Cognitive skills explain economic preferences, strategic behavior and job attachment

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1 Methods

The data items collected in-person by the investigators were gathered during 23 Saturdays between December 5, 2005 and August 8, 2006, from driver trainees in the middle of a two-week basic training course operated by the cooperating firm at a location in the U.S. Midwest. Subjects took part in two 2-hour sessions in groups of 18 to 30. The firm provided weekly updates on the employment status of the members of the subject pool, through April, 2007. This data was collected for the "New Hire Panel Study", which is Research Component Two of the Truckers & Turnover Project, which was first conceived during a pilot exploration in the summer of 2004. A more detailed account of the design and of the context for the project may be found in [1].

1.1 Experimental Design

The part of the design utilized here includes the following components: two economic experiments involving individual choices, an interactive game of strategy, a cognitive skills measure in the form of a game against the computer, two conventional cognitive skills measures, a personality profile, and a demographic profile. In addition to a flat show-up fee ($10 at the beginning of each 2-hour session), all tasks except the personality profile and the demographic profile were compensated on the basis of choices made or answers provided. Average total earnings were $53, with a low of $21 and a high of $168.

Subjects

1,069 trainee drivers took part, which was 91% of those offered the chance to participate. 3 of the subjects withdrew from the experiment, so the final sample consisted of 1,066 subjects. Because adjustments were made to two tasks shortly after data collection began, as noted below, the sample size is 892 when both these measures are utilized.

Risk Aversion

In the risk aversion experiment there were 24 choices divided into four blocks of six choices each. There were two possible options for each choice: a fixed amount of money received with certainty, versus a lottery paying a higher dollar amount or a smaller one, depending on whether a green or a blue chip was drawn from a bowl publicly observed to contain five poker chips of each color. Subjects also chose the color giving them the higher payoff, so the outcome was described as "a larger amount if your color is drawn and a smaller amount if the other color is drawn". There were four lotteries, with the following pairs of monetary outcomes in dollars: $(10, 2)$, $(5, -1)$, $(1, -5)$, and $(5, 1)$. In the $(10, 2)$ lottery, the fixed alternative was varied from 2 to 7 in increments of 1. In the $(5, -1)$ lottery, the fixed option ranged from 0 to 2.5, in increments of 0.5. In the $(1, -5)$ lottery, the fixed option went from -2.5 to 0 in increments of 0.5. In the $(5, 1)$ lottery, the fixed alternative was varied from 1 to 3.5 in increments of .5. The one question on which all subjects were paid was drawn from a separate bowl with 24 numbered poker chips, prior to the drawing of the winning color.

Time Preferences

In this experiment subjects had to make 28 choices, divided into four blocks of seven choices each. There were two possible options for each choice, a smaller amount of money paid earlier and a larger amount of money paid later. Each of the four blocks of seven choices had the same format. The amount for the higher payoff at a later date was in every case $80 and the amount for the lower payoff at an earlier time varied between a maximum of $75 and a minimum of $45, with decrements of $5. The experiment was always run on Saturday. The pair of dates were respectively today (Saturday) *vs.* tomorrow (Sunday), today *vs.* Thursday, Monday *vs.* a week from Monday, and Monday *vs.* 4 weeks from Monday. The question for payment was drawn first from a bowl with 28 numbered chips, and then the two subjects who were paid were selected by drawing from a separate bowl of numbered chips. Subjects departed the training school on the Friday following the data collection event, so the last two payments mentioned were made by mail when subjects chose them.

Sequential Prisoner's Dilemma

The extensive form of the game is the following: Person 1 (the first mover) and Person 2 (the second mover) each are allocated $5. Person 1 can send either $0 or $5 to Person 2, and Person 2 can respond by sending $0, $1, $2, $3, $4, or $5 back. All funds sent are doubled by the researchers.

Each subject made both an unconditional decision for the first mover role, and a conditional one for the second mover role (first how to respond if the other sends $0, and second how to respond if the other sends $5, doubled to $10.) Subjects were randomly matched and their role selected by the computer, after their decisions. This is a variant of the task used in [1].

Before each decision screen, subjects were also asked how they thought other participants in the room would act in this experiment. The first question was "What percent of the participants do you think will send their $5 as Person 1?" and payed $1 if the subject was correct within plus or minus 5%. The second and third questions were "If Person 1 does not send/does send, what is the average amount that participants in this room will send back?" and payed $1 each if the subject was within plus or minus $0.25 of each of the two actual averages.

Hit 15 Task

The Hit 15 task is a game between subject and computer. The computer and the subject take turns adding points to the "points basket" and in each turn the subject or the computer must add either one, two, or three points to the points basket. The goal is to be the first player to reach 15 points.

The game was played for five rounds, and the number of points in the points basket at the beginning of the round varied, and the computer and participant took turns going first. The first round was a practice round set to give the subjects an example of how the first stage of backward induction works. The subjects were paid $1 for each round that they won after the first. 892 subjects have a score on this measure. This is the same game that is studied in [2].

IQ Measurement

The IQ instrument used is a licensed computerized adaptation of the Standard Progressive Matrices (SPM) by J.C. Raven [3]. It consists of five sections (A-E), each containing 12 questions. Each question is presented as a graphic image. On top a large rectangular box contains some kind of a pattern with a piece missing out of the lower right hand corner. On the bottom are six (or eight) possible pieces that could be used to complete the image on top. Each section starts with easy images, and becomes progressively more difficult, and the later sections are more difficult than the earlier ones.

Due to the time constraints the first section of the SPM was omitted. In addition, while we did not announce a time limit at the beginning of the SPM, we halted activity at 31 minutes, with a prior warning at 28 minutes. Initial analysis showed that this affected the performance of a significant subset of subjects on section E, so the score used herein is the sum of correct answers on sections B, C, and D, scaled up by five thirds. Two subjects were randomly chosen to be paid $1 per correct answer, for a total possible earnings of $48 each for their answers. 1,015 subjects have scores on this instrument

Numeracy

This instrument is part of the test of adult quantitative literacy from the Educational Testing Service. The full instrument consisted of two sections, of which only the first section was used. The section was made up of 12 questions and subjects were given exactly 20 minutes to complete the test. The test required subjects to be able to add, subtract, compare numbers, fill out a form, and to be able to read and understand a short problem, among other things. Two subjects were randomly chosen to be paid $2 per correct answer, for a total possible earnings of $24 each for their question answers.

Demographic Profile

The investigators asked participants to answer a series of questions designed to locate them within standard demographic categories (e.g. age, gender, and marital status), and to provide basic socio-economic information, such as past experience in the labor market, and earnings information.

Employment Status

The firm provided weekly updates through April 7, 2007 on the employment status of the participants. This included a list of those who failed to complete the last week of training (through the week after we inducted our last new participants), and also a list of those drivers who had completed training who had separated during the week being reported. In both cases the data indicated whether the separation was a voluntary quit or a discharge. See SI Table 13 for details.

Personality Questionnaire

The Multidimensional Personality Questionnaire [4], otherwise known as the MPQ is a standard personality profile test. It consists of 11 different scales that represent primary trait dimensions: wellbeing, social potency, achievement, social closeness, stress reaction, alienation, aggression, control, harm avoidance, traditionalism, and absorption. The short version used in the study has 154 multiple choice questions. An example of one question would be, "At times I have been envious of someone." Almost all of the 154 questions have the same four possible answers: "Always True", "Mostly True", "Mostly False", and "Always False".

Statistical Analysis

The analysis was conducted with Stata, Stata Corp, College Station, TX, Release 10/SE.

1.2 Factor Analysis of Cognitive Abilities

SI Tables 1 and 2 show that the three measures of cognitive skills we use are significantly and strongly correlated. Factor analysis shows a single factor for the three variables. As can be seen in SI Table 1, only one factor has an eigenvalue greater than one, with the remaining two factors having very small eigenvalues very close to zero.

Variable	Factor 1	Uniqueness	Proportion	Cumulative
Factor1	1.1828	1.3126	1.3906	1.3906
Factor2	-0.1298	0.0725	-0.1527	1.2380
Factor3	-0.2024	.	-0.2380	1.0000

Table 1: Factor analysis and correlation. Number of observations = 886. LR test: independent vs. saturated: $\chi^2(3) = 496.62$, Prob> $\chi^2(3) = 0.00001$.

Variable	Factor 1	Uniqueness
Numeracy	0.6678	0.5541
IQIndex	0.6387	0.5921
Hit15Index	0.5736	0.6710

Table 2: Factor loadings (pattern matrix) and unique variances.

2 Correlations between IQ and Preferences

In the section below we illustrate the procedures underlying the figures in the main text, which establish a link between preferences and IQ. The procedure is based on two steps: first we estimate parameters describing the preferences, and then we establish the relation between these parameters and measures of IQ.

