

Eliciting Beliefs in the Laboratory

by

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Abstract

Belief elicitation methods based on proper scoring rules such as the quadratic scoring rule provide the experimenter with little opportunity to control the incentives for optimal reporting behavior by experimental subjects. Since subjects are typically risk averse, distortions in belief reports should be expected from any kind of proper scoring rule. But how likely and how large are these distortions in practice? Can one correct for such distortions? And what impact will corrections have on the incentives for optimal behavior? We approach these questions theoretically and empirically.

Our theoretical model shows how the widely used quadratic scoring rule can be generalized and represented as a contingent wealth opportunity set described by the indirect utility function of a CRRA agent in a competitive contingent claims market. This representation has a naturally-occurring form, much like the markets that sports betting agencies have developed. Optimal reporting behavior is logically equivalent to optimal pricing behavior against compensated demand functions of a consumer whose certainty equivalent, in a dual perspective, has the form of a CES utility function. The parameters of this utility function are the risk attitude (elasticity of substitution), distributional weights, and endowment location in the space of available experimental funds. Critically, these parameters are all under the control of the experimenter. We provide graphical examples to show how variations in the CRRA/CES parameters of this constraint impact on the incentives for optimal reporting of beliefs by subjects. The class of incentive functions we develop provide significantly stronger penalties for sub-optimal belief reporting behavior than the conventional quadratic scoring rule.

The theory also suggests that belief reporting in the lab be framed for the subject as a pricing problem. Besides having strong conceptual and analytical foundations in De Finetti/Savage type Bayesian statistics where probabilities are viewed as prices, the idea of having a subject set odds or prices in a contingent claims market may help to overcome well known difficulties subjects face in understanding the language of frequency and probability. Their odds-setting or pricing behavior will reveal their beliefs even without them explicitly articulating their beliefs as probability distributions. We provide experimental evidence evaluating the performance of this new approach to belief elicitation.

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Subjective beliefs play a role in many economic decisions. In individual choice settings, any time the agent faces a lottery there is a role for subjective probabilities. Even when the probabilities are “given” to the subject and the states of nature are objectively generated, the subject might employ some psychological process to edit that information. Or the lottery might directly entail probabilities that are subjective, such as health states or enjoyment of the characteristics of consumer goods. In game theory settings with multiple agents, virtually all solution concepts hinge on assumptions about consistency of beliefs.

It has been known for some time, at least since Good [1952; p.112] and Savage [1971], that subjective probabilities can be elicited from individuals in a manner that offers incentives for truthful revelation. Thus it is possible to turn an important unobservable determinant of behavior into an observable.

Unfortunately, the standard implementations of these methods for eliciting beliefs of individuals suffer from some serious design defects. The most important defect is that rewards for truthful reporting are dismal. This does not mean that the reports themselves are poor, but it does mean that it is hard to maintain the illusion that they have been elicited in a controlled manner. A second defect is that many implementations of these elicitation methods do not control for the joint unobservable of risk aversion. When the subject is not risk neutral, elicited beliefs will provide a distorted estimate of true beliefs unless one undertakes calibrations for the non-linear utility function of the subject. A third defect is that the incentives for truthful reporting are hard to explain to subjects, and use “proper scoring rules” that can appear like black boxes to some subjects.

We provide a theoretical and practical framework for eliciting beliefs from individuals which addresses all of these concerns to varying degrees. Our focus is directly on the elicitation of beliefs in a laboratory setting, although our framework has broader implications and clear field

counterparts. We develop an elicitation procedure which deliberately mimics the manner in which belief elicitation is framed in the field of sports betting.¹ Quite apart from the fact that such frames have obviously survived some market test of acceptance, they allow us to explain the task to subjects in a natural manner. In addition, they provide surprising insights into the proper interpretation of “market beliefs” that are elicited in markets. We show that there are some important subtleties when drawing inferences from betting markets.

In section 1 we explain the basic elicitation procedure and some variants. Our basic procedure has a striking familiarity with “multiple price list” procedures for the elicitation of risk attitudes (Holt and Laury [2002]), discount rates (Harrison, Lau and Williams [2002]) and valuations for goods (Andersen et al. [2006]). In section 2 we provide a more formal theoretical framework to understand the procedure, which also helps see how traditional scoring rules fit in as special cases. In section 3 we propose an experimental design to examine the behavioral properties of the procedure. In section 4 we present the results of some initial laboratory experiments testing the procedure.

1. An Elicitation Procedure

Assume that the subject is risk neutral and is asked to state their belief that event A will occur instead of event B, where A and B are mutually exclusive. Let the subject be told that there are nine bookies willing to take a bet at stated odds. Table 1 shows the probabilities of each outcome and the associated odds. The odds are stated in columns 3 and 4 in the *form* that they are naturally stated in the field: what is the amount that the subject would get for a \$1 bet if the indicated event occurred? In columns 1 and 2 the same odds are represented in terms of the implied probability of

¹ Similar exercises have been undertaken in the area of betting markets: see Plott, Wit and Yang [2003], for example.

the event. Thus the odds of A occurring are simply the reciprocal of the probability of A, so a probability of 0.1 implies an odds of \$10 so that a \$1 bet would return a gross payout of \$10 and a net payout of \$9. Some people (academics) find probabilities easier to understand, and some people (everyone else) seems to find odds easier to understand, so we provide both.

We discuss an important difference between our approach and the field counterparts below: we only state “competitive odds” in which the betting house “take” is zero. Allowing for the hour take requires some simple arithmetic adjustments, which we discuss later.

The subject is asked to state their probability that A will occur, and then decide how they want to bet for each of the nine bookies. For each bookie they need to decide what fraction of a \$1 stake they would like to bet, and then whether they want to bet on A or B. Using this information, the interface provides the subject with their expected income. This information is designed to show the subject the consequences of their choice, so that we are not jointly eliciting beliefs and testing cognitive prowess at such calculations.

Consider a subject that has revealed that they have a personal belief that A will occur with probability $\frac{3}{4}$. Assume for the moment that the subject has to place a bet with each bookie, as shown in panel A of Table 1. This assumption is reflected in the fraction to bet being set to 1 in each row. Such a subject would bet on A for every bookie offering odds that corresponded to a lower probability of A winning than $\frac{3}{4}$, and then switch over to bet on B for every bookie offering odds that corresponded to a higher probability of A winning than $\frac{3}{4}$. These bets are shown in panel A, and imply net earnings of \$9 or -\$1 with the first bookie, \$4.00 or -\$1 with the second bookie, and so on. The expected earnings from each bookie can then be calculated using the subjective belief of $\frac{3}{4}$ that the subject stated. Hence the expected earnings from the first bookie are $(\frac{3}{4} \times \$9) + (\frac{1}{4} \times -\$1) = \$6.50$, and so on for the other bookies. Expected earnings for some bookies are less

than \$1, a fact which we return to in a moment. Overall expected income is given by expected income from bets laid with the bookies plus any stake not bet. Since all of the stake is assumed to be bet in this case, total earnings are expected to be \$14.20.

