B Supplementary Materials (online publication)

B.1 Economies with two tokens per initial consumer

Here I report a result about existence of monetary equilibrium in economies with two plain tokens.

Proposition 3. *Consider an economy with $n \geq 2$ producers and n consumers. Let each initial consumer be endowed with 2 tokens. If*

$$\beta \geq \beta^*(0) = \frac{d-a}{g-d+l}, \tag{1}$$

then a monetary trade strategy exists that supports monetary equilibrium.

To prove the existence of monetary equilibrium we once again consider a time-invariant strategy. As before, all consumers choose "buy" any time they have some tokens, and otherwise they have no action to take. However, we adjust the monetary trading strategy for producers. Divide traders into two groups: group A is composed of all those who are initial consumers, group B is composed of all those who are initial producers; see Table B1.

Table B1: Equilibrium token distribution .

	Period t				
Role in $t =$	1	2	3	4	5 ...
Players A	c	p	c	p	c
initial consumer	2	1	2	1	2 ...
other	2	1	2	1	2 ...
other $n-2$	2	1	2	1	2 ...
Players B	p	c	p	c	p
initial producer	0	1	0	1	0 ...
other	0	1	0	1	0 ...
other $n-2$	0	1	0	1	0 ...

Producer B chooses "sell" in the initial round of play, and in all subsequent rounds does so only if all consumers A are believed to have 2 tokens and otherwise select "D." Producer A chooses "sell" only if all consumers B are believed to have 1 token, and otherwise select “D.” It follows that in monetary equilibrium, every player alternates spending one token to selling for one token. Consequently, producers have 1 token, while producers B have 0 tokens; consumers A have 2 tokens, while consumers B have 1 token.

Recall that players A are only matched to players B. The idea here is that “wealthy” players A should always maintain a 2-token balance as consumers, or monetary equilibrium will break down. Off equilibrium this could be easily supported if producers could see the consumer’s exact token inventory a producer B would simply not trade with a consumer A who has just 1 token. Since this is not possible, we address this issue by resorting to publicly available information about the distribution of tokens.

To do so, we specify a set of (self-fulfilling) beliefs off the monetary equilibrium path which we did not do before. As before, in monetary equilibrium all players must believe that everyone will follow the monetary trading strategy in the continuation game. Instead, off-equilibrium players believe that tokens will no longer be accepted in the future. Since the number of meetings that resulted in trade is publicly revealed at the end of each round, this is sufficient to trigger the change in beliefs. To see this, consider a situation off equilibrium. Trying to spend a token is always optimal, so the monetary strategy is a best response for a consumer. However, selling for a token is suboptimal for producers because now tokens are believed to be no longer accepted. This belief is clearly self-fulfilling. Hence, the monetary strategy is a best response for a producer off-equilibrium.

Now we show a condition ensuring that deviating in equilibrium is unprofitable. For a consumer, the monetary strategy choice dominates any other choice. Now consider a producer. Without loss in generality consider producer A who has one token in equilibrium. This producer has the greatest incentive to deviate because she has a token to spend next round even if she does not produce today (a producer B does not have this luxury). For concreteness, let $t = 2$ and suppose producer A deviates by choosing D. She reverts back to play the monetary strategy in $t = 3$. By doing so, in $t = 2$ she earns d instead of $a < d$, and in $t = 3$ she has one token to spend. Since her deviation changes the distribution of tokens, beliefs will change hence from $t = 3$ on she (and everyone else) will be unable to spend tokens. It follows deviating in equilibrium is suboptimal for a producer A if

$$d + \beta\frac{d - l + \beta d}{1 - \beta^2} \leq v_0 = \frac{a + \beta g}{1 - \beta^2} \qquad \Rightarrow \qquad \beta \geq \beta^*(0) = \frac{d - a}{g - d + l}.$$

Notice that this is the same condition we found under the monetary trading strategy. It is the same because the deviator is punished as quickly and as effectively in both cases.

B.2 Would players benefit from accumulating tokens?

I start by discussing the difference between non-monetary equilibrium and hoarding.

Non-monetary equilibrium is inconsistent with hoarding. Producers unconditionally cooperate and do not accumulate tokens: the frequencies of choices Idle and C are both 1. Instead, in a hoarding outcome producers *conditionally* cooperate to accumulate tokens: the frequency of Idle and C are 1 and 0, respectively. Here, consumers must choose Sell at least sometime. Hence, if hoarding occurs, Sell should be more frequent than Spend; in monetary equilibrium this should not happen, and in non-monetary equilibrium both frequencies should be close to zero.

Now I consider the question: would players benefit from accumulating interest-paying tokens? I will show that they would not, even in the best-case scenario. In the experiment there are 4 tokens and accumulating them is not economically beneficial for a participant because the flow payoff of tokens is too low. With a larger group size, i.e., if more than 4 tokens could be accumulated, and/or a larger flow payoffs u, then token accumulation *might* be profitable.

To show it I consider an upper bound for the expected payoff of a player who manages to accumulate all tokens. Doing so is most beneficial if done in the early rounds of a supergame. The highest possible payoff would accrue to an initial consumer who accumulates all 3 other tokens by round 6. Hence, suppose this is possible because everyone trades in meetings where it is possible independent of the producer's holdings.

Suppose also an initial consumer meets a different participant, as a producer in her first three meetings. In this best-case scenario, she can accumulate 3 tokens in rounds 2, 4 and 6 (when she is a producer). Suppose she does not spend them. If so, she deterministically earns u points for 15 rounds from the first token, for 13 rounds from her second token, 11 rounds from her third, and 9 rounds from her fourth token. Starting in round 16, the tokens accumulated give her another $4u$ points for an expected number of $1/(1-\beta)$ rounds. The expected flow payoff from token accumulation is thus

$$u(15+13+11+9)+\frac{4u}{1-\beta}.$$

As this player never spend tokens, she receives 3 points every time she is a consumer (in 8 deterministic meetings). She earns 0 points in the first three meetings as a producer (she cooperates for a token), and earns 6 points in all meetings as a producer, thereafter (4 deterministic meetings). Starting in period 16 (when she is a producer) she earns the expected payoff $\frac{6+\beta 3}{1-\beta^2}$. Her expected payoff from actions taken in meetings is

$$3 \times 8 + 6 \times 4 + \frac{6+\beta 3}{1-\beta^2}.$$

Putting these expected payoffs together, we obtain an upper bound for the expected payoff from accumulating tokens:

$$\tilde{v}_c(4) = 48(1+u) + \frac{4u}{1-\beta} + \frac{6+\beta 3}{1-\beta^2}.$$

This is an upper bound because meetings are random so the player does not have the certainty to accumulate all tokens in the first 6 rounds, or, to accumulate them at all.

The equilibrium payoff in monetary equilibrium is

$$v_c(1) = 8 \times (15+u) + \frac{\beta(u+15)}{1-\beta^2},$$

because the initial consumer earns 15 points plus u for 8 deterministic rounds (when she is a consumer), and has $\frac{\beta(u+15)}{1-\beta^2}$ expected payoff from period 16 on.

A sufficient condition ensuring that accumulating tokens is suboptimal is thus:

$$v_c(1) \geq \tilde{v}_c(4) \qquad \Rightarrow \qquad -8\beta^2(9-5u) + 3\beta(4-u) + 22(3-2u) \geq 0.$$

This inequality holds for $u=0$ (plain tokens) and $u=1$ (where the left hand side is 10.75 points). It is violated for $u=2$ (the LHS is -13 points). Note that this condition is not necessary in the experiment because the calculations are for the best-case scenario for tokens accumulation (all 4 tokens are accumulated in the 6 initial rounds of the game).

By means of example, if the initial consumer only accumulates 3 tokens (not all 4) and does so as early as possible, then her highest possible payoff is $\tilde{v}_c(3) = 48 + 39u + \frac{3u}{1-\beta} + \frac{6+\beta 3}{1-\beta^2}$. Here, $v_c(1) - \tilde{v}_c(3) \geq 0$ also for $u=2$ (the value is 9.6). Hence, accumulating 3 tokens is not economically beneficial as compared to playing monetary trade.

In fact, the consumer might not accumulate any tokens at all if other players do not spend theirs. This suggests that there are not enough economic incentives to engage in token accumulation in the experiment even for $u = 2$.

