

## **Instructions**

Welcome! This is an experiment in economics. Funding for this experiment has been provided by the National Science Foundation and Virginia Commonwealth University.

For today's session, you will receive a \$6 show-up fee. In addition, you will have the opportunity to earn money during the session. Your decisions are likely to considerably affect your earnings. If you follow the instructions and make good decisions, you can earn more money.

**Caution:** Talking or looking at others' screens is not allowed. Should you have any questions please raise your hand and an experimenter will come to you.

**A. Overview.** Today's session involves making production decisions for others. At the beginning of the session you will be matched with other four participants in this room. The participants are labeled *a#*, *b#*, *c#* or *d#*. Where the # sign indicates a group number, 1 to 4. You will remain matched with these same people throughout the first portion of this session. The first part of this session consists of a series of 10 *periods*. In each period you and the other participants in your group will make costly *production decisions* that affect another player's earnings.

1. Period Structure: At the beginning of each period, the participants in your group will be randomly ordered 1<sup>st</sup> through 4<sup>th</sup> in sequence. Periods will consist of three *stages*. Following the third stage the period ends, earnings are calculated and the next period begins.

2. Production Decision: In each stage 2<sup>nd</sup>, 3<sup>rd</sup>, or 4<sup>th</sup> player makes a production decision for the player that precedes her in sequence. In stage 1, for example, the 2<sup>nd</sup> player decides whether or not to produce a unit for the 1<sup>st</sup> player, etc. The 1<sup>st</sup> player in sequence makes no production decision.

3. Tokens. In a period's first stage, the 1<sup>st</sup> player in sequence is endowed with a *token*. The token has no value and can be offered to the next player if the next player produces a unit. In stage 1, for example, the 1<sup>st</sup> player can offer to pass the token to the 2<sup>nd</sup> if the 2<sup>nd</sup> player produces a unit for the 1<sup>st</sup>, etc.

4. Earnings: To repeat, tokens have no value. Rather your earnings come from points. If a producer decides to produce a unit, it costs her 1 point. The preceding player, who consumes the unit, earns 3 points. For example, if in stage 2, the 3<sup>rd</sup> player decides to produce, she incurs a cost of 1 point, and the 2<sup>nd</sup> player earns 3 points by consuming the good. If 3<sup>rd</sup> player decides to not produce, she incurs a cost of 0, and 3<sup>rd</sup> player earns 0 from consumption.

5. Some observations:

a) The 1<sup>st</sup> player in sequence makes no production decision and will know that she is first in sequence

b) 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> players will not know their position in sequence when they make a production decision.

c) If a player is offered a token, she can infer that the preceding player was either the 1<sup>st</sup> player or that the preceding player has previously produced a unit for another player.

d) The 4<sup>th</sup> (last) player in sequence will have no opportunity to consume a good produced by a subsequent player.

e) Each period players have a 1/4 chance of being 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup>.

f) In the first part of this session your point earnings from all periods will be summed. The sum will be converted to cash at a rate of \$1 per point. You will earn this in addition to your \$6 appearance fee.

5. Screen Displays and the Sequence of Decisions. Figure 1 illustrates the screen for a participant *b3* at the beginning of period 2. The player is presented with the earnings for possible combinations of own production and consumption decisions. If the player is the 1<sup>st</sup> in sequence she will see only the first two lines because she does not produce.

Player <i>b3</i>											
Period 2											
<b>Earnings Possibilities</b>											
If you consume but don't produce	3 points										
If you consume and produce	2 points										
If you don't consume and don't produce	0 points										
If you don't consume but produce	-1 point										
Notes: the 1st player CANNOT produce. The 4th Player CANNOT consume.											
<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <th colspan="2">Decisions if offered token</th> </tr> <tr> <td>Produce?</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> <tr> <td>Offer Token to next Player if she produces?</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> </table> <table border="1" style="display: inline-table; vertical-align: top; margin-left: 20px;"> <tr> <th colspan="2">Decisions if NOT offered token</th> </tr> <tr> <td>Produce?</td> <td><input type="radio"/> Yes <input type="radio"/> No</td> </tr> </table>		Decisions if offered token		Produce?	<input type="radio"/> Yes <input type="radio"/> No	Offer Token to next Player if she produces?	<input type="radio"/> Yes <input type="radio"/> No	Decisions if NOT offered token		Produce?	<input type="radio"/> Yes <input type="radio"/> No
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Produce?	<input type="radio"/> Yes <input type="radio"/> No										
<input type="button" value="Confirm"/>											