In the figures of the main text we use the quartile of the IQ of the subject i, denoted by $j(i)$. We estimate the coefficient corresponding to the j^{th} quartile of this cognitive skill in two ways: raw and adjusted. The latter differs from the raw estimate because we add to the independent variables a set of control variables. The control variables are:

i. schooling, classifying subjects into the the following groups: middle school, some college, technical school, college, graduate (residual category: high school)

ii. age and age squared

iii. household income

iv. gender

v. race, classifying subjects into the the following groups: African American, American Indian, Asian, Latino, White (residual category: those reporting more than one race)

vi. The full set of personality traits derived from the MPQ.

2.1 Consistency

We define as consistent an individual who displays at most one switching point in each block of choices. In other words, if an individual i makes an inconsistent choice in any one of the blocks, we label him as inconsistent, and set the corresponding variable $\text{consis}_i = 0$; else this variable is equal to 1. We then estimate a linear probability model

$$consis_i = \gamma^{CS}_{j(i)} + x_i b + e_i \tag{2.1}$$

where x_i is the vector of control variables for subject i, and b is the vector of coefficients to be estimated. To assess the impact of cognitive skills on the frequency of consistent choices, we estimate this equation once without $x_i b$, producing the raw or simple results. Then we estimate it a second time with $x_i b$, that is, using our full standard list of control variables. We estimate equation (2.1) separately for consistency in the risk experiment and consistency in the discounting experiment. The results are displayed in the main text of the paper in Figure 1, for risk (Panel A) and discounting (Panel B). We plot the four estimated γ^{CS}_j's with their standard error bands in sequence to create each line in each graph, with blue lines showing the simple values and the green ones the values estimated with the control variables included. SI Table 3 displays the coefficient estimates for the simple and full specifications.

Table 3: Statistical Model for Figure 1: Consistency of Choices

	Risk Experiment		Discounting Experiment	
2nd IQ quartile (γ_2^{CS})	0.106***	0.083**	0.071***	0.059**
	(0.037)	(0.038)	(0.026)	(0.027)
3rd IQ quartile (γ_3^{CS})	0.164***	0.132***	0.111***	0.096***
	(0.041)	(0.043)	(0.029)	(0.030)
4th IQ quartile (γ_4^{CS})	0.270***	0.231***	0.146***	0.119***
	(0.039)	(0.042)	(0.027)	(0.029)
middleschool		− 0.163**		− 0.055
		(0.072)		(0.050)
somecollege		0.007		0.003
		(0.034)		(0.023)
technicalschool		− 0.039		− 0.006
		(0.043)		(0.030)
college		− 0.045		0.051
		(0.062)		(0.043)
graduate		0.063		− 0.040
		(0.101)		(0.070)
Age		− 0.001		0.000
		(0.002)		(0.001)
Age2		− 0.000		0.000
		(0.000)		(0.000)
householdincome		0.001		0.000
		(0.001)		(0.000)
Gender		0.065		0.051
		(0.047)		(0.033)
Afro		− 0.093		− 0.032
		(0.098)		(0.068)
Indian		0.139		0.045
		(0.123)		(0.085)
Asian		− 0.087		0.179
		(0.165)		(0.115)
Latino		0.011		0.023
		(0.118)		(0.082)
White		− 0.038		0.125
		(0.125)		(0.087)
Whiteonly		0.093		0.013
		(0.134)		(0.093)
Absorption		− 0.003		− 0.004
		(0.003)		(0.002)
Achievement		0.004		0.000
		(0.003)		(0.002)
Aggression		0.002		0.003
		(0.003)		(0.002)
Alienation		− 0.003		− 0.002
		(0.003)		(0.002)
Control		− 0.002		0.003
		(0.003)		(0.002)
HarmAvoidance		0.002		− 0.002
		(0.003)		(0.002)
SocialCloseness		− 0.003		− 0.003

Table 3: (continued)

	Risk Experiment		Discounting Experiment	
		(0.003)		(0.002)
SocialPotency		0.001		0.002
		(0.003)		(0.002)
StressReaction		− 0.000		− 0.003
		(0.003)		(0.002)
Traditionalism		0.000		0.002
		(0.003)		(0.002)
Wellbeing		0.001		− 0.004
		(0.004)		(0.002)
_cons	0.591***	0.630***	0.811***	0.816***
	(0.027)	(0.032)	(0.019)	(0.022)
Significance of CS	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$
R^2	0.048	0.081	0.030	0.090
N	1012	1012	1012	1012

Notes: OLS estimates. Robust standard errors in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The omitted category for cognitive skills is the bottom quartile in the IQ test.

2.2 Choices under uncertainty

Risk Aversion

We use the set of choices in the two activities of choice under uncertainty in which lotteries have positive outcomes to obtain two measures of relative risk aversion from each individual. The subjects have to decide between a safe option and a 50/50 gamble in which they can win \$10 or \$2 in one choice block, and a 50/50 gamble in which they can win \$5 and \$1 in the other. For each block, we calculate the coefficient of relative risk aversion needed to rationalize the choice the individual made, assuming a constant relative risk aversion (CRRA) utility function.

Specifically, in block 1, the subjects have to choose between several certain payments p_j that are monotonically increasing from \$2 to \$7 and a 50/50 gamble with payoffs of either winning \$10 or winning \$2. Suppose individual i takes the gamble at step h, but switches to the certain amount at step $h+1$. We assume that the individual would have been indifferent between the gamble at the midpoint $0.5p_h + 0.5p_{h+1}$ between p_h and p_{h+1}. We further assume that the individual's utility function is given by

$$u(c) = \frac{c^{1-\sigma}}{1-\sigma} \tag{2.2}$$

where c is consumption and σ is the coefficient of relative risk aversion. We solve for the corresponding coefficient of relative risk aversion σ_i in:

$$0.5u(10) + 0.5u(2) = 0.5u(p_h) + 0.5u(p_{h+1}) \tag{2.3}$$

If an individual takes all gambles, we assign the minimal degree of risk lovingness that rationalizes the choice. Similarly, if an individual only makes safe choices, we assign the minimal degree of risk aversion that rationalizes the choice.

As we showed in the section on Consistency, a considerable number of individuals make inconsistent choices. It would introduce a potentially significant bias to drop inconsistent individuals, since these are disproportionately of lower IQ. However, with inconsistent individuals, by definition, it is impossible to infer preferences from choices without an auxiliary assumption. We use the simplest reasonable approach that retains these cases: we treat inconsistent subjects as individuals who have some actual level of risk preference, but make errors in translating their preferences into choices. Thus, we assign them the level of risk aversion that the "nearest consistent individual" would have. The algorithm is to count the number of gambles in which the subject chose the lottery over the certain amount, call it n, and take this as the number of the lowest certain amount at which he would have chosen the lottery had he been consistent. For example, to consider a typical inconsistency case, a subject that chooses the lottery at certain amounts of 2, 3, and 5, (so that he switched to the certain amount from the lottery first at 4, and then again at 6) is treated like the individual who takes the lottery for certain amounts 2, 3 and 4, and then switches once at 5.

We conduct the analogous procedure to calculate the coefficient of relative risk aversion in the case of the 50/50 lottery in which an individual can win \$5 or win

\$1. With these two calculated values of σ for each individual at hand, we estimate the regression where for individual i in choice k:

$$\sigma_{i,k} = \alpha_k + \gamma_{j(i)}^{CS} + x_i b + e_{i,k} \tag{2.4}$$

and α_k is a fixed effect for each of the two choice blocks described above (win 10/win 2 or win 5/win1). The four coefficients γ_j^{CS} indicate the coefficient of relative risk aversion for quartile $j, j = 1, ..., 4$. These, together with their estimated standard errors, are plotted in the graph. As in the consistency specification, we estimate this equation once without $x_i b$, producing the raw or simple results. Then we estimate it a second time with $x_i b$, that is, using our full standard list of control variables. Because we use two parameters calculated for the same individual, we need again to adjust the standard errors for clustering on individuals. The results are presented in the main text in Figure 3, Panel C, and in SI Table 4.

We perform a robustness check on our results to examine the impact of our censoring convention for the most risk-loving and most risk-averse individuals, as well as the fact that we can only imperfectly pin down the indifference point (outlined in equation (2.3)). Interval regression determines the coefficient of a model in which risk aversion is a linear function of the independent variables, by calculating the parameters that maximize the likelihood that the coefficient of risk aversion is contained in that interval, assuming a normally distributed residual with standard deviation θ. The results are displayed in SI Table 5. The coefficients have the same interpretation as the ones in SI Table 4.

Gains and Losses

We define two additional measures for risk preferences: the fraction of fair gambles accepted, and the fraction of unfair gambles accepted. We define a fair (unfair) gamble as a choice in which the uncertain payoff has a strictly higher (lower) expected value than the certain option. We say that a subject accepts a fair (unfair) gamble if he chooses the lottery in a fair (unfair) gamble. For example, in the risk experiment involving the lottery (win \$5/win \$1), there are four fair gambles, and one unfair gamble. If an individual accepted 3 of the fair gambles, the fraction of fair gambles accepted is 0.75.

