Appendix E [For Online Publication]:

Experimental Instructions for "Timing of Commitment in Coalitional Bargaining"

By Aaron Kamm and Simon Siegenthaler

General Instructions

Welcome to the Laboratory for Research in Behavioural Experimental Economics.

Your earnings from the experiment will largely depend on your decisions and the decisions of others. Therefore, it is important that you read the instructions carefully.

Throughout the experiment, we will not speak of EUR, but rather of ECU (Experimental Currency Units). At the end of the experiment the total amount of ECU you earned will be converted to EUR at the **exchange rate 1 ECU = 0.105 EUR**. You will also receive a **show up fee** of **EUR 5**. You will be paid your earnings in cash, privately at the end of the session.

All interactions between you and other participants will occur through the computer terminals. Please do not talk directly to or attempt to communicate with other participants during the session. Please also do not ask questions aloud. If you have a question, raise your hand and a member of the experimenter team will come to you. All personal electronic devices should remain switched off until the end of the experiment.

Instructions for Treatment *4P-Baseline*

Summary of Setting

In this experiment, you will play **10 rounds** of a decision situation. In each round, there will be four groups A, B, C and D. Each group will have one representative who will negotiate on behalf of the group. In particular, representatives will negotiate how to distribute 100 ECU between four projects (called projects A, B, C and D). The distribution of the 100 ECU will be determined by majority rule, where the four groups will differ in the number of votes they have (there will be two groups with 1 vote, one group with 2 votes and one group with 3 votes). The earnings of each participant will depend on the amount of ECU allocated to their preferred project. In the following, we will explain to you the decision situation in detail.

Groups

There are three different types of groups. A **small** group has **1 vote**. A **medium group** has **2 votes**. A **large group** has **3 votes**. Each participant in a group has a vote, that is, a small group consists of 1 participant, a medium group consists of 2 participants and a large group consists of 3 participants. At the beginning of the experiment, the computer will randomly determine whether you will be a member of a small, medium or large group. If you are a member of a small group, you will be in a small group for the entire experiment. Likewise, if you are a member of a medium (respectively, large) group, you will be in a medium (respectively, large) group for the entire experiment. However, the other participants with whom you form a medium or large group randomly change between rounds.

Representatives

For each group and in each round, the computer will randomly choose a **representative** who will negotiate on behalf of their group. A participant in a small group will thus always be a representative, while a participant in a medium group will be a representative with probability 1/2 and a participant in a large group will be a representative with probability 1/3 in each round.

Matching

In each round, **two small groups**, **one medium group** and **one large group** will be randomly matched. There are thus 7 votes (participants) in total in each match of four groups, 1 participant in each of the small groups, 2 participants in the medium group and 3 participants in the large group.

Each of the four groups will be allocated an identifier A, B, C or D. That is, in a match there will always be one group A, one group B, one group C and one group D. We would like you to think about the identifiers as a group's preference for a **project A, B, C or D**. In other words, a member of group A prefers project A, a member of group B prefers project B, a member of group C prefers project C and a member of group D prefers project D.

Identifiers A, B, C and D are randomly chosen in each of the 10 rounds. Hence, if a participant is a representative of group A in one round, he or she may be the representative of group A, B, C or D in the next round.

Moreover, since the matching of groups is random, the participants you meet will typically change between rounds. You will never know the identity of the people with whom you are matched in a given round.

Negotiation Process

In each round, the four group representatives will negotiate how to distribute 100 ECU between the four projects. The participants in the medium and large group who were not chosen as the representative will not actively participate in the negotiation process, but will see the proposals made during the negotiating process.
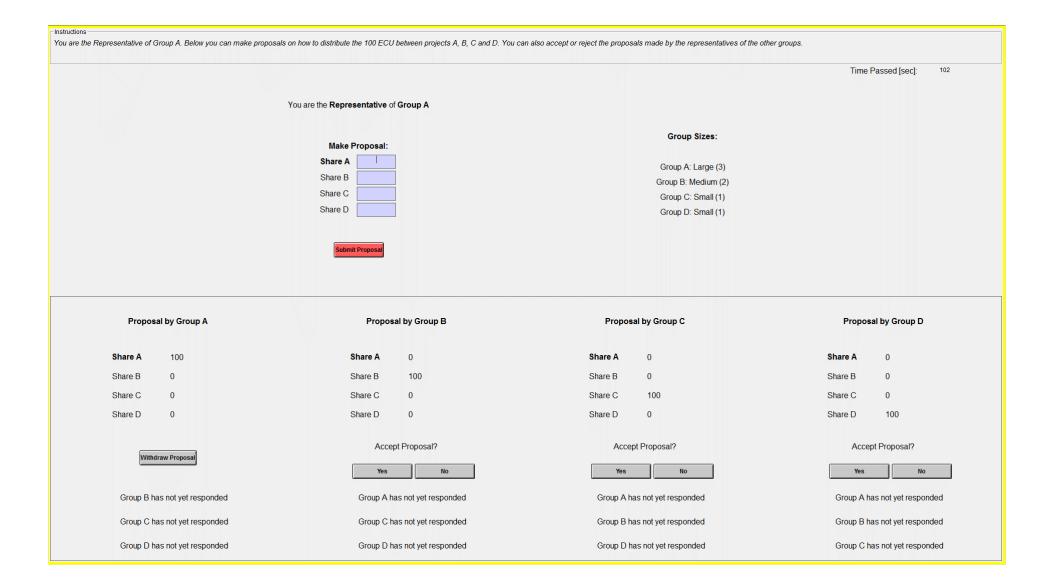
Representatives can make proposals of the following form: **Proposal = (share A, share B, share C, share D).** If the proposal is accepted, share A will be allocated to project A, share B will be allocated to project B, share C will be allocated to project C and share D will be allocated to project D. The sum of the four shares is required to be 100.