We would need a much higher flow payoff u, for hoarding of tokens to be optimal. For instance, if $u \geq 10$ an initial consumer prefers to never trade and never receive cooperation, and just hold onto his initial token endowment because in this case her payoff is: $\tilde{v}_c(1) = 48 + 15u + \frac{u}{1-\beta} + \frac{6+\beta 3}{1-\beta^2}$, which is greater than the payoff in monetary equilibrium.

B.3 Result 1: Additional Analysis

Table B2: Efficiency vs. Monetary Strategy Adoption.

Dep. var.: Realized Efficiency	Coeff.	S.E.
Monetary Trade	0.189***	(0.012)
Treatment dummies		
Penalty	0.010	(0.062)
Reward	-0.055	(0.069)
Reward2	-0.039	(0.062)
Fiat2	-0.095*	(0.051)
Mix	-0.191***	(0.067)
Switch	-0.079*	(0.046)
Other regressors		
Game	-0.018*	(0.011)
Controls	Yes	
N	315	

Notes: GLM regression with robust standard errors (S.E.) adjusted for clustering at the session level. One obs.=one economy (all meetings, rounds 1-16), all treatments. The independent variables include the (standardized) frequency of monetary trade, treatment dummies, and a continuous *Game* regressor interacted with treatment dummies capturing the impact of experience with the game. *Controls* include standardize measures of the proportion of males in the economy, duration of previous supergame, and of understanding of instructions according to two different measures from an incentivized quiz administered after reading the instructions (response time and wrong answers in the quiz). Symbols $***$, $**$, and $*$ indicate significance at the 1%, 5% and 10% level, respectively.

The standardized *monetary trade* coefficient in Table B2 shows that one standard deviation increment in the frequency of monetary trade is associated with an efficiency increment of about 19 percentage points.

Figure B1: The Distribution of Realized Efficiency: All Data

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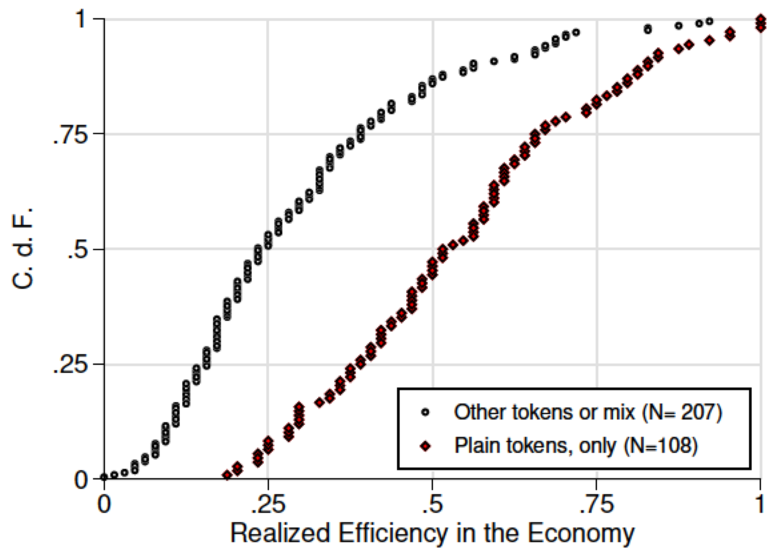


Notes: One obs.=one economy in a supergame (rounds 1-16), all treatments. There are $N = 315$ observations overall, of which $N = 108$ are economies with only plain tokens, and 207 are economies with sophisticated tokens or a mix of tokens. Efficiency is proportional to the average cooperation rate in the economy. It is 100% (0%) when there was full cooperation (full defection) in the average round.

B.4 Result 2: Additional Analysis

Table B3: Fiat Economies: all Meetings

Dep. var.:	(1) Cooperation		(2) Gift		(3) Monetary Trade	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Trade Possible	0.112**	(0.046)	-0.072**	(0.029)		
Game	0.019	(0.014)	-0.005	(0.009)	0.042***	(0.004)
Controls	Yes		Yes		Yes	
Constant	0.459***	(0.087)	0.152***	(0.051)	0.167***	(0.026)
N	360		360		360	
R^2 within	0.242		0.273		0.113	
R^2 between	0.330		0.174		0.161	
R^2 overall	0.278		0.232		0.131	

Notes: Panel regression with random effects at the individual level and robust standard errors (S.E.) adjusted for clustering at the session level. One obs.=one subject in a supergame, all meetings of rounds 1-16. The dependent variable is the average frequency of the outcome experienced by the subject. Three kinds of outcomes are considered: any outcome resulting in cooperation (column 1), outcomes were cooperation is supported by a gift (column 2), and where cooperation is supported by monetary trade (column 3). The regressions include a continuous *Game* regressor to assess the effect of experience with the task as the session unfolded; a continuous *Trade Possible* regressor (standardized) to estimate how variation in the possibility to exchange tokens affected outcomes. The set of additional controls discussed earlier is also included in all regressions. For other details see notes to Table B2.

Participants learned to coordinate on monetary trade and did not employ a non-monetary social norm of mutual support. The coefficient on the *Game* regressor is positive and highly significant in col. 3, and insignificant otherwise.

Cooperation increased because individuals learned to rely on monetary trade, not on the unilateral transfer of gifts. The coefficient on the *Trade Possible* regressor is highly significant in both columns, but while it is positive in the first, it is negative in the second. A one standard deviation increase in the frequency of trade meetings increased the frequency of cooperation by about 11 percentage points (col. 1), but decreased the frequency of gifts by about 7 percentage points (col. 2).

Table B4: FIAT: Outcomes & Choices in Meetings where Trade is Possible.

	Choices		Outcomes	
Game	Spend	Sell	Monetary Trade	Gift
1	0.75	0.46	0.34	0.03
2	0.83	0.59	0.51	0.03
3	0.88	0.66	0.56	0.01
4	0.89	0.62	0.53	0.00
5	0.93	0.65	0.60	0.01

Notes: One obs.: one subject in a supergame, meetings where trade is possible of rounds 1-16. *Choices*: relative frequency of Sell choice (as a producer in the supergame), and Spend choice (as a consumer). *Outcomes*: relative frequency of *Monetary Trade* and *Gift*. N: no. of observations.

Table B5: FIAT: Panel Regression, Meetings where Trade is Possible.

Dep. var.:	(1) Monetary Trade		(2) Gift		(3) Spend		(4) Sell	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Game	0.055***	(0.004)	-0.009***	(0.003)	0.044***	(0.003)	0.043**	(0.018)
Controls	Yes		Yes		Yes		Yes	
Constant	0.293***	(0.043)	0.041***	(0.013)	0.736***	(0.062)	0.436***	(0.053)
N	360		358		343		358	
R^2 within	0.133		0.079		0.159		0.082	
R^2 between	0.126		0.019		0.041		0.108	
R^2 overall	0.130		0.061		0.097		0.099	

Notes: Panel regression with random effects at the individual level and robust standard errors (S.E.) adjusted for clustering at the session level. One obs.=one subject in a supergame, meetings where trade is possible (rounds 1-16). Columns (1)-(2) refer to outcomes in a meeting, column (3) refers to a specific choice of the player as a consumer and column (4) to a specific choice of the player as a producer (not all subjects had the opportunity to be offered such choices, depending on the realized distribution of tokens, hence N¡360). *Controls* include duration of the previous supergame, self-reported sex, and two measures of understanding of instructions (response time and wrong answers in the quiz). Symbols $***$, $**$, and $*$ indicate significance at the 1%, 5% and 10% level, respectively.

B.5 Result 6: Additional Analysis

The panel regression in Table B6 mirrors the econometric model in Table 4.

Table B6: The effect of adding tokens.

Dep. var.:	(1) Cooperation		(2) Gift		(3) Monetary Trade	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Trade Possible	0.096***	(0.023)	-0.058***	(0.013)		
Treatment Indicators						
Fiat2	-0.049	(0.085)	0.021	(0.044)	0.022	(0.058)
Mix	-0.140	(0.105)	0.009	(0.068)	-0.067*	(0.037)
Game	0.019	(0.013)	-0.006	(0.008)	0.042***	(0.003)
Fiat2 × Game	0.010	(0.017)	-0.008	(0.010)	0.034***	(0.010)
Mix × Game	-0.045***	(0.015)	-0.013	(0.010)	-0.036***	(0.007)
Controls	Yes		Yes		Yes	
Constant	0.497***	(0.065)	0.127***	(0.044)	0.164***	(0.030)
N	1080		1080		1080	
R^2 within	0.198		0.269		0.164	
R^2 between	0.526		0.224		0.470	
R^2 overall	0.389		0.250		0.320	

Notes: Panel regression with random effects at the individual level and robust standard errors (S.E.) adjusted for clustering at the session level. One obs.=one subject in a supergame 1-5 (rounds 1-16). *Fiat2*, and *Mix* take value 1 in the respective treatment and zero otherwise (*Fiat* serves as the basis of the regression). *Game* is a continuous regressor taking values 1-5, corresponding to the supergame in the session. *Controls* include duration of the previous supergame, self-reported sex, and two measures of understanding of instructions (response time and wrong answers in the quiz). Symbols $***$, $**$, and $*$ indicate significance at the 1%, 5% and 10% level, respectively.