In panel B we relax the assumption that the subject has to place a bet with every bookie. Since expected earnings for some bets are shown to be less than \$1 in panel A, when given the chance the subject would prefer to retain the \$1 stake in those cases and not bet at all. The result is the behavior and outcome shown in panel B, with expected income from betting being \$15.25, income from stake that was retained being \$5.00, for overall expected earnings of \$17.25. The risk neutral subject is clearly better off not betting when allowed that option, and it is apparent that the same would be true of any risk averse agent.

The absence of betting in panel B is worth pausing over. In our elicitation mechanism we are still able to recover the true belief of the subject, since that was needed to identify which bookies were worth betting with. But if we simply observed the bets of the subject, what would be infer? We could infer that the subject believed that A would occur with probability greater than 0.4 and less than 0.9, which is not particularly informative.² It is not a wrong inference, since the true belief is $\frac{3}{4}$ by assumption, but it is not very precise. Moreover, the sample selection that occurs as one moves from panel A to panel B is suggestive of the difficulty of making inferences about true beliefs from market odds based solely on realized bets, since this subject would not have had any impact on the market *within* this wide range.

An additional point about the implication of allowing for the absence of betting concerns the temporal difference between the investment in the bet (today) and the expected payoff (tomorrow).

² One could imagine a longer list of bookies, arrayed in finer increments of odds, but this would not provide significant improvement on the possible inferences from the observed bets alone.

When subjects place a bet today they give up the stake: virtually every betting house³ requires that bets be covered immediately with transfers of funds. But the payout is defined in terms of future dollars. So any bettor must discount the future payouts, conditional on outcome, to compare with the current outlay. This implies that individual discount rates must play a role in inferring individual beliefs from naturally occurring bets.⁴

What happens if the subject is not risk neutral? TO BE DONE. CRANK OUT SOME EMPIRICS FOR SPECIFIC UTILITY FUNCTIONS, THEN DISCUSS THE GENERAL CASE HERE OR IN AN APPENDIX.

As noted above, we simplify by stating competitive odds for the subject, such that each house has a zero take if there are equal numbers of bettors on each side of the market. To see the parallel to field betting odds, it is worthwhile translating field odds that include a house take into implicit beliefs. Essentially, one has to define the exhaustive set of events, calculate the implied house probability of all events, and normalize the probabilities by that sum. Consider the odds quoted in May 2006 by one betting house, William Hill, for the winner of Group B of the 2006 World Cup. These were England at 1.57, Sweden at 3.00, Paraguay at 8.00 and poor old Trinidad & Tobago at 34.00. The reciprocal of these odds on wagers of 1 unit are 0.64, 0.33, 0.13 and 0.03, which sums to 1.125. So the house take here is 12.5%: if it ended up with a “balanced book” in which equal dollar wagers were placed on each outcome, it would earn \$1.125 for every \$1 bet *with no risk*. We can take the house take away, and re-normalize the implied probabilities of each outcome

³ We exclude those houses interested in making exorbitantly priced loans and/or backed by the Mafia, as any fan of *The Sopranos* can testify.

⁴ In betting *markets* one might simply assume that these factors, risk attitudes and discount rates, cancel out on both sides of the market. We have no sense of the veracity of this casual assumption. A lively debate on these issues was initiated by Manski [2006], who formally challenged the claim that equilibrium prices in prediction markets necessarily reflected the average belief of traders. Responses from Gjerstad [2005] and Wolfers and Zitzewitz [2005] suggest that the two may be relatively close for plausible environments.

to be 0.57 ($= 0.64 \div 1.125$), 0.30, 0.11 and 0.03. This adjustment does not much help the chances of the hapless Trinidad & Tobago team, but it does make a noticeable change for the England and Sweden outcomes. With this adjustment, our experimental approach reflects practice in the field.

2. A Formal Model of Belief Elicitation as a Betting Game

This elicitation framework can be formally viewed from the perspective of a trading game between two agents. This framework provides several insights. First, traditional scoring rules can be interpreted consistently with field counterparts, and our laboratory implementation of those field procedures. Second, the role of risk aversion can be identified systematically.

HERE – JOHN?

MORE TO GO

3. Experimental Design

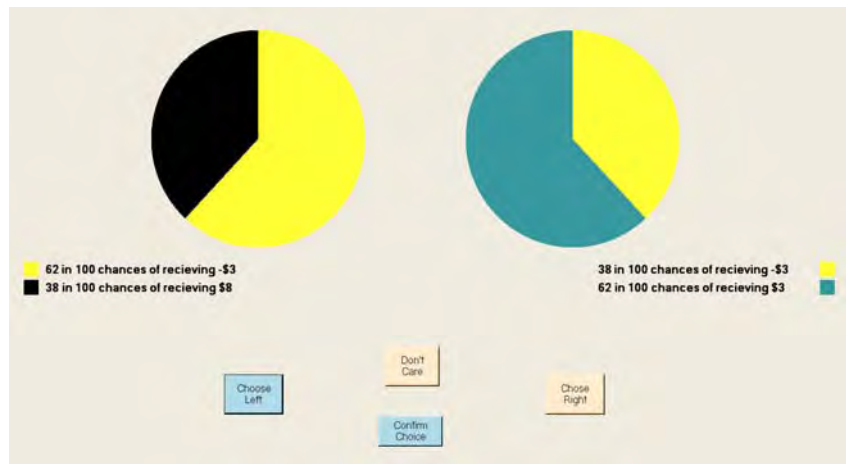
Our overall design is to embed the belief elicitation procedure in tasks that allow us to identify some characteristics of the choice behavior of the subject, to be trained in the use of the elicitation procedure, to apply the procedure to some naturally occurring event, and finally to use a control procedure popular in the literature.⁵

A. Characterizing Attitudes to Risk

The first series of tasks are designed to tell us if the subject is better characterized as following expected utility theory or prospect theory, and then to identify the specific attitudes to risk or losses that the subject has. This will be useful when we evaluate performance in the elicitation

⁵ Our experiments vary the order of tasks, to control for any procedural sequencing effects on behavior.

task, as explained later. For this purpose we use a series of binary choice tasks patterned after Hey and Orme [1992], but with the “mixed frame” implementation of Harrison and Rutström [2005].



Each lottery consisted of 2 or more monetary prizes ranging from \$8 down to -\$7, with varying probabilities. Each subject received an endowment at the start of the task to cover any losses. There were 60 choices, and three were to be chosen at random for payment, so the endowment was \$24. Hence, if the subject ended up losing \$7 three times, net earnings from these choices would be \$3. Some lotteries consisted of non-negative prizes, some of non-positive prizes, but most had a mixture of positive and negative prizes. The screen shot displayed here illustrates a typical choice task. An appendix shows the instructions provided to subjects, who also had a practice session of 6 hypothetical choices.

These choices allow one to estimate a parametric model of behavior that allows expected utility theory (EUT) or prospect theory (PT) to explain behavior. Conditional on the choices being generated by EUT we estimate a coefficient of relative risk aversion. Conditional on the choices being generated by PT we estimate risk aversion coefficients for gains and losses, a loss aversion coefficient, and a coefficient reflecting the extent of probability weighting. We also consider a mixture model in which any observation may be generated by EUT or PT, and estimate the fraction of choices consistent with each. This allows us to classify subjects by the strength to which we can characterize their choices as EUT or PT.

