THE STRENGTH OF SOCIAL ASSESSMENTS & INFLUENCE AS A DETERMINANT OF ORGANIZATIONAL CHANGE

THE PROBLEM: UNDERSTANDING THE COMPLEXITIES OF ORGANIZATIONAL CHANGE

It is largely taken for granted that successful organizational change is difficult and infrequent. In fact, the prevailing theoretical wisdom is not only that organizational change has unexpected consequences (Merton, 1936; March, 1981) but that it jeopardizes legitimacy (e.g. Hannan and Freeman, 1984; Singh et al. 1986) and increases the likelihood of organizational failure (Hannan and Freeman, 1984; Amburgey and Kelly, 1993). Yet, many organizations are struggling to realize their performance potential and being constrained by the choice of failing because of inattention to poor performance and failing because of an attempt to change it, many organizations opt for the latter.

One of organizational scholars’ principle responsibilities must be to help society realize the social value generated by the effective performance of its most important organizations, private, public and not-for-profit. Accomplishing this goal requires the development of much more reliable theories about the dynamic complexities of organizational change. A large part of the problem with developing reliable predictions about the nature and effects of organizational change is determining the appropriate theoretical level from which to investigate the problem. Like many topics in organizational studies questions about change tend to focus either at the micro or macro level, addressing individual responses to change using models of self-regulation and control (e.g. Carver and Scheier, 1982) or their organization-level corollary, models of organizational search and learning (e.g. Argyris and Schon, 1978; Levinthal and March, 1981; Keisler and Sproull, 1982). This focus on topics that are on one side or the other of the micro-macro divide hinders progress in theoretical and practical understanding of organizational change. In particular, the micro-macro dichotomy obscures the complex interdependencies that characterize the dynamics between these two levels in the real world.

Advancements in two areas of study have moved scholars much closer to being able to better model real-world organizational change and achieve what DiMaggio (1991, p.76) calls “the quest for the Holy Grail of social science theory” – a bridge for the micro-macro divide. Specifically, work in social network theory and sociocognitive models has helped clarify the mechanisms by which individual cognitions and actions become the cognitions and actions of a group or organization. In particular, social network models capture the effects of the dynamic interactions that are the necessary result of the complex interdependencies found in most modern organizations (Thompson, 1967). Sociocognitive theories, including theories of emergent and distributed cognition (e.g. Hutchins, 1995) model how understandings embedded in social interactions structure systems and construct realities (e.g. Berger and Luckmann, 1966). The integration of network and sociocognitive models in this research is proposed as a way to make reliable predictions about a complex phenomenon like organizational change.

This research provides another important move forward in understandings of organizational change by integrating the theoretical propositions of scholars of strategic and institutional change. Though, adaptation and selection are often portrayed as competing forces,
organizational change is a function of both the selective pressures of the institutional environment and the adaptive forces of organizational managers making strategic decisions about organizational goals, structures and strategies. Dutton and Duncan (1987) argue that strategic change is possible only (1) when a change initiative would be highly visible and subject to time or external pressure and (2) when the means of change are known. Dutton and Duncan (1987) refer to these change dimensions as urgency and feasibility, respectively. Oliver (1991) argues that organizational and institutional change is a response to external demands for conformity to accepted practices. When organizational members believe that changing to new practices is socially desirable and consistent with existing practices (3) and that change will result in performance gains or reduced costs in important domains (4) change is more likely. We refer to the ‘socially desirable and consistent’ dimension as the legitimacy of change (Oliver, 1990) and to the ‘performance gains or reduced costs’ dimension as the effectiveness of change. Taken together the work of Dutton and Duncan (1987) and Oliver (1991) imply that change in an organization is most likely when organizational members perceive change as feasible, urgent, effective and legitimate (e.g. F.U.E.L. for change).

THE OBJECTIVE: ADVANCING CONCEPTIONS OF ORGANIZATIONAL CHANGE

The research presented herein bridges and advances knowledge from social network and sociocognitive theories by integrating the two in order to develop a dynamic model of organizational change. In addition to meeting the broad aim “to increase our collective ability to anticipate the complex consequences of change” and “better understand the dynamics of human and social behavior” the research addresses the call of the Human and Social Dynamics program in three specific ways:

1. The research provides a model of change that not only promotes an understanding of cognitive and social structures but also demonstrates how cognition is a product of social structure and can be represented as a collective process.
2. The research integrates work from two existing fields by using social network analysis and sociocognitive theory to demonstrate how cognition within collectives evolves and becomes the impetus for change given interpretations of salient and ambiguous information. It also integrates arguments from strategic and institutional theories of change, this providing a more complete analysis of change dynamics.
3. The anticipated findings from the research will empower organizational practitioners with an understanding of the dynamic patterns of interdependence and influence that promote or prevent change in organizations so that they might better manage profound change within their organizations.