Cooperation significantly declined during the course of the session in Mix; in col. 1 the sum of *Game* and *Mix* × *Game* coefficients is negative and highly significant (Wald test). Instead, cooperation increased significantly in Fiat2; in col. 1 the sum of the coefficient on *Game* and *Fiat2* × *Game* is positive and significant (Wald test).

Monetary trade did not improve during the session in Mix; in col. 3, the sum of the *Game* and *Mix* × *Game* coefficients is indistinguishable from zero. Instead, it significantly increased in Fiat2; in col. 3 the sum of the coefficient on *Game* and *Fiat2* × *Game* is positive and significant (Wald test).

Cooperation generally benefits from an increased frequency of meetings where trade is possible; see the coefficient *Trade Possible* in col 1. By contrast, the frequency of gifts generally declines with an increased frequency of meetings where trade is possible; see the coefficient *Trade Possible* in col 2.

B.6 Result 8: Additional Analysis

The panel regression below assesses the significance of the numerical observations. Switching to benefit-yielding tokens in supergame 3 of the Switch treatment caused a decline in cooperation and monetary trade relative to Fiat. The coefficients on *Switch* × *Games 3-5* are negative and significant; their sum with the *Games 3-5* coefficient is also significant (Wald tests).

Table B7: The Effect of Switching Tokens.

	Switch + Fiat data (supergames 1-5)		Switch + Reward data (supergames 3-5)	
Dep. var.:	(1) Cooper.	(2) Mon. Trade	(3) Coop.	(4) Mon. Trade
Switch	-0.022	0.074**	0.079	0.112***
	(0.053)	(0.031)	(0.076)	(0.038)
Games 3-5	0.051**	0.121***		
	(0.025)	(0.018)		
Switch × Games 3-5	-0.122***	-0.168***		
	(0.027)	(0.027)		
Trade Possible	0.119***		0.080***	
	(0.021)		(0.018)	
Controls	Yes	Yes	Yes	Yes
Constant	0.472***	0.231***	0.269***	0.160***
	(0.061)	(0.026)	(0.067)	(0.030)
N	720	720	432	432
R^2 within	0.282	0.067	0.160	0.000
R^2 between	0.386	0.069	0.179	0.227
R^2 overall	0.326	0.067	0.171	0.121

Notes: Panel regression with random effects at the individual level and robust standard errors (in parentheses) adjusted for clustering at the session level. One obs.=one subject in a supergame rounds 1-16. Columns 1-2 consider data from all supergames in *Switch* and *Fiat* (the base of the regression). Columns 3-4 consider data from supergames 3-4 in *Switch* and *Reward* (the base of the regression). *Games 3-5*=1 in supergames 3-5 (0, otherwise). *Controls* include duration of the previous supergame, self-reported sex, and two measures of understanding of instructions (response time and wrong answers in the quiz). Symbols $***$, $**$, and $*$ indicate significance at the 1%, 5% and 10% level, respectively.

Col. 1-2 consider all supergames in Switch and Fiat, while col. 3-4 consider supergames 3-5 in Switch and Reward. Switching to benefit-yielding tokens induced a significant decline in cooperation and monetary trade relative to Fiat; in col. 1-2 the coefficients on *Switch* × *Games 3-5* are negative and significant; their sum with the *Games 3-5* coefficient is also highly significant (Wald tests).

Monetary trade in supergames 3-4 did not fall to REWARD levels (col. 4 coefficient on *Switch*), although cooperation is not statistically different (col. 3 coefficient on *Switch*).

Your ID in this session:____ First Name & Last Initial:_____________

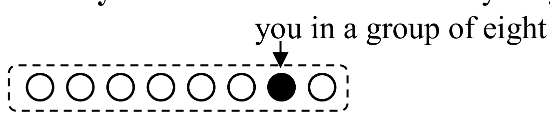
Instructions – Baseline Treatment

This is an experiment in decision-making. You will earn money based on the decisions you and others make in the experiment, and you will be paid in cash at the end of the experiment. Different participants may earn different amounts.

Overview of the experiment

The experiment is divided into **five blocks**. Each block is a separate section comprising **many periods**:

You are one of 24 participants. At the start of each **block**, a computer program will form **groups** of 8 participants each; in that block you will **only** interact with someone from your group.



New groups of 8 participants are formed at the start of each block so that **you cannot interact with anyone for more than one block**.

How do you earn money in a period?

In each period you will be **paired** with one random person from your group, called your **"match."** Your match is **anonymous**. One of you will be **red** and the other **blue**.

Your earnings depend on your color and the choices in your pair, which lead to one of two outcomes:

- if **Y** is the outcome: **red** earns **6** points and **blue** earns **3** points;
- if **Z** is the outcome: **red** earns **0** points and **blue** earns **15** points.

Points will be converted into dollars at the end of the session in a manner that we explain later.

Tickets

In the first period of each block everyone who is **blue** will receive one electronic object, called "yellow ticket." Tickets:

- can be transferred from **blue** to **red**
- cannot be carried over to the next block
- cannot be redeemed for points or dollars at the end of the experiment.

What happens in each period?

Each **period** has the following timeline:

1. You are randomly assigned a match from your group.
2. You must make a choice.
3. You see the result of your choice.

Now, we discuss each of these steps.

1. Your color and your match

In each period, half of the persons in your group are **red** and the others **blue**. Your initial color is random and then it alternates from period to period: **blue**, **red**, **blue**, … or **red**, **blue**, **red**, …

Your match has always a color different than yours.

In each period you switch color and have an equal chance to meet anyone in your group who has a color different than yours. Hence, there is one chance out of four that your match stays the same in two consecutive periods, but neither you nor your match will know if this happens because **no-one can be identified:** everyone remains anonymous.