USA versus Morocco in World Cup soccer warm-up
USA Wins Game is on May 23, 2006
 Payments made May 24, 2006

Stake you have to bet with	10	10	10	10	10	10	10	10	10	10
BET AMOUNT IN US \$	0	0	0	0	0	0	0	0	0	0

USA Wins	<input type="radio"/> \$10 0.1	<input type="radio"/> \$5 0.2	<input type="radio"/> \$3.33 0.3	<input type="radio"/> \$2.5 0.4	<input type="radio"/> \$2 0.5	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.11 0.9	Odds by house Probability by house
USA Does Not Win	<input type="radio"/> \$1.11 0.9	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$2 0.5	<input type="radio"/> \$2.5 0.4	<input type="radio"/> \$3.33 0.3	<input type="radio"/> \$5 0.2	<input type="radio"/> \$10 0.1	Odds by house Probability by house

Net winnings if USA Wins										
Net winnings if USA Does Not Win										

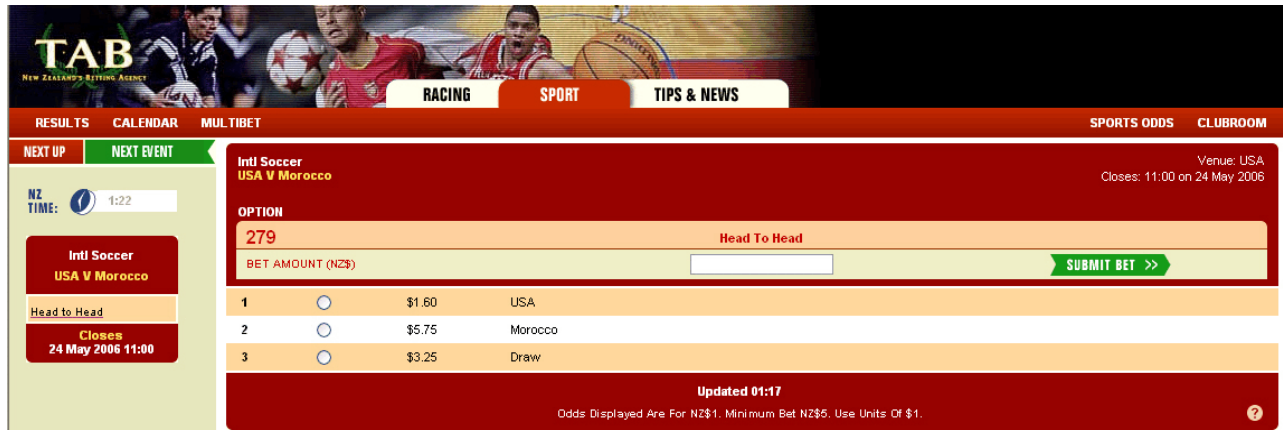
Bets in US dollars

B. Belief Elicitation With Odds

The second task is the elicitation task trainer. We use a simple event that can be resolved in the laboratory to train subjects on the procedure. The instructions are presented in written form, and read out aloud (they are provided in full in an appendix). Rewards for the trainer are hypothetical, but our experience is that a hands-on trainer provides more information than written instructions in many experiments.

The third task is the elicitation task of interest. We use a naturally occurring event as the object of the elicitation, such as a football game. This event was one that was to be resolved in the future, as explained below.

The basic task is illustrated in the screen shot shown above, which is the example used in the instructions given to subjects. The event is a warm-up soccer match for the 2006 World Cup



between the United States and Morocco. The bet is defined in terms of the USA winning or not winning, so a draw would be the USA not winning.

There are 9 betting houses offering different odds that the USA would win. Prior to this interface the subject is provided information on 3 betting houses that offer odds on events ranging from the winner of the U.S. Presidential race in 2008, the winner of the *American Idol* television show in 2006, an Australian Rules football match, and the USA *v.* Morocco soccer match. The laboratory interface was patterned after the field interface used by the New Zealand Totalisater Agency Board (NZ TAB) shown above, so that the subjects would realize that there are numerous field referents to the interface we were providing. The use of 4 field bets from 3 betting houses also served to show the subjects that there are many betting houses available.

To reinforce the fact that different betting houses in the field might offer different odds for the same outcome, we also provided subjects with a screen shot from a web site that simply collects these. This display is shown on the next page, and used the winner of the 2006 U.S. National Basketball Association championship as the exemplar. Odds for the top 3 teams are displayed from 14 active betting houses, and the range of odds for the same team pointed out to subjects.

Our instructions are deliberate in using these graphics to provide subjects with field referents to the nature of the task, without of course providing information on prevailing market odds for any

The screenshot shows the oddschecker website interface. At the top, there's a navigation bar with 'Home', 'Feedback', 'Mobile', 'Radio', 'Calendar', 'Casino', and 'Poker'. Below that, a 'Market Summary' sidebar lists various sports categories. The main content area is titled 'NBA Championship Odds' and displays a table of odds for four teams: Dallas Mavericks, Detroit Pistons, Miami Heat, and Phoenix Suns. The table columns represent different bookmakers, including totalbet, skybet, Ladbrokes, COMAL, VC bet, Paddy Power, betbetting, bluesp.com, bet365, betdirect, POKY PZZA, PRELUDE, bet-at-home, ST. JAMES, BETFRED, sportsbet.com, betrabet, betfair, BETDAQ, MANSION, and BETX. Odds are shown in various colors (blue, red, green) to indicate different levels of competitiveness. A 'Win Market' section is visible on the right side of the table.

of the bets that were to be used to reward subjects. Harrison and List [2004] argue that there are many features of field experiments compared to conventional lab experiments, and that the use of field referents in instructions is one component, among many, that might encourage subject behavior in an experiment that is closer to naturally-occurring behavior.

Returning to our lab interface, the subject is given a \$10 stake with which to bet in each betting house. The \$10 from one house is not transferable to other houses, and one of the bets will be selected to be actually played out (selected using a die that the subject throws). In the default design we “force fed” the subjects by requiring that they place a bet with each house, and did not allow them to change the \$10 stakes: all the subject can do is decide if they want to bet on event A or event B in each house. The interface updated the display showing net winnings conditional on each event occurring. The alternative “free range” design also allows the subject to vary the stake that is bet in each house, from \$0 up to \$10 in \$1 increments.

