Toward a Micro-Enactment Theory of Leadership

and the Emergence of Innovation

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Abstract

Organizations are complex adaptive systems comprised of heterogeneous agents interacting in unplanned ways. According to complexity theory, emergent events occur at various levels within a system, and within organizations. The focus in this paper is at the micro-level of analysis. We describe leadership emergence within groups and describe how innovative action and communication results from this emergence. In particular, we specify how leadership emerges at the individual, dyadic, and group level within events. Taking the complex systems leadership theory (CSLT) approach as a starting point, we describe how micro-enactments, which consist of the individual behaviors of heterogeneous agents as they interact with one another, create organized programs of action that are subject to evolving group dynamics and show how this process can be described as self-organizing by observers who are unaware of the intentionality of the individual agents. Seven micro-enactments are described, along with a framework for examining how they assemble, intersect, and influence one another to enable organized learning, action, innovation, and change, both at the group level, and subsequently at the organizational level, and how they can be assessed. Suggestions for shaping and guiding micro-enactments to generate effective leadership within public sector organizations are provided.

Keywords: Leadership, complexity, emergence, change management, group, organizational learning, innovation.

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INTRODUCTION
Public sector organizations are increasingly facing a variety of challenges as they struggle to meet the needs of their constituents. The world-wide economic crisis plus the confluence of global warming, food shortages due to rising populations, drought and political struggles, and the spread of HIV/Aids and other infections diseases in an increasingly interconnected world demand innovative, perhaps even radical, ways of thinking and acting. The very NGO's and agencies with the capacity to address these pressing issues can expect a difficult funding environment with declining budgets and reduced staffs, fewer volunteers, priorities that are altered as a result of political appointees or party agendas, unwieldy bureaucracies, and the usual red tape; all of these factors affect the ability of many public sector organizations to carry out their mandate. These challenges are magnified by natural tragedies such as the terrible tsunami of 2004, the typhoon that befell Myanmar in April 2008, and the earthquake in Sichuan China in May 2008, catastrophes unpredictable in their devastation, yet controllable in part by way of our responses to them. .

The Need for Radical New Approaches: Effective Group Functioning

It is no wonder that many public sector organizations are questioning basic assumptions: How can we best perform our mission? What can we do to maximize our impact in these difficult times? How do we do more with less? How do we innovate to generate creative solutions to entrenched problems? How can we provide hope to those we serve? Despite the difficulties public sector organizations encounter, many have nevertheless been quite successful in carrying out their mission (see Hill, 2004; Rizvi, 2004). Our goal in this article is to use recently developed ideas from complexity science to provide a new way of thinking about what leadership means in this context and how it can be utilized to foster the kind of innovation that will be necessary to effectively deal with the wave of issues that will emerge over the next half century.
Our specific utilization of complexity theory focuses on the *group* as our level of analysis since that is where the emergence of innovative leadership can be directly accessed. Moreover, the study of groups allows for insight into the dispersal of authority, power, and decision-making. Research has demonstrated that responsibilities once reserved for leaders have filtered down to the group level (Shipper & Manz, 1992) so that employees can share in and even take on leadership responsibilities (Houghton, Neck & Manz, 2003). Groups often operate with at least some degree of autonomy and hence provide conditions in which the subculture, norms, and processes may diverge from those of the organization as a whole. This sort of decentralization enables group members to operate with greater flexibility than they would find within a strictly hierarchicalal chain of command, thereby providing more opportunities for knowledge acquisition and sharing (Ayas & Zeniuk, 2001).
Groups that work together (as opposed to dispersed virtual teams) share implicit as well as explicit knowledge as implicit knowledge is directly transmitted through interpersonal interactions (Edmondson, Winslow, Bohmer & Pisano, 2003). The transmission of tacit (implicit) and explicit communication patterns is crucial for the development of group learning, innovation, and change (Silberstang & London, manuscript in preparation). Groups engage in adaptive, generative, and transformative learning processes as they grapple with internal and

external demands. Generative learning enables groups to proactively innovate, while transformative learning does that and more: it enables the group to radically reconfigure and transform how they work together as well as how they approach their work (London & Sessa, 2006).

Finally, and most importantly for the effective functioning of public sector organizations, as group members interact with others in the organization, and thereby work on other projects, the competencies they have acquired can be disseminated to enhance the organization's overall ability to change, innovate and learn (Silberstang & Diamante, 2008).