We then run the following regression

$$fair_i = \gamma_{j(i)}^{CS} + x_i b + e_i \tag{2.5}$$

The two lotteries of interest are the (win \$5/win \$1) and (lose \$5/win \$1) lotteries. We repeat these estimations with the fraction of unfair gambles taken as the dependent variable, with and without control variables, and for the two lotteries. Figure 2, panel A and B displays the results in a manner similar to the consistency graphs described above. The full set of coefficient estimates can be found in SI Table 6. SI Table 7 shows the regression results for the (win 10 / win 2) lottery and the (win 5 / lose 1) lottery.

Cognitive Skills and Risk attitude

We claim that the relation between cognitive abilities and risk preferences is non-monotonic. We plot the average CS as a function of the number of risky choices a subject made in a particular lottery experiment. Specifically, we estimate the following regression of the index of CS used here, the IQ score, on the number of the times the subject chooses the lottery:

$$CS_i = \gamma_k I(i \text{ made } k \text{ risky choices}) + x_i b + e_i \tag{2.6}$$

Since an individual can make between zero and six risky choices, this yields seven possible risk outcomes. As in previous estimates, we run 2.6 once without, and once with, the full set of control variables x_i. Furthermore, we estimate 2.6 separately for the choices involving the (win \$10/win \$2) and (win \$5/win \$1) lotteries. The results are displayed in Figure 3, Panel D for the (win \$10/win \$2) lottery in a similar manner to the display of the consistency results. SI Table 8 displays the coefficient estimates for both lotteries.

We also test whether the peak is significant in the following manner: let us call choice k the peak. We then test jointly whether $\gamma_{k-1} < \gamma_k$ and $\gamma_{k+1} > \gamma_k$.

Table 4: Statistical Model for Figure 3: Risk Aversion

2nd IQ quartile (γ_2^{CS})	– 0.145	– 0.017
	(0.167)	(0.169)
3rd IQ quartile (γ_3^{CS})	– 0.550***	– 0.369**
	(0.159)	(0.163)
4th IQ quartile (γ_4^{CS})	– 0.596***	– 0.403**
	(0.151)	(0.160)
α_2	– 0.346***	– 0.346***
	(0.047)	(0.047)
middleschool		0.024
		(0.266)
somecollege		– 0.080
		(0.132)
technicalschool		– 0.171
		(0.154)
college		0.121
		(0.212)
graduate		– 0.183
		(0.300)
Age		0.013**
		(0.006)
Age2		0.000
		(0.000)
householdincome		– 0.001
		(0.002)
Gender		– 0.158
		(0.157)
Afro		1.272***
		(0.364)
Indian		0.020
		(0.406)
Asian		0.895
		(0.560)
Latino		0.866**
		(0.420)
White		0.060
		(0.297)
Whiteonly		0.780*
		(0.453)
Absorption		– 0.006
		(0.013)
Achievement		– 0.020*
		(0.012)
Aggression		– 0.008
		(0.012)
Alienation		– 0.005
		(0.012)
Control		0.019
		(0.013)
HarmAvoidance		– 0.003
		(0.011)
SocialCloseness		0.009

Table 4: (continued)

		(0.011)
SocialPotency		0.008
		(0.012)
StressReaction		0.026***
		(0.010)
Traditionalism		0.006
		(0.011)
Wellbeing		0.003
		(0.015)
_cons	0.862***	0.710***
	(0.133)	(0.143)
Significance of CS	$p < 0.001$	$p = 0.006$
R^2	0.028	0.054
N	2024	2024

Notes: OLS estimates. Standard errors, adjusted for clustering on individuals, in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The omitted category for cognitive skills is the bottom quartile in the IQ test.

Table 5: Robustness Check: Interval Regression for Risk Aversion

2nd IQ quartile (γ_2^{CS})	– 0.126	0.036
	(0.230)	(0.231)
3rd IQ quartile (γ_3^{CS})	– 0.628***	– 0.392*
	(0.226)	(0.230)
4th IQ quartile (γ_4^{CS})	– 0.694***	– 0.461**
	(0.214)	(0.226)
α_2	– 0.574***	– 0.578***
	(0.068)	(0.069)
middleschool		0.022
		(0.388)
somecollege		– 0.045
		(0.184)
technicalschool		– 0.220
		(0.222)
college		0.249
		(0.286)
graduate		– 0.199
		(0.454)
Age		0.018**
		(0.008)
Age2		0.000
		(0.001)
householdincome		– 0.002
		(0.003)
Gender		– 0.250
		(0.231)
Afro		1.884***
		(0.578)
Indian		– 0.370
		(0.643)
Asian		1.329
		(0.825)
Latino		1.390**
		(0.651)
White		0.267
		(0.463)
Whiteonly		1.035
		(0.707)
Absorption		– 0.005
		(0.018)
Achievement		– 0.032*
		(0.016)
Aggression		– 0.016
		(0.017)
Alienation		– 0.008
		(0.017)
Control		0.029
		(0.018)
HarmAvoidance		– 0.003
		(0.016)
SocialCloseness		0.008

Table 5: (continued)

		(0.016)
SocialPotency		0.016
		(0.017)
StressReaction		0.038***
		(0.014)
Traditionalism		0.010
		(0.016)
Wellbeing		0.001
		(0.020)
_cons	1.119***	0.930***
	(0.177)	(0.193)
$\log \theta$	0.882***	0.861***
	(0.039)	(0.039)
Significance of CS	$p < 0.001$	$p = 0.025$
N	2024	2024

Notes: ML estimates from interval regressions. Standard errors, adjusted for clustering on individuals, in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The omitted category for cognitive skills is the bottom quartile in the IQ test. The parameter θ is the standard deviation of the normally distributed error term in the interval regression.

Table 6: Statistical Models for Figure 3: Behavior in Lotteries

	Win 1 / Lose 5				Win 5 / Win 1			
	Take unfair gambles		take fair gambles		Take unfair gambles		take fair gambles	
2nd IQ quartile (γ_2^{CS})	– 0.055	– 0.032	0.034	0.050	– 0.074*	– 0.090**	0.065**	0.045
	(0.036)	(0.036)	(0.042)	(0.043)	(0.042)	(0.043)	(0.028)	(0.028)
3rd IQ quartile (γ_3^{CS})	– 0.157***	– 0.118***	0.042	0.052	– 0.063	– 0.086*	0.128***	0.098***
	(0.037)	(0.038)	(0.047)	(0.049)	(0.046)	(0.048)	(0.027)	(0.028)
4th IQ quartile (γ_4^{CS})	– 0.246***	– 0.198***	0.026	0.035	– 0.086**	– 0.094**	0.153***	0.114***
	(0.034)	(0.036)	(0.044)	(0.047)	(0.044)	(0.047)	(0.025)	(0.026)
middlel		– 0.098		– 0.165**		0.060		0.019
school		(0.064)		(0.077)		(0.082)		(0.047)
some		– 0.067**		0.018		– 0.040		0.020
college		(0.030)		(0.038)		(0.038)		(0.021)
tech. school		– 0.097***		– 0.059		– 0.006		0.030
		(0.037)		(0.049)		(0.048)		(0.025)
college		– 0.159***		– 0.006		– 0.115*		– 0.003
		(0.046)		(0.070)		(0.067)		(0.039)
graduate		– 0.010		0.024		– 0.028		0.072*
		(0.087)		(0.116)		(0.115)		(0.043)
Age		0.003**		0.004**		– 0.004**		– 0.002**
		(0.001)		(0.002)		(0.002)		(0.001)
Age2		– 0.000		– 0.000		0.000		– 0.000
		(0.000)		(0.000)		(0.000)		(0.000)
household		– 0.000		0.000		0.000		0.000
income		(0.000)		(0.001)		(0.001)		(0.000)
Gender		– 0.072*		– 0.084		0.059		– 0.005
		(0.039)		(0.054)		(0.052)		(0.026)
Afro		– 0.181**		– 0.383***		– 0.195**		– 0.171***
		(0.076)		(0.079)		(0.091)		(0.057)
Indian		0.030		– 0.042		0.177		0.032
		(0.094)		(0.104)		(0.116)		(0.065)
Asian		– 0.098		0.143**		0.007		– 0.168

Table 6: (continued)

