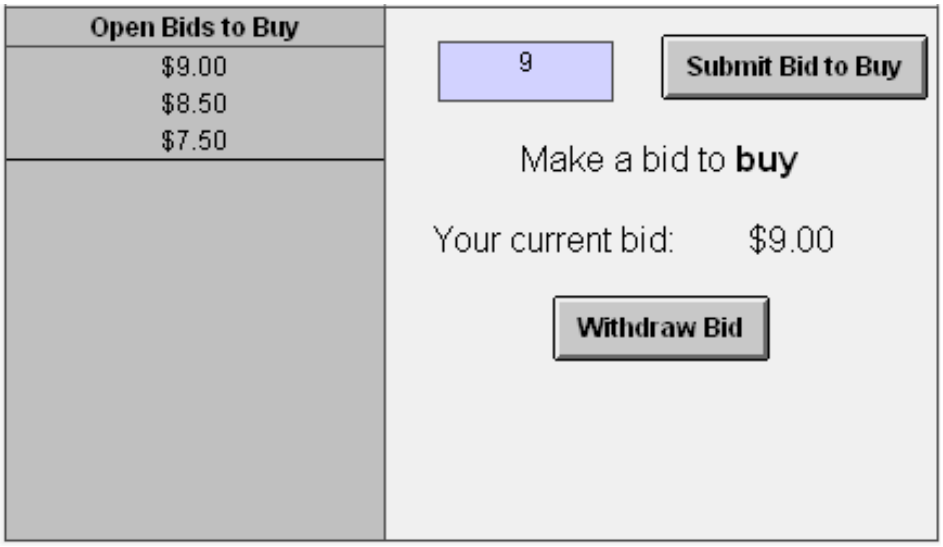
On the left side of the screen you can see the outstanding offers to sell shares at different prices. You can instantly buy a share from another participant by accepting the 'Lowest Offer' (see 0). If you click on the "Buy at this price" button you will buy one share at the lowest available price. That is, your total amount of shares will increase by one and your amount of cash will decrease by the price at which you bought the share. When you buy a share a message will appear on the adjoining box.

FIGURE 4 – ACCEPTING AN OFFER

2. Posting a bid to buy

Instead of accepting the standing offer, you can also post a bid to buy one share. Enter the price at which you wish to buy a share and click on the "Submit Bid to Buy" button.

FIGURE 5 – POSTING A BID TO BUY



Once your bid has been posted, other participants can decide whether they want to accept it. If your bid is accepted your total amount of shares increases by one and your amount of cash decreases by the price you posted. Furthermore, a message indicating that your bid was accepted appears on the screen. Note that you can post only one bid at a time. New bids will replace existing ones.

Finally, on the screen you see all open bids sorted from low to high. If you wish to withdraw your bid you can do so by clicking on the "Withdraw Bid" button (see 0). Good luck and happy trading!

B.5. Instructions for the Asset Market Game (given during the experiment)

This is the game for which you received instructions last week. When you arrived, you also received summary of the instructions. You can read them now to refresh your memory.

Initial amount of shares and cash

In this experiment you will have **10 periods** each lasting **two minutes** to trade shares with seven other participants. In period 1 you will start with **2 shares** and **$40.00 in cash**. Note that, other participants will have a different allocation of shares and cash.

Remember that each share pays a dividend at the end of every period. The dividend is drawn from the following distribution: $4.00, $1.50, $0.50, or $0.00 each with equal probability. The number of shares and cash that you have at the end of each period will carry over from period to period. Your earnings in this game are equal to the total amount of cash you are holding at the end of the 10th period.

To familiarize you with the computer screen there will first be a **trial period**. The trial period will last one minute and any trading done during this period will not affect your earnings.

B.6. Instructions for the Trust Game

In this game you will make three different decisions. One of them will be randomly selected to determine your earnings for game 2. Note that decisions are independent, that is, none of your decisions affects the earnings from the other decisions.