**Figure 1.** Screen Display at the Beginning of a Period.

Player *b3* must decide whether or not to produce and whether or not to offer to pass a token to the next player if she will produce in the case she is offered a token and in the case she is not offered a token. To make a decision she must click on the radio dials to the left of the 'Yes' or 'No' headings. If the player is the 1<sup>st</sup> in sequence she will see her order in sequence. She will see only the 'Offer Token' decision that appears in the bottom portion of the left side of Figure 1. Once the player is comfortable with her decisions, she clicks 'confirm'.

After all players have completed decisions for the period, results are tabulated and illustrated. Figure 2 illustrates results for a period where *b3* turned out to have been 3<sup>rd</sup> in sequence.

Order in Sequence	3 <sup>rd</sup>	
Actions		Earnings
1) Previous player	Offered Token	
2) Your action	Produce	-1 point
3) Next Player's action	Produce	3 points
This Period Earnings		2 points
Cumulative Earnings		4 points
Continue		

**Figure 2.** Display of Period Results.

In this period, *b3* chose to produce a unit if passed a token. The 2<sup>nd</sup> player did pass along the token (indicating that 2<sup>nd</sup> player produced for the 1<sup>st</sup> player). Subsequently, the 4<sup>th</sup> player chose to produce a unit that provides consumption to the 3<sup>rd</sup> player. As a consequence, player *b3* earned 2 points for the period. The bottom portion of a player's screen displays period and cumulative earnings. Once the player has reviewed earnings she should press 'continue'.

### Questionnaire

Prior to beginning please complete the following questionnaire.

1. Suppose in period 2 you are paired with three other players. In period 3 will you be paired with the same or different players?
2. Suppose in period 3 you were the 3<sup>rd</sup> in sequence. In period 4 will you be the 3<sup>rd</sup> in sequence again? What about other players, will they keep their order in sequence?
3. When you make a production decision, do you know your order in the sequence? What do you know about production decisions of other players?
4. Suppose that in a period you were 4<sup>th</sup> in sequence and you were passed a token, what can you infer about production decisions of the players who preceded you?
5. In any period what is the chance that you are the 2<sup>nd</sup> or 3<sup>rd</sup> player in sequence?
6. If you are 2<sup>nd</sup> or 3<sup>rd</sup>, what are your highest and lowest earnings? What should happen for you to earn the highest amount? What should happen for you to earn the lowest amount?
7. In any period what is the chance that you are the 1<sup>th</sup> or 4<sup>th</sup> player in sequence?
8. If you are 1<sup>st</sup> in a sequence, what are your highest and lowest earnings? What should happen for you to earn the highest amount? What should happen for you to earn the lowest amount?
9. If you are 4<sup>th</sup> in a sequence, what are your highest and lowest earnings? What should happen for you to earn the highest amount? What should happen for you to earn the lowest amount?

Any questions?

## Final Period

*Overview:* In this 11<sup>th</sup> and final period you will make production and consumption decisions as before with the following two differences

1. *New groups.* Until this moment, you have been paired with a constant group of four . Now we will place you in a new group. Your new group will consist of people who have never been paired together.
2. *Increased Earnings.* We will *triple* the value of consumption and the cost of production. If a consumption unit is produced for you, you will earn 9 points. If you produce a unit for someone else, it will cost you 3 points.

Following this last period the session will end. The points that you earn in this final period will be converted to U.S. dollars at the rate \$1 per point. These earnings will be added to you appearance fee and your earnings from the first portion of this session.

Any questions?