Predicting social influence with faction sizes and relative status

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A B S T R A C T

Building on a recent theoretical development in the field of sociological social psychology, we develop a formal mathematical model of social influence processes. The extant theoretical literature implies that factions and status should have non-linear effects on social influence, and yet these theories have been evaluated using standard linear statistical models. Our formal model of influence includes these non-linearities, as specified by the theories. We evaluate the fit of the formal model using experimental data. Our results indicate that a one-parameter mathematical model fits the experimental data. We conclude with the implications of our research and a discussion of how it may be used as an impetus for further work on social influence processes.

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1. Introduction

The science of social influence has identified several factors that promote influence. Sociologists have shown that both status characteristics (e.g., Berger et al., 1977; Berger and Webster, 2006) and the structure of relationships among individuals (Friedkin, 1998; Friedkin and Johnsen, 2011) shape influence processes. Psychologists have shown that the distribution of opinions in a group or faction sizes shapes social influence (e.g., Latane, 1981; Tanford and Penrod, 1984). Until recently, little research investigated the combined effects of these different factors.

Two separate lines of research, however, have changed this. First, Kalkhoff et al. (2010) integrated two sociological accounts of social influence by formally linking status and network processes. They showed that weighting interpersonal associations within a network by status generates more precise predictions of social influence, thereby combining interpersonal influence with status-based influence in one formal framework. Second, Melamed and Savage (2013) united psychological and sociological research on social influence by showing how faction sizes and status processes combine to affect social influence. One key difference between these two approaches is that the latter postulates a non-linear relationship between status and social influence. It is this second line of inquiry and the non-linear relationship between status and social influence that concerns us.

Melamed and Savage's (2013) theory of social influence links faction sizes and status processes to social influence through the intervening mechanism of uncertainty reduction. It argues that both status information and faction sizes combine to affect perceptions of uncertainty about an outcome, and as a result, social influence. Here, social influence refers to a change in an individual's thought or behaviors as a result of interacting with others (Rashotte, 2007). One of the implications of their theory is that people rely on status processes most when faction size fails to reduce uncertainty (i.e., when the group is evenly divided). Using standard statistical procedures, they found that faction sizes and relative status interact in their effect on social influence.

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In the present paper, we extend this line of inquiry by developing a formal mathematical model consistent with Melamed and Savage's theory of social influence. The model estimates a single scaling parameter from the data. We then fit the model to experimental data. Results indicate that the single parameter formal model fits the experimental data. Below we review Melamed and Savage's theory of social influence. We then formalize it, describe the data, and evaluate the model. We conclude with a general discussion and directions for future research.

2. Theories of social influence

The theoretical model developed in Melamed and Savage (2013) integrates research on faction sizes with Status Characteristics Theory. Consequently, we briefly review these literatures before describing the logical argument. Building on the seminal works of Asch (1951, 1956) and Moscovici (1980), several psychological models have been developed to predict how much influence an individual experiences when confronted with different faction sizes or numerical distributions of opinions. Here, a faction refers to a subset of individuals within a group that share a common opinion. Although there may be more than two opinions on many matters, presently we focus on a binary task implying that each actor may belong to one of two possible factions. Social Impact Theory (Latane, 1981), the Social Influence Model (Tanford and Penrod, 1984), and Self-Attention Theory (Mullen, 1983) are all attempts to mathematically model how the number of others in disagreement impacts or affects individuals. These models have in common the fact that the focus is on the distribution of opinions, and that it has a large effect on predictions of social influence. More recent research in this area has examined how faction sizes interact with other factors, such as the size of the minority faction (Gordijn et al., 2002), argument quality (Tormala and DeSensi, 2009), and prior attitudes of group members (Erb et al., 2002). Very little research, however, investigates how social status and factions combine to shape social influence.

This is problematic, because as repeated tests of Status Characteristics Theory (SCT) have demonstrated, status characteristics also affect social influence (see Berger and Webster, 2006, for a review). An attribute is a status characteristic if it involves at least two states that are differentially evaluated, and each state has a distinct specific expectation state. This description characterizes specific characteristics, such as mathematical or gardening abilities. States of diffuse status characteristics, such as education or sex, are also associated with similarly evaluated general expectation states. The theory applies to collectively-oriented and task-focused groups. Given those conditions, the theory argues that any status-valued attribute, such as race, sex, or specific abilities, that differentiates the group members will become salient and affect the formation of expectation states for each person in the group, with individuals higher on status characteristics having more positive expectation states. Subsequently, the theory argues that social influence (and other behavioral indicators of inequality) will be a direct function of expectation states.[1]

Given the same scope conditions as SCT (e.g., task and collectively-oriented groups working on a binary veridical task), Melamed and Savage (2013) argue that people process both the distribution of opinions and the distribution of status when determining the correct solution. Based on principles of cognitive efficiency, they argue that people process the distribution of opinions first, which is consistent with the extant social cognition literature (e.g., Fiske and Taylor, 1991). If the distribution of opinions does not result in a state of consensus, they argue that people subsequently seek out other pertinent information, such as status, which, by definition, implies competence. They further argue that when the distribution of opinions reduces the least amount of uncertainty – that is, in situations with evenly divided factions – other factors should have the strongest effect. Thus Melamed and Savage's theoretical model implies that the effect of status on social influence should be strongest when the group is evenly divided in terms of their initial opinions, and the effect should be weakest when there is consensus (or near consensus). It also implies that these processes apply to settings where individuals of different statuses report their initial opinions independently and concurrently and know the distribution of these initial opinions before making a final decision. Each iteration of a jury deliberation is an example of such a setting.[2]

Melamed and Savage (2013) evaluated their theoretical argument with experimental data. Their results supported the theory's logic, with status, faction sizes, and their interaction all predicting social influence. Their results came from estimating a series of generalized linear mixed models predicting whether a participant was influenced on each of twenty "critical" trials. The predictors were (1) the participant's faction size, which varied at the trial level, (2) the relative status of the participant's faction, which is an *a priori* quantification based on the mathematics of SCT, and (3) the interaction of (1) and (2) (plus a constant term). Other theories of social influence are more mathematically-oriented. SCT (Berger et al., 1977), Social Impact Theory (Latane, 1981) and Social Influence Network Theory (Friedkin, 1998) estimate very little from the empirical data in order to make predictions. Social Influence Network Theory, for example, only estimates the participant's perception of how influential each person was (c.f., Kalkhoff et al., 2010). Thus our aim is to "civilize" (Skvoretz, 1983) Melamed and Savage's theory of influence by quantifying it. Below, we describe how we do so.

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[1] For a formal presentation of the theory, see: Berger et al. (1977: 107–130), Kalkhoff and Thye (2006: 221–222), or Webster et al. (2004: 742–743).

[2] The independent and concurrent reporting of initial opinions does not always happen. In many situations, high status actors express their opinions first, effectively influencing and silencing lower status others before they can express their first impressions. Our research does not speak to these situations. We leave it for future work to examine the evolution of social influence (see the discussion section).