An Experimental Study Of Uncertainty In Coordination Games

Appendix For Online Publication

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1 A Statistical Procedure for Assessing the Closeness of the Empirical and Theoretical Distributions in Binary Games

1.1 The Problem

Consider games where each player chooses between two actions, and where a Nash equilibrium is of the form that all players choose the same action; we call these *Binary games*. The two actions can be thought of, without loss of generality, as actions $a = 1$ and $a = 0$. *To fix ideas, we will refer to* $a = 1$ *as "register" and to* $a = 0$ *as "do not register," and suppose that the equilibrium we are interested in has all players choosing* $a = 0$ *(i.e. not registering).* When such games/predictions are taken to the lab, it is often the case that some subjects choose to register. One would want to be able to investigate whether such behavior is consistent with the theoretical prediction. However, hypothesis testing cannot be used when the H_0 is that the number of total registrations follows a distribution that puts all probability on just one realization, because a single data point, which is inconsistent with the H_0 (and hence carries zero probability of occurrence under the H_0) would be sufficient to reject the latter for any (positive) level of significance.

We develop a procedure to investigate whether behavior in the lab is *close* (in a sense defined shortly) to the theoretical prediction for Binary games. The starting position is that subjects' behavior in the lab may also be driven by various unobservable characteristics, such as short attention spans, random distractions etc. As a result, a sample may be "infected" by erred (i.e. inconsistent with game-theoretic predictions) behavior. To capture this, we assume that the "behavioral error" is an iid random variable, which captures the probability with which the typical subject will take - for reasons "outside the theoretical model" - an action that is not predicted by the use of game-theoretic arguments in the Binary game under scrutiny. We then develop a procedure, using the total number of registrations as a statistic, by assuming that the behavioral error is a Beta random variable.

1.2 The Statistical Procedure

We postulate that the total number of registrations is a random variable $Z \sim Bin(N, \pi)$, where $Bin(N, \pi)$ is the binomial distribution with size parameter N (the number of independent trials/players) and "success probability" π. This probability captures the likelihood

of occurence of the behavioral error that leads subjects to register. Importantly, we assume that $\pi \sim Beta(a,b)$ for some exogenously given scalars $a \geq 1, b > 1$. That is, we model the iid (behavioral) error $\pi \in [0,1]$ as a Beta random variable,[1] with a "bell-shaped" or strictly decreasing pdf and mode at $\frac{a-1}{a+b-2}$.[2] The mean error is $\frac{a}{a+b}$, while the error's variance is $\frac{\frac{a}{a+b}(1-\frac{a}{a+b})}{a+b+1}$. We note that the case where subjects make an error with an infinitesimal probability (thus approximating the game-theoretic prediction) is captured by $\frac{a}{a+b} \to 0$ (i.e. $b/a \to \infty$).

To investigate whether behavior in the lab is "close" to the game-theoretic prediction of a total of zero registrations, and get a sense of how close it is, we will examine whether behavior in the lab is consistent with the H_0 that $Z \sim Bin(N,\pi)$ with $\pi \sim Beta(a,b)$ for predetermined values of $a \geq 1, b > 1$, paying particular attention to determining the set of values of (a,b) for which the H_0 is rejected. The latter is particularly useful when one would like to compare how close the empirical distribution to the theoretical prediction is of alternative treatments for the same Binary game. In that case, one could simply compare the sets of values of (a,b) for which the H_0 is rejected in the treatments under scrutiny. In fact, as we show next, such a procedure amounts to simply comparing the observed total registrations (and an associated critical value of the mean error) between treatments.

To summarise behavior in the lab and conduct our statistical procedure, we will use the total number of observed registrations Z as our statistic. We therefore need to derive the probability distribution of our statistic under the above H_0. We will derive it first in terms of its characteristic function $\varphi_Z(z)$. We do so next.

Let Y_j $(j = 1, ..., N)$ be a Bernoulli random variable with success probability $\pi \sim Beta(a,b)$. This random variable describes behavior of any subject j. We thus have that $Z = \sum_{j=1}^{N} Y_j$, and thereby:

$$\varphi_Z(z) = \varphi_{Y_j}^N(z) = \Big(\mathbb{E}(e^{izY_j})\Big)^N = \Big(\mathbb{E}_\pi(\mathbb{E}_{Y_i}(e^{izY_j}|\pi))\Big)^N = \Big(\mathbb{E}_\pi(e^{iz}\pi + (1-\pi))\Big)^N,$$

where i denotes the imaginary unit. Thus, we have that

$$\varphi_Z(z) = \Big(1 - (1-e^{iz})\frac{a}{a+b}\Big)^N,$$

which implies that the probability distribution function of the statistic under the H_0 is

[1] Conveniently, the $Beta(\cdot,\cdot)$ is defined on the interval $[0,1]$, hence can be used to describe the distribution of a probability value.

[2] These restrictions are present *only* to capture our interpretation of π as an error which is likely to be small. They thus assume away cases where its pdf is strictly increasing (the case of $b = 1$) or is not uni-modal (the case of $a, b < 1$).

$Bin(N, \frac{a}{a+b})$.

Denoting with $p(z, \frac{a}{a+b})$ the p-value that corresponds to the realization z of the statistic, it follows that the H_0 is rejected given a realization z of the statistic and a level of significance $\alpha \in (0,1)$ if

$$p(z; \frac{a}{a+b}) := \sum_{j=z}^{N} \binom{N}{j} (\frac{a}{a+b})^j (\frac{b}{a+b})^{N-j} < \alpha. \tag{1}$$

We know that $p(0; \pi) = 1$ for all $\pi \in [0,1]$. We thus have that the H_0 cannot be rejected following a realization $z = 0$ of the statistic for any mean error $\frac{a}{a+b}$. Turning to the case of a realization $z > 0$ of the statistic, the level of the mean error plays a key role in rejecting or not the H_0. Given the interpretation of π as a behavioral error, it might be natural to expect that it is small. Therefore, if there is prior information as to what constitutes a "small (mean) error", one can use directly the above rule to reject or not the H_0 following a realization $z > 0$ of the statistic, given the size of the data N and the level of significance α.

