

# **ATTITUDE CHANGE, AFFECT CONTROL, AND EXPECTATION STATES IN THE FORMATION OF INFLUENCE NETWORKS\***

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# **ATTITUDE CHANGE, AFFECT CONTROL, AND EXPECTATION STATES IN THE FORMATION OF INFLUENCE NETWORKS**

## **ABSTRACT**

This paper works at the intersections of affect control theory, expectation states theory, and social influence network theory. First, we introduce social influence network theory into affect control theory. We show how an influence network may emerge from the pattern of interpersonal sentiments in a group and how the fundamental sentiments that are at the core of affect control theory (dealing with the evaluation, potency, and activity of self and others) may be modified by interpersonal influences. Second, we bring affect control theory and social influence network theory to bear on expectation states theory. In a task-oriented group, where persons' performance expectations may be a major basis of their interpersonal influence, we argue that persons' fundamental sentiments may mediate effects of status characteristics on group members' performance expectations. Based on the linkage of fundamental sentiments and interpersonal influence, we develop an account of the formation of influence networks in groups that is applicable to both status homogeneous and status heterogeneous groups of any size, whether or not they are completely connected, and that is not restricted in scope to task-oriented groups.

## INTRODUCTION

Recently, there have been efforts to develop linkages between some of the major lines of work in sociological social psychology—*affect control theory (ACT)*, *expectation states theory (EST)*, and *social identity theory*. Ridgeway and Smith-Lovin (1994) have described possible linkages between *affect control theory* and *expectation states theory*. Kalkhoff and Barnum (2000) have described possible linkages between *social identity theory* and *expectation states theory*. These and other linking efforts (Skvoretz & Fararo, 1996) indicate points of intersection based on shared theoretical constructs and shed an integrative light on the domain of social psychology by joining different theoretical structures. Such efforts advance knowledge by developing links between extant theories, in contrast to advancements that are predicated on competition through elimination or subsumption of theories.<sup>1</sup>

Our present effort is exactly in this vein of establishing productive linkages. We believe that it is feasible and useful to link *social influence network theory* (a combinatorial theory of attitude change) with *affect control theory* and *expectation states theory*. *Social influence network theory* and *affect control theory* intersect on *sentiments*, which in *affect control theory* are attitudes about particular persons measured by semantic differential scales of evaluation, potency, and activity. *Social influence network theory* and *expectation states theory* intersect on *performance expectations*, which in *expectation states theory* are latent attitudes that affect interpersonal influence in task-oriented groups. As attitudes, sentiments and expectations are subject to endogenous interpersonal influences, so they may be influenced by the attitudes of others. A network of such endogenous interpersonal influences is often formed in social groups. However, neither *affect control theory* nor *expectation states theory* grapples directly with the implications of the presence of such networks. We currently do not have a

good theoretical understanding of how the fundamental sentiments associated with persons' social identities or the performance expectations associated with persons' status positions are modified by the displayed attitudes of other group members, or how endogenous interpersonal influences in a group may generate equilibrium sentiments and expectations that are quite different from (and possibly more consensual than) their initial array of sentiments and expectations.

As we shall see, social influence network theory does not add anything further to the accounts of affect control theory and expectation states theory when the *initial* attitudes of group members are consensual, i.e., when they view the same object in the same way.<sup>2</sup> In affect control theory and expectation states theory, this is the typical situation analyzed. When there is an initial consensus, interpersonal influences are moot and equilibrium attitudes are the initial attitudes of each group member. However, matters become more complex and interesting when the attitudes of group members toward the same objects are heterogeneous and there is a network of interpersonal influence that connects the members of the group. A contribution of social influence network theory is to show how an influence network may operate to modify attitudes and how a more consensual set of attitudes can emerge from a sequence of interpersonal influences. As a prelude to our analysis, we briefly and roughly sketch the main features of affect control theory, expectation states theory, and social influence network theory, and we develop some of the possible links between them. Our main analytical emphasis will be on the linkage between affect control theory and social influence network theory. We will demonstrate how these theories, once joined, may bear on the account of the core constructs of expectation states theory (the performance expectations that are associated with persons' status positions and the influence networks in groups) and how an influence network may emerge from the process of attitude change about group members' interpersonal sentiments. We also will show how the standard prediction

equation for persons' performance expectations in expectation states theory can be employed to predict influence networks in our social-influence-network-theory framework and how a relaxation of the EST assumption of consensual performance expectations is easily accommodated by our framework.

## THREE THEORIES

### Affect Control Theory

Affect control theory deals with mechanisms and associated behaviors and emotions that underlie the formation, maintenance, and transformation of persons' definitions of situations in the particular social settings in which they are interacting (Heise, 2002; Smith-Lovin & Heise, 1988). A detailed description of affect control theory, related computer software, and an extensive bibliography of the theoretical underpinnings and empirical supports for this theory may be found on David Heise's website (<http://www.indiana.edu/~socpsy/ACT/>).

Affect control theory posits that social situations entail a constellation of sentiments toward various objects, including the social setting (classroom, home, workplace), the social identity of the persons who are located in the setting (doctor, nurse, husband, child), the behaviors of the persons in the setting, and other salient characteristics of the persons (mood, gender, status) and their behaviors. Hence, for  $n$  persons with  $k$ -dimensional sentiments toward  $q$  objects, the social situation would be defined in terms of an  $n \times k \times q$  matrix of scores that are indicative of persons' attitudes about the  $q$  objects. Prior to any interaction among the persons involved in a social situation, a set of *fundamental* sentiments are triggered by persons' identification or recognition of the objects in the situation. Affect control theory assumes that these fundamental sentiments are *normative* in the sense that the same matrix of sentiments would be expected for a different set of persons in identical situations. This homogeneity is

assumed to be based on a cultural consensus in the population from which the persons involved in the situation are drawn. Affect-control investigators have obtained empirical estimates from surveys of the fundamental sentiments for a large number of objects, so that in applications of the theory a matrix of fundamental sentiments can be obtained *a priori* for an immense number of theoretically possible social situations.

Affect control theory posits that each person in a social situation will have a normative *expectation* about the likelihood of various events that might occur in that setting, based on the fundamental sentiments that are entailed in their initial definition of the situation.<sup>3</sup> The events that occur in a social setting do not necessarily conform to these expectations for a variety of reasons. Affect control theory posits that any such *deflection* (deviation) of actual events from expectation are *transitory* and that these deflections are diminished by homeostatic control or balancing mechanisms (involving actions or redefinitions) that bring experienced sentiments into closer conformity or fit with expected fundamental sentiments. Although perfect conformity with expectations may not be feasible, it is the movement toward greater conformity that is the fundamental social mechanism with which affect control theory is concerned. Events trigger felt and displayed emotions that signal the degree of deflection of events from expectations.

Persons may reduce deflections by altering their behavior (eventually bringing their behavior into closer accord with normative expectations) or by *redefining* the elements of the definition of the situation. If the social identities, setting, and other salient conditions of the situation are *fixed*, then a deflection can only be mitigated by new behaviors in subsequent events that bring the sentiments for these subsequent events closer to the fundamental sentiments for these fixed conditions. However, affect control theory also allows for *reidentifications* that involve a re-labeling of the setting or the identities

and characteristics of persons and other objects. In effect, a reidentification may reduce deflection by changing fundamental sentiments, so that now the experienced events in a setting are more consistent with normative expectation and do not produce as much stress.

The balancing mechanisms of affect control theory are grounded on consensual understandings in the culture or subculture of a population that a particular set of fundamental sentiments are appropriate or correct for the situation. Without discounting this explanation, we point out that when there is a lack of initial consensus on what is appropriate or correct, *interpersonal influences* in a group may produce the shared meanings and the strong normative foundations that underlie the equilibrating behaviors postulated by affect control theory. That is, in a group of persons who find themselves interacting in a situation, a consensual understanding about what is expected and correct may be *constructed* by them on the basis of a network of interpersonal influences that is being formed in the group.