Leadership and Innovation in Groups

This paper makes use of complexity theory to elucidate the role of leaders as they help their groups meet goals and survive, thrive, change, and innovate (Surie & Hazy, 2006). In particular we describe the role of *micro-enactments* (Silberstang & London, manuscript in preparation; Hazy & Silberstang, 2008), that is, the moment-to-moment actions and interactions of group members as they mutually influence one another to generate novel and innovative outcomes (Guastello, 2007).

We propose that leadership and innovation emerge as group members engage, to one extent of another, in seven different types of micro-enactments. We provide a framework for examining how individual group members, known as agents, assemble, intersect, and influence one another through micro-enactments to enable organized learning, action, innovation, and change, both at the group level, and subsequently at the organizational level. Propositions are put forth to suggest how specific types and patterns of micro-enactments influence one another toward specified courses of action and outcomes. Finally, we provide suggestions for shaping and guiding micro-enactments to generate effective leadership and innovation within public sector organizations.

COMPLEXITY THEORY AND THE EMERGENCE OF INNOVATION

Complexity theory views organizations as complex systems composed of heterogeneous agents (the organization's members) whose interactions with each other are varied and difficult to predict. When the intentionality of individual agents is not considered, complex systems appear to be self-organized and emergent in that the interactions among individual agents can result in observable collective properties that are not apparent at the individual agent level (Goldstein, 2007). Agents are also adaptive rather than merely passive so that they can take proactive measures in response to what is occurring around them. As such, they are viewed both individually and collectively as similar to other living systems existing in the tension at the interface of individual and collective needs in the face of a changing environment.   It is in this tension where the conditions of innovation can occur which may eventually supersede the status quo (Waldrop, 1992; Marion & Uhl-Bien, 2001; Goldstein, 2007). When patterns of interaction between agents are more complex and interdependent, significant change is more likely to occur than when patterns of interactions between agents are more limited (Kauffman, 1995).   In the later case, change is more likely to be incremental whereas in the former case, called a "rugged landscape", change can be more fundamental (Levinthal, 1997).

Incremental versus Radical Innovation

Although complex systems such as organizations evolve through the twin mechanisms of internal variation and external demands, the resulting changes are often constrained by internal structures resulting in system changes that are only incremental (Kauffman, 1995). Incremental innovation involves changes that are narrow in scope by improving or adding features to existing

technology (Christensen, 1997). An example of this would be the addition of a variable speed windshield wiper on an automobile.

Radical innovation, on the other hand, changes the architecture of the underlying technology landscape. As such, it involves the unfolding of totally new views and approaches (Christensen, 1997). The Internet itself, cellular telephony and more recently, the spread of virtual world communities are examples of radical innovation. Radical innovation is not always successful -- however when it does work, significant paradigm shifts may occur (Frenken, 2006).

Innovation that Works and How Complexity Informs the Innovation Process

Innovation, which is "fluid, flexible, and dynamic" (Davis, 2003) is considered the "single most important factor in determining America's success through the 21st century" (Council on Competitiveness, 2005: 7). It is not surprising, therefore, that it is also an important area of focus for the not-for-profit sector. Innovation is more than the generation of new ideas; potentially viable ideas must be assessed and tested, then diffused, implemented, evaluated, and sustained. In public sector organizations, this cycle takes time as well as an ability to work within the bureaucracy to effectuate change.

Although the genesis of novelty may come from unexpected sources, human intelligence allows for the critical evaluation of innovation potentials. Using heuristics, guidelines can be developed to limit the possibilities down to those that are doable and to determine the functions that need improvement and those that do not, to determine where new problems are likely to emerge to be solved and not, and to determine as well as which system elements should be "the object of search" and which should be maintained, strengthened, and not changed (Frenken, 2006: 53). Determining these heuristics is, of course, one of the difficulties involved. This discovery is itself a creative process and as such emerges best in group dynamical processes.

As we discuss in detail later, group leadership and group dynamic processes are a critical enabler of creativity and innovation. As groups coalesce over time, roles and responsibilities become increasingly differentiated. Communication and coordination not only serve to move a group toward its goal, they also provide a means of bringing about innovation through the interactions of the group. As we describe in the next section, these interactions can simultaneously also bring about the emergence of a new kind of leadership (Panzar, Hazy, McKelvey & Schwandt, 2007). We intend to show how innovation can evolve out of the interactions of agents as they engage in micro-enactments (Uhl-Bien, Marion, & McKelvey, 2007).