2006 World Cup in soccer
Brazil Wins

Final game is on July 9, 2006
Payments made July 10, 2006

Stake you have to bet with 10 10 10 10 10 10 10 10 10

BET AMOUNT IN US \$ 10 10 10 10 10 10 10 10 10 **Submit Bets**

Brazil Wins	<input checked="" type="radio"/> \$10 0.1	<input type="radio"/> \$5 0.2	<input type="radio"/> \$3.33 0.3	<input type="radio"/> \$2.5 0.4	<input type="radio"/> \$2 0.5	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.11 0.9	Odds by house Probability by house
Brazil Does Not Win	<input type="radio"/> \$1.11 0.9	<input checked="" type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$2 0.5	<input type="radio"/> \$2.5 0.4	<input type="radio"/> \$3.33 0.3	<input type="radio"/> \$5 0.2	<input type="radio"/> \$10 0.1	Odds by house Probability by house

Net winnings if Brazil Wins	90	-10	-10	-10	-10	-10	-10	-10	-10	
Net winnings if Brazil Does Not Win	-10	2.5	4.29	6.67	10	15	23.33	40	90	
Stake you chose not to bet	0	0	0	0	0	0	0	0	0	
Expected Bet Winnings	10	0	1.43	3.34	6	10	16.66	30	70	
Total Expected Earnings	10	0	1.43	3.34	6	10	16.66	30	70	

Bets in US dollars

The other major treatment was to initiate the information display at the optimal response for a risk-neutral bettor with a stated subject probability belief. In this version the subject was initially asked to provide a belief that event A would occur. This was accomplished by providing a slider, illustrated here, that the subject could move between 0% and 100%. A numerical display identified the exact percentages implied. Once the subject had entered this information, and confirmed it, the betting sheet came up. This sheet is the same as the one displayed earlier, except that the bets are already filled in and there is a display at the bottom of the expected bet winnings and total expected earnings. These expectations reflect the belief that the subject had entered immediately prior,

HOW LIKELY DO YOU THINK IT IS THAT

A. Brazil wins the 2006 World Cup in soccer

B. Brazil does not win the 2006 World Cup in soccer

Brazil Wins

Brazil Does Not Win

20% percent chance that Brazil Wins

80% percent chance that Brazil Does Not Win

which is a 20% chance of Brazil winning. Consider the first bet, in which the subject wins \$90 if Brazil wins and loses the \$10 wager if Brazil does not win. The expected winnings are then \$18 (= $\$90 \times 0.2$) minus \$8 (= $-\$10 \times 0.8$), or \$10 as shown. If the subject had entered a different belief, the initial bets and numeric display of expected winnings would have changed. The subject can change any bet, and the interface shows the effect on total expected earnings.

We stress, and this is explained carefully to the subject, that these initial bets are optimal only if the subject is neutral with respect to risk. We actually explain that if the subject is extremely averse to any risks, the best thing they could do is to not bet at all and just collect \$10 at some future date. Or, if the subject is forced to bet, to bet as if they thought that Brazil would win with a 50% chance. **NEED TO THINK ABOUT THESE INSTRUCTIONS A BIT.** We also point out that if they are not so risk averse, doing either of these things would reduce their expected earnings.

The actual elicitation tasks involved a hypothetical trainer, one fact which could be resolved during the session, and three natural events occurring in the future. The hypothetical trainer was whether Mercury was the closest planet to the sun. This question was chosen since there is some survey evidence that U.S. college seniors do not universally know that this is true, and it can be verified with no time delay. Thus subjects could see the effect of their choices when compared to an actual outcome. The fact used for real rewards was either (i) whether Spanish was the main language of Brazil, or (ii) whether Lisbon was the capital of Spain. We varied these in two sessions to avoid subjects in one session communicating the (revealed) fact to subjects in the next session.⁶ The natural events used for real rewards were (i) whether Brazil would win the 2006 World Cup outright, (ii) whether Donald Rumsfeld would resign by the end of 2006, and (iii) whether Tiger Woods

⁶ This possibility was extremely unlikely. Our lab is structured to allow incoming subjects to be kept separate from outgoing subjects, and the sessions were literally run after the other with no spare time in between.

would win the 2006 U.S. Golf Championship. The outcome of the two sporting events were to be known in late June and early July, and subjects were to be paid mid-July. The political event was to be known by the end of 2006, and subjects were to be paid at the beginning of 2007.

3. Results

4. Conclusions

Table 1: Betting Choices Facing Subject

Assume subject has a true belief that A will occur with probability $\frac{3}{4}$.

Probabilities		Odds		Fraction				Earnings (given odds, choices and subjective belief)				
A	B	A	B	Stake	to Bet	Bet on A	Bet on B	A wins	B wins	Expected from bets	Not Bet	Total
<i>A. Subject is Required to Bet</i>												
0.1	0.9	\$10.00	\$1.11	\$1.00	1.00	1	0	\$9.00	\$-1.00	\$6.50	\$0.00	\$6.50
0.2	0.8	\$5.00	\$1.25	\$1.00	1.00	1	0	\$4.00	\$-1.00	\$2.75	\$0.00	\$2.75
0.3	0.7	\$3.33	\$1.43	\$1.00	1.00	1	0	\$2.33	\$-1.00	\$1.50	\$0.00	\$1.50
0.4	0.6	\$2.50	\$1.67	\$1.00	1.00	1	0	\$1.50	\$-1.00	\$0.88	\$0.00	\$0.88
0.5	0.5	\$2.00	\$2.00	\$1.00	1.00	1	0	\$1.00	\$-1.00	\$0.50	\$0.00	\$0.50
0.6	0.4	\$1.67	\$2.50	\$1.00	1.00	1	0	\$0.67	\$-1.00	\$0.25	\$0.00	\$0.25
0.7	0.3	\$1.43	\$3.33	\$1.00	1.00	1	0	\$0.43	\$-1.00	\$0.07	\$0.00	\$0.07
0.8	0.2	\$1.25	\$5.00	\$1.00	1.00	0	1	\$-1.00	\$4.00	\$0.25	\$0.00	\$0.25
0.9	0.1	\$1.11	\$10.00	\$1.00	1.00	0	1	\$-1.00	\$9.00	\$1.50	\$0.00	\$1.50
										\$14.20	\$0.00	\$14.20
<i>B. Subject Chooses Whether to Bet</i>												
0.1	0.9	\$10.00	\$1.11	\$1.00	1.00	1	0	\$9.00	\$-1.00	\$6.50	\$0.00	\$6.50
0.2	0.8	\$5.00	\$1.25	\$1.00	1.00	1	0	\$4.00	\$-1.00	\$2.75	\$0.00	\$2.75
0.3	0.7	\$3.33	\$1.43	\$1.00	1.00	1	0	\$2.33	\$-1.00	\$1.50	\$0.00	\$1.50
0.4	0.6	\$2.50	\$1.67	\$1.00	0.00			\$0.00	\$0.00	\$0.00	\$1.00	\$1.00
0.5	0.5	\$2.00	\$2.00	\$1.00	0.00			\$0.00	\$0.00	\$0.00	\$1.00	\$1.00
0.6	0.4	\$1.67	\$2.50	\$1.00	0.00			\$0.00	\$0.00	\$0.00	\$1.00	\$1.00
0.7	0.3	\$1.43	\$3.33	\$1.00	0.00			\$0.00	\$0.00	\$0.00	\$1.00	\$1.00
0.8	0.2	\$1.25	\$5.00	\$1.00	0.00			\$0.00	\$0.00	\$0.00	\$1.00	\$1.00
0.9	0.1	\$1.11	\$10.00	\$1.00	1.00	0	1	\$-1.00	\$9.00	\$1.50	\$0.00	\$1.50
										\$12.25	\$5.00	\$17.25

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Appendix A: Experimental Instructions