### *Introducing Influence Networks into Affect Control Theory*

Social influence network theory and affect control theory intersect on the fundamental sentiments that deal with persons' attitudes toward objects in a social situation. In affect control theory, a *semantic differential scale* is employed to describe persons' sentiments toward the objects that define a situation and the events that take place in it. Semantic differential scales are among the most widely employed attitudinal scales in social psychology (Osgood, May, & Miron, 1975; Osgood, Suci, & Tannenbaum, 1957). Such scales are constructed from pairs of antonyms (good or bad, wise or foolish, and so forth) that might describe an object. For each pair of antonyms, a scale consisting of 5, 7, or 9 possible

positions or locations indicate the attitude of a person toward the object; for example, a scale with nine positions would be coded

-4, -3, -2, -1, 0, 1, 2, 3, 4, and the middle position would indicate that one adjective is not better than other, or that both adjectives are irrelevant.

Semantic differential scales of attitudes are widely employed, in part, because they allow a standard or uniform set of antonym pairs to be applied to a large domain of different objects. The frequent and successful employment of this scaling approach to attitudes has suggested, in turn, that persons may be responding to a wide variety of different objects in terms of a common metric. From factor-analytic studies of semantic differential antonyms, it appears that the many possible word-items (pairs of antonyms) that have been employed in the construction of semantic differential scales are indicators of three underlying dimensions—*evaluation* (e.g., good vs. bad), *potency* (e.g., strong vs. weak), and *activity* (e.g., lively vs. quiet). A person's mean scores on the dimensions of evaluation, potency, and activity are referred to as the EPA profile for the target-object from the point of view of the source-person, who is the holder of the attitude. If the EPA profile is treated as a set of coordinates in 3-dimensional space, then a spatial model of the distribution of persons' attitudes toward a common target-object is produced.

Social influence network theory is introduced into affect control theory by allowing persons' fundamental sentiments to be affected by other persons' fundamental sentiments (cf. Robinson, 1996). Heterogeneous fundamental sentiments towards the same object may arise in various ways: different subcultures (e.g., male vs. female subcultures) may have different sentiments towards the same object, persons with similar identities (e.g., males) from different cultures may have different sentiments toward the same object (e.g., females), or persons with similar identities may identify the same object

differently. Thus, endogenous interpersonal influences—sentiments affecting sentiments—may modify persons' viewpoints about the objects in their social environments. Leaving aside the particular formal specification of this influence process, the proposition that such interpersonal influences might be occurring is hardly startling. Indeed, Newcomb (1951) suggested that the occurrence of endogenous interpersonal influence should be taken as a basic postulate in social psychological theory: "Any observable behavior [attitude, emotion, action] is not only a response (on the part of a subject) which is to be treated as a dependent variable; it is also a stimulus to be perceived by others with whom the subject interacts, and thus to be treated as an independent variable." An influence network is the *structure* in which such endogenous interpersonal responses occur.

Although affect control theory emphasizes that definitions of the situation are constructed on the basis of widely shared orientations towards identities and expected behaviors, the theory allows for within-group processes that modify the identities that persons attribute to themselves and others in a particular setting. We have previously noted that affect control theorists argue that such reidentifications redefine the situation so that there is a closer correspondence between the situated identities and their behaviors. We believe that there also may be some reidentification based on endogenous interpersonal influence, that is, as a direct response to the displayed sentiments of significant others toward the objects that define a situation.<sup>4</sup> Therefore, we introduce a process of endogenous interpersonal influence into the construction of a definition of a situation, based on the assumption that persons may take into account (to varying degrees) the fundamental sentiments of their significant others in refining their own fundamental sentiments about the salient objects involved in a social situation. Social influence network theory is nuanced in that it allows for individual differences in susceptibilities to interpersonal influence;

hence, we do not stipulate that persons necessarily modify their sentiments through a process of interpersonal influence or that all persons involved in a situation will do so to the same extent.

Thus, our contribution to affect control theory is the idea that the fundamental sentiments upon which deflections are based are not always strictly based on the specification of the dyadic situation consisting of the identities of two persons, their modifying characteristics, and setting. We are proposing that the normative foundations of the fundamental sentiments are not entirely specified by the fixed contextual conditions of the situation, but may to some extent be shaped by the interpersonal influences in the situation. Hence, the basis of deflections may not be the discrepancy between the *initial* fundamental sentiments and the transitory impressions that are associated with a particular behavior, but instead may involve a set of *influenced* fundamental sentiments that have been shaped by the interpersonal influences of significant others. When there are multiple persons involved in a situation who are simultaneously forming sentiments about the salient objects in the setting, and when at least some of these persons are susceptible to interpersonal influence, then the normative sentiments (and expected behaviors) for the situation may be “negotiated” within the group to some extent. Interpersonal influence among persons with heterogeneous identities may produce sentiments that are very different from the initial fundamental sentiments that are broadly associated with the identities in the population-level culture. Indeed, once endogenous interpersonal influences are introduced it becomes at least a theoretical possibility that a person may come to hold sentiments that are radically inconsistent with his or her initial fundamental sentiments toward some object. Whether such persons experience stress as a consequence of such a structural deflection from their initial sentiments is an open question.

## Expectation States Theory

Expectation states theory is a family of models concerned with the formation of inequalities of individual behavior and interpersonal interaction in task-oriented groups (Balkwell, 1991; Berger, Conner, & Fisek, 1974; Berger, Fisek, Norman, & Zelditch Jr., 1977; Berger, Wagner, & Zelditch Jr., 1985; Fisek, Berger, & Norman, 1991; Fisek, Norman, & Nelson-Kilger, 1992; Skvoretz, Webster, & Whitmeyer, 1999; Wagner & Berger, 1993). Following Bales (1950), the initial emphasis of the theory was on an account of how inequalities of interpersonal influence emerge in status homogeneous groups, where there are no differences among group members on certain socio-demographic characteristics; however, the theory was quickly extended to include an account of how the emergent inequalities of interpersonal influence in heterogeneous groups are shaped by members' socio-demographic characteristics.

In expectation states theory, the key construct in the explanation of influence inequalities is a latent attitude—a performance expectation—that a person forms about each group member, including him or her self, concerning the value of a person's task-relevant opinions and actions. In status *homogeneous* groups, expectation state theory posits that the main antecedents of a performance expectation are initial manifest differences in behavior (e.g., persons' self-assertion or quiescence).<sup>5</sup> In status *heterogeneous* groups, the main antecedents of a performance expectation include general socio-demographic characteristics of the group's members (e.g., the members' age, sex, skin color, height, weight, attractiveness, and social class) and more specific task-related characteristics that suggest some relevant expertise. A major accomplishment of expectation states theory is the development of a “graph-analytic” model that predicts persons' performance expectations based on socio-demographic characteristics. Expectation states theory posits that group members compare each other in terms of

their expected levels of task-related performance and that these comparisons govern their behavior toward one another, including their resistance or acceptance of interpersonal influence from particular persons in the group (Festinger 1954). The empirical focus in expectation states research has been on the dyad, where influence outcomes have been measured as the proportion of disagreements resolved in favor of one member of the dyad or the other. Because expectation states theory assumes that the effects of status characteristics on performance expectations and interpersonal influence are based on population-level consensual understandings about the meaning and relevance of particular status characteristics, the predicted pattern of interpersonal influence that emerges in these dyads should tend to reflect the broader cultural consensus concerning the value of these different status characteristics in the population.