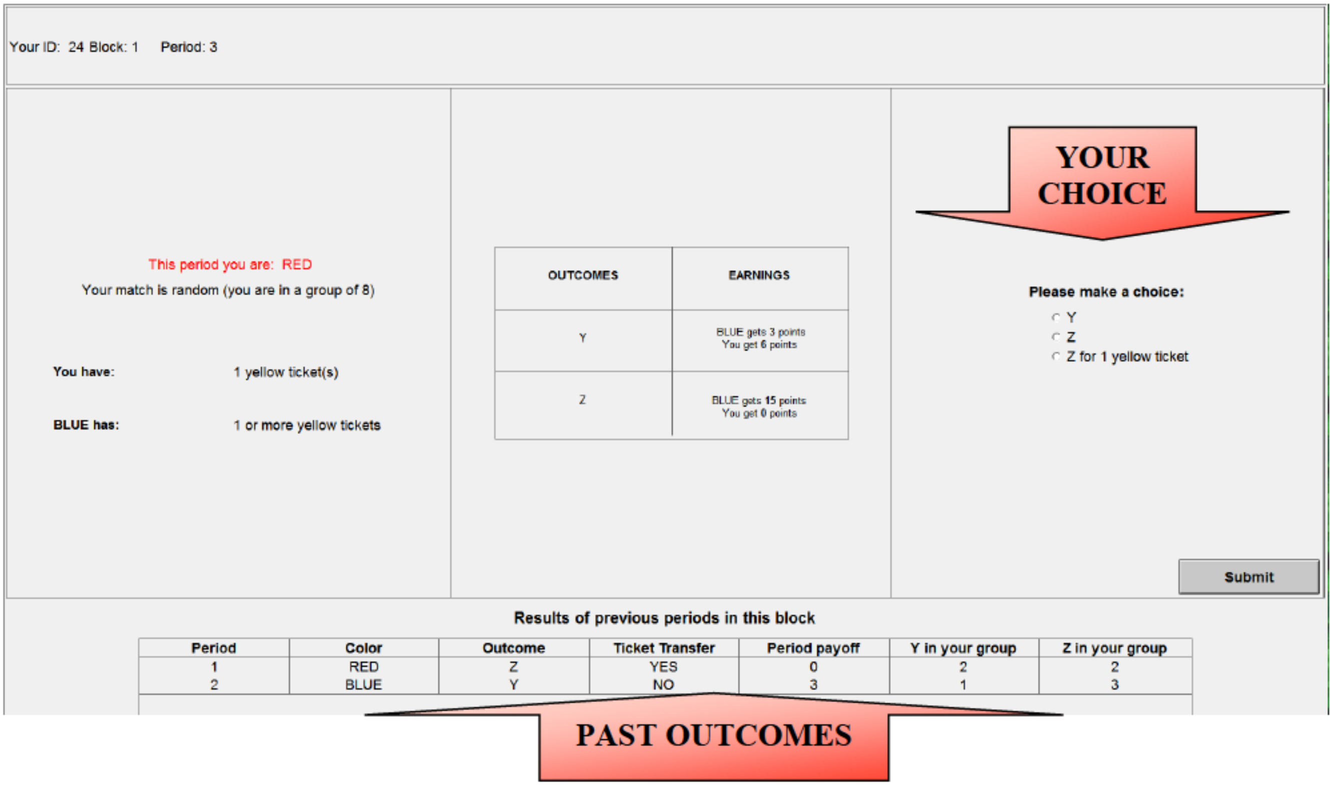
2. Your choices

Your choices depend on your color.

- If you are **red,** you must choose one of three options (see figure below):
  - ***Y***
  - ***Z***
  - ***Z for 1 yellow ticket***

    If you choose this last option, then the computer:
    - picks **Z** only if **blue** selects to give you a ticket;
    - otherwise, it picks **Y** and you get nothing from **blue**.

Note: the last option appears only if your **blue** match has tickets.



To make your choice, choose the option you prefer and click "Submit." Your choice is **private**: no one can see it before making their choice.

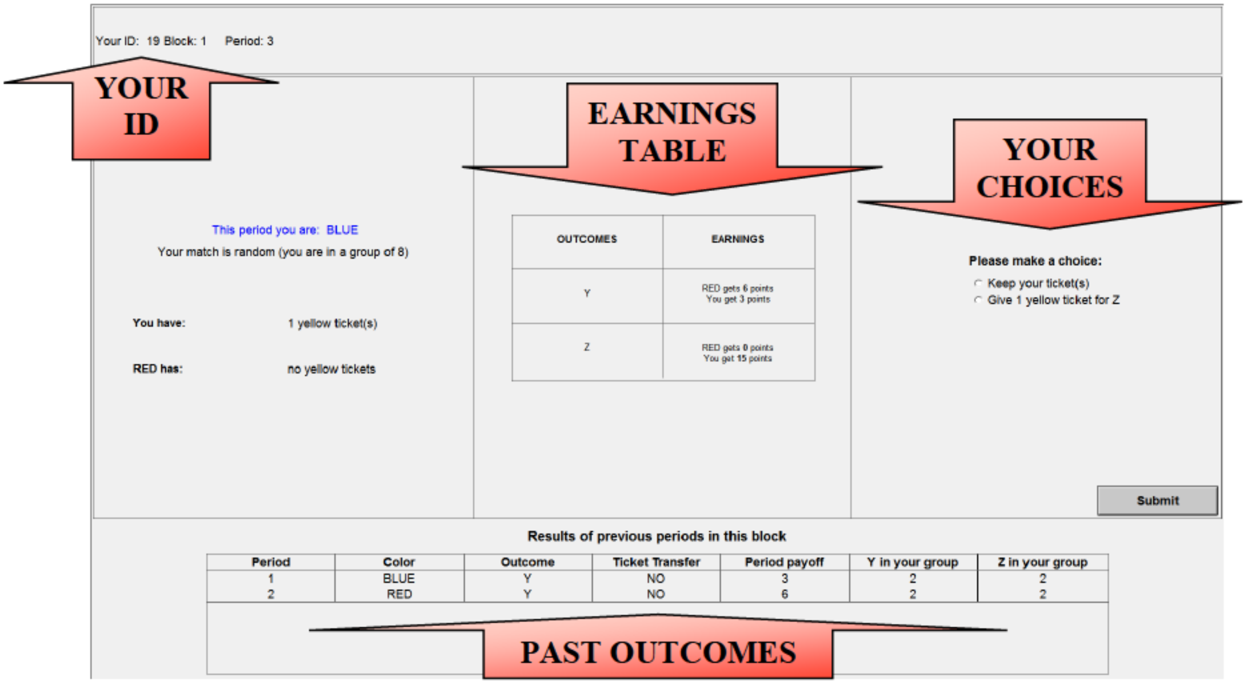
Before making a choice, you can review results of previous periods **of the block** by scrolling down the table at the bottom of the screen. Each line refers to a **past** period.

You can see: your color, the outcome Y or Z in your pair and if a ticket was exchanged, your earnings, and your total payoff for the period. The last two columns report the total number of outcomes Y and Z **in your group**.

- If you are **blue,** you must choose one of two options (see figure below):
  - ***Keep your ticket(s)***
  - ***Give 1 yellow ticket for Z***

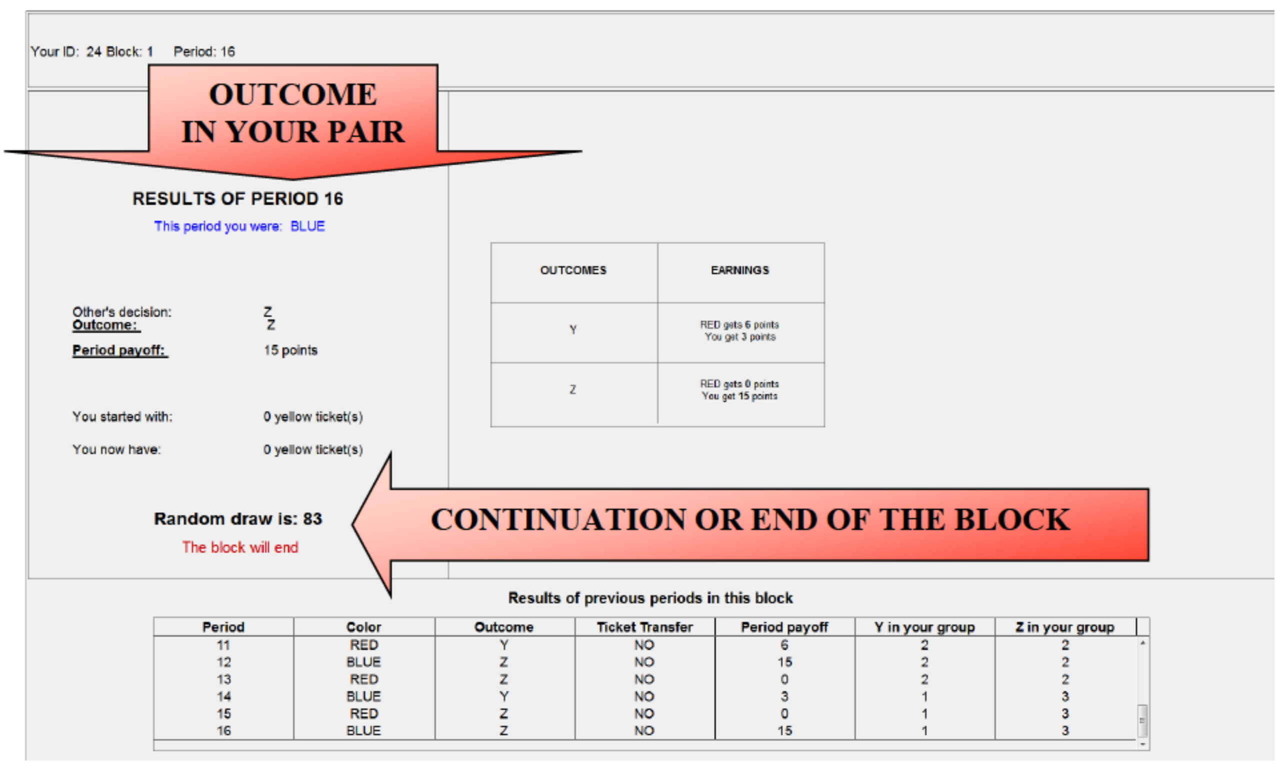
    If you choose this second option, then the computer:
    - picks **Z** and gives your ticket to **red** only if **red** selects "**Z**" or "***Z for 1 yellow ticket***";
    - otherwise, it picks **Y** and you keep all the tickets you have.