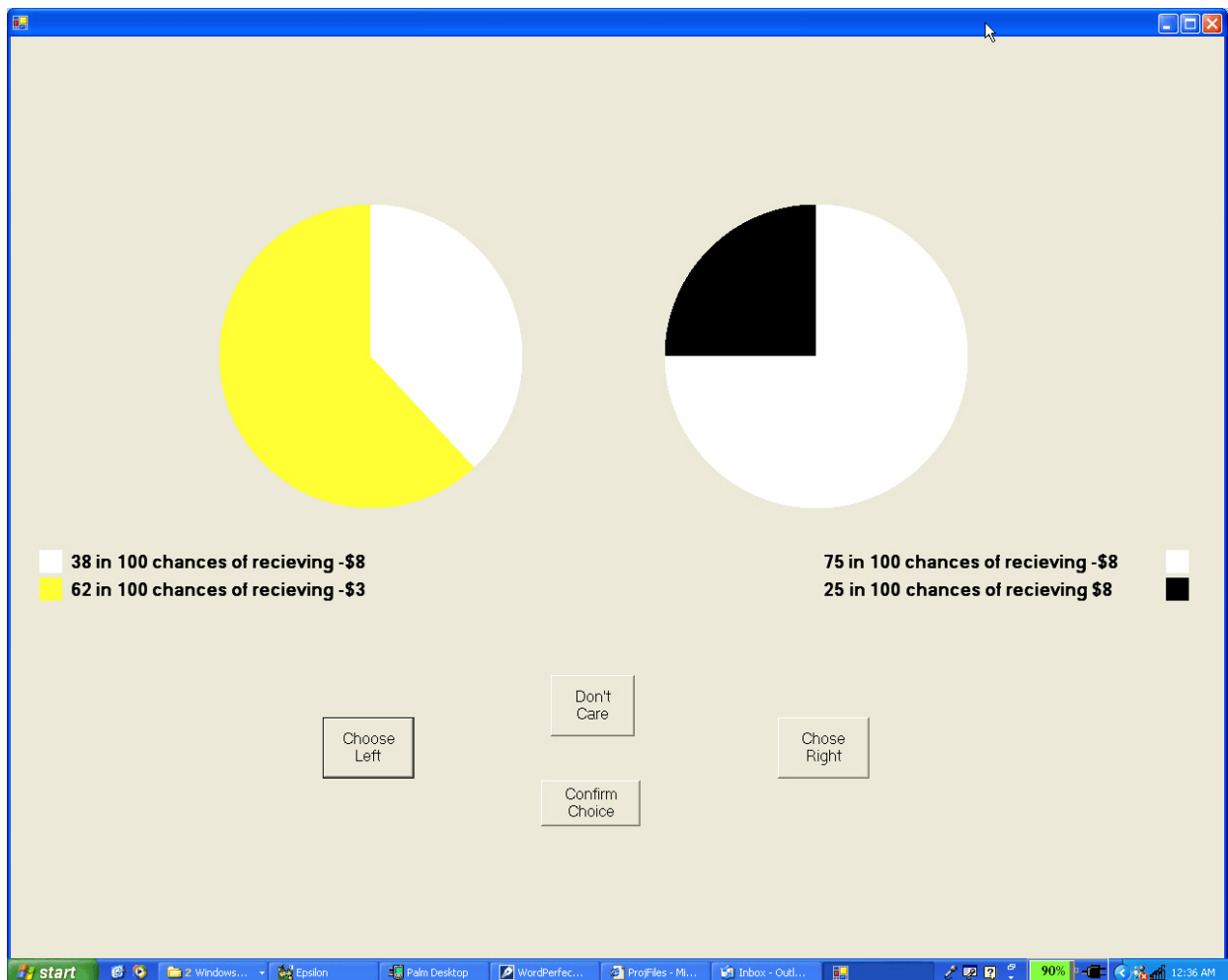
A. Binary Lottery Choice Task

YOUR INSTRUCTIONS

This is an experiment about choosing between lotteries with varying prizes and chances of winning. You will be presented with a series of lotteries where you will make choices between pairs of them. There are 60 pairs in the series. For each pair of lotteries, you should indicate which of the two lotteries you prefer to play. You will actually get the chance to play three of the lotteries you choose, and will be paid according to the outcome of those lotteries, so you should think carefully about which lotteries you prefer.

You will be given \$24 before you make a choice. Any losses will be deducted from that \$24. You cannot lose more than \$24, no matter what choice you make in this experiment.

Here is an example of what the computer display of such a pair of lotteries will look like. The display on your screen will be bigger and easier to read.



The outcome of the lotteries will be determined by the draw of a random number between 1 and 100. Each number between (and including) 1 and 100 is equally likely to occur. In fact, you will be able to draw the number yourself using a special die that has all the numbers 1 through 100 on it.

In the above example the left lottery pays minus eight dollars (-\$8) if the random number on the ball drawn is between 1 and 38, and pays minus three dollars (-\$3) if the number is between 39 and 100. The yellow color in the pie chart corresponds to 62% of the area and illustrates the chances that the ball drawn will be between 39 and 100 and your payoff will be -\$3. The white area in the pie chart corresponds to 38% of the area and illustrates the chances that the ball drawn will be between 1 and 38 and your payoff will be -\$8.

We have selected colors for the pie charts such that a lighter color indicates a lower prize. White will be used when the prize is minus eight dollars (-\$8).

Now look at the pie in the chart on the right. It pays minus eight dollars (-\$10) if the number drawn is between 1 and 75, and eight dollars (\$8) if the number is between 76 and 100. As with the lottery on the left, the pie slices represent the fraction of the possible numbers which yield each payoff. For example, the size of the -\$8 pie slice is 75% of the total pie.

Each pair of lotteries is shown on a separate screen on the computer. On each screen, you should indicate which of the lotteries you prefer to play by clicking on one of the three boxes beneath the lotteries. You should click the LEFT box if you prefer the lottery on the left, the RIGHT box if you prefer the lottery on the right, and the DON'T CARE box if you do not prefer one or the other.

You should approach each pair of lotteries as if it is one of the three that you will play out. If you chose DON'T CARE in the lottery pair that we play out, you will pick one using a standard six sided die, where the numbers 1-3 correspond to the left lottery and the numbers 4-6 to the right lottery.

After you have worked through all of the pairs of lotteries, raise your hand and an experimenter will come over. You will then roll a 20 sided die three times to determine which pairs of lotteries that will be played out. One lottery pair from the first 20 pairs will be selected, one from the next 20 pairs, and finally one from the last 20 pairs. If you picked DON'T CARE for one of those pairs, you will use the six sided die to decide which one you will play. Finally, you will roll the 100 sided die to determine the outcome of the lottery you chose.

For instance, suppose you picked the lottery on the left in the above example. If the random number was 37, you would lose \$8; if it was 93, you would lose \$3. If you picked the lottery on the right and drew the number 37, you would lose \$8; if it was 93, you would gain \$8.

Therefore, your payoff is determined by three things:

- by which three lottery pairs that are chosen to be played out in the series of 60 such pairs using the 20 sided die;
- by which lottery you selected, the left or the right, for each of these three pairs; and
- by the outcome of that lottery when you roll the 100 sided die.

This is not a test of whether you can pick the best lottery in each pair, because none of the lotteries are necessarily better than the others. Which lotteries you prefer is a matter of personal taste. The people next to you will have different lotteries, and may have different tastes, so their responses should not matter to you. Please work silently, and make your choices by thinking carefully about each lottery.