In recent path-breaking theoretical work, Whitmeyer (2002) has demonstrated that the graph-analytic models of expectation states theory, that have been employed to predict performance expectations, may be represented more parsimoniously by algebraic equations of the following form:

$$\Phi = \exp\left[-a \sum_r n_r g(r)\right] - \exp\left[-a \sum_r p_r g(r)\right], \quad (1)$$

where  $\Phi$  is the predicted performance expectation for a person with a given array of status characteristics,  $r = \{1,2,3\}$  is the relevance level of a status condition,  $p_r$  is the number of status conditions of relevance  $r$  on which a person's status value is high (positive),  $n_r$  is the number of status conditions of relevance  $r$  on which a person's status value is low (negative),  $a > 0$  is a constant,  $g(r) > 0$  is one of the following functions

$$g(r) = \begin{cases} c^{3-r} + c^{2-r} & \text{Berger et al. (1977)} \\ c^{6-r} + c^{5-r} & \text{Balkwell (1991)} \\ c^{1-r} + c^{-r} & \text{Fisek et al. (1992)} \end{cases}$$

and  $c$  is an estimated constant ( $c \approx 3$ ). In turn, the performance expectations of group members

$\{\Phi_1, \Phi_2, \dots, \Phi_n\}$  are linearly transformed into a measure (B) of influence behavior; for instance,

$B_{12} = \mathbf{b}_0 + \mathbf{b}_1(\Phi_1 - \Phi_2)$  in the case of a dyad.

We note that an alternative expression for Eqn. (1) is

$$\Phi = \exp\left[-\mathbf{b}_0 \sum_r \mathbf{b}_r n_r\right] - \exp\left[-\mathbf{b}_0 \sum_r \mathbf{b}_r p_r\right], \quad (2)$$

where the  $\mathbf{b}$  coefficients are estimable constants.<sup>6</sup> This reformulation suggests that even simpler

expressions may suffice. For example, if we take the two leading terms in the infinite series expansion of

the exponential function  $e^{-x} = 1 - \frac{x}{1!} + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots$ , that is  $1 - x$ , performance expectations might be

adequately predicted by a simple linear combination of status variables, i.e.,

$$\begin{aligned} \Phi &= \sum_k \mathbf{b}_k X_k \\ &= \mathbf{b}_0 \sum_{r=1}^3 \mathbf{b}_r p_r - \mathbf{b}_0 \sum_{r=1}^3 \mathbf{b}_r n_r = \mathbf{b}_0 \sum_{r=1}^3 \mathbf{b}_r (p_r - n_r) \end{aligned}, \quad (3)$$

where each status variable  $X_k$  involves a dichotomous coding ( $-1$  for negative status,  $+1$  for positive

status) and there are only *three* homogeneous classes of these variables with three corresponding

distinct effects ( $\mathbf{b}_1, \mathbf{b}_2, \mathbf{b}_3$ ). These, in turn, can be transformed into interpersonal influences according

to a function that we shall specify. Whether such a reformulation captures all of the effects of the

standard expectation states formulation is an open question that we believe is worth pursuing.<sup>7</sup>

*Introducing Influence Networks into Expectation States Theory*

We have mentioned that most of the empirical work in the expectation states tradition has been concentrated on an analysis of dyads, and this focus is for us a major limitation of the tradition; see the work on larger discussion groups (e.g., Robinson & Balkwell, 1995; Smith-Lovin, Skvoretz, & Hawkins, 1986). We are interested in the analysis of systems of interpersonal influence of arbitrary size; moreover, we suspect that dyadic systems have certain unusual properties and that it may be misleading to concentrate analysis on them.<sup>8</sup> In the expectation states research tradition, there has been some work on the effects of persons' performance expectations on other persons' performance expectations; it is assumed that the influential expectations are *fixed* conditions that are affecting the performance expectations of some focal person (Fisek, Berger, & Norman, 1995; Troyer & Younts, 1997; Webster & Sobieszek, 1974; Webster & Whitmeyer, 1999, 2002). However, unlike persons' status characteristics, influential performance expectations may not be fixed conditions. While the performance expectations of a person are being influenced by the performance expectations of others, others' performance expectations also may be influenced and undergoing modification. Hence, in natural groups, the grounds on which persons are forming attitudes about themselves and others may be shifting rather than fixed, especially when there is substantial initial *disagreement* on appropriate expectations. In its account of the emergence of stable influence structures in newly formed task-oriented groups, we believe that expectation states theory has somewhat overstated the general extent of *initial* consensus on performance expectations (the theory assumes consensus as an initial condition), and that it has not adequately detailed the *mechanism* by which interpersonal agreements are produced on performance expectations through the interactions of the group members. Thus, when there is a consensus on performance expectations in a group, we believe that it often has been produced *within the group*,

through a process of endogenous interpersonal influence among its members. When an observed consensus is not based on the simple importation of a population-level agreement, then the intragroup process that has produced the consensus should be formally incorporated into expectation states theory.

The work on interpersonal influences on performance expectations has not described a mechanism by which the expectations of the sources of influence are also being influenced and has not shown how, in concrete mathematical terms and under what conditions, a consensus will arise as a result of a sequence of interpersonal influences among group members. The work that has been conducted on the diffusion of shared understandings of the performance value of different status characteristics has been motivated by the assumption (central to expectation states theory, but one that we question) that persons *enter into* groups with a substantial degree of consensus about the relevance and performance value of various status characteristics to task-oriented activities (Ridgeway 1991; Ridgeway & Balkwell 1997). For us, what is most fundamental about expectation states theory is *not* the assertion of an initial consensus of status beliefs (we think that this assertion can be discarded); it is the assertion that status characteristics affect persons' attitudes about each other (their performance expectations) and that, regardless of the degree of initial consensus on group members' attitudes, social processes operate within groups to generate such consensus and, in turn, a stable network of interpersonal influence that reflects the agreement that has been constructed in the group. Our theoretical focus is on the social process within a group that generates such consensus and stable patterns of influence, where they do not exist *a priori*.

#### Social Influence Network Theory

During the past decade, there has been a dramatic increase of work on how social networks are formed and change (Arrow, 1997; Carley, 1990, 1991; Doreian & Stokman, 1997; Lazer, 2001;

Stokman & Baveling, 1998). Our focus is on the *influence* networks in groups that shape group members' attitudes, and we develop a model of the evolution of such influence networks in which the set of attitudes that group members have about themselves and others (i.e., their sentiments) affect the network of interpersonal influences among them, the influence network in turn modifies persons' sentiments, and so on, until an equilibrium is reached. Thus, our theoretical orientation to network dynamics is distinctly social psychological, and our present effort is to link these dynamics to theoretical constructs that are the cornerstones of affect control theory (sentiments and identities) and expectation states theory (performance expectations and status characteristics).

In much of our previous work (Friedkin 1991; 1998; 1999; 2001; Friedkin & Johnsen 1990; 1997; 1999), we have assumed that an influence network is a stable social context in which the process of attitude change unfolds:

$$y_i^{(t+1)} = a_i \left( w_{i1} y_1^{(t)} + w_{i2} y_2^{(t)} + \dots + w_{iN} y_N^{(t)} \right) + (1 - a_i) y_i^{(t)} \quad (4)$$

for each of the  $n$  persons in the group,  $i = 1, 2, \dots, n$  and  $t = 1, 2, \dots, \infty$ . The attitudes of the persons at time  $t$  are  $y_1^{(t)}, y_2^{(t)}, \dots, y_n^{(t)}$  and their initial attitudes are  $y_1^{(1)}, y_2^{(1)}, \dots, y_n^{(1)}$ . The set of influences of the group members on person  $i$  is  $\{w_{i1}, w_{i2}, \dots, w_{in}\}$ , where  $0 \leq w_{ij} \leq 1$ , and  $\sum_j w_{ij} = 1$ . The *susceptibility* of person  $i$  to the influence of others is  $a_{ii}$ , where  $0 \leq a_{ii} \leq 1$  and  $a_{ii} = 1 - w_{ii}$ . The system of equations described by Eqn. (4) can be represented as

$$\mathbf{y}^{(t+1)} = \mathbf{A} \mathbf{W} \mathbf{y}^{(t)} + (\mathbf{I} - \mathbf{A}) \mathbf{y}^{(1)}, \quad (5)$$

where  $\mathbf{y}^{(t)}$  is a  $n \times 1$  vector of persons' attitudes on an issue at time  $t$ ,  $\mathbf{W} = [w_{ij}]$  is a  $n \times n$  matrix of interpersonal influences, and  $\mathbf{A} = \text{diag}(a_{11}, a_{22}, \dots, a_{nn})$  is a  $n \times n$  diagonal matrix of the persons'

susceptibilities to interpersonal influence on the issue. Simply stated, the process is one in which at each time period, every person in the group forms a revised attitude that is a *weighted average* of the attitudes of the members of the group in the immediately previous time period (including the person's own previous attitude) and the person's initial attitude.