Instructions for first movers (decision 1)

For this decision, you will be randomly paired with another participant. We refer to this participant as the responder. To start, you receive $50 (the responder does not receive any money). You must decide how much money to send to the responder. You keep every dollar not sent to the responder. Every dollar sent to the responder is multiplied by **3**. Then the responder will decide how much money to return to you. The responder keeps every dollar not returned.

Your earnings from this choice equal the amount you keep plus the amount returned to you by the responder. The responder's earnings equal the amount he/she keeps. Please use the slider below to decide how much to send to the responder. You can choose only multiples of five.

Instructions to elicit the expectations of first mover (decision 2)

Now, we ask you to estimate the behavior of the responder. Depending on the accuracy of your estimations, you can earn up $100. We asked the responder to decide how much money to return for every possible sent amount. Please indicate how much money you expect the responder will return for every sent

amount. You earn **$10** for every sent amount in which your estimation matches the responder's decision (with a 10% margin of error). For example, suppose you estimate that, after receiving $150, the responder returns $100. If for that sent amount the responder decides to return between $85 and $115, you earn $10.

Instructions for second movers (decision 3)

For this decision, you will be randomly paired with another participant. We refer to this participant as the **sender**. Note that the participant with whom you are paired for this decision is **not** the same participant with whom you were paired before.

The sender will decide to send you between $0 and $50. The sent amount will be multiplied by 3. Please indicate, for **each** possible sent amount, how much you would like to return to the sender. Your earnings will depend on the precise sent amount and your answer below. Note: you can use the calculate buttons to see how your choice affects your own as well as the sender's earnings.

B.7. Instructions for the Competition Game

This game is divided into 4 periods. At the beginning of the game you will be divided into groups of four. The participants in your group will be the same throughout the 4 periods.

In each of the first 3 periods you will be given a series of **addition tasks** (sums of four 2-digits numbers like the one below). You will have 150 seconds to answer as many questions as you want. The computer will record the number of sums that you answer correctly. You may use paper and pencil but you **cannot** use a calculator. In each period, the rules for the payment are different and will be explained in detail before the start of the respective period.

One of the 4 periods will be randomly selected by the computer to determine your earnings for Game 3. In addition, after period 4 there will be a bonus section consisting of four questions. Any money earned in the bonus section will be added to this experiment's earnings.

Instructions for the uncompetitive payment

In this period you will be paid **$4** for each correct answer you give.

Example: If you answer 6 questions correctly, your earnings for period 1 equal $24. Remember, you can write down the numbers on a piece of paper but you **cannot** use a calculator.

Instructions for the competitive payment

In this period you will compete against the other **three participants** in your group. Your payment is contingent on you having the highest number of correct answers. You will be paid **$16** for each correct answer if you have the **highest** number of correct answers in your group. If you do not have the highest number of correct answers, you will earn **$0** in this period. If there are two or more group members tied in first place, one of them will be randomly selected to be paid $16 for each correct answer (the others are paid $0). Note that all group members will face the same difficulty. That is, everyone will face the same sequence of numbers.

Example: Suppose that the other three participants in your group answer 5, 9, and 12 questions correctly. If you answer 11 questions correctly your earnings in this period would equal $0. If you answer 13 questions correctly your earnings in this period would equal $208. Remember, you can write down the numbers on a piece of paper but you **cannot** use a calculator.

Instructions for the choice between competitive or uncompetitive payments

In this period you will replay the same game but you choose the rule according to which you will be paid. You can be paid with Rule 4 or with Rule 16:

- **Rule 4:** If you choose this rule you will be paid $4 for each correct answer regardless of what others do.
- **Rule 16:** If you choose this rule you will be paid according to your performance relative to the performance of the other three group members. You will earn $16 for each correct answer if you have more correct answers than the other group members had in period 2. If you do not have more correct answers than the other group members had, you will earn $0 in this period. If you tie in first place, a random draw will determine whether you are paid $16 for each correct answer or $0.