However, the actual choice of the mean error may, in general, be arbitrary. Motivated by this, we now ask the alternative question of *how big is the range of values of the mean error for which a given realization $z > 0$ of the statistic would lead to a rejection of the H_0.* We know that $p(z; \pi)$ is increasing in π for all $z \in \{1, ..., N\}$, with $p(z; 1) = 1$ and $p(z; 0) = 0$. Therefore, there is a critical threshold for the mean error below which the H_0 is rejected, whereas for all (weakly) higher mean errors the H_0 is not rejected. This threshold mean, denoted hereafter by $\underline{\pi}(z)$, is in $(0,1)$ and given implicitly by

$$\sum_{j=z}^{N} \binom{N}{j} (\underline{\pi}(z))^j (1 - \underline{\pi}(z))^{N-j} = \alpha. \tag{2}$$

Obviously, this threshold mean depends also on N and α, but we suppress this dependence (whenever there is no risk of confusion) for notational simplicity. This threshold summarizes naturally how "close" to the game-theoretic prediction behavior in the lab is; specifically, the lower the threshold mean error, the closer it is, because the interval of mean errors for which the H_0 is rejected is smaller.

We can use the above "characterization" of how close behavior in the lab is to the game-theoretic predictions - as summarised by a realization $z > 0$ of our statistic - to compare alternative theories regarding their performance in the lab. The staring point is to note that $p(z, \pi)$ is decreasing in z for all $\pi \in (0,1)$. Consequently, we also have that $\underline{\pi}(z)$ is increasing in z. It follows that the smaller the realization $z > 0$ of the statistic, the closer the observed behavior is to the game-theoretic prediction. Therefore, if one wishes to compare the empirical distributions of two alternative treatments (that both predict a total

of zero registrations in the equilibrium), while keeping N and α the same across treatments, then one could argue that the theory that is "closer" to the observed behavior is the one with the **lower** realization of the statistic; this is because, the lower the realization of the statistic, the "less often" the above H_0 will be rejected.

2 Limited Depth of Reasoning in Coordination Games

2.1 The Problem

Consider a Coordination game between N players, when the profitability state is given by Y, the cost of registering to buy the cash amount ("registration fee") is $T > 0$, the cash award gross of the fee is given by $b(Y) > 0$, and the threshold size for the cash amount to be awarded is given by $\alpha(Y) > 0$. In the experiments, we set $b(Y) = Y/2$, but our theoretical analysis holds whenever b is an increasing function. Assume that α is a decreasing function. We assume that $Y \in \{Y_{min}, Y_{min}+1, ..., Y_{max}-1, Y_{max}\}$ and $x \in \{x_{min}, x_{min}+1, ..., x_{max}-1, x_{max}\}$. Assume that indifferent players choose to abstain from registering to buy the cash amount. In what follows, we distinguish between two cases regarding agents' information about economic fundamentals Y and the number of players N, captured by the Global and Poisson games.

In Global games, the number (and identity) of players in the game N is common knowledge and players receive private identically distributed and conditionally independent signals/hints about the unknown state of economic fundamentals Y. The set of signals is $\{x_{min}, x_{min}+1, ..., x_{max}-1, x_{max}\}$ and we denote a generic element of this with x or y. Denote the conditional probability distribution of the signal of a player with $\Pr(x|Y)$. Let also $\Pr(Y|y)$ be the posterior belief of a player with signal y over the state of economic fundamentals Y. We will say that a distribution f first-order stochastically dominates distribution f' if the cumulative of f is (weakly) lower than the cumulative of f'. We assume:

A1: $\Pr(\cdot|y')$ first-order stochastically dominates $\Pr(\cdot|y)$ for all $y' > y$.

A2: $\Pr(\cdot|Y')$ first-order stochastically dominates $\Pr(\cdot|Y)$ for all $Y' > Y$.

A1 says that the higher the received signal is, the more likely it is that the economic fundamentals are high. A2 says that the higher the state of economic fundamentals, the more likely it is that the signals received by the players are high.

Observe that from the point of view of a player with signal y who registers, the number of other players registering when all other players are expected to register if their signal is higher than x, and the economic fundamentals are Y, is a binomial random variable with size parameter $N-1$ and "success probability" $\sum_{\tilde{x}=x+1}^{x_{max}} \Pr(\tilde{x}|Y)$. An important object of our analysis is the probability attached by a player with signal y who registers on the event that the threshold is met, when all other players are expected to register if their signal is

higher than x, and the economic fundamentals are Y. This probability is given by

$$G(Y,x) := \sum_{\tau=\lceil \alpha(Y) \rceil -1}^{N-1} \binom{N-1}{\tau} \Big(\sum_{\tilde{x}=x+1}^{x_{max}} \Pr(\tilde{x}|Y) \Big)^{\tau} \Big(1 - \sum_{\tilde{x}=x+1}^{x_{max}} \Pr(\tilde{x}|Y) \Big)^{N-1-\tau},$$

where the symbolic function $\lceil \cdot \rceil$ rounds-up the fraction to the nearest integer from above. Note that a binomial distribution with some parameters first-order stochastically dominates a binomial distribution with lower parameters. Given A2, we then have that:

Lemma: $G(Y,x)$ is non-decreasing in Y, and non-increasing in x.

In the Poisson games, economic fundamentals are common knowledge, whereas it is commonly understood that the number of actual players in the game is a Poisson random variable with mean n. In Poisson games, the only signal players receive reveals to them whether they are active players in the game. Let $F(\cdot \mid n)$ denote the Poisson cumulative distribution function with parameter n. It is straightforward to see that if $Y \leq 2T$, then it is never profitable to register. Moreover, if $Y \geq \overline{Y}$, then a single registration is enough for the cash amount to be awarded, and so every player finds it optimal to register. If, on the other hand, $2T < Y < \overline{Y}$, then all players in the game abstaining is an equilibrium regardless of the realized number of other players. If, however, the typical other player in the game registers with some strictly positive probability, then beliefs about the number of other players is important for decisions. According to the "environmental equivalence" property, shown in Myerson (1998), from the point of view of a player who has found himself in the game, the number of other players is a Poisson random variable with the mean number be equal to the mean number of players from the point of view of an outsider (or a potential player); that is n. It follows that if all other players in the game register, $F(\nu|n)$ is the probability from the point of view of a player in the game that there will be ν registrations from the other players in the game.