COMPLEXITY THEORY AND LEADERSHIP EMERGENCE

An emerging area of leadership research is complexity leadership theory (Lichtenstein et al., 2006; Marion & Uhl-Bien, 2001; Uhl-Bien, et al., 2007; Hazy, Goldstein & Lichtenstein, 2007b). It assumes that, rather than being only the result of external imposition, leadership emerges from interactions. In a complexity framework leadership involves an ordering of human interactions as they play out over time within the nested environments in which they occu*r*. In their book *Complex Systems Leadership Theory,* Hazy, Goldstein and Lichtenstein (2007a) wrote that leadership in complex systems "takes place during interactions among agents when those interactions lead to changes in the way agents expect to relate to one another in the future" (p.7).

This is in contrast with the traditional view of leadership which is based on the archetype of the great man (and more recently the great woman) who takes charge, is successful in 'battle', singlehandedly outwits and defeats foes, and triumphantly returns home to great accolades.

Based on ancient myths and legends, this view of the leader has permeated our national consciousness and organizational life. Yes, it is true that there have been and are great leaders who take charge and turn around countries and organizations. Yet, they cannot do so alone.

Derivative theories of this type of "heroic" leadership focus abound: transformational (Bass, 1985; Burns, 1978); charismatic (Conger & Kanungo, 1987); leader substitutes (Kerr & Jermier, 1978); and group self-leadership (Houghton, et al, 2003). For the majority of leadership theories, different leader behaviors, traits, roles, or functions are recommended for different types of situations, persons, personalities, tasks, and so forth. In most of these theories, the leader is the doer whose primary job is to plan, lead, organize, and motivate others.

Complexity theory views leadership in a very different way (Hazy, Goldstein & Lichtenstein, 2007b; Uhl-Bien, et al., 2007). It does not conceptualize leadership as residing in the 'official' leader per se, or even in "self-leadership" where individual group members work on their own skills and leadership potential through self-influence (Houghton, et al, 2003; Manz, 1986), or as a collective group approach in which group members take on and share the roles and tasks of the leader (Neck, Stewart & Manz, 1996; Pearce & Conger, 2003). Instead, complexity-based leadership is viewed as occurring within and out of events (Hazy, Goldstein & Lichtenstein, 2007a). As such, it is a fluid and dynamical state with persistent patterns of interaction that operate as dynamic *attractors* that capture and constrain the behaviors and choices of the group's actors. These attractor patterns can be either positive and enabling or negative and constraining in relation to innovation (Panzar et al, 2007).

In the context of complex systems leadership theory, Hazy, Goldstein & Silberstang (2008) describes two different contexts for leadership that are relevant here. The first, a convergent context, implies that leadership activities tend to move the dynamics toward stability consisting of broadly articulated objectives, for example, a budget. The second context builds upon the ideas of *generative* leadership (Surie & Hazy, 2006) which describes how innovation arises within the interactions both inside and external to the organizational setting.

Relationship between Leader Emergence and Innovation

Drawing on research in group dynamics, we argue that a climate that supports the emergence of leadership is one in which the group is able to adapt to environmental changes and internal demands through high levels of context facility, cue potency, and cultural intelligence (Silberstang & London, in preparation). These terms are defined below. Psychological safety behaviors, namely the ability to listen and offer ideas, experiment without fear of repercussions, and communicate openly, are all important for the emergence of innovation and contribute to a supportive leadership climate (Edmondson, 2004). No matter what the focus of the public sector organization, the development and sharing of knowledge is a primary activity (Luen & Al-Hawamdeh, 2001). As such the role of leadership in facilitating these activities—and the creativity and innovation that occur—becomes a key element for study and intervention.

We posit that the enabling conditions that bring about leadership emergence and those that foster creativity and innovation are related. As shown in Figure 1, when the group *context facility* is low (i.e., groups have less of an ability, or no ability, to adopt their norms and behaviors) roles are rigid, and generative leadership (Silberstang & London, manuscript in preparation; Surie & Hazy, 2006) is less likely to emerge. To the extent leadership is present, it is likely to be seen as driving convergence in group dynamics toward stability (Hazy, 2008b, 2008c). In addition, because open communication will be stifled and therefore ideas will be suppressed, the group is unlikely to innovate. In a stifling, negative spiral, the weakened potentiality for emergent leadership makes it unlikely that leadership activities or even individual