Note: these choices appear only if you have tickets. Otherwise, you have **no choice** to make.



3. Outcome of choices

At the end of each period, after everyone has made a choice, you will see the outcome for the period (see figure below), i.e., the choice made by you and your match, if a ticket was exchanged, your earnings, and your total payoff for the period.
You can write these results on your record sheet, if you wish. Results from previous periods will be visible at the bottom of the screen.



Ending of a block

Each block has many periods but their number is **uncertain** because it is **random**.

Each block will have at least 16 periods. From period 16 on, at the end of each period the computer selects a number between 1 and 100. Each number is equally likely to be selected:

- If the number selected is less than or equal to 75, then the block will continue for everyone.
- If the number selected is 76 or more, then the block will end for everyone.

So: starting in period 16, the block has always a chance to continue. To see whether the block continues or ends look at the results screen; you will see the random number selected by the computer.

The number of past periods does not influence the chance that a block will end because the number selected is independent of the numbers selected in past periods. The chance that a block will end, say, after period 19, is 25%, which is exactly the same as the chance that the block will end after period 16. Hence:

- **We never know for sure which period will be the last in a block;**
- **Some blocks may end up being longer and others shorter.**

As soon as a block ends, new groups are formed and a new block starts.

Payments

When the session ends, **one** of the blocks completed will be randomly selected. The points you have earned in that block will be converted into dollars: **1 point is worth 15 cents** ($0.15). To choose the block we randomly select a number between 1 and 5 at https://www.random.org. The number selected will identify the block. Each block is equally likely to be selected.

Final reminders

- The session is divided into 5 separate blocks.
- Each block has 16 periods for sure plus an uncertain number of additional periods. After each additional period there is **always** a 75% chance of one more period, and a 25% chance of ending.
- In each period, your match is a random person from your group of 8, with a color unlike yours. Your match in a block can **never** be your match in another block.
- The points you earn in a period depend on your color, and the choices in your pair.
- Tickets will not be redeemed for points or dollars at the end of the session.

Before we start the experiment, you will be asked to answer ten questions designed to verify your understanding of the instructions. You will receive $0.25 for each question you answer correctly on the first try. If you have a question at any time, then please raise your hand and someone will help you.

Your ID in this session:____ First name & Last Initial:_____________

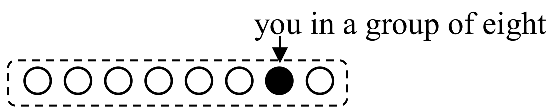
Instructions—Reward2 Treatment

This is an experiment in decision-making. You will earn money based on the decisions you and others make in the experiment, and you will be paid in cash at the end of the experiment. Different participants may earn different amounts.

Overview of the experiment

The experiment is divided into **five blocks**. Each block is a separate section comprising **many periods**:

You are one of 24 participants. At the start of each **block**, a computer program will form **groups** of 8 participants each; in that block you will **only** interact with someone from your group.



New groups of 8 participants are formed at the start of each block so that **you cannot interact with anyone for more than one block**.

How do you earn money in a period?

In each period you will be **paired** with one random person from your group, called your **"match."** Your match is **anonymous**. One of you will be **red** and the other **blue**.

Your earnings depend on your color and the choices in your pair, which lead to one of two outcomes:

- if **Y** is the outcome: **red** earns **6** points and **blue** earns **3** points;
- if **Z** is the outcome: **red** earns **0** points and **blue** earns **15** points.

Points will be converted into dollars at the end of the session in a manner that we explain later.

Tickets

In the first period of each block everyone who is **blue** will receive one electronic object, called "yellow ticket." Tickets:

- can be transferred from **blue** to **red**
- cannot be carried over to the next block
- cannot be redeemed for points or dollars at the end of the experiment.

You will earn 2 points for each ticket you hold at the start of a period.

What happens in each period?

Each **period** has the following timeline:

1. You are randomly assigned a match from your group.
2. You must make a choice.
3. You see the result of your choice.

Now, we discuss each of these steps.

1. Your color and your match

In each period, half of the persons in your group are **red** and the others **blue**. Your initial color is random and then it alternates from period to period: **blue**, **red**, **blue**, … or **red**, **blue**, **red**, …

Your match has always a color different than yours.

In each period you switch color and have an equal chance to meet anyone in your group who has a color different than yours. Hence, there is one chance out of four that your match stays the same in two consecutive periods, but neither you nor your match will know if this happens because **no-one can be identified:** everyone remains anonymous.

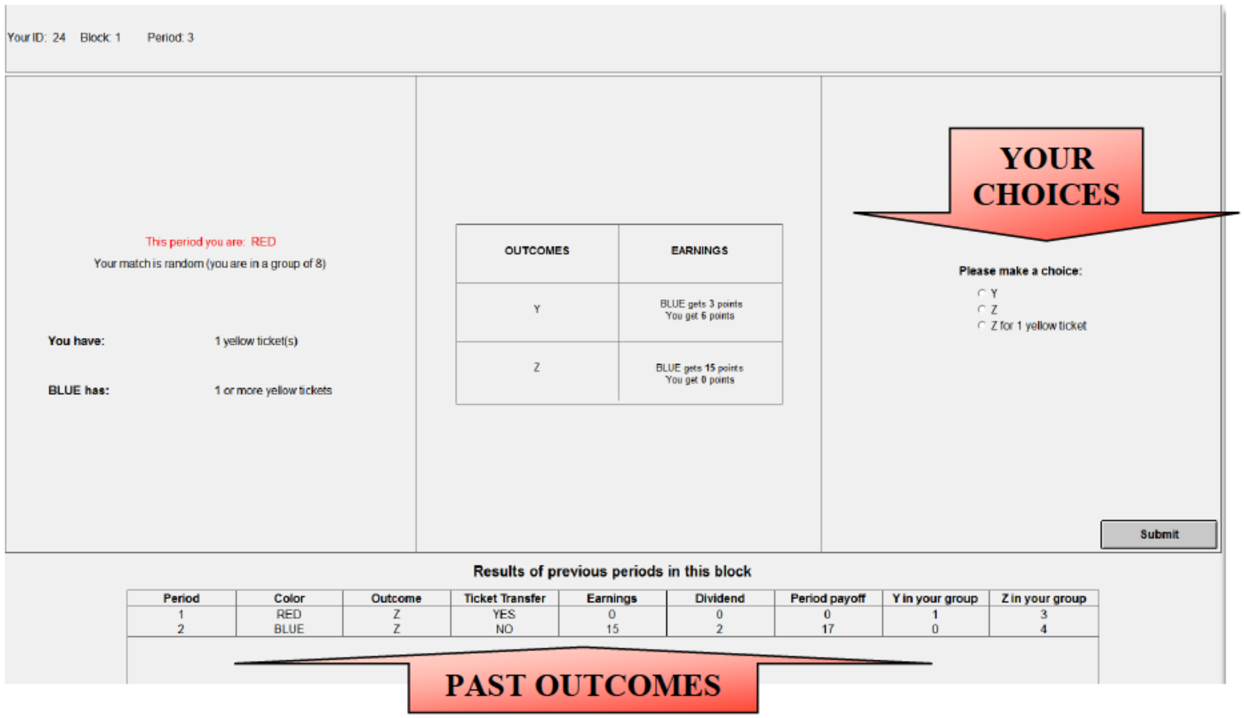
2. Your choices

Your choices depend on your color.

- If you are **red,** you must choose one of three options (see figure below):
  - ***Y***
  - ***Z***
  - ***Z for 1 yellow ticket***

    If you choose this last option, then the computer:
    - picks **Z** only if **blue** selects to give you a ticket;
    - otherwise, it picks **Y** and you get nothing from **blue**.

Note: the last option appears only if your **blue** match has tickets.



To make your choice, choose the option you prefer and click "Submit." Your choice is **private**: no one can see it before making their choice.