2.2 The Level-k Types

Each player is one of $K+1$ types, $k = 0, 1, ..., K$. Namely, each player can be of an "L_k" type of bounded depth of reasoning with $k = 0, ..., K$ capturing the depth of reasoning. Players of "level-0" (i.e. L_0) type are not strategic. Each player of "level-1" (i.e. L_1) type believes that all other players are of L_0 type and the number of other players who register is given by a distribution $Q(l|N^-)$ over $l = 0, ..., N^-$, when N^- is the number of other players. L_2 types believe that all other players are of L_1 type, and so on and so forth. We further assume that

A3: $\sum_{l=\tilde{l}}^{N^-} Q(l|N^-)$ is non-decreasing in N^-, for all $\tilde{l} = 0, ..., N^-$.

That is, in bigger groups, L_1 types put (weakly) more probability on higher realizations of the number of other players who register.

In what follows, we will make extensive use of the fact that if the distribution of some random variable satisfied the first-order stochastic dominance property with respect to some parameter of the distribution, then the mean of any non-decreasing function of the random variable in question is non-decreasing in that parameter.

2.3 Optimal Decisions

We now study the decisions of each type $k \geq 1$. We start with Global games.

2.3.1 Global games

From the point of view of L_1 types who register, and believe that l other players will also register and that the profitability fundamental is Y, the threshold for the cash award will be met if $l + 1 \geq \alpha(Y)$. Thus, every player of L_1 type with signal x chooses to register if and only if

$$\sum_{Y=Y_{min}}^{Y_{max}} \sum_{l=\lceil \alpha(Y) \rceil - 1}^{N-1} \Pr(Y|x) Q(l|N-1) b(Y) > T.$$

If $\sum_{Y=Y_{min}}^{Y_{max}} \sum_{l=\lceil \alpha(Y) \rceil - 1}^{N-1} \Pr(Y|x) Q(l|N-1) b(Y)$ is non-decreasing in x, then the above rule reduces to a threshold strategy: the typical L_1 player with signal x registers if and only if $x > x^1$, where x^1 is a real number. Of course, under a threshold strategy, if $x^1 < x_{min}$ then all L_1 players would register while if $x^1 \geq x_{max}$ then all L_1 players would forego registering. Observe that the monotonicity properties of α and b, and assumption A3, imply that $b(Y) \sum_{l=\lceil \alpha(Y) \rceil - 1}^{N-1} Q(l|N-1)$ is non-decreasing in Y. Assumption A1 then implies that L_1 types deploy a threshold strategy defined as above.

Given the above threshold strategy for L_1 types, we have that L_2 types believe that every other player registers if and only if their signal is above x^1. Thus, from the point of view of an L_2 type with signal y, and for any given Y and N, the number of other players who register is a binomial random variable with size parameter $N - 1$ and "success probability" $\sum_{\tilde{x}=x^1+1}^{x_{max}} \Pr(\tilde{x}|Y)$. We then have that every player of type L_2 with signal x chooses to register

if and only if

$$\sum_{Y=Y_{min}}^{Y_{max}} \Pr(Y|x)G(Y,x^1)b(Y) > T.$$

As above, if the left-hand-side of the above inequality is non-decreasing in x, then, the above rule reduces to a threshold strategy: the L_2 player with signal x registers if and only if $x > x^2$, where x^2 is a real number. Observe that the monotonicity property of b and the above Lemma imply that $G(Y,x^1)b(Y)$ is non-decreasing in Y and x. Assumption A1 then implies that L_2 types deploy a threshold strategy defined as above. In a similar (recursive) manner we can find the threshold strategies of all $L_k, k > 2$ types. We then have the following result:

Proposition 1 *If, in addition to A1-A3,*

$$G(Y,x^1) \leq \sum_{\tau=\lceil \alpha(Y) \rceil -1}^{N-1} Q(\tau|N-1)$$

for all Y and N, then, the threshold signals (weakly) increase with the $k \geq 1$: $x^1 \leq x^2 \leq ... \leq x^K$.

Proof. The result follows by using induction on $k \geq 1$ and the first-order stochastic dominance properties of the binomial distribution. In more detail, we have that $x^2 \geq x^1$ directly from the inequality in the statement of the proposition. Fix now any $k > 1$. By the induction step, we have $x^k \geq x^{k-1}$. Recall from the above Lemma that $G(Y,x)$ is non-increasing in x. This and the definition of threshold signals imply directly that $x^{k+1} \geq x^k$. ■

Note that the assumed inequality in the statement says, in effect, that L_1 types place (weakly) higher probability on the cash amount awarded than L_2 types. Crucially, this property does not depend on the (joint) distribution of fundamentals; it only depends on the assumed $Q(\cdot|N^-)$ and the signal structure $\Pr(\cdot|Y)$.

We now turn to Poisson games.

2.3.2 Poisson games

Given our earlier discussion of incentives in Poisson games, we restrict attention to the case of $2T < Y < \overline{Y}$.