leaders will emerge to bring change to the group context. Even individuals desiring change are likely to have their initiatives dampened by the low energy and lack of enthusiasm in the group environment. Many potential leaders will be unable to stimulate leadership dynamics and may tune out or even chose to leave the group or "defect".
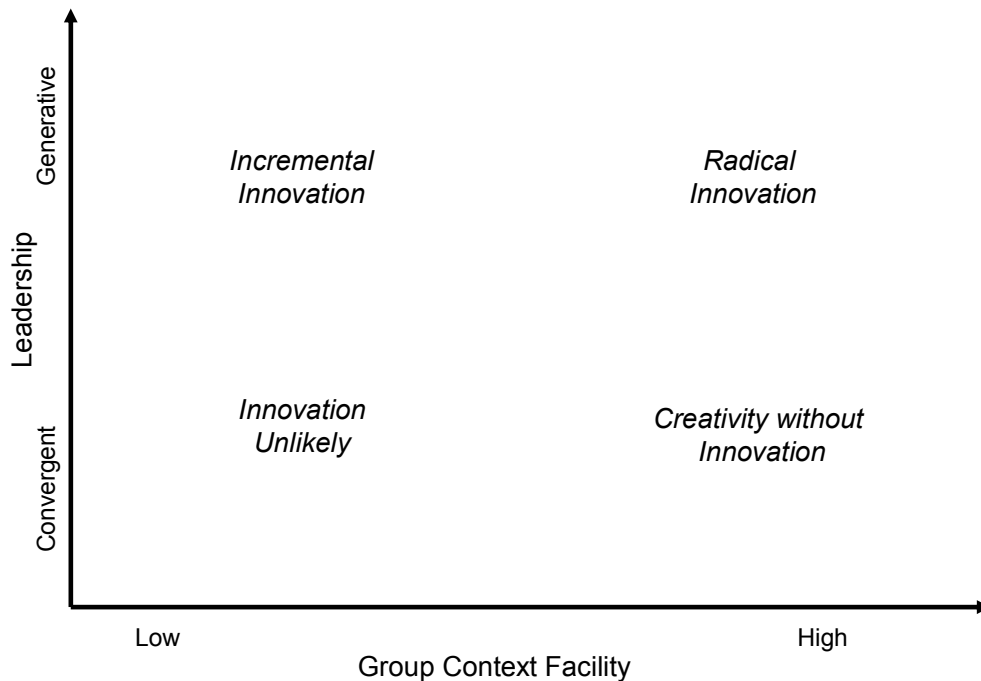

Figure 1: Conditions for the Emergence of Leadership and Innovation

Conversely, when the group *context facility* is high (i.e., groups have a greater ability to adopt their norms and behaviors) roles are less rigid and more fluid (Silberstang & London, manuscript in preparation). Because constraints on individual reaction and participation are lowered, the potential for individual initiatives to achieve resonance with and among others increases. In these cases, leadership would be seen as more generative of ideas and of possibilities and less convergent in its dynamics (Hazy, 2008b, 2008c). Several initiatives can be processed at once by the group, and new ideas can be surfaced as some resonances are dampened while others are amplified through interaction and debate. Like improvisational Jazz, a crescendo of cacophony can eventually give way to several harmonic themes, each influencing and developing the others in the shared excitement of collective self-discovery. Leadership is in the themes, but it is also in the harmony. It is not isolated in the players but is alive in their interactions.

In a group setting the music is in the ideas. Because open communication prevails, ideas are more freely communicated and explored, setting the conditions for leader emergence as possibilities are articulated and the potentialities are developed. Often, entirely new directions of inquiry are opened up for exploration. For instance, the microcomputer was invented in this way (Hazy, 2008a) as were new automobiles for the fast-growing Indian market (Surie & Hazy, 2006).

MICRO-ENACTMENTS AS UNITS OF ANALYSIS

Several streams of research and theoretical approaches support viewing leader behaviors and outcomes as micro-enactments. We have chosen to describe three diverse approaches, the Invisible Group theory, social exchange theory, and operant conditioning theory, to illustrate the broad base out of which the ideas of micro-enactments emerge. There are many other influences as well including studies of "thin slices" of behavior (Borkenau, Mauer, Reinmann, Spinath & Angleitner, 2004) and the assessment of organizational culture through cultural artifacts and behavioral interactions (Schein, 1992) that are not addressed here.

Agazarian's (1989) Invisible Group theory stipulates that *invisible* subconscious dynamics influence individual and group behavior manifested through nonrandom goal-directed and self-correcting *systems*. Behavior serves as an outward manifestation of inner dynamics. According to this perspective, individual role-member behavior and group behavior have a recursive relationship; they mutually influence one another as group members engage in problem-solving and defensive communications.

We depart from this theory in one critical aspect. According to complexity leadership theory, roles are fluid, dynamic, and subject to change, as systems adapt and grow based on environmental and contextual demands as well as intra-group and extra-group processes (Panzar et al, 2007). Although at some point the behavior of group members may coalesce into specific roles, we believe that the roles are in a state of flux, and are subject to subtle and not so subtle changes as agents interact and mutually influence one another.   Thus we perceive micro-enactments as a more fundamental unit of analysis than the individual, role, or behavior.