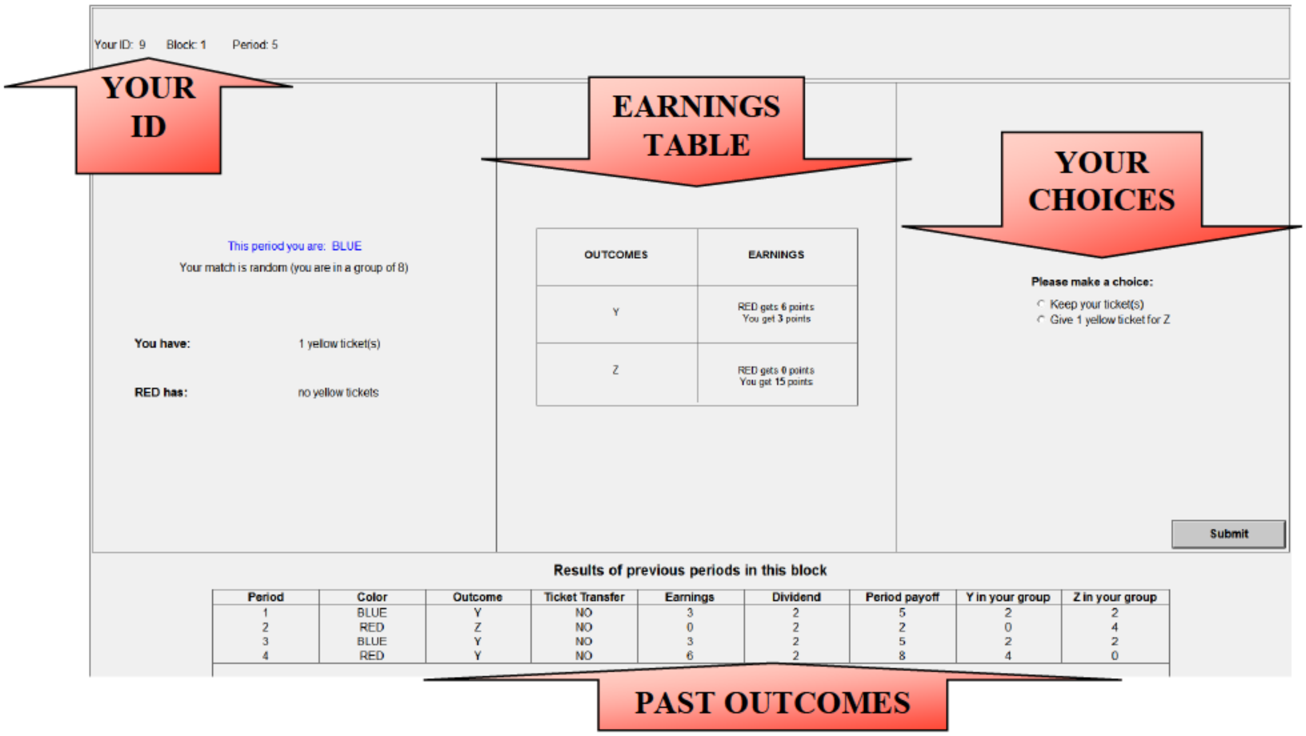
Before making a choice, you can review results of previous periods **of the block** by scrolling down the table at the bottom of the screen. Each line refers to a **past** period.

You can see: your color, the outcome Y or Z in your pair and if a ticket was exchanged, your earnings, points earned from holding tickets (called "dividend"), and your total payoff for the period. The last two columns report the total number of outcomes Y and Z **in your group**.

- If you are **blue,** you must choose one of two options (see figure below):
  - ***Keep your ticket(s)***
  - ***Give 1 yellow ticket for Z***

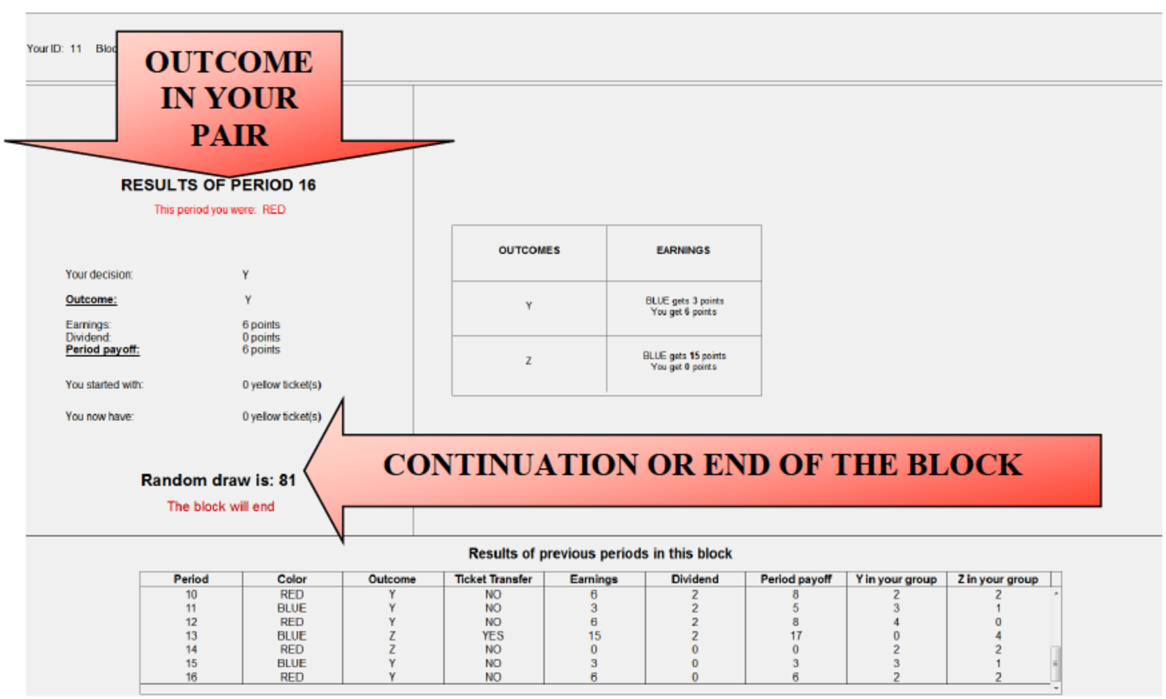
    If you choose this second option, then the computer:
    - picks **Z** and gives your ticket to **red** only if **red** selects "**Z**" or "***Z for 1 yellow ticket***";
    - otherwise, it picks **Y** and you keep all the tickets you have.

Note: these choices appear only if you have tickets. Otherwise, you have **no choice** to make.



3. Outcome of choices

At the end of each period, after everyone has made a choice, you will see the outcome for the period (see figure below), i.e., the choice made by you and your match, if a ticket was exchanged, your earnings, points earned from holding tickets, and your total payoff for the period.
You can write these results on your record sheet, if you wish. Results from previous periods will be visible at the bottom of the screen.



<u>Ending of a block</u>

Each block has many periods but their number is **uncertain** because it is **random**.

Each block will have at least 16 periods. From period 16 on, at the end of each period the computer selects a number between 1 and 100. Each number is equally likely to be selected:

- If the number selected is less than or equal to 75, then the block will continue for everyone.
- If the number selected is 76 or more, then the block will end for everyone.

So: starting in period 16, the block has always a chance to continue. To see whether the block continues or ends look at the results screen; you will see the random number selected by the computer.

The number of past periods does not influence the chance that a block will end because the number selected is independent of the numbers selected in past periods. The chance that a block will end, say, after period 19, is 25%, which is exactly the same as the chance that the block will end after period 16. Hence:

- **We never know for sure which period will be the last in a block;**
- **Some blocks may end up being longer and others shorter.**

As soon as a block ends, new groups are formed and a new block starts.

<u>Payments</u>

When the session ends, **one** of the blocks completed will be randomly selected. The points you have earned in that block will be converted into dollars: **1 point is worth 15 cents** ($0.15). To choose the block we randomly select a number between 1 and 5 at https://www.random.org. The number selected will identify the block. Each block is equally likely to be selected.

<u>Final reminders</u>

- The session is divided into 5 separate blocks.
- Each block has 16 periods for sure plus an uncertain number of additional periods. After each additional period there is **always** a 75% chance of one more period, and a 25% chance of ending.
- In each period, your match is a random person from your group of 8, with a color unlike yours. Your match in a block can **never** be your match in another block.
- The points you earn in a period depend on your color, and the choices in your pair.
- Tickets will not be redeemed for points or dollars at the end of the session.

Before we start the experiment, you will be asked to answer ten questions designed to verify your understanding of the instructions. You will receive $0.25 for each question you answer correctly on the first try. If you have a question at any time, then please raise your hand and someone will help you.

Your ID in this session:____ First Name & Last Initial_____________

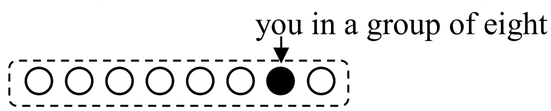
Instructions—Mix Treatment

This is an experiment in decision-making. You will earn money based on the decisions you and others make in the experiment, and you will be paid in cash at the end of the experiment. Different participants may earn different amounts.

