

Welcome to the Experiment

Thank you for participating in our decision-making experiment. The experiment is divided into 3 phases. There are a total of 25 periods. In each period you will have an opportunity to earn money, which is in addition to the \$5 guaranteed for your participation in the experiment. Your earnings each period will depend on your decisions and the decisions of other participants.

Please read the following instructions carefully. Everyone must correctly answer the comprehension questions at the end before we can begin.

During the experiment you are not allowed to communicate with other participants. If you have a question please raise your hand.

During the experiment your earnings will be calculated in *Experimental Dollars* (*EDs* for short). You can earn *EDs* every period. At the end of the experiment, your total earnings in *EDs* will be converted to U.S. dollars at the following rate:

$$50 \text{ EDs} = \$1$$

This means that each ED you earn during the experiment will exchange for \$.02. At the end of the experiment your total earnings (including the \$5 participation fee) will be paid to you, privately and anonymously, in cash.

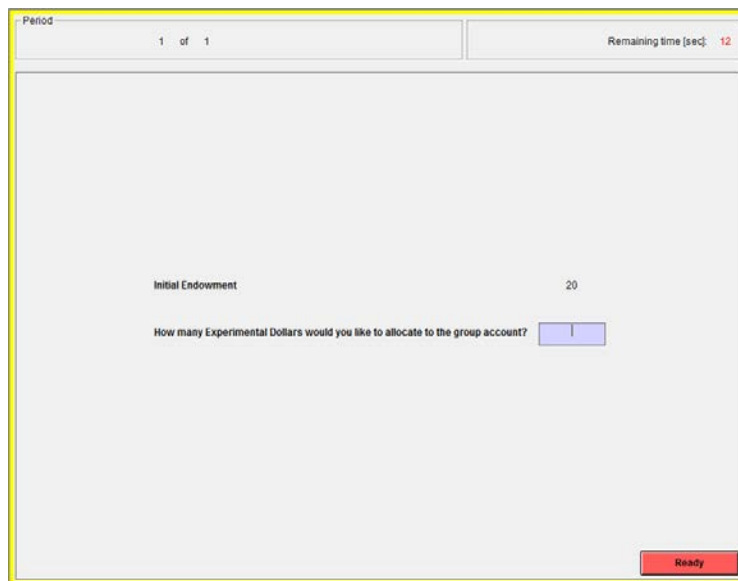
In the experiment, each participant is randomly assigned to a group of 5. This means that you are in a group with four other participants. You will be part of the **same** group throughout the entire experiment. However, at no point will the members of your group be revealed. All of the decisions you make within the experiment are anonymous and will be kept confidential.

Instructions for Phase 1 (Periods 1 - 3)

Phase 1 consists of 3 periods. In each period, each group member, yourself included, will be given an endowment of 20 EDs. In each of these periods you will have to make one decision.

Your decision

Each of you will independently and anonymously decide how many of your EDs to allocate to the group account. You can allocate any integer between 0 and 20 to the group account. Your remaining EDs will automatically be allocated to your private account. Your earnings depend on the number of EDs in your private account and the total number of EDs in the group account.

The screenshot shows a web-based decision interface. At the top, there is a header bar with two sections: 'Period' and 'Remaining time (sec)'. The 'Period' section shows '1 of 1'. The 'Remaining time (sec)' section shows '12'. Below the header, the main area is light gray. It contains the text 'Initial Endowment' followed by '20'. Below that, it asks 'How many Experimental Dollars would you like to allocate to the group account?' with a text input field containing the number '1'. In the bottom right corner, there is a red button labeled 'Ready'.

How do I calculate my earnings?

The earnings from your private account equal the number of EDs in your private account. Your private account earnings do not depend on the decisions of other group members. You simply keep all EDs that you choose not to allocate to the group account.

Your Private Account Earnings = 20 – (EDs you allocated to the group account)

Your earnings from the group account equal 0.4 times the total number of EDs allocated to the group account. Thus, your group account earnings depend, in part, on the decisions of other group members.

Your Group Account Earnings = 0.4*(the number of EDs allocated to the group account)

Your period earnings are the sum of your private account earnings and your group account earnings.

Period Earnings = Private Account Earnings + Group Account Earnings

An Example

Assume that each group member, including you, allocates 10 EDs to the group account so that the sum of the EDs in the group account is 50 EDs.

Your private account earnings = $20 - 10 =$	10 EDs
Your group account earnings = $0.4 * 50 =$	+ <u>20 EDs</u>
Your period earnings = $10 + 20 =$	= 30 EDs

Note that you get 1 ED as earnings for each ED you keep in your private account. For each ED you instead allocate to the group account, your earnings from the group account **increase** by $0.4 * 1 = 0.4$ EDs and your earnings from your private account **decrease** by 1 ED.