### *A Dynamic Influence Network*

We have always viewed Eqn. (5) as a *special case* of a more general model in which persons' susceptibilities and interpersonal influences might change over time (Friedkin & Johnsen 1990),

$$\mathbf{Y}^{(t+1)} = \mathbf{A}^{(t)}\mathbf{W}^{(t)}\mathbf{Y}^{(t)} + (\mathbf{I} - \mathbf{A}^{(t)})\mathbf{Y}^{(1)}, \quad (6)$$

but we have not previously attempted to specify the functions that govern the changes in the influence network. We do so now by linking social influence network theory and affect control theory. We shall describe a process in which persons' initial sentiments determine a network of interpersonal influences that, in turn, modifies sentiments that, in turn, modifies interpersonal influences and so on, within the constraints of interpersonal visibility, so that an initial set of fundamental sentiments are modified by interpersonal influences to produce equilibrium sentiments and a stable influence network.

The linkage between our theory and affect control theory is an  $n \times n \times 3$  matrix of sentiments,  $\mathbf{Y}^{(t)} = [y_{ijk}^{(t)}]$ , where  $\{y_{ij1}^{(t)}, y_{ij2}^{(t)}, y_{ij3}^{(t)}\}$  is the EPA profile for person  $j$  from the viewpoint of person  $i$ . For  $t = 1$ ,  $\mathbf{Y}^{(1)} = [y_{ijk}^{(1)}]$  describes the *fundamental sentiments* of the group members towards themselves and each other. For  $t > 1$ , assuming that the fundamental sentiments are subject to interpersonal influence,  $\mathbf{Y}^{(t)} = [y_{ijk}^{(t)}]$  describes the revised sentiments of the group members that have been influenced by other members' sentiments. In our model of the evolution of the influence network that is detailed

below, we assume that sentiments affect interpersonal influence via a latent construct—the *salience* of self and others—that is at the foundations of interpersonal influence.

Interpersonal influence depends on interpersonal visibility and salience. Person  $j$ 's attitudes cannot directly influence person  $i$ 's attitudes unless they are visible and salient for person  $i$ . Let  $\mathbf{R}^{(t)} = [r_{ij}^{(t)}]$  be the *visibility* matrix for the group

$$\mathbf{R}^{(t)} = \begin{bmatrix} 1 & r_{12}^{(t)} & \dots & r_{1n}^{(t)} \\ r_{21}^{(t)} & 1 & \dots & r_{2n}^{(t)} \\ \vdots & \vdots & \ddots & \vdots \\ r_{n1}^{(t)} & r_{n2}^{(t)} & \dots & 1 \end{bmatrix}, \quad (7)$$

where  $r_{ij}^{(t)} = 1$  if person  $i$  is acquainted with person  $j$  and  $r_{ij}^{(t)} = 0$  otherwise.<sup>9</sup> We restrict our analysis to those groups in which every person is acquainted with at least one other person in the group; hence,

we stipulate that  $\sum_{k \neq i}^n r_{ik}^{(t)} > 0$  for all  $i$ . Let  $\mathbf{S}^{(t)} = [s_{ij}^{(t)}]$  be the *salience* matrix for the group,

$$\mathbf{S}^{(t)} = \begin{bmatrix} s_{11}^{(t)} & s_{12}^{(t)} & \dots & s_{1n}^{(t)} \\ s_{21}^{(t)} & s_{22}^{(t)} & \dots & s_{2n}^{(t)} \\ \vdots & \vdots & \ddots & \vdots \\ s_{n1}^{(t)} & s_{n2}^{(t)} & \dots & s_{nn}^{(t)} \end{bmatrix}, \quad (8)$$

where  $0 \leq s_{ij}^{(t)} \leq 1$  indicates the potential salience of person  $j$ 's attitudes for person  $i$ . In terms of these

constructs, the matrix of interpersonal influence,  $\mathbf{W}^{(t)} = [w_{ij}^{(t)}]$

$$\mathbf{W}^{(t)} = \begin{bmatrix} w_{11}^{(t)} & w_{12}^{(t)} & \dots & w_{1n}^{(t)} \\ w_{21}^{(t)} & w_{22}^{(t)} & \dots & w_{2n}^{(t)} \\ \vdots & \vdots & \ddots & \vdots \\ w_{n1}^{(t)} & w_{n2}^{(t)} & \dots & w_{nn}^{(t)} \end{bmatrix}, \quad (9)$$

is specified as one in which the weight accorded to one's self is the perceived salience of one's self

$$w_{ii}^{(t)} = s_{ii}^{(t)} , \quad (10)$$

and the weight accorded to an acquaintance is a function of the *relative* salience of that acquaintance

$$w_{ij}^{(t)} = \begin{cases} \left(1 - s_{ii}^{(t)}\right) \frac{r_{ij}^{(t)} s_{ij}^{(t)}}{\sum_{k \neq i}^n r_{ik}^{(t)} s_{ik}^{(t)}} & \text{for } \sum_{k \neq i}^n r_{ik}^{(t)} s_{ik}^{(t)} \neq 0 \\ \left(1 - s_{ii}^{(t)}\right) \frac{r_{ij}^{(t)}}{\sum_{k \neq i}^n r_{ik}^{(t)}} & \text{for } \sum_{k \neq i}^n r_{ik}^{(t)} s_{ik}^{(t)} = 0 \end{cases} . \quad (11)$$

Hence,  $0 \leq w_{ij}^{(t)} \leq 1$  and  $\sum_{j=1}^n w_{ij}^{(t)} = 1$  for all  $i$  and  $t = 1, 2, \dots, \infty$ . In turn, we posit that salience is a

function of a linear combination of conditions

$$s_{ij}^{(t)} = \begin{cases} \frac{\exp\{\mathbf{I}z_{ij}^{(t)}\} - 1}{\exp\{\mathbf{I}z_{ij}^{(t)}\} + 1} & \text{for } z_{ij}^{(t)} \geq 0 \\ 0 & \text{for } z_{ij}^{(t)} < 0 \end{cases} , \quad (12)$$

where

$$z_{ij}^{(t)} = \mathbf{b}_{ij0}^{(t)} + \mathbf{b}_{ij1}^{(t)} x_{ij1}^{(t)} + \mathbf{b}_{ij2}^{(t)} x_{ij2}^{(t)} + \dots , \quad (13)$$

$\mathbf{I} > 0$  is a constant and  $-\infty < z_{ij}^{(t)} < \infty$ . Note that Eqn. (13) is *very* general in allowing a

heterogeneous set of coefficients. A simple special case of Eqn. (13) is

$$z_{ij}^{(t)} = \mathbf{b}_0 + \mathbf{b}_1 x_{ij1}^{(t)} + \mathbf{b}_2 x_{ij2}^{(t)} + \dots \quad (14)$$

or, if  $z_{ii}^{(t)}$  and  $z_{ij}^{(t)}$  respond to different conditions, or to the same conditions in different ways,

$$z_{ij}^{(t)} = \mathbf{b}_0 + \mathbf{b}_1 x_{ij1}^{(t)} + \mathbf{b}_2 x_{ij2}^{(t)} + \dots$$

and

$$z_{ii}^{(t)} = \tilde{\mathbf{b}}_0 + \tilde{\mathbf{b}}_1 \tilde{x}_{ij1}^{(t)} + \tilde{\mathbf{b}}_2 \tilde{x}_{ij2}^{(t)} + \dots \quad (15)$$

for  $i \neq j$ . It may make sense to disentangle and treat separately the conditions that affect persons' attitudes about themselves from the conditions that affect persons' attitudes about other group members, as we have done in Eqn. (15), although this theoretical distinction is not made in either affect control theory or expectation states theory. Even for those variables that have noteworthy effects on both "self" and "other" attitudes, the effects may be different; for example, the effect of knowing that some other person  $j$  is an expert on an issue may not be the same as the effect of knowing that you ( $i$ ) are an expert. Moreover, certain group-level conditions, such as a general demand or pressure for consensus, may have an important main effect in lowering self-salience, but have no bearing on the level of salience accorded to particular others.<sup>10</sup>