Overview of the experiment

The experiment is divided into **five blocks**. Each block is a separate section comprising **many periods**:

You are one of 24 participants. At the start of each **block**, a computer program will form **groups** of 8 participants each; in that block you will **only** interact with someone from your group.



New groups of 8 participants are formed at the start of each block so that **you cannot interact with anyone for more than one block**.

How do you earn money in a period?

In each period you will be **paired** with one random person from your group, called your **"match."** Your match is **anonymous**. One of you will be **red** and the other **blue**.

Your earnings depend on your color and the choices in your pair, which lead to one of two outcomes:

- if **Y** is the outcome: **red** earns **6** points and **blue** earns **3** points;
- if **Z** is the outcome: **red** earns **0** points and **blue** earns **15** points.

Points will be converted into dollars at the end of the session in a manner that we explain later.

Tickets

In the first period of each block, everyone who is **blue** will receive two separate electronic objects: one is called "yellow ticket" and the other is called "white ticket." Tickets:

- can be transferred from **blue** to **red**
- cannot be carried over to the next block
- cannot be redeemed for points or dollars at the end of the experiment.

You will earn 2 points for each yellow ticket you hold at the start of a period.

What happens in each period?

Each **period** has the following timeline:

1. You are randomly assigned a match from your group.
2. You must make a choice.
3. You see the result of your choice.

Now, we discuss each of these steps.

1. Your color and your match

In each period, half of the persons in your group are **red** and the others **blue**. Your initial color is random and then it alternates from period to period: **blue**, **red**, **blue**, … or **red**, **blue**, **red**, …

Your match has always a color different than yours.

In each period you switch color and have an equal chance to meet anyone in your group who has a color different than yours. Hence, there is one chance out of four that your match stays the same in two consecutive periods, but neither you nor your match will know if this happens because **no-one can be identified:** everyone remains anonymous.

2. Your choices

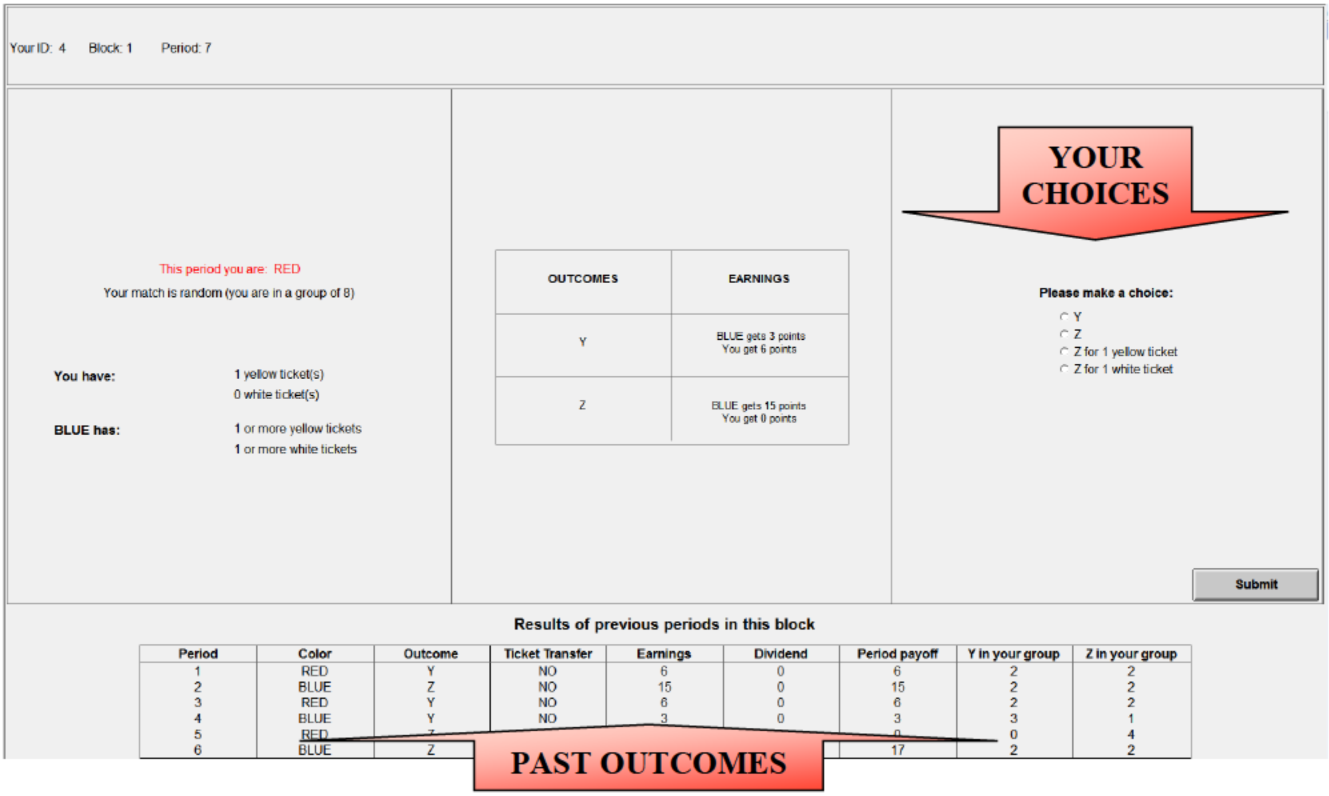
Your choices depend on your color.

- If you are **red,** you must choose one of four options (see figure below):
  - ***Y***
  - ***Z***
  - ***Z for 1 yellow ticket***

    If you choose this third option, then the computer:
    - picks **Z** only if **blue** selects to give you a yellow ticket;
    - otherwise, the computer picks **Y** and you get nothing from **blue**.
  - ***Z for 1 white ticket***

    If you choose this fourth option, then the computer:
    - picks **Z** only if **blue** selects to give you a white ticket;
    - otherwise, the computer picks **Y** and you get nothing from **blue**.

Note: the last two options appear only if your **blue** match has tickets of the corresponding color.



To make your choice, choose the option you prefer and click "Submit." Your choice is **private**: no one can see it before making their choice.

Before making a choice, you can review results of previous periods **of the block** by scrolling down the table at the bottom of the screen. Each line refers to a **past** period.

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- If you are **blue,** you must choose one of three options (see figure below):
  - ***Keep your ticket(s)***
  - ***Give 1 yellow ticket for Z***

    If you choose this second option, then the computer:
    - picks **Z** and gives your yellow ticket to **red** only if **red** selects "**Z**" or "***Z for 1 yellow ticket***";
    - otherwise, the computer picks **Y** and you keep all the tickets you have.
  - ***Give 1 white ticket for Z***