Remember, you can write down the numbers on a piece of paper but you **cannot** use a calculator.

Instructions for the choice between competitive or uncompetitive payments for their performance under the uncompetitive payment

In this period you do not have to repeat the addition task but you have the choice to be paid **again** for your period 1 performance in two ways. You can choose to be paid according to Rule 4 or to Rule 16.

- **Rule 4:** If you choose this rule you will be paid $4 for each question answered correctly in period 1 regardless of what others did.
- **Rule 16:** If you choose this rule you will be paid $16 for each correct answer in period 1 if you have more correct answers than the other three group members had in period 1. If you did not have more correct answers than the other group members had, you will earn $0 in this period. If you tie in first place, a random draw will determine whether you are paid $16 for each correct answer or $0.

Recall that in period 1 you correctly answered **XX questions**. Note that this choice determines your period 4 earnings, it does not affect your earnings from period 1.

Instructions to elicit the subjects' expectations concerning their performance in each period

In this screen we would like you to estimate your performance relative to that of other three players. For each of the first three periods, indicate whether you think you ranked first, second, third or fourth. You will receive **$2** for every period in which you correctly estimate your rank. In case of a tie, you will receive the $2 if there is a way of resolving the tie that makes your estimate correct.

Example: Suppose that in period 1 you had 8 correct answers and the other three group members had 6, 8, and 11 correct answers. You would receive $2 if you guess that your rank is second or third in period 1.

B.8. Instructions for the Chocolate Auction

As part of the LEADERSHIP GAME we are auctioning a **large Toblerone milk chocolate bar** (3.52 ounces). The chocolate will be given to the **highest bidder** at a price equal to the **second highest bid**. Note that if you are the winner, the price will be deducted from your final earnings (if your earnings are not enough to cover the price you will have to pay us the difference). The chocolate will be delivered to the winner either now, in one week, or in two weeks (each is equally likely).

- If the bar of chocolate is to be delivered **now**: immediately at the end of the session. How much money are you willing to bid for this bar of chocolate?
- If the bar of chocolate is to be delivered **in one week**: at the end of your LEAD class. How much money are you willing to bid for this bar of chocolate?
- If the bar of chocolate is to be delivered **in two weeks**: at the end of your LEAD class. How much money are you willing to bid for this bar of chocolate?

B.9. Instructions for the Social Dilemma Game

This game is divided into 2 periods. In each period you will be divided into groups of **eight**. Note that you will interact with the same participants in both periods. **One** of the 2 periods will be randomly selected to determine your earnings in Game 4.

In each period you decide to invest in **project A** or in **project B**. All participants in your group have the same decision to make. If you invest in A, the earnings of all participants in the group (including your own) increase by $15. If you invest in B, your earnings increase by $50 but the earnings of others do not change. Note that the same is true for other participants. If another participant invests in A, your earnings increase by $15. If instead he/she invests in B, your earnings remain unchanged. Below you can see your earnings depending on the number of other participants investing in A and on your choice. You can also see

how your choice affects the average earnings of the other participants in your group.

Your choice		Number of other participants investing in A							
		0	1	2	3	4	5	6	7
Invest in A	**Your Earnings**	**$15**	**$30**	**$45**	**$60**	**$75**	**$90**	**$105**	**$120**
	Average Earnings of Others	$65	$73	$81	$89	$96	$104	$112	$120
Invest in B	**Your Earnings**	**$50**	**$65**	**$80**	**$95**	**$110**	**$125**	**$140**	**$155**
	Average Earnings of Others	$50	$58	$66	$74	$81	$89	$97	$105

Example: Suppose that four other participants invest in A. If you invest in A your earnings equal $75 and the average earnings of other participants equal $96. If instead you invest in B, your earnings increase to $110 and the average earnings of other participants decrease to $81.