All payoffs are in cash, and are in addition to the \$5 show-up fee that you receive just for being here. In addition to these earnings you will also receive a randomly determined amount of money before we start. This can be any amount between \$1 and \$10 and will be determined by rolling the 10 sided die. You will also receive \$24 to cover any losses.

When you have finished reading these instructions, please raise your hand. We will then come to you, answer any questions you may have, let you roll the 10 sided die for the additional money, and start you on a short series of practice choices. The practice series will not be for payment, and consists of only 6 lottery pairs. After you complete the practice we will start you on the actual series for which you will be paid.

As soon as you have finished the actual series, and after you have rolled the necessary dice, you will be paid in cash and are free to leave.

Practice Session

In this practice session you will be asked to make 6 choices, just like the ones that you will be asked to make after the practice. You may take as long as you like to make your choice on each lottery.

You will not be paid your earnings from the practice session, or incur any losses, so feel free to use this practice to become familiar with the task. When you have finished the practice you should raise your hand so that we can start you on the tasks for which you will be paid.

YOUR INSTRUCTIONS

This is an experiment that allows you to place bets on the outcome of events that will happen in the future. For example, who will be the next U.S. President? Or who will win the next U.S. Masters Golf Championship? Or will interest rates in the United States go up? You can make more money if you have better estimates about these outcomes.

Our bets today will be similar to those that you can find in any number of betting houses around the world. So we begin by showing you how some of these houses offer their bets. *William Hill* is one of the world's largest betting houses, and is based in the United Kingdom. They offer legal off-course betting on a wide range of events, illustrated on their web site at <http://www.willhill.com>. For example, here are the odds that they had on May 23, 2006, for the first question posed above: who will be the next U.S. President?

Online Sports Betting

Sports Casino Poker Games TV & Radio

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Live Betting Diary Mobile Services One Account Results

William HILL  **World Cup 2006**
Outright & Match Prices Available

Open Account Username: Password: Login Lost Your Login?

Bet Finder: Please Select a Coupon Decimal Odds

Politics : U S Presidential Election 2008 - Winner

Bet Until : 17:30 31/05/2006

Competitor	Price	Unit Stake
Hilary Clinton	3.00	<input type="text"/>
John McCain	6.00	<input type="text"/>
John Edwards	8.00	<input type="text"/>
Mark Warner	11.00	<input type="text"/>
G Allen	11.00	<input type="text"/>
Rudolph Giuliani	15.00	<input type="text"/>
C Rice	15.00	<input type="text"/>
Bill Frist	26.00	<input type="text"/>
Mitt Romney	34.00	<input type="text"/>
Evan Bayh	34.00	<input type="text"/>
Arnold Schwarzenegger	34.00	<input type="text"/>
Sam Brownback	41.00	<input type="text"/>
Russ Feingold	41.00	<input type="text"/>
John Kerry	41.00	<input type="text"/>
Jeb Bush	41.00	<input type="text"/>

Home
All Sports
Antepost Dogs
Athletics
Baseball
Basketball
Boxing
Cricket
Darts
Football
World Cup 2006
Gaelic Football
Golf
Greyhounds
Horse Racing
Hurling
Ice Hockey
Motor Racing
Motorbikes
Politics
Rugby League
Rugby Union
Snooker
Specials
Speedway
Tennis
U S Football

You see that the odds that they quote imply that Hilary Clinton is the favorite, followed by John McCain and then John Edwards. Clinton is listed as having a price of 3.00. This means that for every \$1 that you bet on Clinton winning, you will get back \$3 if she does win – but you lose your \$1 if she does not win. If you think that Clinton is virtually certain to win, this is a good bet for you to take on. But if you think that Clinton has no hope of winning, you would not take this bet.

The odds quoted here suggest that it is less likely that McCain or Edwards will win. If McCain wins you would get \$6 for every \$1 bet, compared to \$3 if you bet on Clinton and she won. Similarly, if Condaleeza Rice wins you would get \$15 for every \$1 bet.

You can also see on the left hand side that they offer bets in a wide range of sports, including blockbuster events such as Hurling and Darts! They even have some special events in the entertainment field. Here are the odds that Taylor Hicks and Katherine McPhee will win the *American Idol* competition on TV:

Specials : Outright			
Bet Until : 22:00 23/05/2006			
Competitor	Price	Unit Stake	
Taylor Hicks	1.40	<input type="text"/>	
Katherine Mc Phee	2.75	<input type="text"/>	

Win Only

So Hicks was the favorite a few hours before the show aired. If you bet \$10 on Hicks and he won you would earn \$14.00 in winnings. If you bet \$10 on McPhee and she won you would earn \$27.50. Of course, this final is now over and you probably know that Hicks won, but these were the odds being offered before the show aired. Do you believe that these were good odds to bet on or not? That is what our experiment asks you to decide for several events yet to occur.

Another popular betting site is *CentreBet*, at <http://sports.centrebet.com/>. This is a large betting house based in Australia. Here you can bet on a similar range of sporting events from around the world, as well as some local Australian sports. For example, the screen shot below shows their odds for the round #9 match between Hawthorn and Sydney in the Australian Football League. The odds are \$3.50 for Hawthorn to win and \$1.30 for Sydney to win, each on a wager of \$1. The orange box on the right shows the bet and payout for each outcome.

The screenshot shows the CentreBet website interface. On the left, there's a navigation menu with categories like 'Sports', 'American Football', 'Baseball', 'Basketball', 'Cricket', etc. The main content area is titled 'Place Your Bets' and shows the 'AFL Round 9' match between Hawthorn and Sydney. The odds are listed as 3.50 for Hawthorn and 1.30 for Sydney. A modal window in the center provides details about the fixture, start time, venue, and closing time. On the right, a 'Betting Slip' section shows a 'Single Bet' for Hawthorn with a \$2.00 wager and a \$4.80 payout.

One last example is the *New Zealand TAB* (Totalisater Agency Board), which is in New Zealand of course. Their betting web sit is at <http://www.tab.co.nz/>. They are offering the following odds on a soccer match between the United States and Morocco, a warm-up for the World Cup later this year:

The screenshot shows the New Zealand TAB website. The main content area is titled 'Next Event' and shows the 'Intl Soccer USA V Morocco' match. The odds are listed as 1 for USA at \$1.60, 2 for Morocco at \$5.75, and 3 for Draw at \$3.25. A 'BET AMOUNT (NZ\$)' field is set to 279, and a 'SUBMIT BET >>' button is visible. The website also shows a 'Venue: USA' and 'Closes: 11:00 on 24 May 2006'.

So these odds suggest that the *NZ TAB* believes that the US is more likely to win than Morocco is, and that a draw is more likely than Morocco winning.

As you can see, there are many betting houses around the world. Each one offers odds on a wide range of outcomes, including local events and events in other countries. It is common to see some differences in the odds quoted by different betting houses.

To illustrate, consider bets on which U.S. NBA basketball team is going to win the NBA Championship for 2006. This event attracts odds-makers from many betting houses. The web site <http://www.oddschecker.com/> lists odds for the same event from most of the big online betting houses. Here are the odds being quoted for the top 3 teams. The teams are listed in each row, and each betting house is listed in each column.