Social exchange theory describes the purposive behavior of individuals whose interactions and complex interdependencies stem from mutually advantageous reciprocal relationships based on the exchange of information, rewards, or other tangible or intangible resources. When groups or group members engage in such transactions, exchange networks form (Homans 1961; Blau, 1964; Cropanzano & Mitchell, 2005). The driving forces behind this theory are rational choice, rewards, punishments, types of power, and the limited role of group norms. However, these ideas are not central or entirely shared by our conception of micro-enactments. What social exchange theory does contribute is the following: the importance of agents choosing courses of action; social networks; and social influence.

Operant conditioning theory developed in response to the need for "dependable, timely knowledge" (Komaki, 1998: 19) in the social sciences, psychology, decision-making and management fields.   It focuses on delineating the antecedents and consequences of behaviors in order to develop workplace interventions for use by managers. Although we depart from this approach in their emphasis on behaviorism, we found their technique of using work sampling to examine, track, and code specific behaviors and interactions – a technique that has since become more widespread in the social sciences – to be quite useful. Likewise, we seek to understand, as best we can, the specific dynamics that contribute to behavior in complex adaptive systems. To do so requires knowledge of micro-level behavior, the very micro-enactments that inform, influence, and shape group behaviors and interactions.

Micro-Enactments that Constitute Leadership

How does complexity science help us to understand just how these all-important group processes unfold? For this analysis, we take a discrete dynamical systems approach (Hazy, Goldstein & Silberstang, 2008). We posit that individual agents interact with one another and that these interactions can be codified into discrete packets of information in the similar sense that communication is modeled in information theory (Shannon, 1948). Each discrete exchange therefore has a beginning (address), a middle (content) and an end (closure) and may include verbal, and non-verbal communication as well as carry symbolic and affective information plus purely instrumental content. In other words, we do not intend to imply an artificial limitation to the range of content included in the communication act.   Further, information content is neither perfect not is it content-less (i.e., only noise). In other words, we assume that agents can exchange information and that in the exchange meaningful knowledge about the environment and the system itself does in fact become available to all parties to the communication. It is not the case that the information content of such an exchange is void or self-referential as some might argue (Maturana & Varela, 1998). However, to say that there is content available in the communication is not the same as saying that each agent is consciously aware of it or makes effective use of it.

For these purposes, we have identified seven distinct micro-enactments that categorize the various classes of communication acts that characterize agent interactions in collectives. We argue that as a first approximation, as individuals navigate the dynamical phase transition from individual self-interested action to cooperative activity in support of collective interests, they either initiate, accept, negotiate, question/synthesize, reject, recognize/imitate, or ignore/defect with respect to an espoused program of action. The many specific instantiations of the micro-enactments that make up these categories are comprised of discrete actions that individual agents take as they interact with one another and react to each others' ideas, decisions, behaviors, and actions.

The seven types of agent interactions are in a sense the primitives of the language of interaction. Together with the grammars that organize them into patterns, they give meaning to cooperative action. As such, these seven are intended to be a first step in defining a complete set of the micro-enactments which form the subjective environment experienced by agents as leadership in organizations. In other words, we posit that, when a particular series of micro-enactments is observed to unfold around a set of individuals, one could analyze those micro-enactments and then predict whether those individuals will upon reflection report an experience of either having been led or of having been a leader. Micro-enactments can occur in any context from working through group process issues, conducting strategic deliberations by top management teams, or even undertaking large scale organizational change projects.

The focus of this paper is on micro-enactments that occur within groups as they work to establish norms, gather information about the environment, and frame an action plan. Micro-enactments are distinguished from roles, behaviors, styles or personality traits that are commonly used for analyses of this type. In this paper, however, we only focus on the relationships between the micro-enactment types themselves and dyadic and group outcomes. The micro-enactments are described below.

Micro-Enactments – Seven Types

Initiate. Agents *initiate* interactions in the normal course of human activity. These may be simple communicative acts sharing locally held information; they may advocate action; or

they may even attempt to establish a power or dominance relationship over others. They are also particularizations of global themes, social objects, at work within the collective Johannessen & Stacey, 2005). These micro-enactments begin the process that may result in the emergence of a leadership "event" (Lichtenstein et al., 2006) if, in going forward, expectations about future interactions are changed for the groups' members (Hazy, Goldstein & Lichtenstein, 2007).