However, for each ED you allocate to the group account, the earnings of each of the other 4 members of your group **increase** by 0.4 EDs. Therefore, for each ED you allocate to the group account the total group earnings **increase** by $0.4 * 5 = 2$ EDs.

Note that you also obtain earnings from each ED allocated to the group account by others. You earn $0.4 * 1 = 0.4$ ED for each ED allocated to the group account by another member.

What information is provided after each period?

At the end of each period you will be shown the following:

- Your group account allocation
- The sum of the group account allocations by all members of your group
- Your group account earnings
- Your period earnings

You are also shown the individual group account allocations by each other member of your group by random ID. The random ID (labeled as A, B, C or D) represents a different group member each period.

You will also be presented with the history of choices from previous periods. This information includes the information above and your total earnings up to this point in the experiment. Your total earnings are the sum of your earnings from each period of the experiment.

The example screen depicted is for demonstration only and relates to example 1 below.

Period		1 of 4		Remaining time [sec]: 25	
<div style="text-align: right;"> Your Allocation 15 Total Allocation 55 Your Group Account Earnings 22.00 Your Period Earnings 27.00 </div>					
<div style="text-align: right;"> Allocations of Other Members Allocation of member A 20 Allocation of member B 0 Allocation of member C 0 Allocation of member D 20 </div>					
Ready					
Period	Your Allocation	Total Allocation	Your Group Account Earnings	Your Period Earnings	Your Total Earnings
1	15	55	22.00	27.00	27.00

Example 1

Suppose you allocate 15 EDs to the group account, group members B and C each allocate 0 EDs to the group account, and group members A and D each allocate 20 EDs to the group account.

The sum of EDs in the group account is $15+0+0+20+20 = 55$ EDs
So each group member earns $0.4*55 = 22$ EDs from the group account

Individual period earnings will differ across members depending on each member's earnings from their private accounts.

Your period earnings are: $(20-15) + (0.4*55) = 5+22 = 27$ EDs
The period earnings of members B and C are: $(20-0) + (0.4*55) = 20+22 = 42$ EDs
The period earnings of members A and D are: $(20-20) + (0.4*55) = 0+22 = 22$ EDs

Example 2

Now suppose you allocate 5 EDs to the group account but that the allocations of group members A, B, C, and D remain unchanged.

The sum of EDs in the group account is now $5+0+0+20+20 = 45$ EDs
So each group member earns $0.4*45 = 18$ EDs from the group account

Your period earnings are: $(20-5) + (0.4*45) = 15+18 = 33$ EDs
The period earnings of members B and C are: $(20-0) + (0.4*45) = 20+18 = 38$ EDs
The period earnings of members A and D are: $(20-20) + (0.4*45) = 0+18 = 18$ EDs

Compared with the earnings of Example 1, your earnings have increased (by 6 EDs) and the earnings of **each** of the other four members have decreased (by 4 EDs).

Comprehension questions

Please answer the following questions. Raise your hand if you need any help. A member of the experiment team will check your answers when you are done. We will begin when everyone has finished. Thank you for your patience.

1) Suppose that each group member, **including** you, allocates 0 EDs to the group account.

What are your private account earnings? _____
What are your group account earnings? _____
What are your period earnings? _____

2) Suppose that each group member, **including** you, allocates 20 EDs to the group account.

What are your private account earnings? _____
What are your group account earnings? _____
What are your period earnings? _____

3) Suppose that each group member, **excluding** you, allocates 10 ED to the group account.

a. Suppose you allocate 0 ED to the group account

What are your private account earnings? _____
What are your group account earnings? _____
What are your period earnings? _____

b. Suppose you allocate 10 ED to the group account

What are your private account earnings? _____
What are your group account earnings? _____
What are your period earnings? _____

c. Suppose you allocate 20 ED to the group account

What are your private account earnings? _____
What are your group account earnings? _____
What are your period earnings? _____

Instructions for Phase 2 (Periods 4 – 15)

The next 12 periods are like the previous 3 in that you continue to interact with the same four individuals and in each period you make a decision about how many of your 20 ED endowment to allocate to the group account. In each period your earnings are initially computed exactly as earnings were computed in the previous phase. Earnings computed in this way will, from here on, be referred to as your *initial* earnings.

In this phase your initial earnings may be reduced.

When are my initial earnings reduced?

Your initial earnings are reduced if your allocation to the group account is monitored **and** is less than 20 EDs.

How are group account allocations monitored?

Each period, before you make your group account allocation decision, you will be informed how many group members are likely to have their group account allocations monitored. This value can be any integer from 0 to 5 and determines the probability that **your** group account allocation will be monitored. The table below depicts the relationship between this value and the probability that your group account allocation is monitored.