For a proposal to be accepted, it must receive a **majority** of the 7 votes in a match of four groups, that is, it must get **4 or more 'Yes'-votes**. If a representative of a group votes in favor of a proposal, the proposal receives all votes of the respective group (1 for a small, 2 for a medium and 3 for a large group). Any combination of 4 or more 'Yes'-votes results in the proposal passing. Notice that the large group and one small group can form a majority (3+1 votes), and so can the large and the medium group (3+2 votes) or the medium group together with the two small groups (2+1+1 votes). If the proposal is accepted, the proposed allocation is binding and we will move on to the next round. If a proposal is defeated (gets less than 4 'Yes'-votes), it is removed from the list of proposals.

The screen shot on the next page shows how representatives will be able to make and accept / reject proposals. As you can see, in the upper half of the screen, you will be able to make proposals by entering a share A, a share B, a share C and a share D. The share that corresponds to your own share is shown in bold. The lower half of the screen shows the proposals that have been made by the representatives. To vote in favor of another representative's proposal, you can click on 'Yes'. To vote against a proposal, you can click on 'No'. You cannot vote for your own proposal, since it is already assumed that you are in favor of it. You can however withdraw your proposal, in which case it will disappear from the list of proposals.

As a representative, you can make as many proposals as you would like, but you cannot have more than one standing proposal. Hence, after you have made a proposal, you are free to submit another proposal, which will then simply replace the previous proposal. When revising a proposal, you are in no way restricted by your previous proposal, e.g. you can propose to allocate to your preferred project a smaller or a larger share than in the previous proposal.

Representatives can make proposals at any time they wish to do so. There are no rules regarding which representative can make the next proposals or when this proposal has to be made. Proposals can also be accepted or rejected at any time, **except in the first minute** of the negotiation process during which no proposals can be accepted or rejected.

You are the Representative of Group A. Below you can make proposals on how to distribute the 100 ECU between projects A, B, C and D. You can also accept or reject the proposals made by the representatives of the other groups.

Time Passed [sec]:   102

You are the **Representative** of **Group A**

Make Proposal:

Share A [   ]
Share B [   ]
Share C [   ]
Share D [   ]

Submit Proposal

Group Sizes:

Group A: Large (3)
Group B: Medium (2)
Group C: Small (1)
Group D: Small (1)

Proposal by Group A		**Proposal by Group B**		**Proposal by Group C**		**Proposal by Group D**	
Share A	100	**Share A**	0	**Share A**	0	**Share A**	0
Share B	0	Share B	100	Share B	0	Share B	0
Share C	0	Share C	0	Share C	100	Share C	0
Share D	0	Share D	0	Share D	0	Share D	100

Withdraw Proposal	Accept Proposal?	Accept Proposal?	Accept Proposal?
	Yes No	Yes No	Yes No

Group B has not yet responded	Group A has not yet responded	Group A has not yet responded	Group A has not yet responded
Group C has not yet responded	Group C has not yet responded	Group B has not yet responded	Group B has not yet responded
Group D has not yet responded	Group D has not yet responded	Group D has not yet responded	Group C has not yet responded