## FORMAL LINKAGES AND ILLUSTRATIONS

### Linking to Affect Control Theory

In line with affect control theory, we posit that interpersonal sentiments toward one's self and particular others, on the dimensions of evaluation, potency, and activity, are among the immediate (direct) determinants of salience:

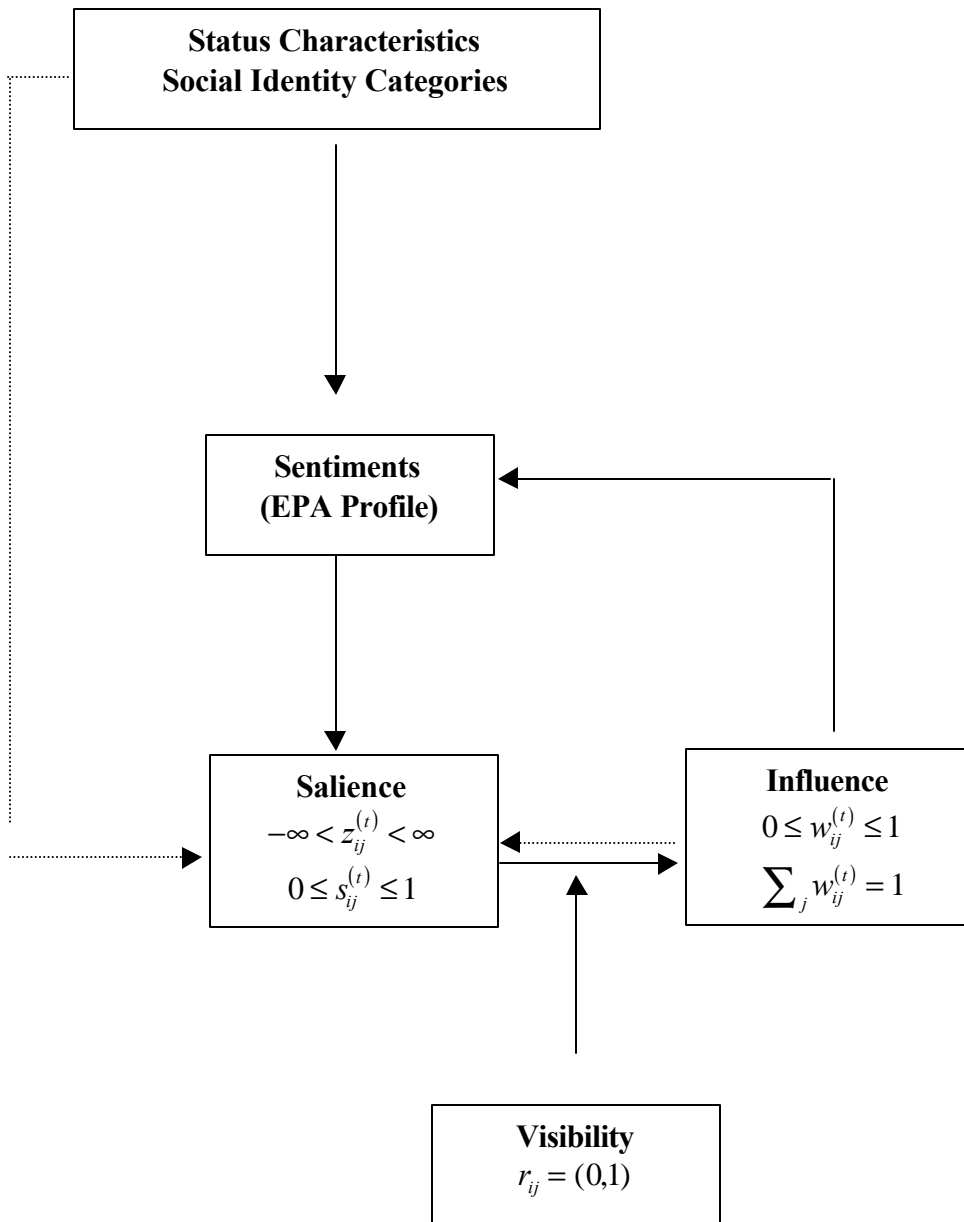
$$z_{ij}^{(t)} = \mathbf{b}_{ij0} + \mathbf{b}_{ij1}y_{ij1}^{(t)} + \mathbf{b}_{ij2}y_{ij2}^{(t)} + \mathbf{b}_{ij3}y_{ij3}^{(t)} \quad (16)$$

Evaluation                      Potency                      Activity

This equation may be easily elaborated to include other determinants of salience; for instance, bases of social power (French & Raven, 1959), status characteristics, and other conditions directly affecting persons' salience may be included. As we have illustrated in Figure 1, we believe that many of these conditions are *antecedents* of the sentiments that are at the core of affect control theory (evaluation, potency, activity) and that these sentiments, in turn, affect salience. After controlling for persons' sentiments, there may or may not be any noteworthy *direct* effects of status characteristics and identity categories on salience. Our tentative theoretical position is that persons' displayed sentiments towards themselves and others in a group have a major role in the determination of interpersonal influence networks and that alternative mechanisms may be discounted; specifically, in terms of the path diagram shown in Figure 1, we believe that two direct effects indicated by the dotted arrows (.....▶) may be negligible effects.

Insert Figure 1 About Here

**Figure 1. A Model of the Evolution of Influence Networks**



Note: The mediating role of sentiments is an open empirical issue.

Hence, in this social influence process, the sentiments of group members towards themselves and others are being shaped by interpersonal influences that, in turn, are being affected by the sentiments of group members, and so on. The displayed attitudes of influential others toward person *i* describe a viewpoint on person *i*'s identity that may change *i*'s self-orientation depending on *i*'s susceptibility to interpersonal influence. Person *i*'s attitude toward self may be a *reflected appraisal* of the attitudes of others, but this interpersonal determination of *i*'s self-orientation is governed by his or her susceptibility to influence. Interpersonal influences on *i* may either support, lower, or heighten person *i*'s self-orientation depending on whose attitudes are influential. In this process, person *i* is not only a potential recipient of influence, he or she also is a potential *source* of influence: person *i* is simultaneously a recipient and an agent of influence and these "roles" are determined, respectively, by *i*'s susceptibility to influence and by the amount of influence that is being accorded to *i* by others. Because person *i* may directly or indirectly influence those persons who are having some influence on him or her, person *i* may shape the social environment in which he or she is situated so that the definition of the situation as construed by *others* more closely corresponds to person *i*'s own *initial* definition. Hence, the agents of influence are in competition with each other, whether or not they recognize it, in the determination of the definition of the situation for each person. This competition is especially clear when a *consensual* definition of the situation emerges from the process, because in that case each person's *initial* position (their initial fundamental sentiments) has a proportionate contribution in determining the content of the consensual understanding of the group as a whole.

