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Social influence and the emergence of norms amid ties of amity and enmity

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Abstract

This paper explores the coevolution of social networks and behavioral norms. Previous research has investigated the long-term behavior of feedback systems of attraction and influence, particularly the tendency toward homogenization in arbitrary cultural fields. This paper extends those models by allowing that norms diffuse not only by simple contagion but through intentional sanctioning behavior among peers. Further, the model allows for negative relations, where actors differentiate themselves from enemies while seeking to align themselves with friends. Sociometric maps reveal non-trivial system dynamics—structural bifurcation, discrimination between factions, and cycles of deviance and solidarity—emerging from a few elementary agent-level assumptions.

Keywords: Social networks; Group dynamics; Social influence; Norms; Organizations

1. Introduction

Several basic theories of interaction have grown from one of the starkest regularities in the social world: the tendency of social ties to connect individuals who are similar in attributes, attitudes, or behaviors. This observed lawlike regularity of relative homogeneity in social relations—or *homophily* [39,48]—has inspired prominent "first principles" for models of emergent structure.

One such principle is the preference among actors to choose interaction partners who are similar to themselves [30,31,41,50–52]. Psychologists have proposed the "Law of Attraction" [7,8], according to which actors hold a positive affective bias toward similar others, which leads them to choose these similar alters as interaction partners. Other work has posited the same preference for homophilous sociometric choices, but has emphasized shared knowledge and reduced costs of communication [9,18,44,55] rather than an affective bias. Both research programs suppose that similarities drive network change. This sociometric choice explanation is

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most compelling when the attributes underlying homophily are fixed (e.g. race, gender) or change slowly (e.g. age, language) relative to changes in social ties.

Classic work in group dynamics [12,19,23,59] and recent work in social networks [25,46] posit a converse explanation for homophily, arguing that interpersonal influence operates through social ties, engendering common attitudes or behaviors among friends and other close relations. This social influence explanation is most compelling when social relations are fixed or change slowly relative to the attributes underlying homophilous choices (e.g. opinions, behaviors).

When individuals' attributes and social ties are both subject to change, sociometric choice and influence processes may operate simultaneously to generate homophily. This combination of differential attraction and influence creates a self-reinforcing dynamic in which similarity increases the likelihood or intensity of dyadic influence and influence reduces differences between the interaction partners. This feedback of course leads to inferential problems for natural observation and statistical analysis, and so empirical research does not give us much leverage on the relative importance of sociometric choice and social influence when the two processes operate together. For this important and challenging case, exploring formal models in "thought experiments" allows us to observe the qualitative implications of our assumptions and to design critical tests for empirical research.

Recent work has used simulation to study these dynamics of attraction and influence, primarily their effects on cultural diffusion and convergence. For example, several prominent projects [2,9,44] have assumed that agents who share more cultural traits have a higher probability of interacting, while interaction promotes further cultural similarity. Applications to complete networks such as organizational task groups [26,37] assume that all members interact on some level, but relative similarity determines the strength of dyadic influence. The positive feedback of homophilous sociometric choices and social influence generates a local homogenization that some have presented as an explanation for the emergence of "cultural norms" [38]. In fact, the tendency toward homogeneity is so robust that scholars are left with the opposite puzzle of explaining social differentiation [43–45]. They ask under what conditions social differences can emerge and survive in populations governed by generic processes of homophilous attraction and social influence.

In this paper, we contribute two elements of model design. First, we supplement the conventional models of arbitrary cultural diffusion by allowing that actors have vested interests in their behaviors. In pursuing these interests, agents learn from experience (adjust their behavior to seek rewards and avoid punishments) and also aim to influence their peers' behavior by applying social sanctions (rewards and punishments). As a second innovation, we allow that social ties may have a negative valence, so that actors differentiate themselves from enemies and seek to align themselves with friends.

Most previous research has used computational experiments to investigate stability conditions of system-level equilibria (especially cultural uniformity). We instead explore system dynamics out of equilibrium, examining sequential sociometric maps of group structure from a single simulation run. This qualitative analysis of model behavior will reveal intriguing dynamics at the system level that emerge from a very basic set of agent-level propositions and that are not observable from the model's equilibrium response surface.

1.1. Toward consideration of inductive influence: peer pressure and regulatory interest

The simulation literature reviewed above has examined the case of arbitrary influence, where the behavioral states are empty symbols, inconsequential to the actors who carry them. We refer to this process of arbitrary transmission or imitation as *mimetic influence* [37].

In this paper we incorporate a core property of social norms, the notion that agents may intentionally influence peers to behave in ways that those peers would otherwise not behave. Following Heckathorn [28], we consider the case where each agent's preferences over its own behavior ("inclinations") differ from its preferences over others' behavior ("regulatory interests"). This mismatch of inclinations and regulatory interests implies that agents have a reason to pressure one another, such as through informal social sanctions. Specifically, we model a group of interdependent agents facing a problem of collective goods production, where all agents receive a benefit when peers' "work" toward a collective good, but a net cost of working implies that each agent faces a perverse temptation to "shirk", or allow others to bear this