From the point of view of L_1 types who register, and believe that l out of N^- other players will also register and that the profitability fundamental is Y, the threshold for the

cash award will be met if $l+1 \geq \alpha(Y)$. Thus, every player of L_1 type with signal x chooses to register if and only if

$$\sum_{N^-=0}^{\infty} \sum_{l=\lceil \alpha(Y) \rceil - 1}^{N^-} F(N^-|n) Q(l|N^-) b(Y) > T.$$

If $\sum_{N^-=0}^{\infty} \sum_{l=\lceil \alpha(Y) \rceil - 1}^{N^-} F(N^-|n) Q(l|N^-) b(Y)$ is non-decreasing in n, then the above rule states, in effect, that the typical L_1 player will not register if and only if $n \leq n^1$, where n^1 is defined as the highest integer for which the above inequality does not hold. Observe that the monotonicity properties of α and b, and assumption A3, imply that $b(Y) \sum_{l=\lceil \alpha(Y) \rceil - 1}^{N^-} Q(l|N^-)$ is non-decreasing in N^-. The fact that $F(\cdot|n')$ first-order stochastically dominates $F(\cdot|n)$ for all $n' > n$, then implies that L_1 types will not register if and only if $n \leq n^1$.

Given the above strategy for L_1 types, we have that L_2 types believe that every other player registers if and only if n is above n^1. Thus, from the point of view of an L_2 type, if $n \leq n^1$ it is not optimal to register, whereas if $n > n^1$ then registering is optimal if and only if

$$\sum_{\nu=\lceil \alpha(Y) \rceil - 1}^{\infty} F(\nu|n) b(Y) > T. \qquad (\star)$$

Observe that the left-hand-side of the above inequality is non-decreasing in n, and so the above rule states, in effect, that the typical L_2 player will not register if and only if $n \leq \hat{n}^2$, where $\hat{n}^2$ is defined as the highest integer for which the above inequality does not hold. Summarizing, we have that L_2 players will not register if and only if either $n \leq n^1$ or $\hat{n}^2 \geq n > n^1$. Equivalently, L_2 players will not register if and only if either $n \leq n^2$, where $n^2 := \max\{n^1, \hat{n}^2\}$. Note that $n^2 \geq n^1$. Proceeding recursively to higher L_k types, noting that the inequality ($\star$) does not depend on k, and recalling the above definition of n^2, we have that $L_k, k \geq 2$, players will not register if and only if $n \leq n^2$.

Observe now that the above inequality is the complementary of (1) in the main text. Thus, if $n^1 \leq n^2$, we have that the behavior of L_k types with $k \geq 2$ is the same as the "equilibrium behavior" discussed in Section 3.

3 Experimental Design

3.1 Experimental Instructions

3.1.1 CK169

[Size=17, Threshold=16, Fee=£9, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **two** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
17 subjects participate in this experiment including yourself. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £9, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 16 subjects registers to buy them.

2. The £9 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £9 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the minimum of 16 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3). Thus, in total you will be paid £15.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 16 subjects is not reached, your payoff is: a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

3.1.2 CK1510

[Size=17, Threshold=15, Fee=£10, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **two** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
17 subjects participate in this experiment including yourself. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £10, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 15 subjects registers to buy them.

2. The £10 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £10 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the minimum of 15 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2). Thus, in total you will be paid £14.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 15 subjects is not reached, your payoff is: a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

3.1.3 P169

[Mean Size=17, Threshold=16, Fee=£9, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **three** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

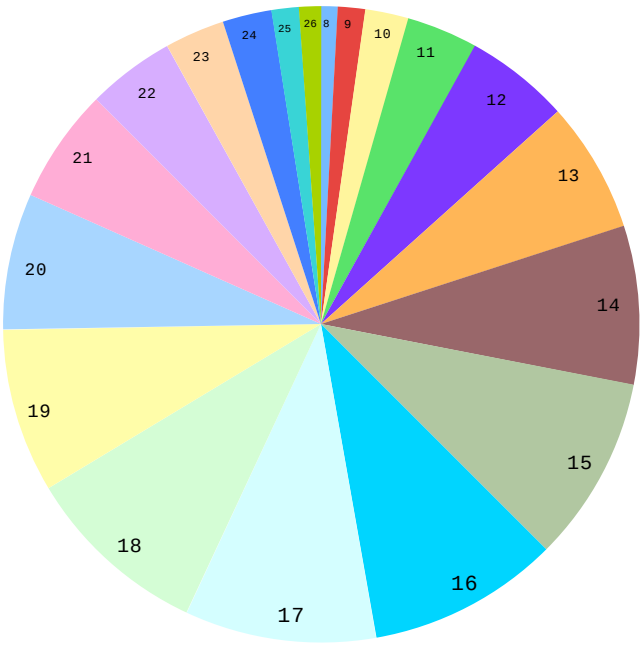
Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
In this part of the experiment, there will be a computer draw. **The number drawn corresponds to the number of subjects that will participate in Part 2. The number drawn will NOT be revealed to you.** Furthermore, it is possible that you will not participate in Part 2 of the experiment.

It is useful to know how the computer will determine the number of subjects that will participate in Part 2. The best way to understand the draw is to imagine that the number will be determined by the outcome of a roulette game as the one shown below. You can see that the roulette is not a standard roulette; the number drawn can be any number between 8 and 26, but not all numbers are equally likely to be drawn. Numbers closer to 17 (the mean) are more likely to be drawn.

Once the number is drawn, the computer will randomly select as many subjects as the number drawn. Thus, it is possible that you will not be selected for Part 2.

- If you are not selected for Part 2, then the experiment will end for you.
- If you are selected for Part 2, you will be directed to the next screen titled Part 2.



Part 2

You have been selected to participate in Part 2. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £9, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 16 subjects registers to buy them.