Number of group members who are <u>likely</u> to have their group account allocation monitored	Probability that your group account allocation is monitored
0	$0/5 = 0$ (0% Chance)
1	$1/5 = .2$ (20% Chance)
2	$2/5 = .4$ (40% Chance)
3	$3/5 = .6$ (60% Chance)
4	$4/5 = .8$ (80% Chance)
5	$5/5 = 1$ (100% Chance)

For example, if 1 group member is likely to have his or her group account allocation monitored, then **each** group member faces a 20% chance of having their group account allocation monitored. **Importantly, this is determined independently for each group member.** Another way to think of this is that, with each member facing a 20% chance, then **on average** 1 group member would have his or her group account allocation monitored.

How does this impact my earnings?

This value impacts your earnings in two ways. First, all group members must pay their share of the monitoring costs regardless of whether their group account allocations are monitored. Second, if your group account allocation is monitored your earnings may be reduced further, as described below.

How do I calculate my monitoring cost?

The total monitoring cost is equal to 5 times the number of group members that are likely to have their group account allocations monitored:

Total Monitoring Cost = 5*Number of group members who are likely to be monitored

To determine each group member's share of the monitoring cost, the total monitoring cost is divided evenly across all group members. Therefore:

Your Monitoring Cost = (Total Monitoring Cost)/5

For example, if 3 group members are likely to have their group account allocations monitored:

The total monitoring cost = $5 \times 3 =$ 15 EDs and

Your monitoring cost = $15/5 =$ 3 EDs

How do I calculate the reduction?

If your group account allocation is monitored, you lose all the EDs that remain in your **private** account. In other words, the reduction in your earnings is equal to the difference between 20 EDs (your endowment) and your group account allocation:

Reduction = 20–Your Group Account Allocation

For example, suppose that you allocate 15 EDs to the group account and your group account allocation is monitored:

The reduction = $20 - 15 =$ 5 EDs.

Note: if your group allocation was 20 EDs your reduction would be 0.

How do I calculate my earnings?

Recall that your *initial* earnings are calculated and reported just as your earnings were in phase 1. To calculate your final earnings each period during this phase you subtract your monitoring cost and the reduction (if your earnings are reduced) from these initial earnings.

Period Earnings = Initial Earnings–(Your Monitoring Cost)–(Reduction (if applicable))

What information is provided after each period?

In addition to the information provided at the end of each period in phase 1 you will be shown:

Your monitoring cost, whether your allocation was monitored and the amount of the reduction (if applicable).

The example screen below is for demonstration only and relates to the example below:

Period		4 of 4		Remaining time [sec]: 24	
Your Allocation		15			
Total Allocation		55			
Your Group Account Earnings		22.00			
Your Initial Earnings		27.00			
Your Monitoring Cost		3.00			
Your Net Initial Earnings		24.00			
Group Account Allocations Monitored?		Yes			
Reduction		5			
Your Period Earnings		19.00			
Allocations of Other Members					
Allocation of member A		20			
Allocation of member B		0			
Allocation of member C		0			
Allocation of member D		20			
Ready					

Period	Your Allocation	Total Allocation	Your Group Account Earnings	Your Initial Earnings	Your Monitoring Cost	Reduction	Your Period Earnings	Your Total Earnings
1	15	55	22.00	27.00	0.00	0	27.00	27.00
2	0	0	0.00	20.00	0.00	0	20.00	47.00
3	20	100	40.00	40.00	0.00	0	40.00	87.00
4	15	55	22.00	27.00	3.00	5	19.00	106.00

An Example

Assume that 3 group members are likely to have their group account allocations monitored:
The total monitoring cost = $5 \times 3 = 15$ EDs and Your monitoring cost = $15/5 = 3$ EDs

Suppose you allocate 15 EDs to the group account, group members A and D each allocate 20 EDs to the group account, and group members B and C each allocate 0 EDs to the group account.

The sum of EDs in the group account is $15 + 20 + 20 + 0 + 0 = 55$ EDs
So each group member earns $0.4 \times 55 = 22$ EDs from the group account.

Your period earnings are calculated as follows:

$$\begin{aligned} \text{Initial earnings} &= (20 - 15) + (0.4 \times 55) = 5 + 22 = 27 \text{ EDs} \\ \text{Your monitoring cost} &= 15/5 = \underline{- 3 \text{ EDs}} \\ \text{Net initial earnings (before possible reduction)} &= 24 \text{ EDs} \end{aligned}$$

If your group account allocation is monitored (a 60% chance) your period earnings are:

$$\begin{aligned} \text{Net initial earnings (before possible reduction)} &= 24 \text{ EDs} \\ \text{Reduction} &= 20 - 15 = \underline{- 5 \text{ EDs}} \\ \text{Period Earnings} &= 19 \text{ EDs} \end{aligned}$$

If your group account allocation is **not** monitored (a 40% chance) your period earnings are:

$$\begin{aligned} \text{Net initial earnings (before possible reduction)} &= 24 \text{ EDs} \\ \text{Reduction} &= \underline{- 0 \text{ EDs}} \\ \text{Period Earnings} &= 24 \text{ EDs} \end{aligned}$$

Opportunity to communicate

Before each of the next 12 periods you will have the opportunity to communicate with your group members through a Chat Box. You can use this area to discuss the experiment.