    If you choose this third option, then the computer:
    - picks **Z** and gives your white ticket to **red** only if **red** selects "**Z**" or "***Z for 1 white ticket***";
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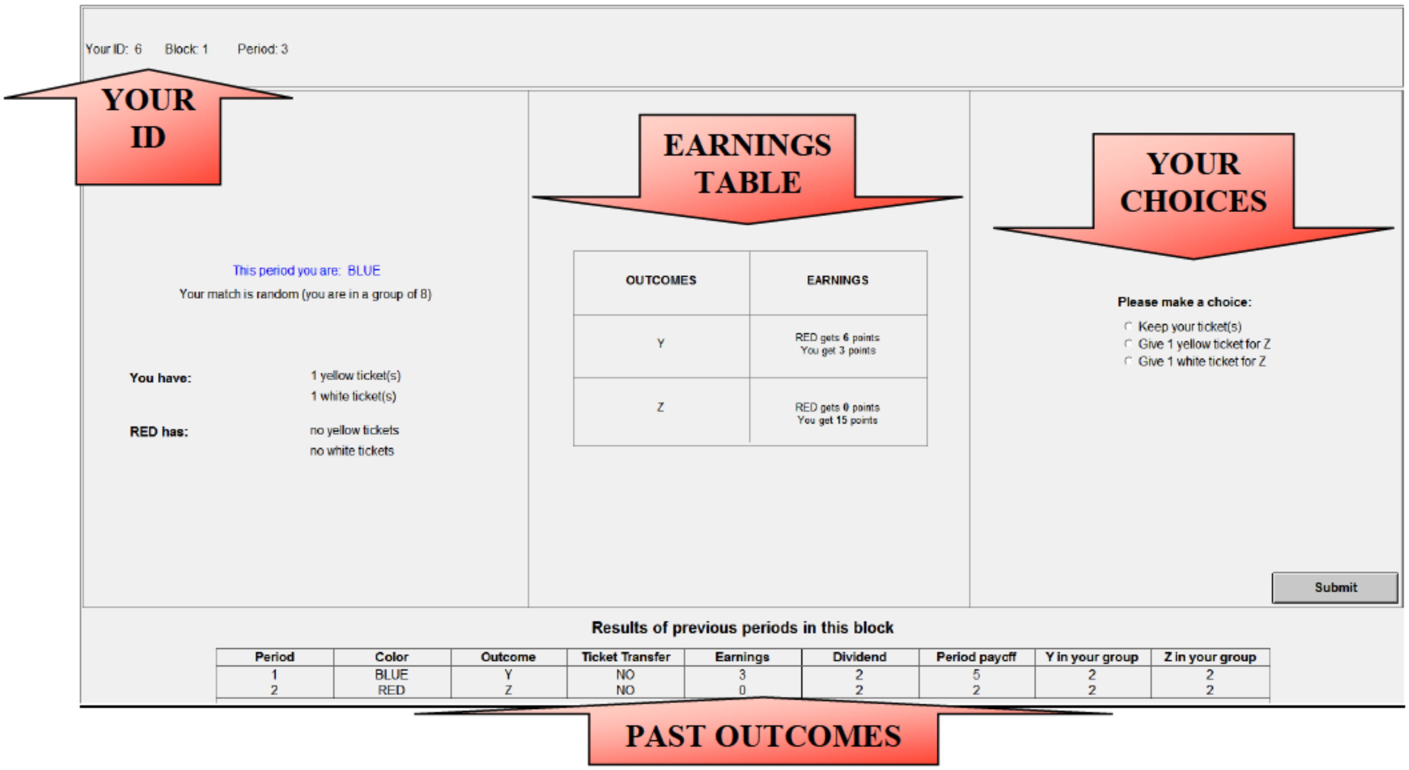

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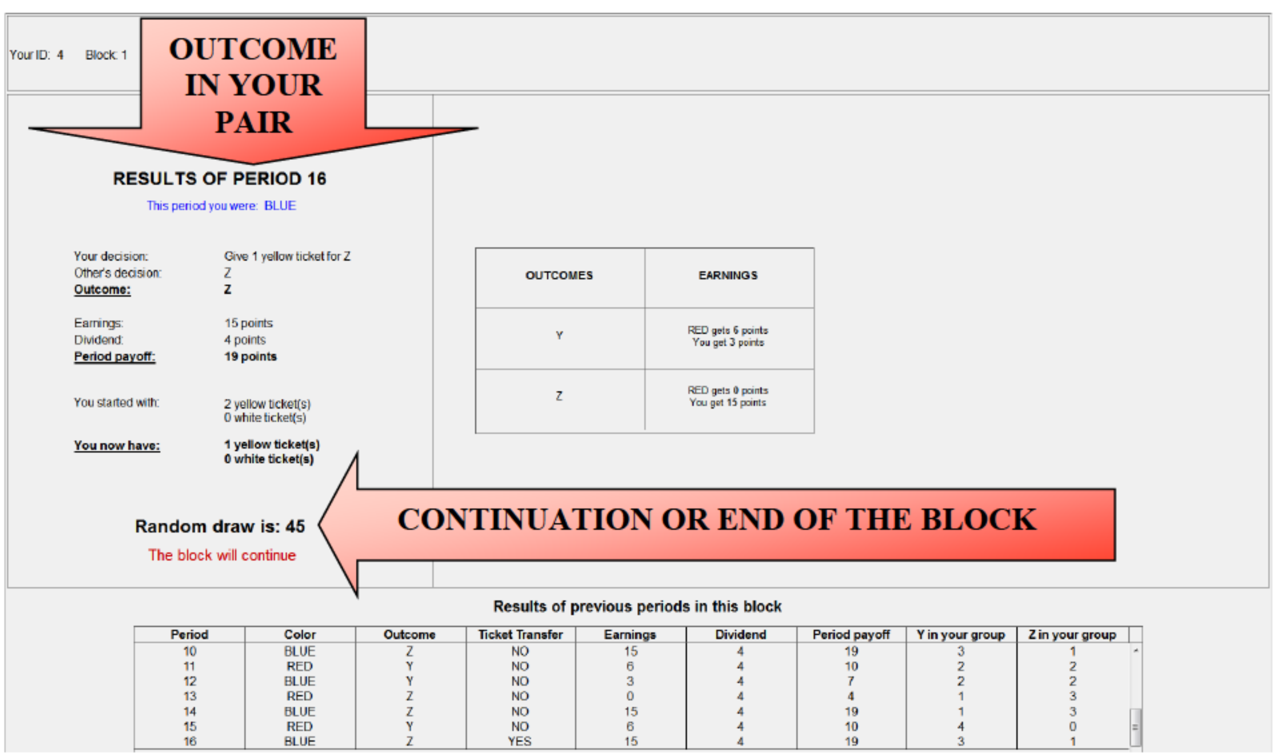

Ending of a block

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Final reminders

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- Each block has 16 periods for sure plus an uncertain number of additional periods. After each additional period there is **always** a 75% chance of one more period, and a 25% chance of ending.
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Before we start the experiment, you will be asked to answer ten questions designed to verify your understanding of the instructions. You will receive $0.25 for each question you answer correctly on the first try. If you have a question at any time, then please raise your hand and someone will help you.

Post-Instructions Quiz (MIX treatment)

We would like you to answer 10 questions, to make sure that instructions are clear. You will receive $0.25 for each question answered correctly at the first try. Press OK to start. Thank you.

QUESTION 1: Each block is composed of:

A) at most 16 periods
B*) at least 16 periods plus an uncertain number of additional periods, depending on a series of random draws
C) an average of 16 periods

QUESTION 2: Suppose we have reached period 24 of a block. What is the probability that the block will continue?

A*) 75%
B) 25%
C) the block will stop for sure

QUESTION 3: In each new block:

A*) I am placed in a new group of 8 participants
B) I remain in the same group of 8 participants I was in block 1
C) there is no way to tell what may happen

QUESTION 4: Will your match change from period to period?

A*) Yes. It is likely that my match changes.
B) No. It is unlikely that my match changes.
C) No, my match will never change.

QUESTION 5: Suppose you are RED in a period. Will you be BLUE the following period?

A) There is a 50% chance that I will be BLUE
B) No, I will remain RED.
C*) Yes, I will be BLUE.

QUESTION 6: Will you earn or pay points from holding a ticket at the start of a period?

A) Holding tickets will never give me points, nor cost me any points.
B*) I will receive 2 points for each yellow ticket I hold at the start of a period.
C) I will pay 1 point for each ticket I hold at the start of a period.

QUESTION 7: Suppose you earn 200 points in every block. At the end of the session one block is randomly selected for payment. How many dollars will you earn in the experiment, IN ADDITION TO show-up fee and payments for questions?

A) A random amount of dollars
B*) $30.00 (= $0.15 x 200 points)
C) $150.00 (= $0.15 x 200 points x 5 blocks)

QUESTION 8: Is it possible that your match in a block is the SAME person who was your match in a previous block?

A) Yes. This is always true.
B) Yes. It is not always true but it is very likely.
C*) No. It is impossible. My match in a block cannot be my match in ANY other blocks.

QUESTION 9: Suppose a block that lasted 28 periods is selected for payment. The outcome was Y in EVERY period. Remember: you are RED half of the periods and BLUE half of the periods. How many points will you earn in total, excluding any points earned from holding tickets?

A) 210 points (=14 periods x 15 points)
B*) 126 points (= 14 periods x 3 points + 14 periods x 6 points)
C) 252 points (=14 periods x 15 points + 14 periods x 3 points)

QUESTION 10: Suppose a block that lasted 28 periods is selected for payment. The outcome was Z in EVERY period. Remember: you are RED half of the periods and BLUE half of the periods. How many points will you earn in total, excluding any points earned from holding tickets?

A) 252 points (=14 periods x 15 points + 14 periods x 3 points)
B) 126 points (= 14 periods x 3 points + 14 periods x 6 points)
C*) 210 points (=14 periods x 15 points)

[**Notes:** "*" identifies the correct answer; Block=supergame (5 blocks played, received payments for one randomly selected publicly at the end of the experiment); RED=producer, BLUE=consumer; Yellow ticket=sophisticated token, White ticket=plain token; Y=defection, Z=cooperation.]