Accept. Agents may *accept* a micro-enactment that another initiates which is itself a micro-enactment. This simply means that the information is received, the action is acceded to, or the dominance relationship is validated. Acceptance of a micro-enactment can be considered active when the agent is consciously aware of the acceptance and acknowledges it. This could include the continued discussion of a topic, in which case acceptance might be associated with the personality trait of extroversion. Extroverts participate more in groups (Riggio, Riggio, Salinas & Cole, 2003). However, when there are too many extroverts, teams decrease their focus on the task and increase their focus on interpersonal relationships which can result in a performance decrement (Barry & Stewart, 1997).

Acceptance can be considered as a passive act when the agent implicitly accepts the action, without acknowledging it per se. This type of passive acceptance can be likened to tacit knowledge, which is implicitly acquired through interpersonal interactions without the learner's knowledge (Wyatt**,** 2001). Adaptive learning occurs when group members automatically react to an occurrence or make incremental changes, thereby maintaining the status quo (Sessa & London, 2006).

Negotiate. On the other hand, agents might attempt to *negotiate* a compromise micro-enactment, for example, a shared-power arrangement, a revised definition or semantics with respect to words, concepts or ideas, or perhaps different terms in leader-member-exchange (Graen & Uhl-Bien, 1995) relationships or resource distribution. Generative group learning occurs when agents intentionally engage in proactive discussions or activities in response to an issue or problem (Sessa & London, 2006).

Question/Synthesize. Alternately, agents might ask *questions* in an attempt to *synthesize* micro-enactments into something qualitatively different than the original initiation. This might take the form of questioning assumptions, or beliefs, or it may involve innovative or creative extrapolation of what is proposed, or it may even involve a challenge to authority or power politics. When questioning and synthesizing, the agents may be engaging in transformative learning. This occurs when the group carries out a totally new approach to the work, rethinks its purpose, or reconfigures its structure (London & Sessa, 2006; Howard, 1995).

Reject. Conversely, agents might decide to *reject* a micro-enactment by refusing to accede to proposals, and refuting actions, or even power plays. Agents who score low in the personality trait of agreeableness are less likely to accept the ideas of others (Barrick et al, 1998) thereby inhibiting group decision making and performance. Just one disagreeable person on the team can significantly disrupt team performance, increase conflict, and lower performance (Barrick et al, 1998). When this micro-enactment is a part of an ongoing group effort characterized by established long-term procedures and expectations used to carry out critical work tasks, the group's routines may be highly resistant to change (Howard-Grenville, 2005). In this type of situation, one or more agents may reject proposed changes to the work or the group's approach to their work.

Micro-enactments involving Individuals and Groups

As groups form around programs of action, other groups or individuals tend to join in. As a result, initiatives are able to grow and the original group becomes aggregated to an increasingly

coherent critical mass of individuals. This occurs, for example, during organizational change programs, the development of a product or service, or any event that generates excitement, interest, or input – whether of an active or passive nature. In these cases it may become increasingly obvious to some bystanders that it would be in their benefit to join one of these groups, even though they might not have been an original member. This observation leads to two additional micro-enactment types.

Recognize/Imitate. The above enactments are primarily dyadic – although they do occur in a group setting. However, there are also individual/group micro-enactments to consider. Agents might *recognize* and then *imitate* an enactment that others are performing, effectively pretending to accept enactments which are currently happening even though the agent might not have been one of the original intended recipients. This latter micro-enactment might be called the "joiner" enactment when a passing agent adopts the practice of others in order to belong and reap the perceived benefits of membership. People who score high in the personality factor of agreeableness may be likely candidates for this micro-enactment. They are more likely to avoid arguments and accept the opinions of others, thereby limiting the quality of group decisions (Ellis et al., 2005). The implications of this micro-enactment for group functioning is mixed; group discussions and learning may be limited, yet increased cohesiveness allows for more immediate action and agreement.

Ignore/Defect. Lastly, rather than initiating, accepting, negotiating, synthesizing, rejecting or imitating, an agent might choose to ignore the observed micro-enactments, a generalized process of choosing to defect in game theory terms. Agents who *ignore/defect* therefore self select away from a particular cooperative activity or group, at least in the short term. They often remain free to engage in micro-enactments in other situations, although not always. Defection can occur when individual, group, organizational and cultural differences impede the expression of appropriate emotions and behaviors (Silberstang, 2006), there is a high level of mistrust or conflict, when an agent loses interest in the project or interaction, or when there are competing work or interpersonal requirements (Silberstang & Diamante, 2008). The micro-enactments are summarized in Table 1.