You are allowed to discuss any feature of the experiment but are **NOT** allowed to identify yourself, your appearance, or your location within the lab. Further, you are **NOT** allowed to use offensive language or make threats of any kind toward your group members.

To enter a message simply hit the Enter key after you have typed your message. Each group member will be identified by a random ID that will change each period. When you are done with the Chat, click the End Chat button. The Chat Box will remain open until all group members have clicked the End Chat button or 1 minute has passed. Be patient, the experiment will continue when all participants are ready.

Comprehension questions

Please answer the following questions. Raise your hand if you need any help. A member of the experiment team will check your answers when you are done. We will begin when everyone has finished. Thank you for your patience.

Suppose that 2 group members are likely to have their group account allocation monitored.

1. What is the probability that your group account allocation will be monitored? _____
2. What is the total monitoring cost? _____
3. What is your monitoring cost? _____

Suppose you allocate 5 EDs to the group account, group members A and B each allocate 20 EDs to the group account and group members C and D each allocate 0 EDs to the group account.

The sum of ED in the group account is	$5+20+20+0+0 = 45$ EDs
So each group member earns	$0.4*45 = 18$ EDs from the group account

4. Find your period earnings if your group account allocation is monitored

Initial earnings	_____
Your monitoring cost (from above)	_____
Reduction	_____
Period earnings	_____

5. Find your period earnings if your group account allocation is **not** monitored

Initial earnings	_____
Your monitoring cost (from above)	_____
Reduction	_____
Period earnings	_____

Instructions for Phase 3 (Periods 16 – 25)

The next 10 periods are like the previous 12. The only difference is that now the group votes determine the number of group members who are likely to have their group account allocations monitored through a voting procedure describe below.

How does the voting work?

Before **each** of the next 10 periods each of you will independently and privately vote on how many group members are likely to have their group account allocation monitored. Your vote can be any integer from 0 to 5. Once each member has voted, the median value is calculated and reported.

Recall that the median represents the middle value. The median is calculated by placing the five votes in ascending order and picking the middle value. For example, the table below represents several possible combinations of votes and the resulting median value.

Votes in Ascending Order	Median Value
0, 1, 2 , 3, 4,	2
0, 0, 0 , 5, 5	0
1, 2, 2 , 3, 5	2
3, 4, 4 , 4, 5	4
0, 4, 4 , 4, 4	4
0, 0, 3 , 5, 5	3

Note that because the median value will be used, it is in your best interest to vote for the number of group members that you prefer to be monitored. Because the median, and not the average, will be used, you cannot improve (from your perspective) the outcome of the vote by choosing a value higher or lower than your preferred level.

An Example

Suppose that your preferred outcome is that **3 group members** are likely to have their group account allocations monitored. Let's see how different voting strategies affect the outcome of the vote. In the following, simply place your vote, in ascending order, into each given set of votes from the other group members.

The other members of your group submit the following votes: 1,2,4,5.

If you vote **1** the median [1,**1**,2,4,5] = 2

If you vote **3** the median [1,2,**3**,4,5] = 3

If you vote **5** the median [1,2,4,**5**,5] = 4

The other members of your group submit the following votes: 0,3,5,5.

If you vote **1** the median [0,**1**,3,5,5] = 3

If you vote **3** the median [0,3,**3**,5,5] = 3

If you vote **5** the median [0,3,5,**5**,5] = 5

The other members of your group submit the following votes: 0,1,4,5.

If you vote **1** the median [0,**1**,1,4,5] = 1

If you vote **3** the median [0,1,**3**,4,5] = 3

If you vote **5** the median [0,1,4,**5**,5] = 4

The other members of your group submit the following votes: 0,3,5,5.

If you vote **1** the median [0,**1**,3,5,5] = 3

If you vote **3** the median [0,3,**3**,5,5] = 3

If you vote **5** the median [0,3,5,**5**,5] = 5

The importance of the examples is to demonstrate that choosing your preferred value **always** results in the outcome closest to your preferred value. In no case is the median closer to 3 than it is when you vote 3. Therefore, given that the votes of your group members remain unknown it is in your best interest to vote for the value you prefer.

Comprehension Questions

Suppose that the other members of your group submit the following votes: 0,1,2,4. For each of the following determine the median vote. Raise your hand if you need any help. A member of the experiment team will check your answers when you are done. We will begin when everyone has finished. Thank you for your patience.

You vote 1? _____

You vote 3? _____

You vote 5? _____