	Win 1 / Lose 5		Win 5 / Win 1	
	Take unfair gambles	take fair gambles	Take unfair gambles	take fair gambles
	(0.111)	(0.070)	(0.154)	(0.106)
Latino	– 0.330***	– 0.285***	– 0.224**	– 0.114*
	(0.079)	(0.109)	(0.109)	(0.069)
White	– 0.186*	– 0.198*	– 0.055	0.009
	(0.098)	(0.120)	(0.130)	(0.058)
Whiteonly	– 0.106	– 0.170	– 0.084	– 0.100
	(0.082)	(0.111)	(0.122)	(0.080)
Absorption	0.005*	– 0.002	– 0.002	0.003
	(0.003)	(0.004)	(0.004)	(0.002)
Achievement	0.001	– 0.004	0.006*	0.005**
	(0.003)	(0.004)	(0.004)	(0.002)
Aggression	– 0.004	– 0.005	0.005	0.002
	(0.003)	(0.004)	(0.004)	(0.002)
Alienation	0.007**	0.004	0.004	– 0.002
	(0.003)	(0.004)	(0.004)	(0.002)
Control	– 0.006*	– 0.011***	– 0.006	– 0.001
	(0.003)	(0.004)	(0.004)	(0.002)
Harm	0.000	0.003	– 0.005	0.003
avoidance	(0.003)	(0.004)	(0.004)	(0.002)
Social	0.002	– 0.004	0.004	– 0.003
closeness	(0.003)	(0.003)	(0.003)	(0.002)
SocialPotency	– 0.004	– 0.001	– 0.007**	– 0.001
	(0.003)	(0.004)	(0.004)	(0.002)
StressReaction	– 0.003	– 0.001	– 0.004	– 0.004**
	(0.002)	(0.003)	(0.003)	(0.002)
Traditionalism	– 0.002	– 0.005	– 0.002	– 0.001
	(0.003)	(0.004)	(0.004)	(0.002)
Wellbeing	0.004	0.007*	0.004	– 0.003
	(0.003)	(0.004)	(0.004)	(0.002)

Table 6: (continued)

	Win 1 / Lose 5				Win 5 / Win 1			
	Take unfair gambles		take fair gambles		Take unfair gambles		take fair gambles	
_cons	0.458***	0.446***	0.521***	0.524***	0.475***	0.480***	0.757***	0.781***
	(0.026)	(0.030)	(0.031)	(0.036)	(0.031)	(0.037)	(0.022)	(0.024)
Significance of CS (p-values)	< 0.01	< 0.01	0.48	0.37	0.14	0.06	< 0.01	< 0.01
R^2	0.056	0.116	0.001	0.049	0.005	0.057	0.045	0.090
N	1012	1012	1012	1012	1012	1012	1012	1012

Notes: Linear probability models. Standard error in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The omitted category is the bottom quartile in the IQ test.

Table 7: Statistical Analysis of the Block of Lotteries

	Win 10 / Win 2				Win 5 / Lose 1			
	Take unfair gambles		take fair gambles		Take unfair gambles		take fair gambles	
gPct2	– 0.108***	– 0.109***	0.038	0.014	– 0.071*	– 0.079*	– 0.004	– 0.006
	(0.039)	(0.040)	(0.028)	(0.028)	(0.042)	(0.044)	(0.026)	(0.027)
gPct3	– 0.117***	– 0.108**	0.120***	0.086***	– 0.054	– 0.053	0.004	0.011
	(0.043)	(0.044)	(0.027)	(0.027)	(0.047)	(0.049)	(0.030)	(0.031)
gPct4	– 0.164***	– 0.139***	0.160***	0.121***	– 0.043	– 0.038	0.059**	0.071**
	(0.039)	(0.043)	(0.025)	(0.027)	(0.044)	(0.048)	(0.026)	(0.028)
middleschool		– 0.063		– 0.038		0.014		– 0.039
		(0.076)		(0.048)		(0.080)		(0.054)
somecollege		– 0.073**		0.027		– 0.019		– 0.028
		(0.034)		(0.023)		(0.039)		(0.023)
technicalschool		– 0.048		0.037		0.000		– 0.016
		(0.045)		(0.026)		(0.050)		(0.029)
college		– 0.111*		0.026		– 0.193***		– 0.104**
		(0.057)		(0.038)		(0.068)		(0.050)
graduate		– 0.048		0.013		– 0.094		0.019
		(0.100)		(0.057)		(0.113)		(0.051)
Age		0.001		– 0.001		0.002		0.003***
		(0.002)		(0.001)		(0.002)		(0.001)
Age2		– 0.000		– 0.000		0.000		– 0.000**
		(0.000)		(0.000)		(0.000)		(0.000)
householdincome		– 0.000		0.000		– 0.000		0.000
		(0.001)		(0.000)		(0.001)		(0.000)
Gender		0.030		0.030		0.034		– 0.007
		(0.048)		(0.029)		(0.053)		(0.032)
Afro		– 0.137		– 0.196***		– 0.190*		– 0.142**
		(0.089)		(0.060)		(0.101)		(0.067)
Indian		0.144		– 0.064		– 0.088		– 0.102
		(0.118)		(0.081)		(0.131)		(0.070)
Asian		– 0.220**		– 0.021		0.156		– 0.110

Table 7: (continued)

	Win 10 / Win 2		Win 5 / Lose 1	
	Take unfair gambles	take fair gambles	Take unfair gambles	take fair gambles
	(0.101)	(0.077)	(0.132)	(0.076)
Latino	– 0.087	– 0.153**	– 0.145	– 0.106
	(0.106)	(0.076)	(0.126)	(0.071)
White	– 0.056	– 0.016	0.076	– 0.015
	(0.131)	(0.067)	(0.134)	(0.068)
Whiteonly	– 0.078	– 0.103	– 0.242*	– 0.144**
	(0.127)	(0.083)	(0.138)	(0.072)
Absorption	– 0.004	0.002	0.006	0.002
	(0.003)	(0.002)	(0.004)	(0.002)
Achievement	0.004	0.002	0.007*	0.002
	(0.003)	(0.002)	(0.004)	(0.003)
Aggression	– 0.000	0.002	0.002	0.002
	(0.003)	(0.002)	(0.004)	(0.002)
Alienation	0.008**	– 0.002	0.004	– 0.002
	(0.003)	(0.002)	(0.004)	(0.002)
Control	– 0.005	– 0.003	– 0.003	– 0.003
	(0.003)	(0.002)	(0.004)	(0.003)
HarmAvoidance	– 0.002	0.001	– 0.002	0.000
	(0.003)	(0.002)	(0.004)	(0.002)
SocialCloseness	0.001	– 0.001	– 0.001	0.002
	(0.003)	(0.002)	(0.003)	(0.002)
SocialPotency	– 0.003	– 0.000	– 0.008**	– 0.003
	(0.003)	(0.002)	(0.004)	(0.002)
StressReaction	– 0.005*	– 0.004**	– 0.009***	– 0.002
	(0.003)	(0.002)	(0.003)	(0.002)
Traditionalism	– 0.003	0.000	– 0.006*	– 0.002
	(0.003)	(0.002)	(0.004)	(0.002)
Wellbeing	0.006*	– 0.002	0.004	– 0.000
	(0.003)	(0.003)	(0.004)	(0.003)

Table 7: (continued)

	Win 10 / Win 2				Win 5 / Lose 1			
	Take unfair gambles		take fair gambles		Take unfair gambles		take fair gambles	
_cons	0.367***	0.375***	0.723***	0.756***	0.583***	0.579***	0.816***	0.833***
	(0.030)	(0.034)	(0.021)	(0.024)	(0.031)	(0.036)	(0.019)	(0.023)
Significance of CS (p-values)	< 0.01	< 0.01	< 0.01	< 0.01	0.44	0.48	0.08	0.03
R^2	0.018	0.056	0.049	0.082	0.003	0.043	0.007	0.035
N	1012	1012	1012	1012	1012	1012	1012	1012

Notes: Linear probability models. Standard error in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The omitted category is the bottom quartile in the IQ test.

Table 8: Statistical Models for Figure 3: IQ as a Function of Behavior in Lotteries

	Win 1 / Win 5		Win 1 / Lose 5	
Accepts 1 gamble	0.064**	0.014	0.065***	0.053**
	(0.030)	(0.027)	(0.025)	(0.022)
Accepts 2 gambles	0.078***	0.038*	0.066***	0.044**
	(0.022)	(0.020)	(0.023)	(0.019)
Accepts 3 gambles	0.130***	0.082***	0.091***	0.054***
	(0.020)	(0.019)	(0.017)	(0.016)
Accepts 4 gambles	0.137***	0.079***	0.125***	0.078***
	(0.018)	(0.018)	(0.017)	(0.016)
Accepts 5 gambles	0.109***	0.052***	0.117***	0.070***
	(0.022)	(0.020)	(0.019)	(0.017)
Accepts 6 gambles	0.110***	0.057***	0.071***	0.041**
	(0.018)	(0.018)	(0.018)	(0.016)
middleschool		− 0.051***		− 0.048**
		(0.020)		(0.020)
somecollege		0.052***		0.050***
		(0.009)		(0.009)
technicalschool		0.049***		0.048***
		(0.010)		(0.010)
college		0.070***		0.063***
		(0.014)		(0.014)
graduate		0.103***		0.111***
		(0.018)		(0.018)
Age		− 0.003***		− 0.003***
		(0.000)		(0.000)
Age2		− 0.000		− 0.000
		(0.000)		(0.000)
householdincome		− 0.000		− 0.000
		(0.000)		(0.000)
Gender		0.026**		0.023**
		(0.011)		(0.010)
Afro		− 0.059**		− 0.058**
		(0.028)		(0.028)
Indian		− 0.042		− 0.034
		(0.026)		(0.027)
Asian		0.003		− 0.011
		(0.042)		(0.041)
Latino		− 0.011		− 0.014
		(0.027)		(0.027)
White		− 0.011		− 0.008
		(0.022)		(0.023)
Whiteonly		0.012		0.010
		(0.029)		(0.028)
Absorption		0.001		0.001
		(0.001)		(0.001)
Achievement		0.002**		0.002**
		(0.001)		(0.001)
Aggression		− 0.001		− 0.001
		(0.001)		(0.001)