Table 1. The Seven Proposed Micro-Enactments

Type	Definition
Initiate	Information is shared / position advocated
Accept	Information is received: action / position accepted
Negotiate	Negotiation of ideas, positions, resources, roles
Question/Synthesize	Exploration and combining of ideas, actions, positions
Reject	Refusal to accept proposals, actions, positions
Recognize/Imitate	Adaptation of group's practices or ideas
Ignore/Defect	Group activity / proposal ignored, attend to other activities

Observing Micro-Enactments

To understand how leadership and innovation emerge within groups, we contend that one must pay attention to the micro-enactments of agents as they interact with each other. One method is to track and code the verbal and nonverbal behaviors of agents (Hazy & Silberstang, 2008) to assess the frequency, pattern, and types of behaviors and interactions. Nonverbal behaviors are a "stream of action with movements and expressions occurring simultaneously and in fluid temporal succession to one another" (Tickle-Degnen & Rosenthal, 1990: 288). The nonverbal behavior of agents provides feedback about whether ideas are understood and conveys information about affective states (Pfleger & Alexandersson, 2004). Nonverbal behaviors form patterns of enacted behavior among agents that are manifested through body language. These messages, which are often culturally bound, are conveyed through eye-contact, facial expressions, posture, gestures, nods, personal appearance, interpersonal distance, touching behaviors, movement, and other indicators.

As group members react to discussions and events, their nonverbal behaviors transmit information about how group members feel about each other and the issues the group faces. They learn which emotions can and should be conveyed to co-workers, clients, and customers, and which should be suppressed or disguised (Rafaeli & Sutton, 1987). By learning whether and how to respond to issues and events, and when to ignore them, group norms about acceptable responses and behaviors are conveyed (Hackman, 1992). Thus, group members learn to behave in set ways by observing, responding to, mirroring, and modifying the behavior of others.

Nonverbal behaviors have the potential to engender conflict, and destroy group cohesion and communication, especially when group members deliberately ignore, resist, or stubbornly oppose efforts to coalesce as a group and work together toward a shared objective. Ignoring a problem, acting surprised, delighted, or disgusted all convey different messages, and their expression may be communicated or withheld based on acceptable group standards, although emotional leakage does occur (Waxer, 1977). It is often these unspoken reactions – or lack of reactions – that indicate issues that, if addressed, would foster leadership emergence and innovation.

IMPLICATIONS FOR INNOVATION IN THE PUBLIC SECTOR

The micro-enactments model is useful with respect to driving and deriving certain kinds of behavior within organizations. As an example of group dynamics analysis at the subgroup level, Agazarian (1989) noted that the initial configuration of groups tends to form into subgroups based on demographic variables such as age, occupation, position, tenure, authority, and status, with this configuration occurring at various times throughout the group's task. However, this 'artificial' grouping began to shift as one or more members crossed boundaries, resulting in a breakdown of the initial hierarchical grouping, and a dramatic change in the types of interactions and communications that subsequently occurred. Although the resulting interactions are often characterized by conflict, these interactions served to "integrate" the group and played an important role in the group's formation. We argue that this realignment can be observed by tracking micro-enactments within the group as a general matter, and that the nature of the emergent structures can be predicted by tracking the leadership micro-enactments in particular.

Agazarian's (1989) observations touch on two key points that affect agent interactions. The first are the phases of a group's life-cycle: inertia, midpoint, and completion (Gersick, 1988; 1989) in which group members have been shown to exhibit specific patterns of behaviors

depending on the challenges they face during the life-cycle (Hazy, 2008d). Although these behaviors have been specified on a macro level, our propositions will focus on the emergence of leadership and then innovation through micro-enactments that form patterns that have been recognized and categorized in these phases by researchers (Gersick, 1988; 1989; Hackman & Wageman, 2005).

The second point is that faultlines in groups play a role in pushing agents apart – and bringing them together. Faultlines initially divide groups into subgroups based on demographic and other characteristics (e.g., occupation, interests, social affiliations, organizational tenure, and personality). One or more subgroups simultaneously and independently interact to discuss ideas and strategies. When and if they converge, group learning (and potentially innovation) is enhanced (Lau & Murnigham, 1998) as diverse insights are shared among group members, resulting in a group-wide solution (Gibson & Vermeulen, 2003). Subgroups help explicate how leadership enactments emerge and how leadership within a group can be simultaneously enacted by more than one agent. As leadership emerges within events (Hazy, Goldstein & Lichtenstein, 2007a), and as events overlap – with more than one occurring at a time—the challenge for the group is to navigate these differences toward an overarching solution rather than ignoring them and reaching a suboptimal agreement that suppresses the conflict.

