Session 3: 3.5 hours total, including breaks

Part One: Social Science
20-30 minutes: Activity: Public Goods Game with Hypothetical and Real Rewards  
15-30 min: Read/Discuss: “Real vs. Hypothetical Rewards”  
20 minutes: Activity: Closeness and Groups  
15-30 min: Read/Discuss: “Closeness and Groups”  
(Break)

Part Two: Computing
30 minutes: Modeling: Finish building “Sheep and Grass” model  
30 minutes: Activity: Brainstorm topics and conduct experiments on model  
15 minutes: Discuss/Model: Party

Supplies:
- Laptops or computers  
- Projector  
- Large graph paper  
- Markers or sharpies  

For Public Goods Activity
- Handouts, including Instructor Assignment Sheet  
- Pens (all the same type of pen/color supports anonymity)  
- Raffle tickets

For Closeness and Groups Activity
- Raffle tickets  
- Envelopes (Four per student, labeled: (1) Student from your school; (2) Student from another school in your town; (3) Student from another school in another town; (4) Student from another school in another state. [To avoid using so many envelopes, this activity can also be done with cups that are covered so students cannot see how many tickets are already inside or large envelopes]

Student Handouts:
- Public Goods Scoring Sheet  
- “Real vs. Hypothetical Rewards”  
- “Closeness and Groups”

Models from NetLogo Models Library:
- Sheep & Grass (tutorial #3) [ccl.northwestern.edu/Netlogo/docs/tutorial3.html]  
- Social Science, “Party”

Resources and References:
- A presentation covering this work: [http://prezi.com/as-2xatinvap/untitled-prezi/](http://prezi.com/as-2xatinvap/untitled-prezi/)
Activity: Public Goods Game  20-30 minutes

Students play a public goods game twice, once for hypothetical rewards and once for real rewards. A standard experimental design in behavioral economics, this game creates what is known in behavioral economics as a social dilemma—a situation where the interests of an individual are at odds with the interest of the group. This is similar to the problem of cooperation discussed in the Prisoner’s Dilemma exercise.

Please note: This game needs a lot of administrative calculating to keep the game moving, and it works best with at least two facilitators to help to move the game along. Creating a spreadsheet to calculate student group totals is also recommended.

Read/Discuss: “Real vs. Hypothetical Rewards”  15-20 minutes

While two students graph the results of the Public Goods game, the other students read “Real vs. Hypothetical Rewards” and discuss the following questions:

• Did you play the game differently when there were tickets involved?
• Why might real tickets change someone’s behavior?
• What do you predict the results will be in the two games?
• What are the costs and benefits of using hypothetical scenarios and rewards in social science research?
• Which game do you think provides the better data?

Students then share the data from the group and discuss.

Activity: Closeness and Groups  20 minutes

For this in-class activity, each student receives 10 raffle tickets and then distributes the tickets between four different envelopes (or cups with lids). The envelopes represent groups of people at different distances (both social and geographical) from the students. Students also insert a scrap of paper with a number on it (0-10) that indicates how close they feel to each group with 0 meaning not at all close and 10 means extremely close.

The tickets are real and will be entered in the raffle at the end of the course. If someone wins from these groups, the prize will be distributed to random individuals in different areas.

Once all the students have distributed their tickets, two students total the amounts and calculate the average closeness rating for each group. These students then graph the data.
Read/Discuss: “Closeness and Groups” 15-20 minutes

Discuss the handout keeping in mind the previous activity. Students can make predictions regarding their own data.

- To which group do they think they allocated the most tickets? The least?
- Might the tickets be evenly distributed across?
- Why would there be differences in how close we feel to each group, and how does that influence how we might allocate the tickets?
- How does this method, and these results, relate to the activities of the previous two weeks?

Students who worked with the class data present the findings. Were there differences between the predictions and the data itself?

Modeling: Finish “Sheep and Grass” model 30 minutes

Finish building sheep & grass model (NetLogo Tutorial #3) Students build procedures related to energy variable (reproduce, die, re-grow grass), add sliders, switches, monitors & plots (guided practice).

Activity: Brainstorm topics, conduct experiments 30 minutes

Perform experiments with a model. Review how models can be used to conduct experiments, and, as a group, brainstorm questions we could answer by designing and performing experiments using our Sheep and Grass model.

Discuss/Model: “Party” 15 minutes

Discuss using models in Social Science, and view “Party” model. Discuss validity and brainstorm questions we could investigate with this model. What additional questions might we ask or models we might design to study Science of Friendship topics?

Extensions:

Learn more about different types of validity in social sciences:
http://psych.csufresno.edu/psy144/Content/Measurementvalidity.html
http://www.holah.karoo.net/validity.htm

NetLogo: Using topics created during the “Sheep and Grass” brainstorming session, have small groups choose one topic, design an experiment, modify the model, run multiple trials to collect data, and analyze data. Discuss results with whole group.