The overarching objective of the three integrated studies that comprise the proposed research is to uncover, describe and demonstrate the underlying social and cognitive dynamics that generate change in organizations. A secondary objective is to provide a contextual model of change that theorists can use to develop an understanding of cognitive and social structures but also demonstrates how cognition is a product of social structure and can be represented as a collective process.

1 Building on the work of Milliken (1990) we add to the concept of feasibility the assertion that the means of change must not only be known but must also be perceived as being available.
2 Note: the notion that gains must be in areas important to internal stakeholders is a specification added to Oliver’s effectiveness arguments and builds on informal interviews with teachers in a school experiencing change (Field notes, Bridwell-Mitchell; February 12, 2004)
change that can be of particular use in a domain that is notorious for its resistance to change – public elementary and secondary schools.

**EXPECTED PROJECT SIGNIFICANCE: INTELLECTUAL MERIT AND BROADER IMPACTS**

**Intellectual Merit.** Practical experience in ‘hard to change’ organizations reveals insufficiencies in our knowledge about the nature and effects of organizational change. The support of this research provides for a much needed parsimonious but explanatorily powerful model of organizational change that relies on advances in network theory and sociocognitive models of organizations. Though there are existing studies of social influences processes on organizational members attitudes about change (e.g. Burkhardt, 1994), this study extends and advances knowledge from these studies in important ways. First, it relies on the intuitive appeal and demonstrated strength of sociocognitive theories (e.g. Weick and Roberts, 1993; Hutchins, 1995; Garud and Rappa, 1994; Porac et al., 1995) and integrates this work with network theory to capture the type of real-world exchanges and interactions that take place in organizations. Evidence from the research team’s hands on experience and research in organizational contexts faced with change corroborates theoretical assertions in support of the sociocognitive model. This research also builds on past research by integrating existing propositions about strategic and institutional change (e.g. Dutton and Duncan, 1987; Oliver, 1991) and arguing that change must be perceived as feasible, urgent, effective and legitimate.

Other advancements facilitated by the research include the potential ability to describe how evolving attitudes predict change, whereas past studies have simply investigated attitudes that follow a change (e.g. Burkhardt, 1994). The presented model also establishes boundary conditions for the effect of cognition on change. We argue that change is reliably predicted only in the period in which attitudes about change are widely-shared and stable over a given period of time. Another innovation of the proposed research is the triangulation of research methods – connecting findings from experimental, simulation and field studies – a technique demonstrated to provide both contextually rich and reliable results when testing new theory (e.g. Uzzi, 1999).

**Broader Impacts for Scientific Understanding.** Currently, there are multiple theories that attempt to describe the nature of organizational change. Some represent organizational change as both a process and an outcome (Barnett and Caroll, 1985) or as either continuous (Ford and Ford, 1999) or episodic (e.g. Tushman and Romanelli, 1985). Change is argued to have both magnitude and direction (Mintzberg and Westley, 1992) and to have greater or lesser effects depending on the level of the organization in which it takes place (Hannan and Freeman, 1984). These theories address a variety of dimensions important to organizational change but they leave one with a surprising lack of clarity about the fundamental nature of change and how to predict it. This research provides an analytical lens that unifies existing conceptions of change by examining its underlying mechanisms. This approach facilitates a much-needed dialogue between scholars of organizational change, scholars of social networks and scholars who study social cognition. Further, we hope to capitalize on the descriptive nature of the study by offering prescriptive guidelines for real organizations undertaking change.

**Broader Impacts for Organizational Change.** One of the expected findings of the research is that the structure of social interactions makes a difference for understandings of organizational
change and ultimately for organizational change itself. It may prove to be the case that strong 
clique with uncharacteristically negative views of change have a significant impact on the larger 
organization’s assessment of change. Or it may be the case that positive assessments of a small 
group of ‘network outsiders’ supports the diffusion of positive assessments throughout the 
organization given their position as a bridge between multiple sub-networks. Given such results, 
prescriptive guidelines would suggest that organizational managers identify cliques of the first 
and second type and respectively isolate or increase their impact by using strategic 
organizational design to structure their interactions with others. The positive results of the 
research would also suggest that managers pay special attention to how change initiatives are 
framed and how resources for change are allocated given the importance of members’ 
assessments of the feasibility, urgency, effectiveness and legitimacy of change efforts.

Broader Impacts for Underserved Populations. The results of the research impact 
understandings of change in all organizational contexts, public, private and not-for-profit by 
illustrating the complex social and cognitive dynamics responsible for change. The research is 
inspired, however, by a context in which limited understandings of change and how to produce 
it, especially on a systemic level, jeopardizes the very human and social capital upon which all 
other organizations rely – public elementary and secondary schools. Deficiencies in many of 
these schools, particularly those in depressed rural and urban communities, prevent students from 
realizing the potential that provides them access to the full benefits of living in the world’s most 
privileged society. The participant population for Study 3 is New York City Schools Under 
Registration Review (SURR) – those identified by New York State as being most in need of 
change. These schools typically serve students who are poor and ‘of color’ and are among the 
most underserved groups in the city, state and nation (Archer et al., 1998). The experimental 
materials in Study 1 and the phenomenological touchstone for Study 2 both use change in these 
types of underperforming schools as a reference point.