Table 8: (continued)

	Win 1 / Win 5		Win 1 / Lose 5	
Alienation		− 0.002**		− 0.002**
		(0.001)		(0.001)
Control		− 0.001		− 0.001
		(0.001)		(0.001)
HarmAvoidance		− 0.001		− 0.001
		(0.001)		(0.001)
SocialCloseness		− 0.002**		− 0.002***
		(0.001)		(0.001)
SocialPotency		0.001		0.001*
		(0.001)		(0.001)
StressReaction		− 0.001		− 0.001
		(0.001)		(0.001)
Traditionalism		− 0.002***		− 0.002***
		(0.001)		(0.001)
Wellbeing		− 0.001		− 0.001
		(0.001)		(0.001)
_cons	0.647***	0.701***	0.668***	0.708***
	(0.017)	(0.016)	(0.015)	(0.014)
Relationship between CS and risk preferences	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$
Test of significance for peak	$p = 0.002$	$p = 0.001$	$p < 0.001$	$p = 0.013$
R^2	0.057	0.250	0.058	0.248
N	1012	1012	1012	1012

Notes: OLS estimates. Standard error in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The omitted category is rejecting all the gambles. Test of significance for peak tests whether the profile is flat around the peak.

2.3 Choices over time

To allow for a possible difference between short-term and long-term discounting, we adopt the model of (β, δ)-preferences proposed by Pollack and Phelps (1968) and Laibson (1997). Using our choice experiment described earlier, we measure the amount x at which the individual is indifferent between receiving it now and receiving 80 t days from now. Indifference implies

$$u(x) = \beta\delta^t u(80) \tag{2.7}$$

If the choice is between receiving an amount y s periods from now or 80 $t+s$ periods from now, indifference implies

$$u(y) = \delta^t u(80). \tag{2.8}$$

Taking logs of equation (2.7), we get

$$\log u(x) - \log u(80) = \log\beta + t\log\delta \tag{2.9}$$

if the choice involves today (as in our choice blocks 1 and 2), and

$$\log u(y) - \log u(80) = t\log\delta \tag{2.10}$$

if it doesn't (as in our choice blocks 3 and 4). In order to estimate β and δ, we assume that u is approximately linear over the relevant range. Then, we can estimate an individual's discount factor for individual i in choice $k = 1, 2$ using:

$$\log x_{i,k} - \log 80 = \log\beta_i + t_k \log\delta_i + e_{i,k} \tag{2.11}$$

and in choice $k = 3, 4$ using:

$$\log x_{i,k} - \log 80 = t_k \log\delta_i + e_{i,k} \tag{2.12}$$

where $x_{i,k}$ is the amount at which the individual switched to the future payment in block k, t_k is the delay (in days) of the larger payment, and $e_{i,k}$ is a mean-zero error term. We let both discount factors depend on cognitive abilities, and estimate a separate discount factor for each quartile of cognitive abilities. Specifically, for the short-term discount factor β, we estimate

$$\log\beta_i = b^{CS}_{j(i)} + x_i b \tag{2.13}$$

where $b^{CS}_{j(i)}$ is the discount rate for quartile j, to which individual i belongs. Similarly, for the long-term discount factor δ, we estimate

$$\log\delta_i = d^{CS}_{j(i)} + x_i d. \tag{2.14}$$

We substitute equations 2.13 and 2.14 into 2.11, and estimate the resulting equation using OLS. Because each individual makes 4 choices, we adjust the standard errors for clustering on individuals, as the residuals within an individual cannot be viewed as independent. The results are presented in Figure 2, Panels A for the short-term discount factor, and Panel B for the long term discount factor. As with the specification for the consistency results, the blue lines represent the simple results (x_ib missing) and the green lines represent the results when x_ib, the full set of control variables and coefficients, is included. SI Table 9 displays the full set of coefficient estimates. The levels of present-bias that we find for our subjects are in line with common findings in the literature [5], [6], [7], and the level of long-term discounting is about the same as in other studies using similar time frames [8].

The same issues arise regarding the treatment of censored choices and inconsistent individuals as with the lottery choices discussed in section 2.2 above. We address them in the same way: In order to resolve the censoring issue in our sample, we assume the minimal amount of impatience to rationalize all-impatient choices, and we assume perfect patience if an individual only chooses more distant payments. We apply the same counting convention to determine the indifference point as explained in section 2.2 above.

We also estimate interval regressions to examine the robustness of our results to alternative assumption of resolving the censoring problem and the issue that we cannot pin down with certainty the indifference point of an individual. SI Table 10 displays the results.

Table 9: Statistical Model for Figure 3: Discounting

	(1)	(2)
$I_k \times$ 1st IQ quartile (b_1^{CS})	− 0.142***	− 0.151***
	(0.011)	(0.012)
$I_k \times$ 2nd IQ quartile (b_2^{CS})	− 0.128***	− 0.135***
	(0.010)	(0.011)
$I_k \times$ 3rd IQ quartile (b_3^{CS})	− 0.093***	− 0.104***
	(0.010)	(0.011)
$I_k \times$ 4th IQ quartile (b_4^{CS})	− 0.075***	− 0.090***
	(0.009)	(0.011)
$t_k \times$ 1st IQ quartile (d_1^{CS})	− 0.014***	− 0.015***
	(0.001)	(0.001)
$t_k \times$ 2nd IQ quartile (d_2^{CS})	− 0.014***	− 0.014***
	(0.001)	(0.001)
$t_k \times$ 3rd IQ quartile (d_3^{CS})	− 0.013***	− 0.013***
	(0.001)	(0.001)
$t_k \times$ 4th IQ quartile (d_4^{CS})	− 0.011***	− 0.011***
	(0.001)	(0.001)
$I_k \times$middleschool		0.024
		(0.029)
$I_k \times$somecollege		0.010
		(0.012)
$I_k \times$technicalschool		0.025*
		(0.015)
$I_k \times$college		0.053***
		(0.017)
$I_k \times$graduate		0.051*
		(0.026)
$I_k \times$Age		0.001
		(0.001)
$I_k \times$Age2		0.000**
		(0.000)
$I_k \times$householdincome		0.000
		(0.000)
$I_k \times$Gender		0.016
		(0.017)
$I_k \times$Afro		− 0.069*
		(0.036)
$I_k \times$Indian		− 0.011
		(0.040)
$I_k \times$Asian		− 0.053
		(0.057)
$I_k \times$Latino		− 0.034
		(0.042)
$I_k \times$White		0.059
		(0.043)
$I_k \times$Whiteonly		− 0.061
		(0.043)
$I_k \times$Absorption		0.001
		(0.001)
$I_k \times$Achievement		− 0.001

Table 9: (continued)

	(1)	(2)
		(0.001)
I_k ×Aggression		− 0.001
		(0.001)
I_k ×Alienation		− 0.001
		(0.001)
I_k ×Control		0.002*
		(0.001)
I_k ×HarmAvoidance		− 0.000
		(0.001)
I_k ×SocialClose		− 0.001
		(0.001)
I_k ×SocialPoten		0.001
		(0.001)
I_k ×StressReac		0.001
		(0.001)
I_k ×Traditional		0.001
		(0.001)
I_k ×Wellbeing		− 0.002
		(0.001)
t_k ×middleschool		0.001
		(0.001)
t_k ×somecollege		0.001
		(0.001)
t_k ×technicalschool		0.002**
		(0.001)
t_k ×college		0.004***
		(0.001)
t_k ×graduate		0.002
		(0.002)
t_k ×Age		0.000***
		(0.000)
t_k ×Age2		0.000
		(0.000)
t_k ×householdincome		0.000
		(0.000)
t_k ×Gender		− 0.001
		(0.001)
t_k ×Afro		− 0.003
		(0.002)
t_k ×Indian		0.001
		(0.003)
t_k ×Asian		− 0.000
		(0.003)
t_k ×Latino		0.001
		(0.002)
t_k ×White		0.000
		(0.003)
t_k ×Whiteonly		0.000
		(0.003)
t_k ×Absorption		0.000

Table 9: (continued)

	(1)	(2)
		(0.000)
$t_k \times$Achievement		− 0.000
		(0.000)
$t_k \times$Aggression		− 0.000
		(0.000)
$t_k \times$Alienation		− 0.000
		(0.000)
$t_k \times$Control		0.000
		(0.000)
$t_k \times$HarmAvoidance		− 0.000
		(0.000)
$t_k \times$SocialClose		− 0.000
		(0.000)
$t_k \times$SocialPoten		− 0.000
		(0.000)
$t_k \times$StressReac		0.000
		(0.000)
$t_k \times$Traditional		− 0.000
		(0.000)
$t_k \times$Wellbeing		0.000
		(0.000)
R^2	0.493	0.518
Significance of CS for β	$p < 0.001$	$p < 0.001$
Significance of CS for δ	$p < 0.001$	$p < 0.001$
N	4048	4048

Notes: OLS estimates. The indicator variable I_k is equal to 1 if the present is involved in the intertemporal tradeoff, and zero otherwise. Standard errors, adjusted for clustering on individuals, in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively.