Duration

There are two ways the negotiation process may end. First, the negotiation process ends as soon as a proposed allocation of shares receives a majority of the votes (4 or more 'Yes'-votes). Second, there is a probability that the negotiation process ends before the representatives have agreed on an allocation. This is done as follows. Each round will last **at least 3 minutes** (unless a proposal is accepted in which case the negotiation process ends immediately). After the 3 minutes, there will be a probability that the negotiation process is terminated. In particular, after the 3 minutes, every 5 seconds there will be a probability of 4% that the round ends. Hence, the game will last at least 3 minutes and 5 seconds with a probability of 96%, at least 3 minutes 10 seconds with a probability of 92.16% and so on… To make things simple, note that the duration is at least 4 minutes with a probability of 61%, at least 5 minutes with 38%, at least 6 minutes with 23%, at least 7 minutes with 14%, at least 8 minutes with 9% and at least 9 minutes with 5%. In the unlikely event the bargaining process should exceed 10 minutes, we will stop at 10 minutes.

Earnings

Recall that members of group A prefer project A, members of group B prefer project B, members of group C prefer project C and members of group D prefer project D. More precisely, the total earnings of each group are given by the share of the 100 ECU allocated to their preferred project. Thus,

Total earnings of group A = Share A of the accepted proposal
Total earnings of group B = Share B of the accepted proposal
Total earnings of group C = Share C of the accepted proposal
Total earnings of group D = Share D of the accepted proposal

Each group's earnings are then equally distributed among the group members. Hence, the large groups have to divide their share between two members. Thus,

Earnings of a member of group A = Share A of the accepted proposal / Size of group A
Earnings of a member of group B = Share B of the accepted proposal / Size of group B
Earnings of a member of group C = Share C of the accepted proposal / Size of group C
Earnings of a member of group D = Share D of the accepted proposal / Size of group D

Below you can find two examples of how earnings are calculated. Both examples are to help you understand better the experiment. They should not be considered as guides on how to behave in the experiment.

Example 1: Assume you are the representative of group A and your group is a small group. You have made a proposal: share A = 84, share B=6, share C=0, share D=10. The representatives of group B and D vote in favor of the proposal while the representative of group C votes 'No'. Group B is a medium group, group C is a large group and group D is a small group. Then the total number of votes for your proposal is 4, your own vote plus 2 votes from group B and 1 vote from group D. This is the majority of votes and the proposal is accepted. You earn 84 ECU, as you are the only member in your group. Each of the two members in group B earns 3 ECU (group B earns 6 ECU in total), the three members in group C earn zero and the sole member of group D earns 10 ECU.

Example 2: Assume you are the representative of group C and your group is a large group. You observe a proposal by the representative of group B, who is part of a small group: share A=25, share B=30, share C=45, share D=0. You vote in favor of the proposal and the representatives of group A (medium group) and D (small group) reject the proposal. The total number of 'Yes'-votes for the proposal is 4, 3 votes from your group plus 1 vote from group B. This is the majority of votes and the proposal is accepted. Your group earns 45 ECU in total. Hence, you and the other two members in your group each earn 15 ECU. The sole member of group B earns 30 ECU. Group A earns 25 ECU and therefore each of its two members receives 12.5 ECU. The sole member of group D receives 0 ECU.

Your earnings from each of the 10 rounds will be summed up and paid to you at the end of the session. All 10 rounds of the experiment will be the same, except that the participants you are matched with will typically change between rounds. If you are a member of a medium or large group, you will sometimes be a representative of your group and sometimes not.

This completes the description of the instructions. If you have any questions, please raise your hand. Otherwise, please proceed to answer the questions shown on the computer screen. The purpose of the questions is to make sure that you understand the different elements of the experiment. Any unclear points will be explained by the experimenter.

Instructions for Treatment *4P-Simultaneous*

Summary of Setting

In this experiment, you will play **10 rounds** of a decision situation. In each round, there will be four groups A, B, C and D. Each group will have one representative who will negotiate on behalf of the group. In particular, representatives will negotiate how to distribute 100 ECU between four projects (called projects A, B, C and D). The distribution of the 100 ECU will be determined by majority rule, where the four groups will differ in the number of votes they have (there will be two groups with 1 vote, one group with 2 votes and one group with 3 votes). The earnings of each participant will depend on the amount of ECU allocated to their preferred project. In the following, we will explain to you the decision situation in detail.

Groups

There are three different types of groups. A **small** group has **1 vote**. A **medium group** has **2 votes**. A **large group** has **3 votes**. Each participant in a group has a vote, that is, a small group consists of 1 participant, a medium group consists of 2 participants and a large group consists of 3 participants. At the beginning of the experiment, the computer will randomly determine whether you will be a member of a small, medium or large group. If you are a member of a small group, you will be in a small group for the entire experiment. Likewise, if you are a member of a medium (respectively, large) group, you will be in a medium (respectively, large) group for the entire experiment. However, the other participants with whom you form a medium or large group randomly change between rounds.