If this process, Eqn. (6), attains an equilibrium, then

$$\begin{aligned}\mathbf{Y}^{(\infty)} &= \mathbf{A}^{(\infty)}\mathbf{W}^{(\infty)}\mathbf{Y}^{(\infty)} + (\mathbf{I} - \mathbf{A}^{(\infty)})\mathbf{Y}^{(1)} \\ &= \mathbf{V}^{(\infty)}\mathbf{Y}^{(1)}\end{aligned}\quad (17)$$

where  $\mathbf{V}^{(\infty)} = [v_{ij}^{(\infty)}]$  is the matrix of reduced-form coefficients,  $0 \leq v_{ij}^{(\infty)} \leq 1$  and  $\sum_j v_{ij}^{(\infty)} = 1$ , that transforms the initial fundamental sentiments of the group members into their equilibrium sentiments,  $\mathbf{Y}^{(\infty)}$ . These equilibrium sentiments are the more or less *influenced* fundamental sentiments of the  $n$  group members about each other on each of the three dimensions of evaluation, potency, and activity. Group members' sentiments and the pattern of interpersonal visibility determines persons' susceptibilities,  $\mathbf{A}^{(\infty)}$ , and influences,  $\mathbf{W}^{(\infty)}$ , so that the equilibrium influence structure of the group also is completely determined by the initial fundamental sentiments among the group members about one another and themselves,  $\mathbf{Y}^{(1)}$ , and by the fixed pattern of interpersonal visibility in the group,  $\mathbf{R}$ . The direct or total influences,  $\mathbf{W}^{(\infty)}$  or  $\mathbf{V}^{(\infty)}$  respectively, may involve a consensual stratification of interpersonal influences or more complex patterns of heterogeneous influences.

If a group's equilibrium sentiments and influences are formed during the discussion of a particular substantive issue, then the development of persons' positions on the substantive issue may evolve in parallel with the process that is forming the interpersonal sentiments and influences in the group. Once a stable influence network is formed, it may provide a fixed social context for a domain of subsequent issues that arise in the group

$$\mathbf{Y}^{(t+1)} = \mathbf{A}^{(\infty)}\mathbf{W}^{(\infty)}\mathbf{Y}^{(t)} + (\mathbf{I} - \mathbf{A}^{(\infty)})\mathbf{Y}^{(1)} \quad (18)$$

where now  $\mathbf{Y}^{(t)}$  represents any one of a number of issues that may arise in the group. Eqn. (18) is simply the model described by Eqn. (5), except that we have provided for the evolution of the influence network that is observed in the group (i.e.,  $\mathbf{W}^{(\infty)} = \mathbf{W}$  and  $\mathbf{A}^{(\infty)} = \mathbf{A}$ ).

To illustrate the application of this approach, consider the following matrix of sentiments for a male husband and female wife:

		Sentiments About:					
		Male			Female		
Sentiments Held By:							
Male		Husband			Wife		
	$t = 1$	1.18	1.59	0.62	2.31	1.17	1.06
	$t = \infty$	1.39	1.55	0.68	2.19	1.12	1.04
Female		Husband			Wife		
	$t = 1$	2.27	1.36	0.93	1.67	0.88	0.97
	$t = \infty$	2.17	1.38	0.90	1.73	0.91	0.98

Each set of three numbers contains the evaluation, potency, and activity sentiments of the row person for the column person. The  $t = 1$  sentiments were obtained from David Heise's INTERACT program.

The  $t = \infty$  sentiments are the equilibrium sentiments of the husband and wife that are predicted from the social influence network theory that we have described. We have based the salience of person  $j$  for person  $i$  on the raw score of the *evaluation* dimension of the EPA profile:  $\mathbf{I} = 1$  in Eqn. (12) and

$z_{ij}^{(t)} = y_{ij1}^{(t)}$  in Eqn. (16). The predicted equilibrium network of direct effects,  $\mathbf{W}^{(\infty)}$ , is

$$\begin{matrix} 0.600 & 0.400 \\ 0.301 & 0.699 \end{matrix}$$

and the corresponding network of total effects,  $\mathbf{V}^{(\infty)}$ , is

$$\begin{matrix} 0.810 & 0.190 \\ 0.093 & 0.907 \end{matrix}$$

Interpersonal influences have not strongly modified the fundamental sentiments of the husband and wife about themselves and each other, because the self-weight of each is high and, therefore, their susceptibilities to influence are low.

### Linking to Expectation States Theory

It is possible to link social influence network theory with expectation states theory *without* the construct of persons' sentiments. In Figure 1, simply replace the construct of sentiment with the construct of performance expectation. Hence, we might simply stipulate that

$$z_{ij}^{(t)} = \mathbf{b}_{ij0} + \mathbf{b}_{ij1}y_{ij1}^{(t)} \quad (19)$$

where  $y_{ij1}^{(t)}$  is person  $i$ 's *performance expectation* for person  $j$ , with the understanding that these performance expectations may not be measurable (expectation states theorists argue that they are not).

An important special case of Eqn. (19) is

$$z_{ij}^{(t)} = \mathbf{b}_0 + \mathbf{b}_1y_{j1}^{(t)} \quad (20)$$

in which person  $j$  has the same salience at time  $t$  for all group members. In this special case, if the initial set of performance expectations are determined by Eqn. (1), then the *initial* performance expectations are the predictions of the expectation states model, i.e.,  $y_{j1}^{(1)} = \Phi_j$ . Given an initial consensus of expectations, the predicted equilibrium performance expectations are simply the initial performance expectations of the group, and the equilibrium influence structure of the group is determined directly (at  $t = 2$ ) by these initial expectations. Thus, the constraints involved in the special case described by Eqn. (20), i.e., consensual initial performance expectations, provide a straightforward dovetailing of expectation states theory and social influence network theory. From our perspective, it would be more interesting theoretically if *individual differences* were allowed and predicted in persons' performance

expectations; that is, if Eqn. (1) were modified so that different members of a group might have different performance expectations for the same target persons. But whether or not individual differences in performance expectations are allowed, if endogenous interpersonal influences are viewed as operating *directly* on persons' performance expectations, then an expectation states theorist may employ our approach to grapple with a larger domain of influence structures without incorporating into his or her theoretical account the *sentiments* that are the key constructs of affect control theory.

However, as Figure 1 has illustrated, we believe that a more exciting line of theoretical development is to link expectation states theory and social influence network theory *through* the sentiments that are the focal constructs in affect control theory. In affect control theory, persons' fundamental sentiments are based on individual variables (identities and traits) and contextual conditions (situation, culture). The identities include a subset of the specific and diffuse status characteristics considered by expectation states theory as being determinants of persons' *performance expectations* for themselves and others in a particular task domain. Not all of these status characteristics are dealt with in the most recent implementation of affect control theory, but there is no theoretical limitation in affect control theory that would prohibit the inclusion of any specific or diffuse status characteristic. Moreover, a substantive application of affect control theory to *task-oriented* groups does not present any serious theoretical problems, because affect control theory is in principle applicable to such situations. Ridgeway and Smith-Lovin (1994, p. 225) suggest that task-specific status is "less easily handled by affect control theory" but this is not to say that fundamental sentiments cannot be formed that are the resultants of an interaction between status and task.

A key question is whether the performance expectations that are at the heart of expectation states theory have a theoretical status that is *independent* of the fundamental sentiments that are at the heart of

affect control theory. Ridgeway and Smith-Lovin (1994, p. 225) state, “There is no simple translation between performance expectations and fundamental sentiments...” We suggest instead that this translation problem is an *open* theoretical issue, and we are not convinced of Ridgeway and Smith-Lovin’s negative appraisal of the possibility of a close relationship between these constructs (Driskell & Webster, 1997; Fisek & Berger, 1998; Lovaglia, 1997; Shelly, 1993). In task-oriented groups, persons’ fundamental sentiments may determine a salience, i.e., each  $z_{ij}$  in Eqn. (13), which is in substance a *performance expectation*.<sup>11</sup> If this is so, then the effects of status characteristics on performance expectations are *mediated* by persons’ fundamental sentiments as in Figure 1. Performance expectations may be high because of a positive *evaluation* of a person’s competence, or because of the perceived *forcefulness* or capability of a person to achieve or foster group tasks, or because of the perceived *activity* or participation of the person with the task, or because of a combination of these dimensions (Kemper & Collins, 1990; Robinson, 1996; Skvoretz & Fararo, 1996).<sup>12</sup> If this general theoretical position has some merit, then it would establish a linkage between the three theories, and we think that this possibility is worth intensive investigation. It is premature in our view to dismiss the possibility of the existence of translation functions between persons’ fundamental sentiments and performance expectations. For groups that are *not* task-oriented, the  $z_{ij}$  in Eqn. (13) need not be a performance expectation, but instead a more general latent construct of the degree of a person’s attitudinal respect, esteem, or admiration for themselves and particular other persons.