The research team believes the positive results of the research can empower practitioners 
to change schools in a way that realizes the full potential of students and the organizations that 
serve them. The research team is committed to ensuring that the results of the research are 
disseminated via workshops and conferences to public school teachers and administrators who 
can use their new understandings of the change process to improve outcomes for their students. 
The proposed budget requests funds for professional development workshops to be held at all of 
the participating schools as well the New York City and New York State Departments of 
Education. This dissemination effort integrates research and education and provides the 
opportunity for practitioners to develop practical ways for operationalizing the research findings 
in their own schools.

WHAT THE RESEARCH TEAM BRINGS: THE SYNERGY OF STUDIES OF CHANGE, SCHOOLS, 
NETWORKS AND SOCIAL COGNITION

The collective experience of the research team is a source of confidence about the impact 
this research can have on broad understandings of organizational change as well as change in 
public schools. The theoretical and empirical work of the first investigator, Stephen Mezias, has 
provided foundational contributions to the field of organizational learning and change. His 
selected works focus of models organizational learning and adaptation and include, “Managing

What the first investigator brings in theoretical, empirical and methodological experience, the second investigator, Ebony Bridwell-Mitchell brings in hands–on experience with organizational change and development in schools. In addition to formal training in educational policy at Cornell University and Harvard University’s John F. Kennedy School of Government the investigator has over ten years of experience in educational research, consulting and practice. This work includes published international work assessing the national capacity for a School to Work initiative in Peru (“Ready For the World? Initiating the School-to-Work Movement in Peru” (1999) in A. Barnechea (Ed.) Building Human Capital in Peru, evaluations of the economic efficiency and educational effectiveness of undergraduate programs at Diné College, the tribal college for the Navajo Nation in New Mexico, USA and work honored in The Cornell Working Papers on Public Policy on the effectiveness of instructional programs in Washington D.C. public schools. Work with the US Department of Education assessing school reform plans under GOALS 2000, consultancies for charter schools seeking to reform or implement new programs and experience as an instructional lead teacher in New York City provides an invaluable understanding of the research context and the dynamics of change in this environment.

The primary investigators’ expertise in organizational change and the public school context is extended by the expert support of senior personnel and project participants who study the dynamics of social networks and sociocognitive models. The senior personnel support of Ray Reagans brings expertise in the interplay between social network structure and performance as well as how network structure influences the diffusion of knowledge and information. His published works and working papers most relevant to the current project include, “Managing Knowledge in Organizations: An Integrative Framework and Review of Current Themes”, (2003) with W. McEvily Jr. and L. Argote, Management Science; “Networks, Diversity and Performance: The Social Capital of R&D Units” (2001) with E. Zuckerman, Organization Science and “Network Structure and Knowledge Transfer: The Transfer Problem Revisited” (2003) with McEvily, working paper, Columbia University, New York, NY. As a project participant, Theresa Lants support provides critical knowledge in the construction of collective cognitive models and how sociocognitive models influence organizations, industries and markets. Some examples of her directly relevant to the project include, “A Situated Learning Perspective on the Emergence of Knowledge and Identity in Cognitive Communities,” in R. Garud & J. Porac (eds), Advances in Managerial Cognition and Organizational Information

Findings from formal research projects in organizational change, education, networks and sociocognition as well as anecdotal evidence from direct experience working with public schools reveal that an analysis of the effects of socially constructed cognitions may be the best way to understand the impetus for and impediments to successful organizational change. This research formalizes the collective cognitive processes at work in organizations, such as schools, by offering a test of the sociocognitive network model of organizational change.

A SOLUTION FOR STAKEHOLDERS OF CHANGE: THE SOCIOCOGNITIVE NETWORK MODEL

The sociocognitive network model of organizational change described below is essentially an information-processing model in the tradition of Cyert and March (1963). These models argue that change depends on information from the environment, which becomes the potential stimulus for change. Unlike, its more atomistic and rational cousins (e.g. theories of organizational learning) the sociocognitive model does not emphasize individual evaluations against preexisting targets as the sole impetus for change. Rather, the sociocognitive network model, introduced here, argues that the need for change is socially constructed, the meaning of information, assessment of targets and resulting reorientations are only meaningful as they are enacted (c.f. Karl Weick, 1979) by the interactions of organizational members.

In the context of organizational change the expectation is that change stimuli, in the form of salient and ambiguous performance information, enters the organization through one or multiple persons (MacDonald, 1995). These individuals make initial assessments of the stimuli (e.g. their cognitions). The ambiguous nature of the information requires organizational members to turn to others to complete their assessments (e.g. Festinger, 1954). Consequently, individual assessments enter into the local network through formal discussions, natural conversations, gossip, stories, etc. (e.g. Boje, 1991). They are then updated and changed by the assessments of other network members even as those assessments are changed and updated by the assessments of the first actor. These assessments and reassessments continue recursively within the network, such that each successive cognitive response is updated to account for the cognitions of others. The result is a positive feedback loop of cognitive patterns whereby individual cognitions become more and more similar until the network’s shared understanding, is realized. It is this shared understanding of potential change stimuli that predicts organizational change.