In particular, we are interested in the implications of this approach for policy innovation that would be relevant to the non-profit sector. In the first instance, one would expect that in the early phase of group functioning, a high rate of *initiate* micro-enactments and a low rate of *reject* micro-enactments would characterize healthy discovery. This observation is aligned with techniques used by facilitators to foster the free and open discussion of ideas, with individual preferences withheld until the entire team has discussed and assessed the relevant ideas, alternatives, and potential solutions (Peterson, 1997). The framework offered here adds to the conversation because the proposed coding process is transparent to research being embodied as it is in a theoretical framework. Thus rigorous measurement and modeling can be added to what has up until now been a heuristic formulation for practice.

In addition, the importance of *question/synthesize* micro-enactments to the emergence of new ideas is highlighted by this theory. Presumably, this would be even more important in public sector organizations where complex, multifaceted policies are the subject of debate. In these cases, many different individuals have unique perspectives on aspects of arcane policy. Such policy debates might in fact exceed the cognitive capacity of the individuals involved. In these cases, policy innovation requires many voices and many competing concerns being aired and processed simultaneously. In these cases, successful innovation would require a prolonged period of question/ synthesis micro-enactments addressing multiple programs of action.

Lastly, many workers in NGOs and other public sector organizations are volunteers. As such, the presence of reject or ignore/defect micro-enactments in deliberations might also imply loss of human resources. One would expect, therefore, that much more time would be taken to respond to and in effect change reject micro-enactments to negotiate, question/synthesize or accept micro-enactments, and defect/ignore to recognize/imitate micro-enactments as workers are recruited.

Overall, agents are hypothesized to engage in a form of "tacit calculus" where they assess the psychological safety to determine whether engaging in a specific behavior will result in a negative reaction from the group. These assessments, which take place at "micro-behavioral decision points", govern whether a behavior will occur or whether the agent will self-censor (Edmondson, 2004).

Implications for Practice: Process Intervention Possibilities

Price (2004) suggests that complexity can be used as a tool for successful organizational interventions through the redesign of the environment in which events occur and the redesign of the group processes that agents utilize. In essence, this change focuses on the context – in our case, the group context, which is governed by the culture of the group, the type and frequency of their conversations, and the mental models they share.

As research along the lines described herein identifies the micro-enactment patterns which engender leadership in policy innovation, opportunities for interventions will become apparent. Tools are becoming available which can track enactments through video and audio coding, and software to analyze and simulate outcomes is being developed (Hazy, 2007). In addition, virtual reality and virtual world experience hardware and software systems will enable cost effective training environments for use in the public sector. Together, these breakthrough technologies offer the potential for a rapid translation of research results into the field.

CONCLUSION

Government employees account for approximately 16% of the US workforce (US Department of Labor, 2005). Canada, too, has many civil-servants, although the public sector has been shrinking since the 1990's (*Journal of Public Administration Research and Theory*, 2003). While economic market forces have traditionally driven innovation in the private sector as competition forces less innovative companies to the sidelines or worse (Hazy, 2008a), no such forces drive organizations in the public sector. There is no "invisible hand" in government to root out failed approaches and replace them with new and better ideas that work. In the past, funding agencies have relied on what amounts to Soviet-era style central planning to allocate resources in these areas. This leads to bureaucratic barriers to innovation and stagnation.

Fortunately this is beginning to change. Some argue that the era of social entrepreneurship is upon us. Internet and media billionaires are beginning to structure their philanthropic activities around quasi-market forces and are demanding innovative bottom-up approaches to creating social value. Awards and grants, such as the Innovations in American Government Awards program administered through Harvard University, and Brazil's National Award for Innovation in Education Management support these efforts. The need to build more innovative public-sector organizations has been widely discussed, and many practitioners, researchers, and theorists continue to take up the challenge (see for example Davis, 2003; Council on Competitiveness; 2005; Lonti & Verma, 2003; Cheever, Clifton & Hogan, 2005).

Complexity science is well positioned to support these trends. Hazy, Goldstein and Silberstang (2008) argue that the developing trends in social entrepreneurship are in need of an explanatory theory and that complexity science includes the bottom-up emergent characteristics that these new philanthropists demand. In this article we have described an approach that we believe can form the basis that marks the beginning of an enduring partnership between researchers and practitioners. Each can help and inform the other as innovation becomes the norm.

In this new area, the theory described herein is recursive. It applies to the field, but it applies equally well to itself. "In the end…the importance of innovation lies…in building a better world for everyone. We see the promise of a better world for our children – and the world's children" (Council on Competitiveness, 2005: 38). Innovation provides hope, enabling public sector organizations to better provide their services and technologies, whatever the

focus. The challenges we face are unprecedented. Fortunately, so too are the new tools we have at our disposal thanks to advances in the new sciences of complexity.

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