Table 10: Robustness Check: Interval regressions for discounting

	(1)	(2)
$I_k\times$ 1st quartile (b_1^{CS})	– 0.212***	– 0.222***
	(0.014)	(0.015)
$I_k\times$ 2nd quartile (b_2^{CS})	– 0.195***	– 0.203***
	(0.012)	(0.013)
$I_k\times$ 3rd quartile (b_3^{CS})	– 0.151***	– 0.165***
	(0.012)	(0.014)
$I_k\times$ 4th quartile (b_4^{CS})	– 0.131***	– 0.150***
	(0.011)	(0.013)
$t_k\times$ 1st quartile (d_1^{CS})	– 0.021***	– 0.021***
	(0.001)	(0.001)
$t_k\times$ 2nd quartile (d_2^{CS})	– 0.019***	– 0.019***
	(0.001)	(0.001)
$t_k\times$ 3rd quartile (d_3^{CS})	– 0.018***	– 0.019***
	(0.001)	(0.001)
t $t_k\times$ 4th quartile (d_4^{CS})	– 0.016***	– 0.016***
	(0.001)	(0.001)
$I_k\times$middleschool		0.030
		(0.037)
$I_k\times$somecollege		0.014
		(0.015)
$I_k\times$technicalschool		0.031*
		(0.018)
$I_k\times$college		0.063***
		(0.021)
$I_k\times$graduate		0.062*
		(0.032)
$I_k\times$Age		0.001
		(0.001)
$I_k\times$Age2		0.000**
		(0.000)
$I_k\times$householdincome		0.000
		(0.000)
$I_k\times$Gender		0.020
		(0.020)
$I_k\times$Afro		– 0.085*
		(0.048)
$I_k\times$Indian		– 0.021
		(0.051)
$I_k\times$Asian		– 0.074
		(0.076)
$I_k\times$Latino		– 0.051
		(0.055)
$I_k\times$White		0.081
		(0.051)
$I_k\times$Whiteonly		– 0.085
		(0.055)
$I_k\times$Absorption		0.002
		(0.001)
$I_k\times$Achievement		– 0.001

Table 10: (continued)

	(1)	(2)
		(0.001)
I_k ×Aggression		− 0.001
		(0.002)
I_k ×Alienation		− 0.002
		(0.001)
I_k ×Control		0.003*
		(0.001)
I_k ×HarmAvoidance		− 0.000
		(0.001)
I_k ×SocialClose		− 0.001
		(0.001)
I_k ×SocialPoten		0.002
		(0.001)
I_k ×StressReac		0.001
		(0.001)
I_k ×Traditional		0.001
		(0.001)
I_k ×Wellbeing		− 0.003*
		(0.002)
t_k ×middleschool		0.002
		(0.002)
t_k ×somecollege		0.001
		(0.001)
t_k ×technicalschool		0.003**
		(0.001)
t_k ×college		0.006***
		(0.002)
t_k ×graduate		0.003
		(0.003)
t_k ×Age		0.000***
		(0.000)
t_k ×Age2		0.000
		(0.000)
t_k ×householdincome		0.000
		(0.000)
t_k ×Gender		− 0.001
		(0.001)
t_k ×Afro		− 0.005
		(0.004)
t_k ×Indian		0.002
		(0.004)
t_k ×Asian		− 0.001
		(0.005)
t_k ×Latino		0.001
		(0.004)
t_k ×White		− 0.000
		(0.004)
t_k ×Whiteonly		0.001
		(0.005)
t_k ×Absorption		0.000

Table 10: (continued)

	(1)	(2)
		(0.000)
$t_k \times$Achievement		− 0.000
		(0.000)
$t_k \times$Aggression		− 0.000
		(0.000)
$t_k \times$Alienation		− 0.000
		(0.000)
$t_k \times$Control		0.000
		(0.000)
$t_k \times$HarmAvoidance		− 0.000
		(0.000)
$t_k \times$SocialClose		− 0.000
		(0.000)
$t_k \times$SocialPoten		− 0.000
		(0.000)
$t_k \times$StressReac		0.000
		(0.000)
$t_k \times$Traditional		− 0.000
		(0.000)
$t_k \times$Wellbeing		0.000
		(0.000)
$\log \theta$	− 1.245***	− 1.271***
	(0.022)	(0.022)
Significance of CS for β	$p < 0.001$	$p < 0.001$
Significance of CS for δ	$p < 0.001$	$p < 0.001$
N	4048	4048

Notes: ML estimates from interval regressions. The indicator variable I_k is equal to 1 if the present is involved in the intertemporal tradeoff, and zero otherwise. Standard errors, adjusted for clustering on individuals, in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The parameter θ is the standard deviation of the normally distributed error term in the interval regression.

2.4 Strategic behavior

The game to measure strategic interactions is a sequential prisoners' dilemma. The sequence of the game is displayed in Figure 1. Two players, a first and a second mover, move sequentially. They are both endowed with \$5 by the experimenter. The first mover has to decide whether to transfer \$0 or \$5 to a second mover. The second mover has to decide, before learning the decision of the first mover, how much he would transfer back in each of the two cases: having received \$0 and having received \$5. All amounts sent are doubled by the experimenter before arriving. Subjects gave their decisions for both roles. At the end of the task, each subject was assigned one of the two roles at random, matched at random with another subject who was assigned to the opposite role, and then paid according to his choice and the choice of his counterpart. Subjects also reported their beliefs about the choices of the other players in the room, and were paid for accurate guesses.

Method for the First-Mover

The dependent variable is the amount sent by the first mover. The amount is either \$0 or \$5. Thus, we estimate the regression

$$sent_i = \gamma_{j(i)}^{CS} + x_i b + e_i \tag{2.15}$$

where $sent_i$ is the amount sent by the first-mover. As in the consistency specification, we run 2.15 once with $x_i b$ missing, and also again with $x_i b$ (our control variables) included.

Method for the Second-Mover

The dependent variable is the amount returned by the second mover. Since the second-mover can condition his choice on the first-mover's amount sent, we have to estimate two regressions. We estimate the equation

$$return_5^i = \gamma_{j(i)}^{CS} + x_i b + e_i \tag{2.16}$$

where $return_5^i$ is the amount returned by the second mover if the first mover sent \$5. As in the consistency specification, we run 2.16 once with $x_i b$ missing, and again with $x_i b$, the full set of control variables, included. We also estimate the analogue to 2.16 for the case in which the first mover did not send any money. In the main text of the paper, Figure 4, Panels C and D, display the results, with the usual format: blue lines represent the simple estimates, while the green lines represent the estimates that include the control variables. The full set of coefficient estimates can be found in SI Table 11.

Beliefs

We conduct the analogous analysis for the beliefs about the first-movers and second movers. The results can be found in the main text of the paper in Figure 4, Panels

A and B, with formatting similar to that explained above. The full set of coefficient estimates can be found in SI Table 12.