The potential validity of the sociocognitive network model is supported by theorists such as Sandelands and Stableins (1987, p.137) who have argued that “the complex patterning and dynamism of behavior in organizations” drives organizational action. Weick and Roberts (1993) argue, that it is the “contributing, representing, and subordinating actions that form a distinct pattern external to any given individual (1993, p.364),” which are responsible for action and outcomes in organizations. Empirical research by Garud and Rappa (1994), Hutchins (1995),
and Porac and his colleagues (1995) demonstrates how the understanding and interactions of individuals shape outcomes, organizations and even industries. Furthermore, evidence from the communication and human relations literature supports arguments about the social influence processes at work in organizations. Meyer (1994) finds that direct contact, affiliation and equivalence (e.g. Burt, 1987) of members of a group influence and create similarity in their perceptions. Ibarra and Andrews (1993) – like Meyers – used social network data to demonstrate that social network characteristics and interaction patterns affect employee perceptions. Burkhardt (1994) makes a link between the social influence literature and organizational change by demonstrating the effects of social cohesion and equivalence on beliefs, attitudes and behaviors after a technological change. This research extends the work of the above authors by attempting to demonstrate that social assessments and influence patterns not only have an effect on individual beliefs and behaviors but also are associated with (and are in fact the mechanism for) macro-level outcomes, such as, organizational change.

The strength of the sociocognitive model depends on network dynamics that aggregate micro-level, individual cognitions to the macro level via system effects (DiMaggio, 1991). Figure 1 illustrates the model for a prototypical network structure, where individual assessments, \{a, b…j\} become local network assessments \{X_1, X_2,…X_n\}, become the global network assessment, \(X'_t\), at time \(t\).

**FIGURE 1:** Sociocognitive Network Model of Organizational Change

![Diagram of sociocognitive network model](image)

WHERE: \{a,b,…j\} are initial individual scalar positions on a vector of assessments about the information, weighted by social network characteristics relevant to influence over information. AND: \(X_1, X_2, X_3\) represent local network assessment of the information given network structure and process characteristics such as 1) order of interactions, 2) frequency of interactions, 3) distance between network nodes (e.g. path length), and 4) diffusion quality.

AND: \(X'_t\) is the global network assessment, given \(X_1, X_2, X_3\).

Note: The value of \(X'_t\) is moderated by 1) source if information, 2) ambiguity of information, 3) degree of consensus and 4) degree of interaction give the diffusion quality of the network.

Estimation of \(X'_t\) must account for the likely dampening effects of minimal consensus and limited interactions given network structure. The model must also take into account social network characteristics of individuals, like status, which likely predict members’ influence over information. Finally, an important characteristic of the model is that \(X'_t\) is estimated at a given time, \(t\), when cognitions are stable over some given period of time. One possible specification of
the model is offered below, where \( v \) is a discount factor for minimal consensus, \( d \) the probability of diffusion given network structure and interactions and \( \beta_j \) is a vector of weights representing individual and social network characteristic:

\[
X_i' = \frac{d}{v} \left( \sum (\beta_a x_a + \beta_b x_b + \ldots + \beta_j x_j + \varepsilon) \right)
\]

Essentially, \( X_i' \) is an \( m \times n \) valued affiliation matrix of members \( m \) by beliefs \( n \), where each row is an individual and each column the individual’s position on specific assessment criteria. For some three-person organization, each individual assesses change on four criteria, feasibility, urgency, effectiveness or legitimacy (measured here as a rating on a seven-point scale for the purposes of example). A matrix of these assessments would have the following form:

<table>
<thead>
<tr>
<th></th>
<th>feasible</th>
<th>urgent</th>
<th>effective</th>
<th>legitimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person a</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Person b</td>
<td>6</td>
<td>3</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Person c</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Kameda, Ohtsubo and Takezawa (1997) call such a matrix, “a belief configuration matrix”, representing the structure of members’ initial knowledge about the various arguments pertaining to the … issue (p.297).” Kameda and colleagues argue that the degree of knowledge sharing, or the social assessment, as it is referred to in this proposal can be obtained by calculating \( X_i \cdot X_i' \) (Xt-transpose) the member by member adjacency matrix, representing each pair’s shared assessment of the feasibility, urgency, effectiveness and legitimacy of change. Following Kameda and colleagues (1997) we call this member–by-member matrix the sociocognitive network—the social network representation of the shared beliefs or social assessments of organizational members. The sociocognitive network model of organizational change argues that the values of the matrix change over time as individuals are influenced by other individuals during their social interactions. When these values are similar, stable and of a particular form (e.g. represent the feasibility, urgency, effectiveness and legitimacy of change), these social assessments, ceteris paribus, predict organizational change.