Conduct experiments with Party model, following the same pattern.
Background: Real vs. Hypothetical Rewards

Last session we discussed about how people would respond in hypothetical situations using hypothetical rewards. You imagined a hypothetical list of your closest friends and family members and how much of a hypothetical reward you would be willing to give up.

How can we be sure that if people were really put in these situations, they would act in the same ways that they say they would in hypothetical situations? While social scientists have the luxury of being able to ask people what they might do and how they think, this doesn’t necessarily mean that people will act in the same way as what they said they would.

These issues relate to the concept of validity in science. **Validity is the extent to which our measurements accurately match or correspond to the real world.** Obviously, researchers can’t put people into some hypothetical situations and observe how they act; however, they can design experiments where people are given real rewards and are then asked to make real decisions that affect themselves and other people.

Real rewards used in real situations are used by social scientists to study behaviors. For example, instead of asking a person how much money they would be willing to give up to help a friend, a researcher might actually give a person an amount of money and see what they do with it.

Different social science disciplines prefer different measures. In the field of economics, researchers who run experiments might only use real measures. They give people real money and ask them to make real decisions. In psychology, researchers who run the same sets of experiments often use self-report or hypothetical measures.

Using hypothetical situations and rewards is not necessarily a bad thing. It allows researchers to get people to think about situations that might be impossible to actually put them in. These are the costs and benefits that researchers must consider when designing social science experiments.
Closeness and Groups

Closeness describes how a person feels towards another person, but it can also describe how a person feels towards another group of people.

For instance, we might feel closer to a stranger based upon some known group membership, such as if a stranger comes up and asks you to do a survey and he is wearing a football hat. Are you more likely to do the survey if he is wearing a hat with your favorite team on it? Less likely if he is wearing a hat with the logo of a rival team? Research suggests that you just might be.

Symbols like football team logos can create a common group identity, even with strangers. In the United Kingdom, Mark Levine and colleagues found that people were more likely to help an injured runner if the runner was wearing a football shirt with that person’s favorite team on it. They were less likely to help if they were wearing a shirt of a rival team.

This leads to an interesting scientific question: What is it about these symbols of group identity that make them have an impact on how we treat each other? And why do people pay so much attention to markers of affiliation?

These phenomena aren’t just found with football fans. People also feel closer to a stranger from his/her own country than to a stranger from another country. In this sense, not all strangers are treated equal. Just knowing where a person is from can influence how close we feel to them and more importantly, how we treat them.

Vocabulary

**Behavioral Economics**: A field of study that examines the effects of social cognitive and emotional factors on economic decision making of people.

**Public Goods Game**: A behavioral economics experiment used to examine behavior when an individual’s interest is at odds with the interests of the group.

**Validity**: A concept in science that reflects how well our concepts and measurements match the real world.
**For Instructors:**

**ACTIVITY 1 INSTRUCTIONS**

**PUBLIC GOODS GAME**

Give student ID numbers and randomly assign them to groups of 3 to 5 players. **Students should be unaware of who is in their group.** Record the groups on the Instructor Accounting Sheet.

After reading the instructions to the students, pass out scoring sheets. Students should then fill in the Round 1 section of the first sheet. To keep students decisions confidential, have students fold the sheets in half and collect them. Fill out the Instructor Assignment Sheet and write the total earned on each student’s sheet and return the sheets to the students. Students repeat for two more rounds to complete the first game. Please ask students to be silent in between rounds.

Students play Game 1.

For GAME 2, introduce the ticket system. These tickets are for real rewards that can be used to potentially earn prizes at the course. Each person in the highest scoring group will receive 5 tickets to enter into the raffle.

Pass out scoring sheets for Game 2.
Instructions for Students:

You will be divided into groups of three to five members; however you won’t know who is in your group. You will be making decisions regarding allocating points.

You are a member of a group consisting of a certain number of people. Imagine that you, along with each group member are given a total of 10 points. You can do two things with the points: You can keep the points, or you can invest the some or all of the points into a group fund. All contributions to the group funds are anonymous.

Once everyone has made their decisions about what to do with their points, the group fund will be doubled and split evenly among all group members, regardless of their individual contributions. Every group member will receive an equal share of the project fund, regardless of their contribution amounts. Here are some examples:

EXAMPLE 1: You are one of four group members in a group. You decide to donate 0 of your points to the group fund and keep all 10 to yourself. All three of the other members contribute all of their points to the group fund (a total of 30 points now in the group fund). The group fund is doubled to 60. This total is then split evenly among you and all others in the group. That means everyone gets 15 points from the group fund. That means that the other three group members walk away with 15 points, while you walk away with 15 points plus the 10 points that you decided to keep. You earned a total of 25 points.