2. The £9 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £9 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the minimum of 16 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3). Thus, in total you will be paid £15.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 16 subjects is not reached, your payoff is: a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

3.1.4 P1510

[Mean Size=17, Threshold=15, Fee=£10, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **three** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

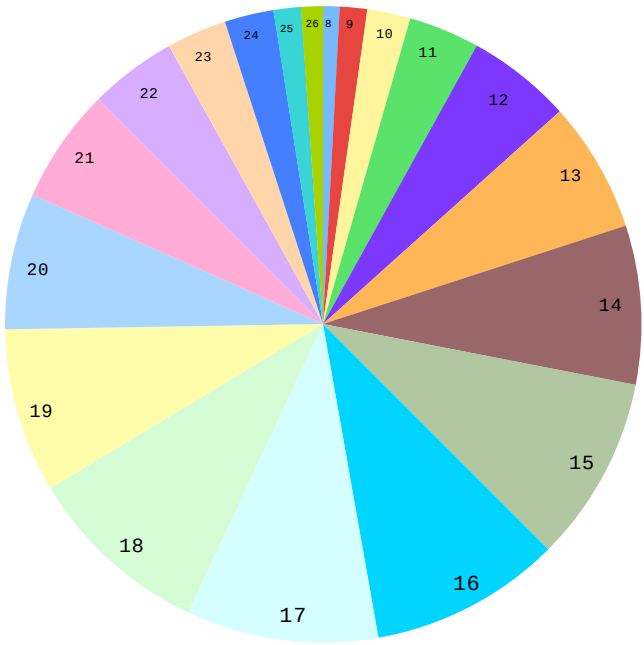
Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
In this part of the experiment, there will be a computer draw. **The number drawn corresponds to the number of subjects that will participate in Part 2. The number drawn will NOT be revealed to you.** Furthermore, it is possible that you will not participate in Part 2 of the experiment.

It is useful to know how the computer will determine the number of subjects that will participate in Part 2. The best way to understand the draw is to imagine that the number will be determined by the outcome of a roulette game as the one shown below. You can see that the roulette is not a standard roulette; the number drawn can be any number between 8 and 26, but not all numbers are equally likely to be drawn. Numbers closer to 17 (the mean) are more likely to be drawn.

Once the number is drawn, the computer will randomly select as many subjects as the number drawn. Thus, it is possible that you will not be selected for Part 2.

- If you are not selected for Part 2, then the experiment will end for you.
- If you are selected for Part 2, you will be directed to the next screen titled Part 2.



Part 2

You have been selected to participate in Part 2. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £10, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 15 subjects registers to buy them.

2. The £10 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £10 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the minimum of 15 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2). Thus, in total you will be paid £14.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 15 subjects is not reached, your payoff is: a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

3.1.5 G169

[Size=17, Threshold=16, Fee=£9, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **three** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
In this part of the experiment, there will be a computer draw. The number drawn will be used in Part 2, and is referred to as Y.

Y can be any integer between 5 and 95 where each integer is equally likely to be drawn. The number Y drawn is the same for all participants. Yet, the number Y will NOT be revealed to you at any point in time.

However, each subject will receive a **hint** for the number Y drawn. The hint will be an integer within a range of -5 and +5 from the Y drawn, where each integer has exactly the same probability of being drawn. That is, if Y is 28, then the hint can be one of integers 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 and 33 where each integer has a probability of $\frac{1}{11}$ of being drawn. Some participants might receive as a hint 23, others 24, others 25, others 26, others 27, others 28, others 29, others 30, others 31, others 32 and others 33. Thus, each participant will receive one hint integer which may be different or the same from the hint integer received by other participants.

Please note that the hint integer you will receive next in Part 2, will provide you with information about Y, even though Y will not be revealed to you. If for example, your hint integer is 22, then Y can be either 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 or 27. If for example, your hint integer is 90, then Y can be either 85, 86, 87, 88, 89, 90, 91, 92, 93, 94 or 95. If your hint integer is 48, then Y can be either 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, or 53.

You will be directed next to the screen titled Part 2 where you will be indicated your hint integer as well as provided with more information about the decision task.

Part 2

Your hint integer about the drawn Y in Part 1 is 25.

17 subjects participate in this experiment including yourself. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £$\frac{Y}{2}$ at a reduced price of £9, conditional on these terms:

1. The cash amount of £$\frac{Y}{2}$ will be issued **only** if at least $22 - \frac{Y}{4}$ subjects register to buy them. Therefore, the cash amount of £$\frac{Y}{2}$ will be issued if one of the following is satisfied:

    - when the Y drawn is in the interval of 5 to 7 inclusive and 21 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 8 to 11 inclusive and 20 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 12 to 15 inclusive and 19 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 16 to 19 inclusive and 18 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 20 to 23 inclusive and 17 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 24 to 27 inclusive and 16 subjects register to buy the cash amount.

- when the Y drawn is in the interval of 28 to 31 inclusive and 15 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 32 to 35 inclusive and 14 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 36 to 39 inclusive and 13 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 40 to 43 inclusive and 12 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 44 to 47 inclusive and 11 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 48 to 51 inclusive and 10 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 52 to 55 inclusive and 9 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 56 to 59 inclusive and 8 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 60 to 63 inclusive and 7 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 64 to 67 inclusive and 6 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 68 to 71 inclusive and 5 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 72 to 75 inclusive and 4 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 76 to 79 inclusive and 3 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 80 to 83 inclusive and 2 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 84 to 95 inclusive and 1 subject registers to buy the cash amount.

2. The £9 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £$\frac{Y}{2}$, then the £9 will be subtracted

automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £$\frac{Y}{2}$), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £$\frac{Y}{2}$ and at least $22 - \frac{Y}{4}$ subjects register to buy the cash amount of £$\frac{Y}{2}$, your payoff is: the cash amount of £$\frac{Y}{2}$ as well as a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3). Thus, in total you will be paid £$\frac{Y}{2}$ + £3.

- Scenario 3

  If you register to buy the £$\frac{Y}{2}$ cash amount and fewer than $22 - \frac{Y}{4}$ subjects register to buy the cash amount of £$\frac{Y}{2}$, your payoff is: a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3).

Please indicate whether you would like to register to buy the £$\frac{Y}{2}$ cash amount.

If you tick the statement, you indicate your willingness to register to buy the £$\frac{Y}{2}$ cash amount.

If you do not want to buy the £$\frac{Y}{2}$ cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £$\frac{Y}{2}$ cash amount.

3.1.6 G1510

[Size=17, Threshold=15, Fee=£10, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **three** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
In this part of the experiment, there will be a computer draw. The number drawn will be used in Part 2, and is referred to as Y.