Representatives

For each group and in each round, the computer will randomly choose a **representative** who will negotiate on behalf of their group. A participant in a small group will thus always be a representative, while a participant in a medium group will be a representative with probability 1/2 and a participant in a large group will be a representative with probability 1/3 in each round.

Matching

In each round, **two small groups**, **one medium group** and **one large group** will be randomly matched. There are thus 7 votes (participants) in total in each match of four groups, 1 participant in each of the small groups, 2 participants in the medium group and 3 participants in the large group.

Each of the four groups will be allocated an identifier A, B, C or D. That is, in a match there will always be one group A, one group B, one group C and one group D. We would like you to think about the identifiers as a group's preference for a **project A, B, C or D**. In other words, a member of group A prefers project A, a member of group B prefers project B, a member of group C prefers project C and a member of group D prefers project D.

Identifiers A, B, C and D are randomly chosen in each of the 10 rounds. Hence, if a participant is a representative of group A in one round, he or she may be the representative of group A, B, C or D in the next round.

Moreover, since the matching of groups is random, the participants you meet will typically change between rounds. You will never know the identity of the people with whom you are matched in a given round.

In each round, the four group representatives will negotiate how to distribute 100 ECU between the four projects. The participants in the medium and large group who were not chosen as the representative will not actively participate in the negotiation process, but will see the proposals made during the negotiating process.

Representatives can make proposals of the following form: **Proposal = (share A, share B, share C, share D).** If the proposal is accepted, share A will be allocated to project A, share B will be allocated to project B, share C will be allocated to project C and share D will be allocated to project D. The sum of the four shares is required to be 100.

For a proposal to be accepted, it must receive a **majority** of the 7 votes in a match of four groups, that is, it must get **4 or more 'Yes'-votes**. If a representative of a group votes in favor of a proposal, the proposal receives all votes of the respective group (1 for a small, 2 for a medium and 3 for a large group). Any combination of 4 or more 'Yes'-votes results in the proposal passing. Notice that the large group and one small group can form a majority (3+1 votes), and so can the large and the medium group (3+2 votes) or the medium group together with the two small groups (2+1+1 votes). If the proposal is accepted, the proposed allocation is binding and we will move on to the next round. If a proposal is defeated (gets less than 4 'Yes'-votes), it is removed from the list of proposals.

The screen shot on the next page shows how representatives will be able to make and accept / reject proposals. As you can see, in the upper half of the screen, you will be able to make proposals by entering a share A, a share B, a share C and a share D. The share that corresponds to your own share is shown in bold. The lower half of the screen shows the proposals that have been made by the representatives. To vote in favor of another representative's proposal, you can click on 'Yes'. To vote against a proposal, you can click on 'No'. You cannot vote for your own proposal, since it is already assumed that you are in favor of it. You can however withdraw your proposal, in which case it will disappear from the list of proposals.

As a representative, you can make as many proposals as you would like, but you cannot have more than one standing proposal. Hence, after you have made a proposal, you are free to submit another proposal, which will then simply replace the previous proposal. When revising a proposal, you are in no way restricted by your previous proposal, e.g. you can propose to allocate to your preferred project a smaller or a larger share than in the previous proposal.

Representatives can make proposals at any time they wish to do so. There are no rules regarding which representative can make the next proposals or when this proposal has to be made. Proposals can also be accepted or rejected at any time, **except in the first minute** of the negotiation process during which no proposals can be accepted or rejected.

You are the **Representative** of **Group A**

Coalition Negotiations

Group Sizes:

Make Proposal:

Agree to form coalition **AD?** | Yes |

Share A [   ]

Agree to form coalition **ABC?** | Yes |

Group A: Small (1)

Share B [   ]

Group B: Small (1)

Share C [   ]

Group C: Medium (2)

Share D [   ]

Summary of Coalition Negotiations
Group A agreed to:
Group B agreed to:
Group C agreed to:
Group D agreed to:

Group D: Large (3)

| Submit Proposal |

Proposal by Group A

Proposal by Group B

Proposal by Group C

Proposal by Group D

Share A	100
Share B	0
Share C	0
Share D	0

Share A	0
Share B	100
Share C	0
Share D	0

Share A	0
Share B	0
Share C	100
Share D	0

Share A	0
Share B	0
Share C	0
Share D	100

| Withdraw Proposal |

Accept Proposal?
| Yes | | No |

Accept Proposal?
| Yes | | No |

Accept Proposal?
| Yes | | No |

Group B has not yet responded

Group C has not yet responded

Group D has not yet responded

Group A has not yet responded

Group C has not yet responded

Group D has not yet responded

Group A has not yet responded

Group B has not yet responded

Group D has not yet responded

Group A has not yet responded

Group B has not yet responded

Group C has not yet responded

Coalition Negotiations

In addition to negotiating how to distribute 100 ECU between the four projects, you will be able to make one other choice. In particular, representatives will have the **option to form majority coalitions.**