Though the proposed sociocognitive model is theoretically justifiable, its potential for reliably predicting change in organizations depends on its empirical validity. The three proposed studies are designed to investigate this validity and the usefulness of the model for real organizations, like public schools. The overarching objective of the three integrated studies is to uncover, describe and demonstrate the underlying social and cognitive dynamics that generate change in organizations by employing the sociocognitive network model. The interrelated objectives, design and analysis for each study are described in detail below.

**STUDY I: EXPERIMENTAL SUPPORT FOR THE SOCIOCOGNITIVE NETWORK MODEL**

**Objective.** The objective of Study I is to isolate and demonstrate the sociocognitive network processes described by the model and to determine the impact of social assessments of feasibility, urgency, effectiveness and legitimacy (F.U.E.L). An experimental design is planned in which network interactions and F.U.E.L. are manipulated to determine their impact on individual and group assessments of change as presented in a short vignette. It is hypothesized...
that: (1) individual assessments of change become more similar over time; (2) individual assessments of change become more stable over time; (3) when assessments deem change to be feasible, urgent, effective and legitimate, assessments are more likely to predict change; (4) as assessments of F.U.E.L. become more stable they increasingly predict the likelihood of organizational change. It is also hypothesized that (5) there is a positive monotonic relationship between frequency of interactions and similarity of perceptions, and (6) individuals holding the highest degrees of cognitive centrality will have the most influence on group assessments (e.g. Kameda et al., 1997)

Proposed Procedure. Study participants will be drawn from a volunteer pool and randomly assigned to groups of three. Each three-person group will be randomly assigned to an experimental condition that manipulates the feasibility, urgency, effectiveness and legitimacy of change in the organization. In each condition, participants will complete the Myers Briggs Type Indicator of extraversion and introversion as a pre-test for the influence of personality on social influence and assessments. The investigator will explain to each group that they are participants in a study about education reform efforts in schools. Modeling status hierarchies in real organizations (e.g. Zucker, 1977), one member will be designated the group leader, the second the group secretary the other will have no formal role – participants will be told they have been assigned these roles based on their qualifications given their responses to the personality pre-test (in actuality assignment is random in order to isolate and measure status effects). To emulate organizational members’ internal thought process after being exposed to a change initiative, each group member will be seated at a computer and asked to silently read the on-screen organizational case study of a typical public school followed by a description of an important education reform issue. After reading the case each participant will be asked to reflect on the case and write a seven-sentence free response about how the school should respond to the issue. Participants will also complete a brief survey about whether they perceive the school’s ability to change as being feasible, urgent, effective and legitimate.

The pattern of interactions and exchanges that happen when members are exposed to salient and ambiguous information is accomplished by having each group member print and read his/her free response aloud to the group. After hearing each response, participants will be asked to reflect on all the responses and then will be given an opportunity to edit their initial responses and will be asked to complete a new survey. Next, participants will be asked to participate in a five-minute open discussion about the school, the issue and how the school will respond — the participant with no formal role will be asked to start the discussion, followed by the ‘secretary’ and the discussion will be moderated by the ‘leader’. The discussion will be video-recorded and group interactions coded. Participants will be given a final opportunity to edit their free responses, complete the survey and respond to a concluding question about the degree to which the school will change, given the group’s discussion. Participants will complete a post-test assessing their perceptions of the influence of other group members on the groups’ and their own opinions.

Kameda, Ohtsubo and Takezawa (1997) argue that consensus tends to evolve around individuals with the most central belief – e.g. their beliefs are most similar to the most other members – because they tend to be perceived as experts. They estimate centrality by $C_i = \sum X_{ij}$.
Proposed Analysis. Content analysis will be applied to the free responses of each group member at t=0, t=1, t=2. This data along with survey response data will be used to measure change in individual responses and variance in responses across individuals and over time. Coded data from the video-recorded discussion will be used to construct network data and estimate influence patterns among the group, given personality, role status (e.g. leader, secretary) and order effect (e.g. first/second/third to read response or to discuss). These patterns and variance in responses will be used to estimate the likelihood of change (measured by the response to the single item scale “how likely do you think it is that this school will change). Comparisons will be made across the six conditions where all (condition 1), none (condition 2) and one of each of the dimensions (conditions 3-6) of change (e.g. F.U.E.L.) are present. Regression techniques will be used to model the interaction effects of the four dimensions.

Support for the hypotheses would indicate that the sociocognitive processes which results in shared understandings is a measurable phenomenon. Support would also demonstrate the importance of social assessment of F.U.E.L. on organizational change. Isolation of the phenomenon is only the first step in developing a reliable sociocognitive network model of organizational change. Next, it is important to understanding how the phenomenon is impacted by any number of variable conditions likely to occur in real-world contexts. This is the objective of the computer simulation planned for Study II.