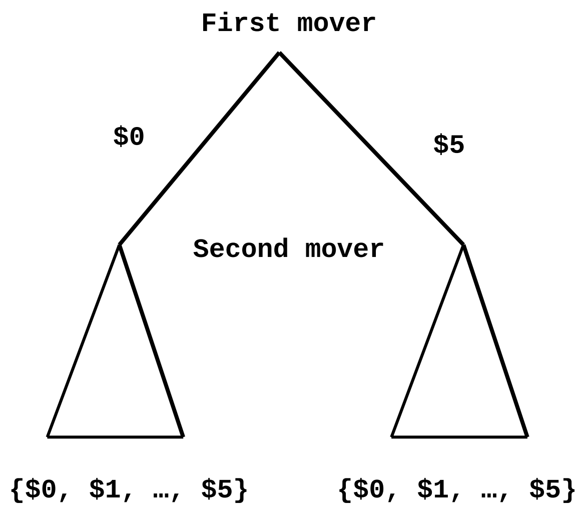

Figure 1: The Sequential Prisoners' Dilemma

Table 11: Statistical Model for Figure 4: Behavior in the PD

	First-Mover Transfer		Second-Mover Return if received 0		Second-Mover Return if received 5	
2nd IQ quartile (γ_2^{CS})	0.218	0.278	− 0.351**	− 0.176	0.307*	0.387**
	(0.200)	(0.203)	(0.170)	(0.173)	(0.159)	(0.163)
3rd IQ quartile (γ_3^{CS})	0.388*	0.413*	− 0.625***	− 0.422**	0.418**	0.416**
	(0.220)	(0.228)	(0.188)	(0.194)	(0.176)	(0.183)
4th IQ quartile (γ_4^{CS})	0.207	0.218	− 0.967***	− 0.695***	0.355**	0.372**
	(0.208)	(0.222)	(0.177)	(0.189)	(0.166)	(0.179)
middleschool		0.507		0.185		0.418
		(0.379)		(0.324)		(0.305)
somecollege		0.417**		0.057		0.426***
		(0.178)		(0.152)		(0.143)
technicalschool		0.457**		− 0.203		0.223
		(0.230)		(0.196)		(0.185)
college		0.467		− 0.439		0.392
		(0.327)		(0.281)		(0.264)
graduate		0.528		− 0.932**		0.311
		(0.545)		(0.457)		(0.431)
Age		0.023***		0.022***		0.002
		(0.008)		(0.007)		(0.006)
Age2		− 0.000		− 0.000		− 0.000
		(0.001)		(0.001)		(0.000)
householdincome		− 0.002		0.003		0.004*
		(0.003)		(0.002)		(0.002)
Gender		− 0.374		0.144		− 0.328
		(0.250)		(0.214)		(0.202)
Afro		− 0.574		− 0.112		− 0.425
		(0.519)		(0.445)		(0.419)
Indian		− 1.179*		0.988*		− 0.648
		(0.647)		(0.555)		(0.523)
Asian		− 0.258		0.328		− 0.377
		(0.871)		(0.746)		(0.704)
Latino		0.289		0.265		− 0.661
		(0.625)		(0.535)		(0.505)
White		1.183*		− 0.728		0.202
		(0.658)		(0.565)		(0.532)
Whiteonly		− 1.401**		0.628		− 0.471
		(0.705)		(0.605)		(0.570)
Absorption		0.036**		0.007		0.011
		(0.018)		(0.015)		(0.014)
Achievement		0.028		0.003		− 0.016
		(0.018)		(0.015)		(0.015)
Aggression		− 0.048***		− 0.047***		− 0.044***
		(0.017)		(0.015)		(0.014)
Alienation		− 0.030*		0.038**		− 0.012
		(0.017)		(0.015)		(0.014)
Control		− 0.042**		− 0.026		− 0.014
		(0.018)		(0.016)		(0.015)
HarmAvoidance		0.028*		− 0.019		0.010
		(0.016)		(0.014)		(0.013)
SocialCloseness		0.005		0.029**		0.000

Table 11: (continued)

	First-Mover Transfer		Second-Mover Return if received 0		Second-Mover Return if received 5	
		(0.015)		(0.013)		(0.012)
SocialPotency		– 0.021		– 0.020		– 0.016
		(0.017)		(0.014)		(0.013)
StressReaction		0.017		0.011		0.027**
		(0.015)		(0.012)		(0.012)
Traditionalism		– 0.009		– 0.010		0.002
		(0.017)		(0.014)		(0.014)
Wellbeing		– 0.005		0.014		0.021
		(0.019)		(0.016)		(0.015)
Significance of CS (p-values)	0.033	0.029	< 0.001	< 0.001	< 0.001	< 0.001
R^2	0.003	0.067	0.031	0.089	0.007	0.053
N	1012	1003	1012	1012	1012	1012

Notes: OLS estimates. Standard error in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The omitted category is the bottom quartile in the IQ test.

Table 12: Statistical Model for Figure 4: Beliefs in the PD

	First-Mover Transfer		Second-Mover Return if received 0		Second-Mover Return if received 5	
2nd IQ quartile (γ_2^{CS})	5.193**	4.750*	– 0.414**	– 0.297*	0.430**	0.447**
	(2.574)	(2.654)	(0.169)	(0.174)	(0.178)	(0.185)
3rd IQ quartile (γ_3^{CS})	6.525**	5.855**	– 0.540***	– 0.341*	0.508***	0.505**
	(2.834)	(2.975)	(0.186)	(0.195)	(0.197)	(0.207)
4th IQ quartile (γ_4^{CS})	9.971***	8.817***	– 0.900***	– 0.643***	0.174	0.206
	(2.679)	(2.907)	(0.176)	(0.190)	(0.186)	(0.202)
middleschool		4.327		– 0.250		0.519
		(4.973)		(0.325)		(0.346)
somecollege		2.356		– 0.029		0.221
		(2.335)		(0.153)		(0.162)
technicalschool		– 0.113		– 0.090		0.205
		(3.009)		(0.197)		(0.209)
college		0.496		– 0.458		– 0.071
		(4.306)		(0.282)		(0.300)
graduate		6.491		– 1.268***		0.117
		(7.013)		(0.459)		(0.488)
Age		– 0.035		0.017**		– 0.009
		(0.105)		(0.007)		(0.007)
Age2		– 0.003		– 0.000		– 0.000
		(0.008)		(0.001)		(0.001)
householdincome		– 0.029		– 0.000		0.001
		(0.038)		(0.002)		(0.003)
Gender		– 0.909		– 0.027		– 0.356
		(3.285)		(0.215)		(0.229)
Afro		5.018		– 0.682		– 0.334
		(6.827)		(0.447)		(0.475)
Indian		4.159		0.231		0.055
		(8.515)		(0.557)		(0.592)
Asian		6.981		0.256		– 0.294
		(11.457)		(0.750)		(0.797)
Latino		8.487		– 0.585		0.095
		(8.214)		(0.538)		(0.572)
White		15.207*		– 0.731		0.169
		(8.665)		(0.567)		(0.603)
Whiteonly		– 6.158		– 0.094		– 0.342
		(9.280)		(0.607)		(0.646)
Absorption		0.247		– 0.011		0.002
		(0.233)		(0.015)		(0.016)
Achievement		– 0.146		0.001		0.003
		(0.238)		(0.016)		(0.017)
Aggression		– 0.371*		– 0.030**		– 0.042***
		(0.223)		(0.015)		(0.016)
Alienation		– 0.460**		0.018		– 0.005
		(0.225)		(0.015)		(0.016)
Control		– 0.037		– 0.014		– 0.002
		(0.241)		(0.016)		(0.017)
HarmAvoidance		– 0.061		0.007		0.013
		(0.214)		(0.014)		(0.015)
SocialCloseness		– 0.087		0.001		0.008

Table 12: (continued)

	First-Mover Transfer		Second-Mover Return if received 5		Second-Mover Return if received 0	
		(0.201)		(0.013)		(0.014)
SocialPotency		– 0.073		– 0.005		– 0.009
		(0.219)		(0.014)		(0.015)
StressReaction		– 0.056		0.016		0.022*
		(0.191)		(0.013)		(0.013)
Traditionalism		0.172		0.001		0.007
		(0.220)		(0.014)		(0.015)
Wellbeing		0.135		0.023		0.004
		(0.248)		(0.016)		(0.017)
R^2	0.014	0.043	0.026	0.061	0.009	0.032
Significance of CS (p-values)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
N	1012	1012	1012	1012	1012	1012

Notes: OLS estimates. Standard error in parentheses. *, **, *** indicates significance at 10, 5, and 1 percent level, respectively. The omitted category is the bottom quartile in the IQ test.

2.5 Analysis of exits from the company

Of the 1,066 subjects that participated in the study, a total of 653 had left the company by 4/07/2007. SI Table 13 presents a breakdown of the total exits in two different ways, depending on whether the exit was voluntary or not, whether it was before or after completion of training.

Name of the Variable	Description	Number
AllExits	all exits at any time for any reason	653
Discharge	all involuntary exits, at any time	162
VolQuit	all voluntary exits, at any time	491
JobExit	all on-the-job exits, for any reason	539
TrngExit	all in-training exits, for any reason	114

Table 13: Reasons for exits from the job or training out of the total 1,066 participants. The numbers are as of 4/07/2007.

2.5.1 Empirical estimates of the Survival function

Job tenure is a time-to-event variable which can be usefully summarized using a survival function, and the associated hazard rate. The hazard rate $h(t)$ is the ratio of the instantaneous failure rate $f(t)$ and the survival function $S(t)$:

$$h(t) = \frac{f(t)}{S(t)}$$

and shows how exit rates vary by the length of job tenure.

As is our standard practice, in Figure 5, Panels A and B, in the main text of the paper, a graph showing the estimated survival curves by quartiles of the IQ index is presented, first alone, and second, in a form that accounts for the effects of our full set of control variables. The unconditional curves are created using the Kaplan-Mayer estimator ([9]), while the version that accounts for the control variables uses a Cox proportional hazard model for each quartile of IQ.

In a Cox proportional hazard model the estimated hazard rate for a subject with the vector of independent variables x is assumed to be

$$h(t|x) = h_0(t)\exp(x\beta).$$

The baseline hazard $h_0(t)$ is common to all subjects. The vector of parameters β captures the effects of the individual variables x. In our tables of regression results the estimated effects of each independent variable are not given as ordinary coefficients, but are instead translated into hazard ratios, which shift the baseline hazard up or down. Consequently, a hazard ratio larger than 1 indicates an increase of the hazard rate with respect to the baseline, a ratio equal to 1 means no effect, and a ratio less than 1 indicates a reduction of the hazard rate with respect to the baseline.