We see that there are differences in the odds quoted by different betting houses. For comparability, these odds are all taken for the same day and time: May 24 at 5pm. They are also taken for the same level of wager, shown here as £100 (about \$187), since the odds can vary with the size of the bet. The odds for the Dallas Mavericks range from \$2.49 up to \$3.04 for every \$1 wagered. The odds for the Detroit Pistons range from \$1.98 up to \$2.88 for every \$1 wagered. And the odds for the Miami Heat range from \$3.50 up to \$5.20 for every \$1 wagered.

The screenshot shows the oddschecker.com website interface. The main content area displays 'NBA Championship Odds' for the 2006 season. The odds are presented in a table format, with columns for different betting exchanges and rows for the top three teams: Dallas Mavericks, Detroit Pistons, and Miami Heat. The odds are color-coded: green for 'Odds shortening' and red for 'Odds drifting'. The best odds for each team are highlighted in bold. A disclaimer at the bottom states: 'The betting odds we show come directly from the online bookmakers. Whilst every effort is made to ensure that the betting odds are correct, it is your responsibility to check before you place a bet.'

selections	Show: Best Odds		All Odds		Exchanges																			
	totalbet	bet365	betdirect	betfair	betdaq	mansion	betting	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq	betdaq
Dallas Mavericks	2.5	2.5	2.75	2.63	2.5	2.7	2.49	2.5	2.75	2.63	2.77	3.04	2.78	2.55										
Detroit Pistons	2.75	2.63	2.88	2.75	2.63	2.7	2.65	2.63	2.75	2.63	2.5	2.08	1.98	2.7										
Miami Heat	4.3	4.3	3.5	4	4.3	4	5.2	4.3	3.5	4	4.7	7.5	<6.23	5.3										
Phoenix Suns	9	9	7	7	9	8	10.9	10	8	9	7.6	10	<8.76	11										
each-way terms	1					1																		
1/1						1/1																		

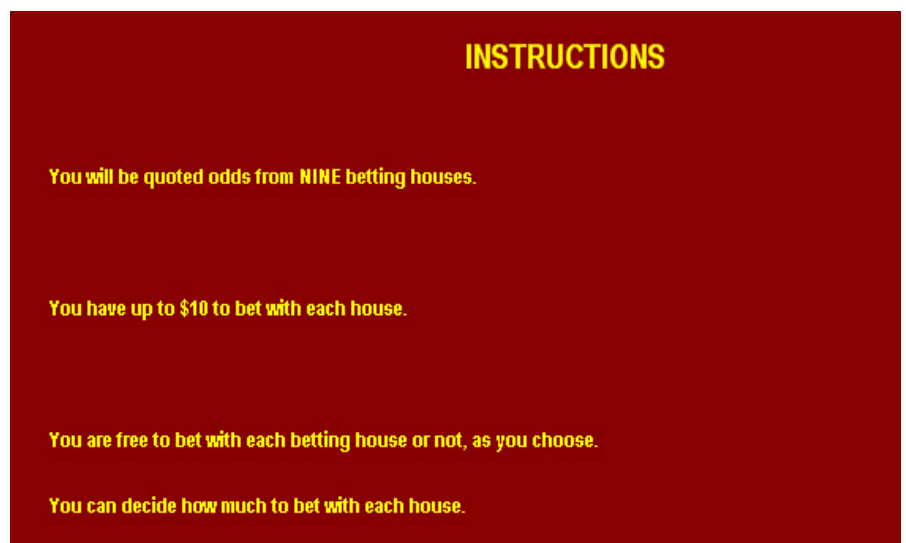
Lets go through an example of the betting tasks we will ask you to do. These are patterned after the display shown above for the *NZ TAB*. All of the screen shots below were taken from the betting screens you will use. The choices were ones we made just to illustrate. Your computer will provide better screen shots that are easier to read.

Our betting tasks will differ in several ways:

- **First**, we will provide you with odds from several betting houses. There may just be one betting house, or there may be several. Think of these as just alternative places you can place your bet. You need to decide what to bet for each betting house.
- **Second**, you will have a stake of \$10 to bet with for each betting house. In some cases you will have to use the whole \$10 to place a bet. In other cases you can decide what fraction of the \$10 to bet, or bet none of it. The computer will tell you which case applies to you today. You cannot use your stake in one betting house and apply it to a bet in another betting house.
- **Third**, if there are several betting houses offering you odds, we will pick one of them to actually pay you. You will be asked to “place your bets,” or “not bet,” for each house. Then we will pause and come over and you can roll a die to decide which betting house we will actually use.
- **Finally**, all payments will be made on a date specified on the betting screen. Some events are over in a few weeks, and some are over in a few months. You will then be paid all earnings, including any money you decide not to bet (if you have that choice).

Here is the opening page, telling you the setup for your choices. This setup will apply to all of your choices today. **The information on your screen may differ from this display, so be sure to read it before making any choices.**

In this case you are told that you will be quoted odds from 9 betting houses. You have a \$10 stake for each betting house, and you can decide how much to bet for each house. Click on Begin, in the bottom of the screen (not shown below) to start...



INSTRUCTIONS

You will be quoted odds from **NINE** betting houses.

You have up to **\$10** to bet with each house.

You are free to bet with each betting house or not, as you choose.

You can decide how much to bet with each house.

To illustrate we will use the USA versus Morocco soccer match as an example. The event that you will be asked to bet on will be whether the USA wins or not. Note that you are betting either that the USA wins or that the USA does not win. Thus, if there is a draw, that is the same as the USA not winning. This screen provides you with the betting form you will use...

USA versus Morocco in World Cup soccer warm-up
USA Wins
Game is on May 23, 2006
Payments made May 24, 2006

Stake you have to bet with

10	10	10	10	10	10	10	10	10	10
----	----	----	----	----	----	----	----	----	----

BET AMOUNT IN US \$

<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	Submit Bets
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------	-------------

USA Wins	<input type="radio"/> \$10 0.1	<input type="radio"/> \$5 0.2	<input type="radio"/> \$3.33 0.3	<input type="radio"/> \$2.5 0.4	<input type="radio"/> \$2 0.5	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.11 0.9	Odds by house Probability by house
USA Does Not Win	<input type="radio"/> \$1.11 0.9	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$2 0.5	<input type="radio"/> \$2.5 0.4	<input type="radio"/> \$3.33 0.3	<input type="radio"/> \$5 0.2	<input type="radio"/> \$10 0.1	Odds by house Probability by house

Net winnings if USA Wins

Net winnings if USA Does Not Win

Bets in US dollars

On this screen you will first see the **event** listed in the top left hand corner. We also list **the bet**, in this case that the USA wins. In the top right hand corner you see when the event is to occur, and when we would pay out any earnings. We will obtain an address and/or e-mail contact for you at the end of the experiment, so that we can send you a check for your earnings. Of course, you will receive all other earnings from today's session in cash, paid out at the end of the session.

You will next see the **stake** amounts you can bet at each of the 9 betting houses. You choose how much to bet, or if you prefer not to bet at all. Then you choose whether you want to bet on USA winning or on USA not winning.

You will see that each betting house offers different **odds**. The first betting house, for example, pays \$10 for every \$1 that you bet on the USA winning, if in fact the USA wins, or \$1.11 for every \$1 that you bet on the USA not winning.

