

Effects of Network elicitation mechanisms on elicited networks.

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I. Introduction

Many studies suggest that network elicitation mechanisms determine the structure of elicited networks. As a result, understanding the effects of network elicitation on the elicited social network is crucial in order to study how networks influence agent's behavior in a wide variety of applications.

The most significant difference between network elicitation techniques is whether the method is incentivized or not, given that the presence of reward schemes potentially influence subject's reports. Incentivized techniques (where the agent is only rewarded with a certain probability only after checking for the reciprocity and certain symmetry of strength measures) are likely to increase the reliability of the results, either through some self-interests or through some sort of guilt aversion behavior. Hence, the main comparison will be among different incentivized procedures to determine how those incentives affect the elicited network structure. Given that it is difficult to define a clear measure of the "true" network, the methodologies will be compared among themselves in terms of number of links, number of mutual links and strength of the relationship reported.

(We might use different levels of monetary prizes as well as class points schemes as a way of rewarding within each method. This would let us see the differences in terms strength type and number of links reported, which can be translated into guilt aversion impact.)

The mechanisms compared will be non-censored elicitation procedures since the presence of a maximum number of links can introduce bias and affect the comparison between elicitation methods.

Furthermore, the comparison will be between subjects to avoid recall issues that arise when dealing with within-subject designs. Notice that between subjects comparisons require homogeneous groups of different participants. Hence, random assignment is a necessary condition in order to assume that there are no significant differences among groups that could drive the results.

The experiments will be run through an online platform like CTools among students of mass courses in sophomore year of a college with random assignment in the USA. The mass courses will be chosen such that the student of the class have no or little training in game theory to avoid the “game theory curse”. The main advantage of the selected group of subjects is the easy access and the fact that we would not need parental consent. The sophomore year is chosen since it still consists of some mass courses and since it gives students enough time to have an already settled network in college. In order to avoid coordination beyond the experiment scene, students might be asked to bring their computers to an exam setting, which would also help to have higher participation rates. Asking students to participate in the experiment in the CTools platform would let the results be easier to organize and keep track of.

II. Network Elicitation Mechanisms

1. COORD-I

A simple modification of the COORD-I game where the students are asked to pick names of their friends from the list of students in the class and answer certain questions about the picked names.

- a) What city/state is your friend from?
- b) What is your friend’s major?
- c) Pick one of the following topics and answer it:
 - i. Your friend’s favorite movie
 - ii. Your friend’s favorite TV show
 - iii. Your friend’s favorite book

iv. The last concert your friend has been to

The students are also asked to answer the whole set of questions for themselves. The answers are collected in order to further match with their friends' answers.

The outcome function works as follows, subjects receive a prize if one of the following two cases holds:

- **CASE 1:** They do not pick any names, or
- **CASE 2:** They pick at least one name and answer the set of questions about the picked name. In this case all the links are checked and rewarded with a prize of 50 cents with a 50% chance if the link is reciprocated and nothing otherwise. If the first two questions are answered correctly the winning probability is increased to 70% and if all the questions are answered correctly it is raised to 75%.

Notes on the elicitation mechanism:

It is a slightly modified version of COORD-I, where the “time spent together” estimation seemed too difficult of a task along with a too strict constraint of “less than 1 hour difference”.

Here, the 3rd question would be an identifier of “stronger relations” whereas the first two questions would correspond to “friendship” since they do not require too detailed information. Finally, reciprocity would correspond to “acquaintance” relationship. Notice that asymmetric relations can as well be captured here since given the reciprocity is satisfied, it is enough to give correct answers to raise the winning probability (the questions answered about the subject by her friends need not be correct for that). Asymmetric relations might be important to elicit, since they might play a role in influencing behavior and role modeling. Relatively popular subjects might have influencing impacts on their friends or acquaintances.

2. COORD-II

Students are asked to reveal full names of their friends in their undergraduate class, jointly with a subjective evaluation (“strength”) of each relationship, framed in the experimental instructions as follows: students are asked to select the name of their friends from a list of their undergraduate class and a subjective evaluation of their relationship. Let r_{ij} be the report of student i regarding the strength of the ij relationship, where

- $r_{ij} = 1$ implies that person i hardly knows j
- $r_{ij} = 2$ means that person j is an acquaintance
- $r_{ij} = 3$ indicates that j is a friend
- $r_{ij} = 4$ denotes that j is a close friend.
- If i does not report a link with j , let $r_{ij} = 0$

Subjects receive a monetary prize if one of the following two cases holds:

- **CASE 1:** They do not pick any names, or
- **CASE 2:** They pick at least one name and one of the elicited links is checked at random. Subjects receive a prize if the link is reciprocated and if the friendship strength is sufficiently accurate, that is, if the difference in the reports is not higher than 1.

3. Two Stage Coordination Game

It is a two stage coordination game, where the exit option (which lets subjects to receive the prize) is given once the instructions of the experiment is revealed.

- **Stage 1:** At the beginning of the exam, ask students to reveal full names of their friends in their undergraduate class and ask about their monthly interaction (in average) with the possible options: i. more than once a week, ii. once a week, iii. less than 4 times a month. Once they are done, let them start working on their exams. Once the exam time is over, they will be asked to work on the second stage.
- **Stage 2:** Every student who has participated in the experiment are given a list of names composed of people who have named her. Let them answer the interaction questions for the listed names, which gives them a second chance to go over the names.

Outcome function works as follows: one of the links is checked at random and subject receives a monetary prize (5-10 dollars) if the answers by both parties match.

Notes on the elicitation mechanism:

Since the strength measuring questions are straightforward and not subjective, we are looking for an exact match.

The two stage formulation of this method gives the students a chance to reconsider some names that they might have skipped, which would also help for the revelation of a larger network.

III. Measures of Comparison

We will be focusing on the comparisons of the above elicitation methods in terms of:

- a) Number of (mutual) links
- b) Correspondence and strength, where strength could be analyzed within a general framework consisting of acquaintance/friend/close friend levels or
- c) Strength as introduced by Granovetter (1973): Link strength will be measured by the number of common friends two subjects share. Formally, it is defined as the intersection between the people named by two players.