In SI Table 14 we model individual i's hazard of leaving at time t $h(t|i)$ as

$$h(t|i) = h_0(t)\exp(\gamma^{CS}_{j(i)} + x_i b). \tag{2.17}$$

In columns (1) and (2) we present the Cox model results first without, and then with, the control variables. In columns (3) and (4) of SI Table 14, we also include the Hit-15 index, due to the independent interest of its predictive power in relation to that of IQ.

SI Table 15 presents an abbreviation of the results of a closely related Cox model specification designed to examine the robustness of our results when looking separately at different exit categories. For simplicity, we only include a linear term in the IQ index and then add the Hit-15 index. All specifications include the control variables, but those coefficients are here omitted. The exit categories (in addition to all exits together) are voluntary quits, discharges, and "wash-outs" during the initial two-week training.

Table 14: The Statistical Model for Figure 5: Cox Proportional Regression

	(1)	(2)	(3)	(4)
2nd IQ quartile (γ_2^{CS})	0.789**	0.773**	0.917	0.915
	(0.083)	(0.085)	(0.106)	(0.111)
3rd IQ quartile (γ_3^{CS})	0.693***	0.703***	0.826	0.820
	(0.082)	(0.089)	(0.111)	(0.117)
4th IQ quartile (γ_4^{CS})	0.533***	0.539***	0.693***	0.676***
	(0.062)	(0.069)	(0.096)	(0.099)
Hit15Index			0.558***	0.639***
			(0.088)	(0.109)
MiddleSchool		1.135		1.075
		(0.234)		(0.256)
SomeCollege		1.037		1.097
		(0.104)		(0.120)
TechSchool		0.977		1.003
		(0.127)		(0.140)
College		0.823		0.858
		(0.168)		(0.182)
GradSchool		1.258		1.172
		(0.372)		(0.361)
Age		0.983		0.959
		(0.026)		(0.027)
Age2		1.000		1.001*
		(0.000)		(0.000)
ExperienceR		0.970		0.975
		(0.025)		(0.027)
OtherIncome		1.000		1.000
		(0.000)		(0.000)
Gender		1.078		1.063
		(0.151)		(0.157)
AfAm		1.533		1.077
		(0.524)		(0.410)
NatAm		0.708		0.637
		(0.284)		(0.280)
Asian		2.072		1.046
		(1.198)		(0.738)
Latino		1.559		1.319
		(0.610)		(0.575)
White		0.839		0.837
		(0.281)		(0.299)
WhiteOnly		1.082		0.843
		(0.491)		(0.407)
Absorption		0.999		1.010
		(0.010)		(0.011)
Achievement		0.989		0.995
		(0.010)		(0.011)
Aggression		1.005		1.010
		(0.010)		(0.011)
Alienation		0.995		0.997
		(0.010)		(0.011)

Table 14: (continued)

	(1)	(2)	(3)	(4)
Control		1.024**		1.017
		(0.011)		(0.012)
HarmAvoidance		0.999		1.005
		(0.009)		(0.010)
SocialCloseness		0.994		0.996
		(0.009)		(0.010)
SocialPotency		1.002		1.001
		(0.009)		(0.010)
StressReaction		1.011		1.003
		(0.009)		(0.009)
Traditionalism		0.996		0.999
		(0.009)		(0.010)
Wellbeing		1.002		0.993
		(0.010)		(0.011)
Significance of CS (*p*-values)	< 0.001	< 0.001	< 0.001	< 0.001
N	1015	1014	885	884

Notes: Changes in hazard rates from Cox regressions of proportional hazard model. The number of observations is lower the Hit-15 score is used, because scores from the first four sessions are not usable. Standard errors are in parentheses. *, **, *** indicate significantly different from 1 at the 10, 5, and 1 percent level, respectively.

Table 15: Cognitive Skills and Retention at the Firm

	All Exits		Voluntary Quits		Discharges		Exits during Training	
IQIndex	0.336***	0.558*	0.411***	0.641	0.212***	0.437	0.323*	0.567
	(0.089)	(0.177)	(0.133)	(0.244)	(0.101)	(0.256)	(0.197)	(0.404)
Hit15Index		0.585***		0.595***		0.520*		0.476*
		(0.096)		(0.113)		(0.176)		(0.182)
N	1014	884	1014	884	1014	884	1014	884

Notes: Changes in the hazard rate from Cox regressions of proportional hazard model. All models contain the full set of demographic controls. The number of observations is lower the Hit-15 score is used, because scores from the first four sessions are not usable. Standard errors are in parent*, **, *** indicate significantly different from 1 at the 10, 5, and 1 percent level, respectively.

3 Correlations among Preferences

We examine correlations between all our measures of preferences and behaviors.

- *Discounting:* Based on equation (2.11), the four choices the individuals made define four equations. Using OLS, we estimate the long-term discount factor δ_i and present-bias β_i for every individual i, as described in the section above on Choices over time.

- *Risk Aversion:* We take the average of the individual-level parameters of relative risk aversion σ implied by lotteries (win 1, win 5) and (win 10, win 2), as explained in equation (2.3), in the section above on Choices under uncertainty.

- *Consistency:* We use the indicators whether an individual is inconsistent in the decision tables for the risk experiment (ConsR), and the decision tables for discounting (ConsF), respectively, as described in the section above on Consistency.

- *Behavior in the PD:* We use the subjects' choices as the first- mover and the second mover. The first-mover can either transfer 0 or 5 (PD1). The second mover can condition the back transfer on what he received: he can choose how much to send back if he received 0 (PD2_0), and if he received 5 (PD2_5), as described above in the section on Strategic behavior.

- *Job Attachment:* We include an indicator whether the individual stayed on the job for at least 6 months (Stay6Mo). This includes all reasons for exits.

SI Table 16 shows the correlations between the different outcomes. For convenience, we also display the correlations with the IQ index, and with the common factor (g) from the three measures of cognitive skills obtained in SI Table 1.

SI Figure 2 shows the c.d.f. of the p-values from the correlations. We do not include correlations between behaviors that could be considered "mechanical". For instance, we exclude the correlation between consistency in discounting and consistency in time preferences. We also exclude correlations between consistency in the risk table and risk aversion, and correlations between the choices in the PD. We use two different methods to calculate the correlations. The blue line shows the c.d.f. from the correlations in SI Table 16, the red line shows the c.d.f. using the p-values from Spearman rank correlations as a robustness check.

Table 16: Correlations between Preferences and Behaviors

	β	δ	σ	PD1	PD2_0	PD2_5	ConsF	ConsR	Stay6
δ	0.468								
σ	-0.065	-0.081							
PD1	0.101	0.156	-0.091						
PD2_0	-0.052	0.024	-0.032	0.331					
PD2_5	0.113	0.120	-0.074	0.547	0.273				
ConsF	0.172	0.063	-0.049	0.047	-0.055	0.097			
ConsR	0.159	0.060	-0.146	0.019	-0.079	0.073	0.238		
Stay6	0.055	0.011	-0.046	0.037	-0.038	0.031	0.103	0.069	
Correlation with measure of cognitive skills									
IQ	0.139	0.126	-0.158	0.068	-0.173	0.090	0.214	0.223	0.183
g	0.203	0.195	-0.147	0.080	-0.162	0.118	0.222	0.250	0.174

= $p < .01$ = $.01 \leq p < .05$ = $.05 \leq p < .10$ = $.10 \leq p < .20$

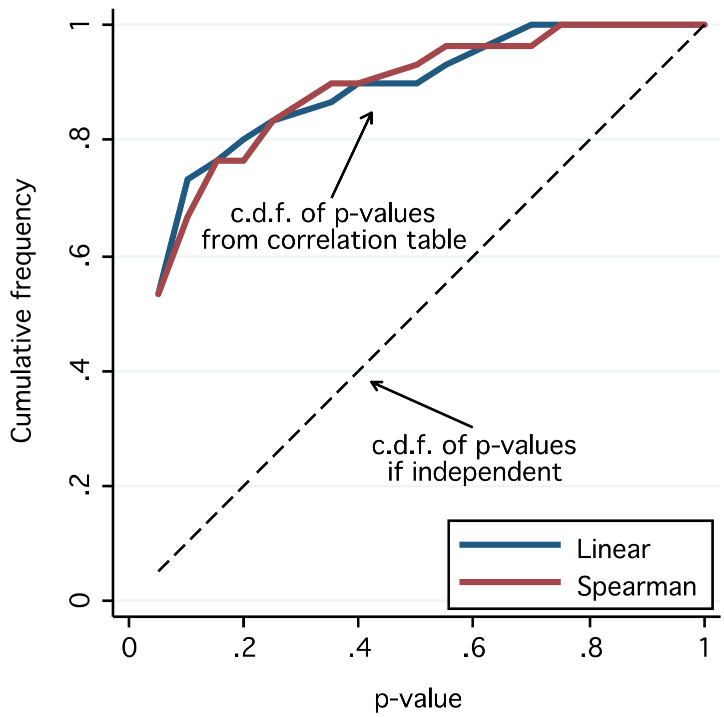

Figure 2: The c.d.f. of the p-values from the correlation table.

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