Y can be any integer between 5 and 95 where each integer is equally likely to be drawn. The number Y drawn is the same for all participants. Yet, the number Y will NOT be revealed to you at any point in time.

However, each subject will receive a **hint** for the number Y drawn. The hint will be an integer within a range of -5 and +5 from the Y drawn, where each integer has exactly the same probability of being drawn. That is, if Y is 28, then the hint can be one of integers 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 and 33 where each integer has a probability of $\frac{1}{11}$ of being drawn. Some participants might receive as a hint 23, others 24, others 25, others 26, others 27, others 28, others 29, others 30, others 31, others 32 and others 33. Thus, each participant will receive one hint integer which may be different or the same from the hint integer received by other participants.

Please note that the hint integer you will receive next in Part 2, will provide you with information about Y, even though Y will not be revealed to you. If for example, your hint integer is 22, then Y can be either 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 or 27. If for example, your hint integer is 90, then Y can be either 85, 86, 87, 88, 89, 90, 91, 92, 93, 94 or 95. If your hint integer is 48, then Y can be either 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, or 53.

You will be directed next to the screen titled Part 2 where you will be indicated your hint integer as well as provided with more information about the decision task.

Part 2

Your hint integer about the drawn Y in Part 1 is 25.

17 subjects participate in this experiment including yourself. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £$\frac{Y}{2}$ at a reduced price of £10, conditional on these terms:

1. The cash amount of £$\frac{Y}{2}$ will be issued **only** if at least $21 - \frac{Y}{4}$ subjects register to buy them. Therefore, the cash amount of £$\frac{Y}{2}$ will be issued if one of the following is satisfied:

    - when the Y drawn is in the interval of 5 to 7 inclusive and 20 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 8 to 11 inclusive and 19 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 12 to 15 inclusive and 18 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 16 to 19 inclusive and 17 subjects register to buy the cash amount.
    - when the Y drawn is in the interval of 20 to 23 inclusive and 16 subjects register to buy the cash amount.

- when the Y drawn is in the interval of 16 to 19 inclusive and 17 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 20 to 23 inclusive and 16 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 24 to 27 inclusive and 15 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 28 to 31 inclusive and 14 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 32 to 35 inclusive and 13 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 36 to 39 inclusive and 12 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 40 to 43 inclusive and 11 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 44 to 47 inclusive and 10 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 48 to 51 inclusive and 9 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 52 to 55 inclusive and 8 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 56 to 59 inclusive and 7 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 60 to 63 inclusive and 6 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 64 to 67 inclusive and 5 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 68 to 71 inclusive and 4 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 72 to 75 inclusive and 3 subjects register to buy the cash amount.
- when the Y drawn is in the interval of 76 to 79 inclusive and 2 subjects register to buy the cash amount.

- when the Y drawn is in the interval of 80 to 95 inclusive and 1 subject registers to buy the cash amount.

2. The £10 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £$\frac{Y}{2}$, then the £10 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £$\frac{Y}{2}$), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £$\frac{Y}{2}$ and at least $21 - \frac{Y}{4}$ subjects register to buy the cash amount of £$\frac{Y}{2}$, your payoff is: the cash amount of £$\frac{Y}{2}$ as well as a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2). Thus, in total you will be paid £$\frac{Y}{2}$ + £2.

- Scenario 3

  If you register to buy the £$\frac{Y}{2}$ cash amount and fewer than $21 - \frac{Y}{4}$ subjects register to buy the cash amount of £$\frac{Y}{2}$, your payoff is: a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2).

Please indicate whether you would like to register to buy the £$\frac{Y}{2}$ cash amount.

If you tick the statement, you indicate your willingness to register to buy the £$\frac{Y}{2}$ cash amount.

If you do not want to buy the £$\frac{Y}{2}$ cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £$\frac{Y}{2}$ cash amount.

4 Robustness Controls

4.1 Experimental Instructions

4.1.1 SCK410

[Size=4, Threshold=4, Fee=£10, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **two** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
4 subjects participate in this experiment including yourself. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £10, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if all 4 of you register to buy them.

2. The £10 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £10 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the other 3 subjects also register, your payoff is: the cash amount of £12.50 as well as a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2). Thus, in total you will be paid £14.50.

- Scenario 3

  If you register to buy the £12.50 cash amount, but any of the other 3 subjects do not register, your payoff is: a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

4.1.2 LCK189

[Size=19, Threshold=18, Fee=£9, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **two** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
19 subjects participate in this experiment including yourself. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £9, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 18 subjects registers to buy them.

2. The £9 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £9 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the minimum of 18 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3). Thus, in total you will be paid £15.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 18 subjects is not reached, your payoff is: a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

4.1.3 LCK1710

[Size=19, Threshold=17, Fee=£10, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **two** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
19 subjects participate in this experiment including yourself. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £10, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 17 subjects registers to buy them.

2. The £10 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £10 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the minimum of 17 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2). Thus, in total you will be paid £14.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 17 subjects is not reached, your payoff is: a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

4.1.4 SP410

[Mean Size=4, Threshold=4, Fee=£10, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **three** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
In this part of the experiment, there will be a computer draw. **The number drawn corresponds to the number of subjects that will participate in Part 2. The number drawn will NOT be revealed to you.** Furthermore, it is possible that you will not participate in Part 2 of the experiment.

It is useful to know how the computer will determine the number of subjects that will participate in Part 2. The best way to understand the draw is to imagine that the number will be determined by the outcome of a roulette game as the one shown below. You can see that the roulette is not a standard roulette; the number drawn can be any number between 0 and 9, but not all numbers are equally likely to be drawn. Numbers closer to 4 (the mean) are more likely to be drawn.

Once the number is drawn, the computer will randomly select as many subjects as the number drawn. Thus, it is possible that you will not be selected for Part 2.

- If you are not selected for Part 2, then the experiment will end for you.
- If you are selected for Part 2, you will be directed to the next screen titled Part 2.