STUDY II: COMPUTER SIMULATION OF SOCIOCOGNITIVE NETWORK PROCESSES

Objective. The objective of the simulation study is to specify the relationship between key variables in the sociocognitive network model and facilitate theory building for the subsequent field study by estimating boundary conditions for the expected effects. There is a tradition of using computer simulations to estimate the effects of information processing models. Studies by March (1991), Lant and Mezias (1990), Mezias and Glynn, (1992) and Harrison and Carroll (1991) demonstrate the important moderating effects of variables like heterogeneity, ambiguity and uncertainty on organizational learning, innovation and cultural transmission. A similar strategy is employed in this simulation study to determine the impact of various conditions on sociocognitive processes. Questions of interest include: (1) How does network size affect social assessments and influence patterns? (2) How does network structure affect social assessments and influence patterns; (3) How do starting values for initial assessments affect final outcomes of social assessments; and (4) Under what conditions does consensus and stability in beliefs evolve?

The simulation models a cognitive and behavioral system of individuals engaged in interpersonal exchanges. It is modeled after the type of real-world exchanges that are initiated when organizational members encounter salient and ambiguous information and discuss this information with other organizational members in formal exchanges, like staff meetings or during informal exchanges, like gossip at the water cooler. Specifications of the simulation attend to characteristics of these real-world exchanges. For example, in organizations members are likely to defer to their superiors and be most influenced by socially similar others (Katz and Lazarsfeld, 1955 cited in Degenne and Forse, 1999) but they may be less likely to change their minds once they learn others agree with them (Asch, 1951). So, ‘influence’ is modeled in the simulation as a weighted average of one’s own opinion, the opinions of others given their social
status and how entrenched one’s beliefs are. The influence of the majority opinion is
operationized by assigning a measure of cognitive centrality (Kameda et. al. 1997) and the
influence of social relationships – who you talk to, how strong your relationship is, to which
cliques one belongs and how large the organization is – is operationalized by assigning typical
network measures (e.g. proximity, cohesion, degree, etc.). Starting values for initial assessments,
network characteristics and number of cycles will vary across different runs of the simulation, as
specified by the researchers. Outputs of the simulation that are of most interest include, values
and structure for the sociocognitive network, variance in assessments across members and across
time, mean assessments, and the belief-by-belief adjacency matrix representing the valence or
strength of the organization’s position on change. The simulation routine models three basic
functions – making initial assessments, interacting with network members, and updating
assessments given those interactions:

(1) **Individuals make assessments** – where individuals \{a...j\} are represented by their
assessments of information, \(i_j\) – each a random draw from their respective individual normal
distributions, given by a computer-generated sequence of pseudo-random integers with a
specified range, mean and median. All distributions are bounded by \(l\) and \(z\) given arguments
about socially situated cognition and basic predictions of social information processing (e.g.
Salancik and Pfeffer, 1978). Also, following predictions of social information processing,
the assessments of proximal network members have the same range and mean – representing
restrictions on cognitions given shared membership in the theoretical organization. The
medians of the distributions differ, however, representing the uniqueness of individual
cognitions within the boundaries established by organizational membership. Assessments, \(i_j\)
are weighted by an assigned status, \(\delta\), representing tenure, organizational role, and cognitive
centrality.

(2) **Individuals chose with whom they will interact** – where individuals \{a...j\} approach the most
proximal network members who are also closest in status. It is assumed that individuals
approach a maximum of 4 others to confirm or disconfirm initial assessments (e.g. Asch,
1951); individuals are most influenced by proximal and structurally equivalent others (e.g.
Burt, 1987) and others of the same social stratum\(^4\) (Katz and Lazarsfeld, 1955 cited in
Degenne and Forse, 1999). After every two-actor interaction, each individual approaches the
next proximal and ‘nearest-statused’ organizational member.

(3) **Individuals compare and update their assessments given the assessments of others** – it is
assumed that a change in assessments only results from comparisons with same or higher
status others and that individuals are less likely to change subsequent assessments when their
initial assessment is confirmed by some proximal other (Asch, 1951). Change in initial
assessments is given by a draw from a new distribution with the range and mean of the initial
distribution but with a new median specified as \(1/n(i_p + k*i_j)\), where \(i_j\) is the initial
assessment, \(i_p\) the assessment of the proximal and same/higher status other, \(k\) the number of
assessments from previous interactions that are in the same direction as \(i_j\) (the lower bound

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\(^4\) Note: Social stratum will be operationalized as the dichotomization (hi, low) of the continuous status variable.
for $k$ is 1, representing $j$’s interaction with himself) and $n$, the number of people interacting (for this simulation $n=2$ in all cases)\(^5\).