As mentioned above, a collection of groups constitutes a majority only if it controls at least 4 votes. To illustrate this point, suppose Groups A and B are small, Group C is medium and Group D is large. Then the representatives can agree to form the following majority coalitions:

- Group A can agree to form coalition AD or ABC (that is, either a coalition with the large group D or a coalition with the other small group B and the medium group C)
- Group B can agree to form coalition BD or ABC.
- Group C can agree to form coalition CD or ABC.
- Group D can agree to form coalition AD, BD or CD.

In the experiment, it will be randomly determined whether group A, B, C or D is large, medium or small. But there will always be two small, one medium and one large group. So what matters is not the particular letter that identifies a group but rather how many members it has (1, 2 or 3).

At most one coalition can form. If a coalition forms, the representatives of the groups in the coalition will be the only ones who can make or accept / reject proposals for the rest of the round. The representatives of the groups who are not part of the coalition will no longer be able to participate in the negotiations. In other words, **how the 100 ECUs will be allocated between the four projects is now fully determined by the representatives who formed a coalition.** Notice that this is consistent with the fact that a coalition always controls a majority of the votes.

Because a proposal still requires at least 4 'Yes'-votes (the majority) to be implemented, **a proposal of how to allocate the 100 ECUs is only implemented if all representatives in a coalition vote 'Yes'.** So, once a coalition forms, everyone in the coalition needs to agree for a proposal to pass.

Please take another look at the screenshot above. As you can see, you can agree to form a coalition by clicking in the upper half of the screen the button next to the respective coalition. You can agree to form several different coalitions (although at most one will be implemented). You can also withdraw your agreement to a coalition by clicking the button again (it will say "Withdraw"). **A coalition will be formed, as soon as all representatives of the groups in the coalition agree to do so.** For instance, coalition ABC will form as soon as the representatives of groups A, B and C have all clicked the button to agree to form ABC. Likewise, coalition BD will form as soon as the representatives of groups B and D have both clicked to agree to form BD. If a coalition is formed, everyone will be informed of this change. From that point onwards until the end of the round only the representatives in the coalition will be able to make and accept / reject new proposals. As with proposals, **coalitions can only be formed once the first minute of the negotiations has passed.**

Duration

There are two ways the negotiation process may end. First, the negotiation process ends as soon as a proposed allocation of shares receives a majority of the votes (4 or more 'Yes'-votes). Second, there is

a probability that the negotiation process ends before the representatives have agreed on an allocation. This is done as follows. Each round will last **at least 3 minutes** (unless a proposal is accepted in which case the negotiation process ends immediately). After the 3 minutes, there will be a probability that the negotiation process is terminated. In particular, after the 3 minutes, every 5 seconds there will be a probability of 4% that the round ends. Hence, the game will last at least 3 minutes and 5 seconds with a probability of 96%, at least 3 minutes 10 seconds with a probability of 92.16% and so on… To make things simple, note that the duration is at least 4 minutes with a probability of 61%, at least 5 minutes with 38%, at least 6 minutes with 23%, at least 7 minutes with 14%, at least 8 minutes with 9% and at least 9 minutes with 5%. In the unlikely event the bargaining process should exceed 10 minutes, we will stop at 10 minutes.

Earnings
Recall that members of group A prefer project A, members of group B prefer project B, members of group C prefer project C and members of group D prefer project D. More precisely, the total earnings of each group are given by the share of the 100 ECU allocated to their preferred project. Thus,

Total earnings of group A = Share A of the accepted proposal
Total earnings of group B = Share B of the accepted proposal
Total earnings of group C = Share C of the accepted proposal
Total earnings of group D = Share D of the accepted proposal

Each group's earnings are then equally distributed among the group members. Hence, the large groups have to divide their share between two members. Thus,

Earnings of a member of group A = Share A of the accepted proposal / Size of group A
Earnings of a member of group B = Share B of the accepted proposal / Size of group B
Earnings of a member of group C = Share C of the accepted proposal / Size of group C
Earnings of a member of group D = Share D of the accepted proposal / Size of group D

Below you can find two examples of how earnings are calculated. Both examples are to help you understand better the experiment. They should not be considered as guides on how to behave in the experiment.

