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Choosing peers: Homophily and polarization in groups

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Abstract

This paper studies the formation of peer groups entailing the joint production of public goods. In our model agents choose their peers and have to pay a connection cost for each member added to the group. After groups are formed, each agent selects a public project to make a costly contribution to, and all members of the group experience the benefits of these contributions. Since agents differ in how much they value one project relative to the other, the group's preferences affect the generated profile of public goods. We characterize mutually optimal groups, groups that are optimal for all their members. When contribution costs are low relative to connection costs, mutually optimal groups must be sufficiently homogeneous. As contribution costs increase relative to connection costs, agents desire more connections, which in turn raises the risk of free riding. Extreme peers are then more appealing, since they are more willing to contribute, and polarization arises.

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1. Introduction

Many social interactions entail the joint production of public goods. Clubs, associations, or online groups have members jointly initiate and organize projects and events. For instance, as of 2015, there are more than 22 million Meetup members selecting themselves into over 207,000 social groups across 181 countries. These groups revolve around commonly planned meetings and volunteering activities.² Student associations congregate around the organization of campus events or public service, such as women's career networking, community outreach, sexual harassment helplines, etc. Similarly, local communities in geographical neighborhoods are often the driving force behind activities such as sport tournaments or music festivals, as well as tasks such as security, gardening, cleaning, etc. and computer programming forums often entail users contributing to the development or explanation of software.³ Furthermore, most groups that are focused on a particular activity or hobby (such as biking clubs, food clubs, and so on) entail contributions to the activity itself as well as to the social interactions of the group.⁴

Three elements are central in these types of social interactions. First, individuals are often in the position to freely choose whom to form a community with. While this is particularly true in environments like online platforms, in which new technologies effectively eliminate geographical boundaries, it also applies to local groups – individuals can ex-ante choose which student association to join within their campus, which neighborhood to live in, etc. Second, contribution to the production of public goods is costly. Therefore, strategic considerations, namely the possibility of free riding, come into play. Third, connecting to other individuals often entails a cost. The marginal cost of an additional connection can display different dependencies on the group's size. It could be increasing in group size if groups face congestion externalities: for example, if a student association grows in size, holding meetings may become more difficult. Other times, adding one connection involves a constant cost, possibly no cost, up to a fixed capacity: for example, building cooperatives involve fixed membership fees and are bound by real-estate constraints.

These three elements jointly determine the size and composition of social communities, as well as their performance in terms of the public goods they ultimately yield. This paper's goal is to illustrate how the interplay between public-good production and connection technologies affects the patterns exhibited by social groups.

We study a model in which agents make costly contributions to two different public projects or tasks. Each agent's preferences are characterized by a parameter in $[0, 1]$, measuring how much she cares about one project relative to the other. For simplicity, we assume that each individual can make a contribution to at most one project. For example, a university student joining an association may have limited time and therefore face a choice of which of the association's missions to actively pursue. Before making contributions, agents have the possibility of forming groups. *What defines a peer group is that all its members benefit from the contributions made*

² There are approximately 550,000 monthly Meetup events. Over 3,000 of the groups focus explicitly on public goods in the form of volunteering, see <http://www.meetup.com/about/> and <http://volunteering.meetup.com/>.

³ Indeed, many open-source programming resources have substantial voluntary contributions from individuals. A prime example is the development of Linux. For instance, when looking at contributors to the Linux Kernel since version 2.6.36, approximately 25% of contributions were done by developers who were not paid for their work, see the "Linux Kernel Development Report," published in 2012 by the Linux Foundation.

⁴ In fact, such activities and hobbies often have several aspects individuals can contribute to. For example, in a biking club, contributions can take the form of carrying first-aid kits, participating in a pace line, mapping new routes, and so on. In a food club, members can contribute to different types of cooking, e.g. baking and grilling.

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