EXAMPLE 2: Nobody in the group donates anything to the group fund and all just keep their 10 points.

EXAMPLE 3: Everyone in a group of four contributes all 10 of their points, for a total of 40 points in the group fund. This is doubled to 80 points and then split among all players. Everyone, including you, walks away with a total of 20 points.

EXAMPLE 4: You are in a group of 4. You decide to contribute all 10 points. No one else contributes anything to the group fund. The other group members decide to keep their 10 points. This means the group fund is at 10 points, which then is doubled to 20. These 20 points are then split evenly among all group members. Each player gets 5 points from the group fund. You walk away with a total of 5 points while all three of the other group members get 15 points.

PRINCIPLES

If you contribute more than your other group members, then you will earn less in total than your other group members.

If you contribute less than your other group members, then you will earn more than your other group members.

If you all contribute all your points, you all will double your starting amount.

If you all contribute nothing, then you will all receive your starting amount.

We will be playing three rounds. Each round you start over with 10 points.

To start, write your ID number on the top of your scoring sheet. Then fill out the questions for round 1, fold the paper in half and turn it in.
## INSTRUCTOR ASSIGNMENT SHEET: GAME 1

### Group 1

<table>
<thead>
<tr>
<th>Student Name</th>
<th>ID</th>
<th>Points Kept</th>
<th>Points Contributed to Group Fund</th>
<th>Points earned, from group fund</th>
<th>Total Earned</th>
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### Group 2

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<th>Points Contributed to Group Fund</th>
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### Group 3

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**Total:**
## INSTRUCTOR ASSIGNMENT SHEET: GAME 2

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Total:  

SCORING SHEET
GAME 1
ID Number: _______________

ROUND 1
You now have a total of 10 points.
How many points do you want to keep? __________
How many points do you want to invest in the group fund? __________

Total points contributed to group fund: __________
Number of group members: __________
Total amount earned from group fund: __________

Total points (points kept + points earned from group fund) __________

ROUND 2
You now have a total of 10 points.
How many points do you want to keep? __________
How many points do you want to invest in the group fund? __________

Total points contributed to group fund: __________
Number of group members: __________
Total amount earned from group fund: __________

Total points (points kept + points earned from group fund) __________

ROUND 3
You now have a total of 10 points.
How many points do you want to keep? __________
How many points do you want to invest in the group fund? __________

Total points contributed to group fund: __________
Number of group members: __________
Total amount earned from group fund: __________

Total points (points kept + points earned from group fund) __________
SCORING SHEET
GAME 2
ID Number: ________________

ROUND 1
You now have a total of 10 points.
How many points do you want to keep? __________
How many points do you want to invest in the group fund? __________

Total points contributed to group fund: __________
Number of group members: __________
Total amount earned from group fund: __________

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ROUND 2
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How many points do you want to keep? __________
How many points do you want to invest in the group fund? __________

Total points contributed to group fund: __________
Number of group members: __________
Total amount earned from group fund: __________

Total points (points kept + points earned from group fund) __________
ACTIVITY 2 INSTRUCTIONS

For this activity, you will each be given 10 raffle tickets, four envelopes and four scraps of paper.

Each envelope represents a person at a different of social and geographical distance.

1. Divide your tickets how you wish and put your tickets into the envelopes and,
2. Using a scrap of paper, indicate how close you feel to the person the envelope represents by using a 0 to 10 scale where 0 is not close at all and 10 is very close.

Instructors! Please stress that the tickets in each envelope will be distributed randomly to people that represent each group. Also when students have finished, they should not talk about their allocation decisions.

If you use cups or one large envelope instead of individual envelopes, the cups should have lids so that students cannot see how many tickets are in each one. Also the cups (or large envelopes) should be relatively out of sight so the students cannot see how the others allocate their tickets. The envelopes or cups should have the following labels

1. A person in your own school
2. A person in another school in your town
3. A person in another school in another town
4. A person in another school in another state

Once all the students have distributed their tickets collect the cups and tally the tickets and the closeness scores together. Graph the results on a large Post-It or the board or using the following graph template.
Using the table below and the graph above, graph the average number of tickets per student for each group of people. Using a different color, graph the average closeness rating in the same graph.

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<tr>
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<th>Student from your school</th>
<th>Student from another school in your town</th>
<th>Student from another school in another town</th>
<th>Student from another school in another state</th>
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<tr>
<td><strong>Average Number of</strong></td>
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<td><strong>Tickets per student</strong></td>
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<td><strong>Average closeness rating</strong></td>
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