Example 1: Assume you are the representative of group A and your group is a small group. You have made a proposal: share A = 84, share B=6, share C=0, share D=10. The representatives of group B and D vote in favor of the proposal while the representative of group C votes 'No'. Group B is a medium group, group C is a large group and group D is a small group. Then the total number of votes for your proposal is 4, your own vote plus 2 votes from group B and 1 vote from group D. This is the majority of votes and the proposal is accepted. You earn 84 ECU, as you are the only member in your group. Each of the two members in group B earns 3 ECU (group B earns 6 ECU in total), the three members in group C earn zero and the sole member of group D earns 10 ECU.

Example 2: Assume you are the representative of group C and your group is a large group. You observe a proposal by the representative of group B, who is part of a small group: share A=25, share B=30, share C=45, share D=0. You vote in favor of the proposal and the representatives of group A (medium group) and D (small group) reject the proposal. The total number of 'Yes'-votes for the proposal is 4, 3 votes

from your group plus 1 vote from group B. This is the majority of votes and the proposal is accepted. Your group earns 45 ECU in total. Hence, you and the other two members in your group each earn 15 ECU. The sole member of group B earns 30 ECU. Group A earns 25 ECU and therefore each of its two members receives 12.5 ECU. The sole member of group D receives 0 ECU.

Your earnings from each of the 10 rounds will be summed up and paid to you at the end of the session. All 10 rounds of the experiment will be the same, except that the participants you are matched with will typically change between rounds. If you are a member of a medium or large group, you will sometimes be a representative of your group and sometimes not.

This completes the description of the instructions. If you have any questions, please raise your hand. Otherwise, please proceed to answer the questions shown on the computer screen. The purpose of the questions is to make sure that you understand the different elements of the experiment. Any unclear points will be explained by the experimenter.

Instructions for Treatment *4P-Sequential*

Summary of Setting

In this experiment, you will play **10 rounds** of a decision situation. In each round, there will be four groups A, B, C and D. Each group will have one representative who will negotiate on behalf of the group. In particular, representatives will negotiate how to distribute 100 ECU between four projects (called projects A, B, C and D). The distribution of the 100 ECU will be determined by majority rule, where the four groups will differ in the number of votes they have (there will be two groups with 1 vote, one group with 2 votes and one group with 3 votes). The earnings of each participant will depend on the amount of ECU allocated to their preferred project. In the following, we will explain to you the decision situation in detail.

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There are three different types of groups. A **small** group has **1 vote**. A **medium group** has **2 votes**. A **large group** has **3 votes**. Each participant in a group has a vote, that is, a small group consists of 1 participant, a medium group consists of 2 participants and a large group consists of 3 participants. At the beginning of the experiment, the computer will randomly determine whether you will be a member of a small, medium or large group. If you are a member of a small group, you will be in a small group for the entire experiment. Likewise, if you are a member of a medium (respectively, large) group, you will be in a medium (respectively, large) group for the entire experiment. However, the other participants with whom you form a medium or large group randomly change between rounds.

Representatives

For each group and in each round, the computer will randomly choose a **representative** who will negotiate on behalf of their group. A participant in a small group will thus always be a representative, while a participant in a medium group will be a representative with probability 1/2 and a participant in a large group will be a representative with probability 1/3 in each round.

Matching

In each round, **two small groups**, **one medium group** and **one large group** will be randomly matched. There are thus 7 votes (participants) in total in each match of four groups, 1 participant in each of the small groups, 2 participants in the medium group and 3 participants in the large group.

Each of the four groups will be allocated an identifier A, B, C or D. That is, in a match there will always be one group A, one group B, one group C and one group D. We would like you to think about the identifiers as a group's preference for a **project A, B, C or D**. In other words, a member of group A prefers project A, a member of group B prefers project B, a member of group C prefers project C and a member of group D prefers project D.

Identifiers A, B, C and D are randomly chosen in each of the 10 rounds. Hence, if a participant is a representative of group A in one round, he or she may be the representative of group A, B, C or D in the next round.

Moreover, since the matching of groups is random, the participants you meet will typically change between rounds. You will never know the identity of the people with whom you are matched in a given round.

Negotiation Process

In each round, the four group representatives will negotiate how to distribute 100 ECU between the four projects. The participants in the medium and large group who were not chosen as the representative will not actively participate in the negotiation process, but will see the proposals made during the negotiating process.

Representatives can make proposals of the following form: **Proposal = (share A, share B, share C, share D).** If the proposal is accepted, share A will be allocated to project A, share B will be allocated to project B, share C will be allocated to project C and share D will be allocated to project D. The sum of the four shares is required to be 100.