The following illustration shows how affect control theory incorporates status characteristics into its account of the definition of situations and how social influence network theory extends affect control theory to include an account of the emergence of an influence network. In this illustration, we again deal

with a dyadic interaction between a male husband and female wife, but in this case the husband is educated and the wife is uneducated:

		Sentiments About:					
		Educated- Male			Uneducated-Female		
Sentiments Held By:							
Educated-Male		Husband			Wife		
	$t = 1$	1.46	1.61	0.45	0.02	-0.73	0.51
	$t = \infty$	1.46	1.61	0.45	0.02	-0.73	0.51
Uneducated-Female		Husband			Wife		
	$t = 1$	1.88	1.77	0.93	-0.28	-0.94	0.04
	$t = \infty$	1.46	1.61	0.46	0.02	-0.73	0.51

In this example, we have based the salience of person  $j$  for person  $i$  on the raw score of the *potency* dimension of the EPA profile:  $I = 1$  in Eqn. (12) and  $z_{ij}^{(t)} = y_{ij2}^{(t)}$  in Eqn. (16). We shift the basis from evaluation to potency because the status differentiation of the husband and wife (educated versus uneducated) is likely to make power the key foundation of salience.<sup>13</sup> Under these assumptions, the predicted equilibrium network of direct effects,  $\mathbf{W}^{(\infty)}$ , is

$$\begin{matrix} 0.623 & 0.377 \\ 0.992 & 0.008 \end{matrix}$$

and the corresponding network of total effects,  $\mathbf{V}^{(\infty)}$ , is

$$\begin{matrix} 0.998 & 0.002 \\ 0.990 & 0.010 \end{matrix}$$

The emergent influence network is highly stratified, with the influence of the educated male husband being much greater than the influence of the uneducated female wife. The total effects matrix indicates that the husband accords little weight to the wife (.002) while the wife accords a substantial weight

(.990) to the husband. Note that while the fundamental sentiments of the husband have hardly changed, the wife's sentiments about her husband have come to more closely reflect his *own* initial sentiments about himself and the wife's sentiments about *herself* have come to more closely reflect the husband's initial sentiments about her. Her susceptibility to influence is large and his is not. Thus, issue outcomes should substantially reflect the initial preferences of the husband.

Expectation states theory also has been concerned with an account of the emergence of stratified influences in status *homogeneous* groups. The basic argument is that even when a group is homogeneous on various socio-demographic characteristics, there are individual differences that will generate unequal influence. Clearly, such an argument can be framed in terms of a translation of fundamental sentiments into salience. We believe that in most situations there will be some, more or less marked, degree of initial heterogeneity of sentiments (even among status peers). Hence, even in status homogeneous groups, variation among persons on the EPA sentiment dimensions may produce inequalities of interpersonal salience and influence.

To illustrate how individual differences among peers may generate a stable influence network consider the matrix of fundamental sentiments for four male engineers with different personality traits. Again, these sentiments are obtained from David Heise's INTERACT program.

	1	2	3	4
1	CONFIDENT (1.11,1.50,.81)	AGREEABLE (1.19,.18,.36)	INDIFFERENT (-.12,-.03,-.18)	STUBBORN (-.61,1.06,.44)
2	INTELLIGENT (1.13,1.28,.34)	CONFUSED (-.39,-.32,.68)	THOUGHTFUL (1.51,.74,0)	EXPERIENCED (.97,1.01,-.10)
3	BOSSY (-1.12,1.37,.64)	STUPID (-.94,-.44,.51)	BORED (-.70,-.30,-.50)	INSECURE (-.61,-.68,.32)
4	RECKLESS (-.96,.72,1.72)	ANNOYING (-1.10,.32,1.21)	APATHETIC (-.57,-.55,-.25)	CAUTIOUS (.82,.32,-.36)