Instructions for the conditional cooperation decision (period 2)

In this period, you can **condition** your decision on the number of other participants investing in A in period 1. Please decide whether to invest in project A or in project B in each of the following situations. Your earnings for period 2 will be determined by the number of **other** participants who invested in project A in period 1 and on your decision below.

B.10. Instructions for the Lottery Choice without Losses

In this game you will make 15 simple decisions. Each decision consists of a choice between two options: A and B. If you choose Option A, you earn a specified amount of money with certainty. If you choose Option B, a random draw determines your earnings: with 50% probability you earn $200 and with 50% probability you earn $0.

One of the 15 decisions will be randomly selected by the computer to determine your earnings for game 5.

B.11. Instructions for the Time Preferences Choice

As your last choice, you decide when to receive your payment. For each row below, choose the amount and timing of your payment. If you choose to be paid **now**, a check will be delivered to your mailfolder by the **end of the day**. If you choose to be paid **later**, the check will be delivered to your mailfolder in **two weeks time**. One of the rows will be randomly selected by the computer and that choice will be implemented.

References

Akerlof, George, and Kranton, Rachel (2000). Economics and Identity. *Quarterly Journal of Economics* 115: 715-733.

Akerlof, George, and Kranton, Rachel (2005). Identity and the Economics of Organizations. *Journal of Economic Perspectives* 19: 9-32.

Baron-Cohen, Simon, Jolliffe, Therese, Mortimore, Catherine, and Robertson, Mary (1997). Another advanced test of theory of mind: Evidence from very high-functioning adults with autism or Asperger Syndrome. *Journal of Child Psychology and Psychiatry* 38: 813-822.

Baron-Cohen, Simon, Wheelwright, Sally, Hill, Jacqueline, Raste, Yogini, and Plumb, Ian (2001). The "Reading the Mind in the Eyes" Test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry* 42: 241-251.

Benjamin, Daniel J., Brown, Sebastian A., and Shapiro, Jesse M. (2006). Who is "Behavioral"? Cognitive Ability and Anomalous Preferences. Mimeo. Harvard University.

Berg, Joyce, Dickhaut, John, and McCabe, Kevin (1995). Trust, reciprocity, and social history. *Games and Economic Behavior* 10: 122-142.

Brandts, Jordi and Charness, Gary (2000). Hot vs. Cold: Sequential Responses in Simple Experimental Games. *Experimental Economics* 2: 227-238.

Buri, John R. (1991). Parental Authority Questionnaire. *Journal of Personality Assessment* 57: 110-119.

Cox, James C. (2004). How to Identify Trust and Reciprocity. *Games and Economic Behavior* 46: 260-281.

Croson, Rachel and Gneezy, Uri (2004). Gender Differences in Preferences. *Journal of Economic Literature* forthcoming.

Crowne, Douglas P. and Marlowe, David (1960). A New Scale of Social Desirability Independent of Psychopathology. *Journal of Consulting Psychology* 24: 349-354.

Davis, Mark H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology* 10: 85.

Davis, Mark H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology* 44: 113-126.

Dohmen, Thomas, Falk, Armin, Huffman, David, and Sunde, Uwe (2007). Are Risk Aversion and Impatience Related to Cognitive Ability? IZA Discussion Paper No. 2735.

Dohmen, Thomas, Falk, Armin, Huffman, David, Sunde, Uwe, Schupp, Jürgen, and Wagner, Gert G. (2005). Individual Risk Attitudes: New Evidence From a Large, Representative, Experimentally-Validated Survey. IZA Discussion Paper No. 1730.

Fehr, Ernst and Gächter, Simon (2000). Fairness and Retaliation: The Economics of Reciprocity. *Journal of Economic Perspectives* 14: 159-182.

Fehr, Ernst and Goette, Lorenz (2007). Do Workers Work More if Wages Are High? Evidence from a Randomized Field Experiment. *American Economic Review* 97: 298-317.