For a proposal to be accepted, it must receive a **majority** of the 7 votes in a match of four groups, that is, it must get **4 or more 'Yes'-votes**. If a representative of a group votes in favor of a proposal, the proposal receives all votes of the respective group (1 for a small, 2 for a medium and 3 for a large group). Any combination of 4 or more 'Yes'-votes results in the proposal passing. Notice that the large group and one small group can form a majority (3+1 votes), and so can the large and the medium group (3+2 votes) or the medium group together with the two small groups (2+1+1 votes). If the proposal is accepted, the proposed allocation is binding and we will move on to the next round. If a proposal is defeated (gets less than 4 'Yes'-votes), it is removed from the list of proposals.

The screen shot on the next page shows how representatives will be able to make and accept / reject proposals. As you can see, in the upper half of the screen, you will be able to make proposals by entering a share A, a share B, a share C and a share D. The share that corresponds to your own share is shown in bold. The lower half of the screen shows the proposals that have been made by the representatives. To vote in favor of another representative's proposal, you can click on 'Yes'. To vote against a proposal, you can click on 'No'. You cannot vote for your own proposal, since it is already assumed that you are in favor of it. You can however withdraw your proposal, in which case it will disappear from the list of proposals.

As a representative, you can make as many proposals as you would like, but you cannot have more than one standing proposal. Hence, after you have made a proposal, you are free to submit another proposal, which will then simply replace the previous proposal. When revising a proposal, you are in no way restricted by your previous proposal, e.g. you can propose to allocate to your preferred project a smaller or a larger share than in the previous proposal.

Representatives can make proposals at any time they wish to do so. There are no rules regarding which representative can make the next proposals or when this proposal has to be made. Proposals can also be accepted or rejected at any time, **except in the first minute** of the negotiation process during which no proposals can be accepted or rejected.

You are the **Representative** of **Group A**

Coalition Negotiations

Group Sizes:

Make Proposal:

Share A [ ]

Share B [ ]

Share C [ ]

Share D [ ]

Submit Proposal

Agree to form coalition **AD?** [Yes]

Agree to form coalition **ABC?** [Yes]

Summary of Coalition Negotiations
Group A agreed to:
Group B agreed to:
Group C agreed to:
Group D agreed to:

Group A: Small (1)
Group B: Small (1)
Group C: Medium (2)
Group D: Large (3)

Proposal by Group A

Share A	100
Share B	0
Share C	0
Share D	0

Withdraw Proposal

Group B has not yet responded

Group C has not yet responded

Group D has not yet responded

Proposal by Group B

Share A	0
Share B	100
Share C	0
Share D	0

Accept Proposal?
[Yes] [No]

Group A has not yet responded

Group C has not yet responded

Group D has not yet responded

Proposal by Group C

Share A	0
Share B	0
Share C	100
Share D	0

Accept Proposal?
[Yes] [No]

Group A has not yet responded

Group B has not yet responded

Group D has not yet responded

Proposal by Group D

Share A	0
Share B	0
Share C	0
Share D	100

Accept Proposal?
[Yes] [No]

Group A has not yet responded

Group B has not yet responded

Group C has not yet responded

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Coalition Negotiations

In addition to negotiating how to distribute 100 ECU between the four projects, you will be able to make one other choice. In particular, representatives will have the **option to form majority coalitions.**

As mentioned above, a collection of groups constitutes a majority only if it controls at least 4 votes. To illustrate this point, suppose Groups A and B are small, Group C is medium and Group D is large. Then the representatives can agree to form the following majority coalitions:

- Group A can agree to form coalition AD or ABC (that is, either a coalition with the large group D or a coalition with the other small group B and the medium group C)
- Group B can agree to form coalition BD or ABC.
- Group C can agree to form coalition CD or ABC.
- Group D can agree to form coalition AD, BD or CD.

In the experiment, it will be randomly determined whether group A, B, C or D is large, medium or small. But there will always be two small, one medium and one large group. So what matters is not the particular letter that identifies a group but rather how many members it has (1, 2 or 3).

At most one coalition can form. If a coalition forms, the representatives of the groups in the coalition will be the only ones who can make or accept / reject proposals for the rest of the round. The representatives of the groups who are not part of the coalition will no longer be able to participate in the negotiations. In other words, **how the 100 ECUs will be allocated between the four projects is now fully determined by the representatives who formed a coalition.** Notice that this is consistent with the fact that a coalition always controls a majority of the votes.

Because a proposal still requires at least 4 'Yes'-votes (the majority) to be implemented, **a proposal of how to allocate the 100 ECUs is only implemented if all representatives in a coalition vote 'Yes'.** So, once a coalition forms, everyone in the coalition needs to agree for a proposal to pass.