Part 2

You have been selected to participate in Part 2. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £10, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 4 subjects registers to buy them.

2. The £10 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £10 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the minimum of 4 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2). Thus, in total you will be paid £14.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 4 subjects is not reached, your payoff is: a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

4.1.5 LP189

[Mean Size=19, Threshold=18, Fee=£9, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **three** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

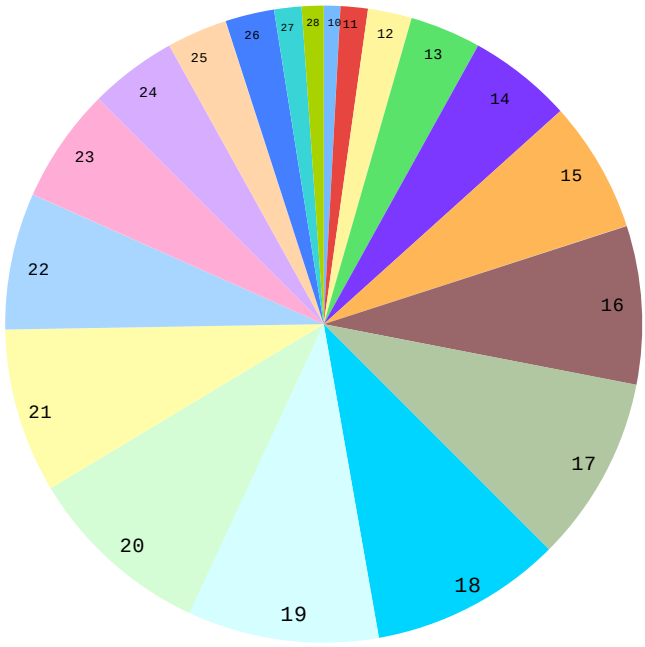
Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
In this part of the experiment, there will be a computer draw. **The number drawn corresponds to the number of subjects that will participate in Part 2. The number drawn will NOT be revealed to you.** Furthermore, it is possible that you will not participate in Part 2 of the experiment.

It is useful to know how the computer will determine the number of subjects that will participate in Part 2. The best way to understand the draw is to imagine that the number will be determined by the outcome of a roulette game as the one shown below. You can see that the roulette is not a standard roulette; the number drawn can be any number between 10 and 28, but not all numbers are equally likely to be drawn. Numbers closer to 19 (the mean) are more likely to be drawn.

Once the number is drawn, the computer will randomly select as many subjects as the number drawn. Thus, it is possible that you will not be selected for Part 2.

- If you are not selected for Part 2, then the experiment will end for you.
- If you are selected for Part 2, you will be directed to the next screen titled Part 2.



Part 2

You have been selected to participate in Part 2. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £9, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 18 subjects registers to buy them.

2. The £9 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £9 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50 and the minimum of 18 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3). Thus, in total you will be paid £15.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 18 subjects is not reached, your payoff is: a cash payment of £3 (initial payment minus the cost of the cash amount = £12 − £9 = £3).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

4.1.6 LP1710

[Mean Size=19, Threshold=17, Fee=£10, Cash Amount=£12.50]

The purpose of this experiment is to study how people make decisions in a particular situation. The experiment consists of **three** parts to be described at the appropriate time.

The instructions are the same for all participants.

Your payoff will depend upon the decisions you make as well as the decisions that other people make. Please note that none of the other participants will be informed of your payoff, and likewise you will not be informed of the payoffs of others. For your participation in the experiment, you will receive an initial payment of £12.

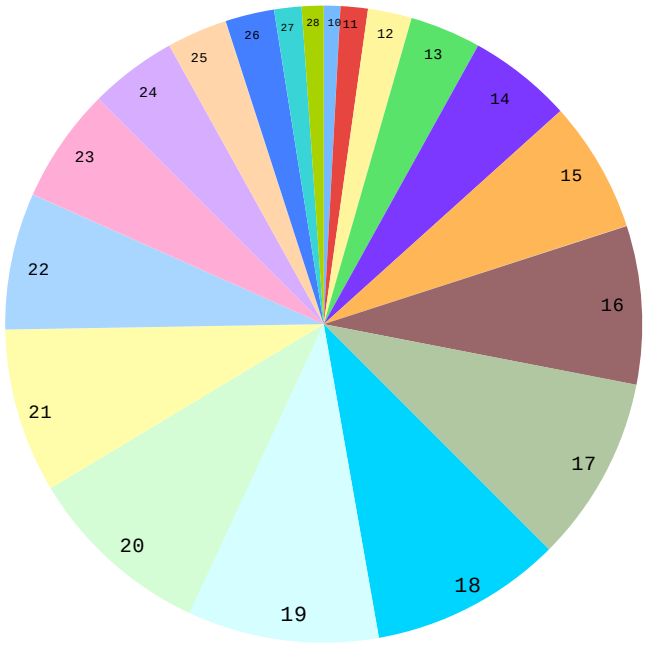
Each screen has a timer. The time on the timer is enough for you to read the instructions on the screen comfortably and carefully. When the time comes to an end, you will be transferred to the next screen.

Part 1
In this part of the experiment, there will be a computer draw. **The number drawn corresponds to the number of subjects that will participate in Part 2. The number drawn will NOT be revealed to you.** Furthermore, it is possible that you will not participate in Part 2 of the experiment.

It is useful to know how the computer will determine the number of subjects that will participate in Part 2. The best way to understand the draw is to imagine that the number will be determined by the outcome of a roulette game as the one shown below. You can see that the roulette is not a standard roulette; the number drawn can be any number between 10 and 28, but not all numbers are equally likely to be drawn. Numbers closer to 19 (the mean) are more likely to be drawn.

Once the number is drawn, the computer will randomly select as many subjects as the number drawn. Thus, it is possible that you will not be selected for Part 2.

- If you are not selected for Part 2, then the experiment will end for you.
- If you are selected for Part 2, you will be directed to the next screen titled Part 2.



Part 2

You have been selected to participate in Part 2. Please read the instructions that follow carefully.