The flow starts with $j$’s assessment of information, $i_j$, $i_j$ is compared to the assessment of the most proximal network member, $i_p$, who may or may not be of higher status and may or may not have an assessment in the same direction as $i_j$. The comparison of $i_j$ and $i_p$ results in one of four conditions: 1) $i_p$ is the same as $i_j$ and represents a same or higher status other, 2) $i_p$ is different than $i_j$ and represents a same or higher status other, 3) $i_p$ is the same in the same direction as $i_j$ and represents a lower status other and 4) $i_p$ is different and in a different direction than $i_j$ and represents a lower status other. If condition (1) or (2) holds a new draw from $I(j)$ – the distribution of possible assessments for $j$ – is made, with the distribution given by the range and mean of the initial distribution but with a new median specified as $1/n(i_p + k*i_j)$. If condition (3) or (4) holds there is no new draw and $j$ makes the next comparison with $i_{p+1}$ following the rule above. The cycle of comparisons of $i_j$ to proximal network members continues until the comparison of $i_j$ to $i_{p+3}$. The number of times the cycle of comparison repeats is specified by the researchers.

For simplicity, the simulation specifies initial assessments as being drawn from a random distribution with specified characteristics. However, evaluations in real organizations are likely to be a function of individual and organizational history rather than simple random draws. Yet, even with its limitations, the simulation study will provide important information about possible boundary conditions for the sociocognitive model and provides a rigorous foundation for theory development and testing for Study III.

**STUDY III: A FIELD STUDY OF SOCIOCognitive PROCESSES IN ACTION**

**Objective.** The objective of the third study in the series is to test the external validity of the sociocognitive network model of organizational change. The model argues that change in an organization depends on how organizational members collectively assess environmental information, given their network interactions. In particular, organization members must perceive change as being feasible, urgent, effective and legitimate (Dutton and Duncan, 1987; Christine Oliver, 1991). These arguments along with those of the overall sociocognitive network model could be evaluated in any number of organizational contexts; however a particularly stringent and provocative test is provided by a context notorious for its resistance to change – New York City’s public elementary and secondary schools.

**Proposed Population, Design and Hypothesis.** There are 1,290 schools and programs in New York City (New York City Department of Education, 2003), the most under-performing schools – based on standardized test scores, parent complaints or conditions threatening health safety or educational welfare – are reviewed by the New York State Department of Education (NYSDE). A poor review by NYSDE places a school under registration review (e.g. SURR status) and in jeopardy of loosing its state registration (e.g. its operating license) and of being

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\(^5\) When $i_p$ represents an individual of higher status, $i_p$ is discounted by 0.5 following Katz and Lazarsfeld’s (1955) finding that “influence from the same social stratum is more important that influence from a higher stratum (cited in Degenne and Forse, 1999 p.162).”
reorganized or closed. Once placed under review the school must develop a comprehensive plan to address areas for improvement, such as instruction, school management and parent and community involvement (The New York State Department of Education and Education, 2001).

The placement of a group of schools on the SURR list in a particular year provides the opportunity for a quasi-experimental design comparing groups in which social assessments of F.U.E.L. are present or not present, given social influences processes. The fact that SURR schools are all attempting change at the same time, have the same institutional context, same unambiguous change stimulus and explicit criteria by which to measure change (e.g. the comprehensive improvement plans and standardized student achievement data) establishes similarity across the group. And though it will not be possible to make causal statements using this design, with a longitudinal study and statistical controls for treatment effects and initial differences between schools, one can have much more confidence about the direction and effect of the relationships.

Though Schools Under Registration Review will already have many efforts to manage and be under close scrutiny from the state, the data collection efforts are not intrusive, do not require students as participants nor do they require classroom observations (see description of data collection efforts below). Also, the budget provides for an organization-level participant/incentive fee to compensate for impositions of the research. A three-year longitudinal study is planned in which teachers will provide information about their opinions of change and their social interactions. It is hypothesized that:

Hypothesis 1: Variance in individual assessments of the change effort decreases over time.
Hypothesis 2: Change in individual and network assessments stabilize over time.
Hypothesis 3a: Individuals’ assessments of change are influenced by the assessments of proximal and socially similar others.
Hypothesis 3b: Assessments of individuals within a local sub-network are more similar than assessments of members across sub-networks.
Hypothesis 4a: Stable assessments are more likely to predict organizational change.
Hypothesis 4b: Organizational change is most likely when there are high and consistent assessments of the feasibility, urgency, effectiveness and legitimacy of change.
Hypothesis 4c: Organizations in which global assessments deem change to be feasible, urgent, effective and legitimate are more likely to change.
Hypothesis 4d: The more quickly assessments stabilize and there is consensus of the feasibility, urgency, effectiveness and legitimacy of change the more quickly the organization will change.

Proposed Data Collection. The study has three main data collection efforts: it collects sociometric data from participants, it collects survey and interview data about participants’ opinions of organizational change, and it collects data about the degree of organizational change from the New York State Education Department (letter of cooperative agreement attached). The first phase of data collection uses a survey asking participants to respond to the sociometric item “please refer to the names on the list below and indicate the frequency with which you interact with each person.” Provided on the list are all teachers, administrators and support staff;
participants rate their frequency of interactions on a nine point scale ranging from, “I do not know this person” to “I have a conversation with this person multiple times a day.” Participants are also asked to indicate members of their friendship and advice ego networks by using name generators that ask participants to list the five organizational members to whom the are most likely to go to when they ‘are uncertain about an important matter related to their job’ or when they have ‘down time and want to have a collegial or friendly conversation.’ Sociometric data will be collected in January, March, June, September and November of 2005 and 2006 and in January, March and June of 2007 to estimate reliability of the network structure over time and make changes where necessary.