Fischbacher, Urs (2007). z-tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics* 10: 171-178.

Fischbacher, Urs, Gächter, Simon, and Fehr, Ernst (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters* 71: 397-404.

Frederik, Shane (2005). Cognitive Reflection and Decision Making. *Journal of Economic Perspectives* 19: 25-42.

Glaeser, Edward, Laibson, David, Scheinkman, Josè A., and Soutter, Christine L. (2000). Measuring Trust. *Quarterly Journal of Economics* 115: 811-846.

Holt, Charles A. and Laury, Susan K. (2002). Risk Aversion and Incentive Effects. *American Economic Review* 92: 1644-1655.

Isaac, Mark R., Walker, James M., and Thomas, Susan (1984). Divergent evidence on free riding: An experimental examination of possible explanations. *Public Choice* 43: 113-149.

Knack, Stephen and Keefer, Philip (1996). Does social capital have an economic payoff?: A cross-country investigation. *Quarterly Journal of Economics* 112: 1251-1288.

Knack, Stephen and Zak, Paul (2001). Trust and Growth. *Economic Journal* 111: 295-321.

Kreps, David M. (1990). Corporate Culture and Economic Theory. In Alt, James and Shepsle, Kenneth (eds.) *Perspectives on Positive Political Economy*. Cambridge: Cambridge University Press.

Marwell, Gerald and Ames, Ruth E. (1981). Economists Free Ride, Does Anyone Else? Experiments on the Provision of Public Goods, IV. *Journal of Public Economics* 15: 295-310.

Niederle, Muriel and Vesterlund, Lise (2007). Do women shy away from competition? Do men compete too much? *Quarterly Journal of Economics* 122: 1067-1101.

Porter, David P., and Smith, Vernon (2003). Stock Market Bubbles in the Laboratory. *Journal of Behavioral Finance* 4: 7-20.

Reitman, David, Rhode, Paula C., Hupp, Stephen D. A., and Altobello, Cherie (2002). Development and validation of the Parental Authority Questionnaire-Revised. *Journal of Psychopathology and Behavioral Assessment* 24: 119-127.

Scheier, Michael F., Carver, Charles S., and Bridges, Michael W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology* 67: 1063-1078.

Selten, Reinhart (1967). Die Strategiemethode zur Erforschung des Eingeschr¨ankt Rationalen Verhaltens im Rahmen eines Oligopolexperiments. In Sauermann, Heinz (ed.) *Beiträge zur Experimentellen Wirtschaftsforschung*. Tübingen: J.C.B. Mohr (Paul Siebeck).

Sherer, Mark, Maddux, James E., Mercadante, Blaise, Prentice-Dunn, Steven, Jacobs, Beth, and Rogers, Ronald W. (1982). The self-efficacy scale: Construction and validation. *Psychological Reports* 51: 663-671.

Shih, Margaret, Pittinsky, Todd L., and Ambady, Nalini (1999). Stereotype susceptibility: Identity salience and shifts in quantitative performance. *Psychological Science* 10: 80-83.

Smith, Vernon, Suchanek, Gerry, and Williams, Arlington (1988). Bubbles, crashes, and endogenous expectations in experimental spot asset markets. *Econometrica* 56: 1119–1151.

Spencer, Steven J., Steele, Claude M., and Quinn, Diane M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology* 35: 4-28.

Triandis, Harry C. (1995). *Individualism and Collectivism*. Oxford: Westview Press.

van Lange, Paul A. M., Otten, Wilma, de Bruin, Ellen M. N., and Joireman, Jeffrey A. (1997). Development of Prosocial, Individualistic, and Competitive Orientations: Theory and Preliminary Evidence. *Journal of Personality and Social Psychology* 73: 733-746.

Vyrastekova, Jana and Onderstal, Sander (2005). The trust game behind the veil of ignorance: A note on gender differences. CentER Discussion Paper 2005-96. Tilburg University.