Beside each set of **odds**, we also display the **probability** that each event will occur. This is just another way of thinking about the odds. Some people understand odds better, and some people understand probabilities better. The probabilities are just the inverse of the odds. So if the odds say that you will be paid \$5 for every \$1 bet if the USA wins, as in betting house 2, then this implies a probability for the USA winning of $\$1 \div \$5 = 0.2$. This is the same things as there being a 20% chance of the USA winning. We have rounded some of the probabilities to make the screen easier to read, and you will be paid according to the odds.

Here is an example of how you place a bet, using betting house 1. In this case we chose to bet all of the \$10 stake, and we bet that the USA would win. The betting screen then tells us what our net winnings would be if either outcome occurs. If the USA wins we get \$10 for every \$1 we bet, and we bet \$10, so we earn \$100. But that cost us our \$10 bet, so the net winnings in this case are \$90. But if the USA does not win, we lose our \$10 bet.

In this case we would place this bet if we were confident that the USA has a better chance of winning than the 10% implied by the odds that this betting house is quoting. If we thought that the USA had less than a 10% chance of winning, we could (a) bet \$10 that the USA does not win, (b) bet nothing, or (c) bet something between \$1 and \$10 that the USA does not win.

Stake you have to bet with		10
BET AMOUNT IN US \$		10
USA Wins	<input checked="" type="radio"/> \$10	0.1
USA Does Not Win	<input type="radio"/> \$1.11	0.9

Net winnings if USA Wins	90
Net winnings if USA Does Not Win	-10

In the screen below we have filled in bets for every one of the 9 betting houses, to illustrate how you fill in the complete sheet. You do not have to place the same bet for every betting house, or bet the same amount:

USA versus Morocco in World Cup soccer warm-up
USA Wins Game is on May 23, 2006
Payments made May 24, 2006

Stake you have to bet with	10	10	10	10	10	10	10	10	10
BET AMOUNT IN US \$	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="0"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="10"/>
Submit Bets									

USA Wins	<input checked="" type="radio"/> \$10 0.1	<input checked="" type="radio"/> \$5 0.2	<input checked="" type="radio"/> \$3.33 0.3	<input checked="" type="radio"/> \$2.5 0.4	<input checked="" type="radio"/> \$2 0.5	<input checked="" type="radio"/> \$1.67 0.6	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.11 0.9	Odds by house Probability by house
USA Does Not Win	<input type="radio"/> \$1.11 0.9	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$2 0.5	<input type="radio"/> \$2.5 0.4	<input checked="" type="radio"/> \$3.33 0.3	<input checked="" type="radio"/> \$5 0.2	<input checked="" type="radio"/> \$10 0.1	Odds by house Probability by house

Net winnings if USA Wins	90	40	23.33	15	10	0	-10	-10	-10
Net winnings if USA Does Not Win	-10	-10	-10	-10	-10	0	23.33	40	90

If we wanted to bet less than \$10 for any betting house, we simply click on the amount we want to bet. The display changes to show the change in net winnings. In this case we bet \$5 with one betting house, \$0 with another, \$3 with another, and \$10 with the remaining houses.

10	10	10	10	10
<input type="text" value="10"/>	<input type="text" value="5"/>	<input type="text" value="0"/>	<input type="text" value="3"/>	<input type="text" value="10"/>

<input checked="" type="radio"/> \$2.5 0.4	<input checked="" type="radio"/> \$2 0.5	<input checked="" type="radio"/> \$1.67 0.6	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.25 0.8
<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$2 0.5	<input type="radio"/> \$2.5 0.4	<input checked="" type="radio"/> \$3.33 0.3	<input checked="" type="radio"/> \$5 0.2

15	5	0	-3	-10
-10	-5	0	7	40

USA versus Morocco in World Cup soccer warm-up
USA Wins

Game is on May 23, 2006
Payments made May 24, 2006

Stake you have to bet with: 10 10 10 10 10 10 10 10 10

BET AMOUNT IN US \$: 10 10 10 10 5 0 3 10 10 **Submit Bets**

USA Wins	<input checked="" type="radio"/> \$10 0.1	<input type="radio"/> \$5 0.2	<input type="radio"/> \$3.33 0.3	<input type="radio"/> \$2.5 0.4	<input type="radio"/> \$2 0.5	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.11 0.9	Odds by house Probability by house
USA Does Not Win	<input type="radio"/> \$1.11 0.9	<input type="radio"/> \$1.25 0.8	<input type="radio"/> \$1.43 0.7	<input type="radio"/> \$1.67 0.6	<input type="radio"/> \$2 0.5	<input type="radio"/> \$2.5 0.4	<input checked="" type="radio"/> \$3.33 0.3	<input checked="" type="radio"/> \$5 0.2	<input checked="" type="radio"/> \$10 0.1	Odds by house Probability by house

Net winnings if USA Wins: 90 40 -10 -10 -5 0 7 -10 -10

Net winnings if USA Does Not Win: -10 -10 -10 -10 -10 -5 0 7 40 90

Please signal the experimenter to come over and select your bet.

OK Cancel

When you have entered all of your bets, and you are happy with your choices, you click on the green SUBMIT BETS tab, and you will be asked to signal the experimenter to come over. We will then roll a die to determine which betting house you will actually place your bet with.

Betting

Please enter the selected bookie as number

OK Cancel

After you click OK, a special box will come up which the experimenter uses to unlock the screen with a super-secret password. Please do not type anything here. The experimenter will do that when he or she comes over.

Betting

Please wait until the experimenter comes to enter a password to continue

OK Cancel

The experimenter will then have you roll a die to determine the betting house you will place your bet with. The experimenter will enter this, and then another password.

In this case we selected betting house 8, so the screen displays that bet. This information will then be recorded on your payment sheet.

USA versus Morocco in World Cup soccer warm-up
USA Wins Game is on May 23, 2006
Payments made May 24, 2006

Stake you have to bet with	10	10	10	10	10	10	10	10	10
BET AMOUNT IN US \$	10	10	10	10	5	0	3	10	10

Submit Bets

USA Wins	<input type="radio"/> \$1.25 0.8	Odds by house Probability by house
USA Does Not Win	<input checked="" type="radio"/> \$5 0.2	Odds by house Probability by house

Please wait until your bets have been recorded on your payment sheet

Net winnings if USA Wins	-10
Net winnings if USA Does Not Win	40

You will be asked to place bets on several events. When you finish one event you will be given a new betting sheet for the other event. In a moment we will provide you with a sheet listing the events that you will be asked to place bets on.

Remember that we will pay you all earnings from these bets on the dates specified. We will also then pay you any money that you choose not to wager, if you have that option.

At the very end we will have a series of questions about you. Your responses will be confidential, and will not be connected with your name or any other identifying ID such as a SSN.

There are no right or wrong choices. Which choices you make depends on your personal preferences and your beliefs about what the chances are that each event will actually occur. The people next to you will have different tasks, and may have different preferences or beliefs, so their responses should not matter to you. Nor do their choices affect your earnings in any way. Please work silently, and make your choices by thinking carefully about the odds being offered in relation to how likely you believe each outcome is.

Do you have any questions?