The second phase of data collection assembles interview and survey data from participants about their assessments of the feasibility, urgency, effectiveness and legitimacy of the change required by the Registration Review. A seven-point Likert-type scale will be used for participants to indicate the degree to which they strongly agree or disagree with statements such as, “I believe this school has the capacity to change” (feasibility), “I believe it is important for this school to make a change right away” (urgency), “The kinds of changes this school is trying to make will improve teaching and learning” (effectiveness) and “The changes being proposed in this school are consistent with what parents and the larger community want to see” (legitimacy). The survey will also collect information on status, measured by tenure and subject taught (where longer-tenured teachers and teachers of core subject areas – math, science, language arts, as well as administrators are presumed to have more status). Participants for interviews will be selected based on estimates of their centrality as estimated from the sociometric data. These open-ended 20-minute interviews will be used to provide contextual data for survey findings by having participants respond to prompts such as “what kind of changes have you noticed happening in this school over the last few months” and “what do people you know say about the changes happening in this school? Survey data will be collected in January, March, June, September and November of 2005 and 2006 and in January, March and June of 2007. Interview will be collected in March, June and November of 2005 and 2006 and in January and June of 2007.

The third phase of data collection will assemble data from the New York State Department of Education on the progress schools have made toward change (e.g. to what degree improvement areas from the comprehensive plans have been attended and test scores raised). Data on various control variables, such as education level of teachers, student background characteristics and school district will also be collected from public archival data in order to estimate treatment effects resulting from initial differences between schools.

Proposed Analysis. Sociometric data and opinion data collected from participants will be used to estimate characteristics of the network, model the sociocognitive network and predict the likelihood of organizational change. Analysis of network characteristics such as average path length, degree, cohesion, equivalence, and diffusion will be performed with standard tools and algorithms provided by Burt’s STRUCTURE program and UCINET. Stabilization of perceptions will be monitored across the thirteen collection intervals. In the period when there is a stable consensus about the feasibility, urgency, effectiveness and legitimacy of change the sociocognitive network will be estimated and regressed against the ratio of total changes made over all possible changes; control variables and specifications for treatment effects will be included in the model. Comparisons across different schools will be made to determine the
between-group effects of sociocognitive assessments on organizational change; when making such comparisons specifications for underlying heterogeneity (Greene, 2003) will also be included. Regression techniques appropriate for the theoretically non-independent nature of network data will be used (e.g. Quadratic Assessment Procedure) given violations of assumptions required by Ordinary Least Squares regression methods.

**Requirements: Resources Needed for a Realistic and Reliable Test of the Model**

The work laid out above is an ambitious undertaking expected to take three years to complete, not including ongoing dissemination efforts. The total direct cost is $359,721 covering all three studies and dissemination efforts at conferences and workshops planned to train educators in useful applications of the research results. The greater part of the resource requirements lie with the implementation of the field study, including participant fees, necessary network analysis software and labor costs. Successful implementation requires participation from the principals and teachers of SURR schools as well the cooperation of the New York State and New York City Departments of Education. Participation of principals and teachers must rely on advocacy of the potential impact of the study for helping schools better manage change. Also, the proposed budget provides for a participant and organization-level incentive fees to assist schools in managing any burdens the research might impose. The cooperation of the New York City Departments of Education is facilitated via a formalized review process for which approval is currently appending (supporting document attached). Cooperation of the New York State Department of Education required for early access to school improvement data is documented in the attached letter of support.

One limitation of Study III is the effect of low-response rates and high attrition due to its reliance on social network data. To help prevent this possibility a remuneration fee equal to the standard professional development rate for the number of hours required to participate in the study (an average of 2.0 hours/year) is proposed in the budget. If initial recruitment efforts prove insufficient, a suitable alternative sample of SURR schools can be drawn from the total population of SURR schools across New York State. Using this alternative, however, reduces comparability across schools given unexpected institutional effects of using schools located across multiple geopolitical areas and increases travel costs. Other major resource requirements for the project include standard fees for the 180 participants in the experimental research in Study I and consulting fees for the programmer responsible for scripting the object-oriented language and window-based interface required for the simulation in Study II.

Though the three-study model increases costs when compared to a single study, one study rarely provides sufficient evidence in support of a new theory and it is the triangulation of research methods in this proposal that strengthens the reliability of inferences made from any particular study and raises confidence about the validity of the results. The study’s positive findings will have a number of significant impacts for both researchers and practitioners interested in understanding the dynamics of organizational change. The anticipated findings have the ability to help organizational practitioners understand the impact of cognitions and social structures on change. They may also illuminate ways in which education reform initiatives can be more successful by properly framing change initiatives and structuring organizational design and dynamics so that successful change is more likely.
REFERENCES CITED