Please take another look at the screenshot above. As you can see, you can agree to form a coalition by clicking in the upper half of the screen the button next to the respective coalition. You can agree to form several different coalitions (although at most one will be implemented). You can also withdraw your agreement to a coalition by clicking the button again (it will say "Withdraw"). **A coalition will be formed, as soon as all representatives of the groups in the coalition agree to do so.** For instance, coalition ABC will form as soon as the representatives of groups A, B and C have all clicked the button to agree to form ABC. Likewise, coalition BD will form as soon as the representatives of groups B and D have both clicked to agree to form BD. If a coalition is formed, everyone will be informed of this change. From that point onwards until the end of the round only the representatives in the coalition will be able to make and accept / reject new proposals. **Coalitions can be formed at any time**, also during the first minute of the negotiation process when proposals cannot yet be accepted or rejected.

Duration
There are two ways the negotiation process may end. First, the negotiation process ends as soon as a proposed allocation of shares receives a majority of the votes (4 or more 'Yes'-votes). Second, there is a probability that the negotiation process ends before the representatives have agreed on an allocation. This is done as follows. Each round will last **at least 3 minutes** (unless a proposal is accepted in which case the negotiation process ends immediately). After the 3 minutes, there will be a probability that the negotiation process is terminated. In particular, after the 3 minutes, every 5 seconds there will be a probability of 4% that the round ends. Hence, the game will last at least 3 minutes and 5 seconds with a probability of 96%, at least 3 minutes 10 seconds with a probability of 92.16% and so on… To make things simple, note that the duration is at least 4 minutes with a probability of 61%, at least 5 minutes with 38%, at least 6 minutes with 23%, at least 7 minutes with 14%, at least 8 minutes with 9% and at least 9 minutes with 5%. In the unlikely event the bargaining process should exceed 10 minutes, we will stop at 10 minutes.

Earnings
Recall that members of group A prefer project A, members of group B prefer project B, members of group C prefer project C and members of group D prefer project D. More precisely, the total earnings of each group are given by the share of the 100 ECU allocated to their preferred project. Thus,

Total earnings of group A = Share A of the accepted proposal
Total earnings of group B = Share B of the accepted proposal
Total earnings of group C = Share C of the accepted proposal
Total earnings of group D = Share D of the accepted proposal

Each group's earnings are then equally distributed among the group members. Hence, the large groups have to divide their share between two members. Thus,

Earnings of a member of group A = Share A of the accepted proposal / Size of group A
Earnings of a member of group B = Share B of the accepted proposal / Size of group B
Earnings of a member of group C = Share C of the accepted proposal / Size of group C
Earnings of a member of group D = Share D of the accepted proposal / Size of group D

Below you can find two examples of how earnings are calculated. Both examples are to help you understand better the experiment. They should not be considered as guides on how to behave in the experiment.

Example 1: Assume you are the representative of group A and your group is a small group. You have made a proposal: share A = 84, share B=6, share C=0, share D=10. The representatives of group B and D vote in favor of the proposal while the representative of group C votes 'No'. Group B is a medium group, group C is a large group and group D is a small group. Then the total number of votes for your proposal is 4, your own vote plus 2 votes from group B and 1 vote from group D. This is the majority of votes and the proposal is accepted. You earn 84 ECU, as you are the only member in your group. Each of the two members in group B earns 3 ECU (group B earns 6 ECU in total), the three members in group C earn zero and the sole member of group D earns 10 ECU.

Example 2: Assume you are the representative of group C and your group is a large group. You observe a proposal by the representative of group B, who is part of a small group: share A=25, share B=30, share C=45, share D=0. You vote in favor of the proposal and the representatives of group A (medium group) and D (small group) reject the proposal. The total number of 'Yes'-votes for the proposal is 4, 3 votes from your group plus 1 vote from group B. This is the majority of votes and the proposal is accepted. Your group earns 45 ECU in total. Hence, you and the other two members in your group each earn 15 ECU. The sole member of group B earns 30 ECU. Group A earns 25 ECU and therefore each of its two members receives 12.5 ECU. The sole member of group D receives 0 ECU.

Your earnings from each of the 10 rounds will be summed up and paid to you at the end of the session. All 10 rounds of the experiment will be the same, except that the participants you are matched with will typically change between rounds. If you are a member of a medium or large group, you will sometimes be a representative of your group and sometimes not.

This completes the description of the instructions. If you have any questions, please raise your hand. Otherwise, please proceed to answer the questions shown on the computer screen. The purpose of the questions is to make sure that you understand the different elements of the experiment. Any unclear points will be explained by the experimenter.