Engineer 1 is confident, engineer 2 is confused, engineer 3 is bored, and engineer 4 is cautious. Their sentiments are heterogeneous. For instance, the confident engineer views his confused peer as agreeable, his bored peer as indifferent, and his cautious peer as stubborn; the cautious engineer views his confident peer as reckless, his confused peer as annoying, and his bored peer as apathetic; and so on. If salience is determined by a magnified raw score of the *evaluation* dimension of these fundamental sentiments, i.e.,  $I = 5$  in Eqn. (12) and  $z_{ij}^{(t)} = y_{ij1}^{(t)}$  in Eqn. (16), then the emergent influence network of direct effects,  $\mathbf{W}^{(\infty)}$ , is

```

0.992 0.008 0.000 0.000
0.000 0.000 0.000 1.000
0.000 0.000 0.000 1.000
0.011 0.011 0.011 0.967

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and the corresponding network of total effects,  $\mathbf{V}^{(\infty)}$ , is

1.000 0.000 0.000 0.000  
 0.000 0.000 0.000 1.000  
 0.000 0.000 0.000 1.000  
 0.000 0.000 0.000 1.000

The cautious engineer emerges as the dominant person of the group. Although the confident engineer is heavily self-weighted and is not susceptible to the influence of the cautious engineer, the two other engineers are influenced exclusively by the cautious engineer. Hence, if decisions are made by a majority rule, then the decisions of this group will reflect the initial preferences of the cautious engineer. The social process that has produced this stratified influence network also has produced a modified set of sentiments for engineers 2 and 3; their equilibrium sentiments are virtually identical to the *initial* fundamental sentiments of the cautious engineer. Hence, engineers 2 and 3 have *adopted* the viewpoints of the cautious engineer about the other group members. This illustration shows that the social process that we have described easily generalizes to an account of influence networks in groups larger than a dyad and that it is consistent with the emergence of complex forms of stratification in which not all members “agree” on the relative influence of each member.

In the three illustrations that we have presented, we note that the results may be sensitive to the parameterization of the function in Eqn. (12) that transforms latent attitudes into saliences. In the two illustrations of the husband-wife dyad, the results do not appear especially sensitive to changes in  $I \geq 1$ ; however, in the case of the four engineers, the value of  $I$  is consequential; e.g., for  $I = 1$ , the confident engineer is dominant and the cautious engineer is not influential, which is just the opposite of our finding for higher values of  $I$ . In the case of the dyads, we have set  $I = 1$  in order to apply a simple transformation of sentiments to salience; in the case of the engineers, we have set  $I$  to the high value of 5 in order to operationalize a contextual condition of strong pressures toward consensus. In

some situations, methodological and substantive criteria may be brought to bear *a priori* to constrain the values of  $I$ . For example, if we require that an increase in the latent attitude ( $z_{ij}^{(t)}$ ) should not result in an increase of the salience ( $s_{ij}^{(t)}$ ) exceeding that of the latent attitude, then the value of  $I$  is constrained to  $0 < I \leq 2$ ; and if we adopt the maximum sentiment value of +4.3 (given by affect control theory) as the value at which salience should be virtually 1, then the value of  $I$  is further constrained to  $I \geq 1.77$ ; hence, we obtain the overall constraint  $1.77 \leq I \leq 2$ .

## DISCUSSION

We believe that three formal theories in sociological social psychology—social influence network theory, affect control theory, and expectation states theory—can be formally linked and that these linkages enhance the power and scope of each theory. Each of these theories represents an attempt to grapple with concrete social processes and structures of groups. Our focus has been on the discovery of fundamental and parsimonious mechanisms and on the formal integration of theory. As part of our effort to link these three theories, we have extended social influence network theory, so that the influence network is not only affecting, but also being affected by, the positions of group members on an issue—their sentiments about themselves and other group members. We have focused on persons' sentiments about themselves and others because of the importance of this construct in affect control theory and its close bearing (in our view) on the performance expectations that, in expectation states theory, underlie the formation of influence structures in task-oriented groups.

Since the early work of Festinger (1954), Hovland (1953) and Serif, Serif and Nebergall (1965) on opinion discrepancies, there has been considerable interest in how the distribution of persons' initial

positions on issues affect their interpersonal influences. Various investigators have posited that the distance between persons' positions on an issue may affect the salience of the positions for others (Davis, 1996; Eagly & Chaiken, 1993; Turner, 1991). For example, a well known hypothesis is that interpersonal influence is a  $\cap$ -shaped function of the distance between persons' initial positions on an issue. This body of work on initial position discrepancies has not considered the possibility that issue-positions may include attitudes about *persons-as-objects*. If attitudes are being formed about persons during the course of interactions on other issues (or if such person-as-object attitudes *are* the issue), then an equilibrium influence network may be formed that reflects the outcomes of the interpersonal influences that have shaped group members' attitudes about each other. This is the basic idea that we have developed in the present paper.

There is an unresolved problem in our formal development of the theory and we want to draw our readers' attention to it. We presently do not know how the three dimensions of sentiment (evaluation, potency, and activity) combine to determine the salience of self and particular others; see Eqn. (16) where the coefficients are unknown. Thus, in our illustrations of the theory, we have employed *single* dimensions of sentiment as the basis of salience. When data is available on both the initial and equilibrium sentiments of each member of a group, one could estimate the parameters for each sentiment dimension, as well as any other included variables. The problem of developing a more refined theoretical linkage between affect control theory and social influence network theory must entail dealing with the manner in which these sentiments combine to determine salience under different conditions. The present paper opens up this question as a line of inquiry. It is a problem that is analogous to the problem in expectation states theory concerning the way in which multiple status characteristics are combined to produce a performance expectation.

An additional point of ambiguity in our formal development is the specification of the pattern of interpersonal *visibility* that constrains the social process. In the present work, we have assumed that the pattern of visibility is stable and complete during the period in which the equilibrium influence network of the group is being formed:  $\mathbf{R}^{(1)} = \mathbf{R}^{(2)} = \dots = \mathbf{R}^{(\infty)} = \mathbf{J}$ , a matrix of all 1's. In small groups, group members are often acquainted with each other, so that  $\mathbf{R}^{(t)} = \mathbf{J}$  is plausible for all  $t$ . In large groups, visibility may be patterned and the pattern may be changing; for instance, if  $\mathbf{R}^{(t)}$  and  $\mathbf{S}^{(t)}$  become linked because persons are establishing ties with persons who are salient to them (Stokman & Baveling, 1998), then some function would have to be specified that describes this linkage in order to understand the evolution of the influence network  $\mathbf{W}^{(t)}$ .

We also want to draw our readers' attention to the special theoretical importance of the *salience of self* in our theory. The salience of self constrains the relative weights of the interpersonal influences on a person. The susceptibility of person  $i$  to the influences of others is the converse of person  $i$ 's self-weight, and it is equivalent to the *aggregate* relative interpersonal influences of others on person  $i$ , i.e.,

$$a_{ii}^{(t)} = 1 - w_{ii}^{(t)} = \sum_{j \neq i}^n w_{ij}^{(t)} \quad (21)$$

High self-weight implies low susceptibility to interpersonal influence, regardless of the potential salience of others in the group. When all susceptibilities in a group are near their theoretical extreme values of 0 or 1, then (depending on the structure of the network of interpersonal influences in the group and the initial distribution of fundamental sentiments), a consensual set of sentiments may be formed. Otherwise, there will be some modification of sentiments that is short of consensual.

In conclusion, the cornerstone of our effort has been the analysis of sentiments that, in affect control theory, are the elementary foundations of persons' definition of a situation. Our theory introduces an

influence network into affect control theory by allowing these fundamental sentiments to be modified by the sentiments of others. Thus, persons not only take into account the “macro-structural” normative information that is evoked by a given situation, but also the “micro-structural” individual differences of sentiment that are displayed by the persons who are involved in a particular situation. As a result of persons’ interactions in a particular situation, endogenous interpersonal influences on sentiments can operate to form a set of within-group normative expectations that are conditional upon the particular social structure of a group and its setting.

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## ENDNOTES

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<sup>1</sup> Joining theories sometimes requires raising the level of abstraction of their constructs so that a commonality and intersection can be established; it seems reasonable to believe that the less abstraction that is required, the more concrete and useful the linkage will be for those engaged in the empirical research program of each theoretical structure. When abstraction is required, the “stress” produced by the juxtaposition of the theoretical structures can be productive in stimulating the growth and revision of the structures so that they dovetail more seamlessly.

<sup>2</sup> This statement applies to influence networks in which the influences are non-negative. If negative influences are allowed (e.g., boomerang effects), then an initial consensus may shift or break apart due to the reactance of individuals.

<sup>3</sup> Behaviors of the person or the object (another person) conform more or less closely to the normative expectations associated with the particular social identities and other features of the setting and persons. For instance, persons would expect their friends to behave in particular ways toward them as a function of the setting, mood, and other attributes involved in the interaction. Thus, certain events (i.e., the nexus of a person-behavior-object) are expected and other events are not.

<sup>4</sup> The sentiments may be communicated through behaviors, emotional expressions, gestures, or words.

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<sup>5</sup> We are not convinced that status differentiation on some dimensions is ever entirely absent in human encounters, because physical differences always provide a basis (however misguided) for attributions and imputations about the character and intelligence of others; hence, task-relevant meaning will be generated on whatever differentiating features are apparent to the persons involved in the interaction. Pure homogeneity may be a theoretical, but not a realistic, possibility in human groups.

<sup>6</sup> Expectation states theorists argue that performance expectations are not observable. The estimation of these coefficients occurs in a reduced-form equation (predicting influence behavior as a function of status variables) in which performance expectations do not appear.

<sup>7</sup> Although attenuation effects (i.e., diminishing marginal effects of additional status characteristics) on influence outcomes have been noted in various studies, there is no direct evidence that there are attenuation effects on performance expectations. It is important to recognize that performance expectations have not been subject to direct measurement in the expectation states research tradition. Additionally, direct indicators of performance expectations would allow an assessment of the degree to which group members actually do *agree* in their expectations at the start of the group interaction. If such consensus actually exists in a group, and we doubt that it does in most groups, then endogenous interpersonal influences may not have any effect in modifying these expectations. It is when such consensus is *absent* that social influence network theory becomes interesting theoretically for an expectation-states theorist.

<sup>8</sup> See Friedkin and Johnsen (1999, p. 11). In dyads, unlike larger groups, there is a noteworthy chance that interpersonal influences will generate opinions that are outside the range of the group members' initial opinions on an issue.

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<sup>9</sup> Note that one might replace  $\mathbf{R}$  with the matrix for a nonnegative valued network, including  $\Pr(\mathbf{R})$  in which case one could develop an analysis that involves the *probability distribution* for alternative patterns of visibility.

<sup>10</sup> This formulation addresses the issue of the relative versus absolute values of the variables that Ridgeway and Smith-Lovin (1994) discussed as a difference between expectation states theory and affect control theory. Fundamental sentiments enter as “absolute” values in the determination of salience. For self-weight these absolute values constrain the amount of interpersonal influence upon a person. For interpersonal weights, salience is relative.

<sup>11</sup> In terms of Figure 1, we are not *replacing* the construct of sentiment with the construct of performance expectation, as an expectation states theorist might be inclined to do, but we are suggesting that a performance expectation may be a *special case* of the general construct of salience.

<sup>12</sup> We recognize that the simple linear combination described in Eqn. (13) may not be sufficiently refined; for instance, a high level of activity may not substitute for low levels of evaluation or potency. This may or may not be the case for the status characteristics that affect performance expectations in Eqn. (1) .

<sup>13</sup> We also shift the basis to reiterate an important theoretical problem pertaining to the application of Eqn. (16); that is, the bases of salience may combine in different ways in particular groups and the dyads within a group. We presently do not have a good understanding of these rules of combination.