You have the option of registering to **buy** a cash amount of £12.50, at a reduced price of £10, conditional on these terms:

1. The cash amount of £12.50 will be issued **only** if a minimum of 17 subjects registers to buy them.

2. The £10 required for the purchase is non-refundable and collected immediately. That is, if you register to buy the cash amount of £12.50, then the £10 will be subtracted automatically from your initial payment of £12, regardless of the number of subjects registering to buy them.

Now, you have to decide what to do. Your earnings will depend on your decision as well as the decisions of others.

To sum up, one of the three scenarios listed below can occur. Each scenario yields a different payoff.

- Scenario 1

  If you opt out (do not register to buy the cash amount of £12.50), you will receive your initial cash payment of £12.

- Scenario 2

  If you register to buy the cash amount of £12.50, and the minimum of 17 subjects is reached, your payoff is: the cash amount of £12.50 as well as a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2). Thus, in total you will be paid £14.50.

- Scenario 3

  If you register to buy the £12.50 cash amount and the minimum of 17 subjects is not reached, your payoff is: a cash payment of £2 (initial payment minus the cost of the cash amount = £12 − £10 = £2).

Please indicate whether you would like to register to buy the £12.50 cash amount.

If you tick the statement, you indicate your willingness to register to buy the £12.50 cash amount.

If you do not want to buy the £12.50 cash amount, then do not tick the statement and wait for the timer to come to an end.

ENTER YOUR CHOICE

☐ I want to register to buy the £12.50 cash amount.

5 Questionnaire

In this part of the study you will complete a questionnaire. The questionnaire asks you to answer some questions of demographic nature as well as some personal characteristics. There are no right or wrong answers. In addition, you have the option to opt out of a question. Be frank and give your honest appraisal of yourself. Please note that your individual data will not be exposed at any circumstances.

1. What is your age?

2. What is your gender?

Male
Female

3. What do you consider your racial background?

White
Black
Hispanic
Asian
Other

4. What is your field of study?

5. Are you an undergraduate or graduate student?

Undergraduate
Graduate

6. Did you run out of time reading the instructions on any of the screens?

Yes
No

If yes, could you describe briefly the screen you ran out.

6 Poisson Cumulative Distribution Table

n	11	12	13	14	15	16	17	18	19
$x = 0$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0012	0.0005	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0049	0.0023	0.0011	0.0005	0.0002	0.0001	0.0000	0.0000	0.0000
4	0.0151	0.0076	0.0037	0.0018	0.0009	0.0004	0.0002	0.0001	0.0000
5	0.0375	0.0203	0.0107	0.0055	0.0028	0.0014	0.0007	0.0003	0.0002
6	0.0786	0.0458	0.0259	0.0142	0.0076	0.0040	0.0021	0.0010	0.0005
7	0.1432	0.0895	0.0540	0.0316	0.0180	0.0100	0.0054	0.0029	0.0015
8	0.2320	0.1550	0.0998	0.0621	0.0374	0.0220	0.0126	0.0071	0.0039
9	0.3405	0.2424	0.1658	0.1094	0.0699	0.0433	0.0261	0.0154	0.0089
10	0.4599	0.3472	0.2517	0.1757	0.1185	0.0774	0.0491	0.0304	0.0183
11	0.5793	0.4616	0.3532	0.2600	0.1848	0.1270	0.0847	0.0549	0.0347
12	0.6887	0.5760	0.4631	0.3585	0.2676	0.1931	0.1350	0.0917	0.0606
13	0.7813	0.6815	0.5730	0.4644	0.3632	0.2745	**0.2009**	0.1426	0.0984
14	0.8540	0.7720	0.6751	0.5704	0.4657	0.3675	**0.2808**	0.2081	0.1497
15	0.9074	0.8444	0.7636	0.6694	0.5681	0.4667	0.3715	0.2867	0.2148
16	0.9441	0.8987	0.8355	0.7559	0.6641	0.5660	0.4677	0.3751	0.2920
17	0.9678	0.9370	0.8905	0.8272	0.7489	0.6593	0.5640	0.4686	0.3784
18	0.9823	0.9626	0.9302	0.8826	0.8195	0.7423	0.6550	0.5622	0.4695
19	0.9907	0.9787	0.9573	0.9235	0.8752	0.8122	0.7363	0.6509	0.5606
20	0.9953	0.9884	0.9750	0.9521	0.9170	0.8682	0.8055	0.7307	0.6472
21	0.9977	0.9939	0.9859	0.9712	0.9469	0.9108	0.8615	0.7991	0.7255
22	0.9990	0.9970	0.9924	0.9833	0.9673	0.9418	0.9047	0.8551	0.7931
23	0.9995	0.9985	0.9960	0.9907	0.9805	0.9633	0.9367	0.8989	0.8490
24	0.9998	0.9993	0.9980	0.9950	0.9888	0.9777	0.9594	0.9317	0.8933
25	0.9999	0.9997	0.9990	0.9974	0.9938	0.9869	0.9748	0.9554	0.9269
26	1.0000	0.9999	0.9995	0.9987	0.9967	0.9925	0.9848	0.9718	0.9514
27	1.0000	0.9999	0.9998	0.9994	0.9983	0.9959	0.9912	0.9827	0.9687
28	1.0000	1.0000	0.9999	0.9997	0.9991	0.9978	0.9950	0.9897	0.9805
29	1.0000	1.0000	1.0000	0.9999	0.9996	0.9989	0.9973	0.9941	0.9882
30	1.0000	1.0000	1.0000	0.9999	0.9998	0.9994	0.9986	0.9967	0.9930
31	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9993	0.9982	0.9960
32	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9996	0.9990	0.9978
33	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9995	0.9988
34	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9994
35	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997
36	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998
37	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
38	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Notes: The table gives the probability of a Poisson random variable X with mean n that is less than or equal to x.

References

Myerson, Roger. "Population Uncertainty and Poisson Games." *Journal of International Game Theory* 27: (1998) 375–92.