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Leading creative people: Orchestrating expertise and relationships

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Abstract

Global competition, new production techniques, and rapid technological change have placed a premium on creativity and innovation. Although many variables influence creativity and innovation in organizational settings, there is reason to suspect that leaders and their behavior represent a particularly powerful influence. In the present article, we review the available literature examining leadership behaviors contributing to creativity and innovation in organizational settings. Based on the findings obtained in these studies, we argue that the leadership of creative people requires expertise. Moreover, the successful leader must employ a number of direct and indirect influence tactics—tactics consistent with the needs of creative people working in an organizational environment. The implications of these observations for theory and practice are discussed.

In organizations, creativity and innovation have not always been seen as something of value. This tendency to dismiss innovative work, and creative people, is aptly illustrated in a statement by one icon of 20th century industry, John D. Rockefeller, who, in describing his career, notes, "I have never felt the need for scientific knowledge, have never felt it. A young man who wants to succeed in business does not require chemistry or physics. He can always hire scientists" (Chernow, 1997, p. 182).

As we move into the 21st century, this traditional view has begun to breakdown. Creativity, the generation of new ideas, and innovation, the translation of these ideas into action (Mumford & Gustafson, 1988), have come to be seen as a key goal of many organizations and a potentially powerful influence on organizational performance (Arad, Hanson, &

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Schneider, 1997; Drazin, Glynn, & Kazanjian, 1999; Tushman & O'Reilly, 1997). For example, Cohen and Levinthal (1990) have shown that a firm's ability to exploit new technologies depends on the availability of "in-house" research and development staff. Tushman and Anderson (1986) have shown that firms initiating technological change tend to grow more rapidly and are more likely to survive discontinuous change. Nystrom (1990) has provided evidence indicating that profit and growth may be related to creativity and innovation. Given these findings, it is hardly surprising that organizations place a premium on innovation under conditions of rapid technological change, global competition, and the emergence of new production technologies (Dess & Pickens, 2000; Drazin & Schoonhoven, 1996; Gryskiewicz, 2000).

Given the apparent impact of creativity and innovation on organizational performance, it is not surprising that scholars from a number of disciplines have sought to understand the factors that shape creativity and innovation. Innovation has been studied with respect to strategy (Hitt, Hoskisson, Johnson, & Mosel, 1996; Parnell, Lester, & Menefee, 2000), structure (Burns & Stalker, 1961; Damanpour, 1991, 1998; Pierce & Delbecq, 1977), climate (Amabile & Gryskiewicz, 1989; Isaksen, Laver, Ekvall, & Britz, 2001), dissemination practices (Abrahamson, 1991; Rodgers & Adhikurya, 1979), group interactions (King & Anderson, 1990; Mumford, Feldman, Hein, & Nago, 2001), and individual performance capabilities (Mumford, Marks, Connelly, Zaccaro, & Johnson, 1998; Runco & Sakamoto, 1999). Conspicuously absent from the list of potential influences, however, is leadership: leadership as evident as the exercise of influence to increase the likelihood of idea generation by followers and the subsequent development of these ideas into useful products.

As Jung (2001) pointed out, leadership, at least traditionally, has not been held to be a particularly significant influence on creativity and innovation. One reason we tend to discount leader influences may be found in our romantic conception of the creative act—a conception where ideas and innovation are attributed to the heroic efforts of the *individual*. Within this framework, leaders, like Rockefeller, are, at best, a hindrance. Another reason we tend to discount leader influences may be found in current models of leadership. More specifically, one can argue that the professionalism, expertise, and autonomy that seem to characterize creative people act to neutralize, or substitute for, leadership (Kerr and Jermier, 1978; Mumford, Scott, & Gaddis, in press).

These propositions, however plausible, are simply not borne out by the available evidence. In one early study examining the relationship between leadership and creativity, Pelz (1963) obtained judgmental assessments of potential, productivity measures, and indices of article impact for 300 scientists working in 20 different laboratories at the National Institutes of Health. The organizational variables related to these indices of creativity were examined. It was found that the intensity of interaction with group leaders was positively related to creativity particularly for more junior scientists. Moreover, exposure to poor supervision or poor role modeling, as manifest in the leaders capability for scientific work, tended to result in unusually poor performance.

Along similar lines, Tierney, Farmer, and Graen (1999) examined creativity among 191 research and development employees of a large chemical company. Leader behavior was assessed using Graen, Novak, and Sommerkamp's (1982) measure of leader–member

exchange. Effective exchange relationships were found to yield correlations in the .30s not only with creativity ratings and invention disclosures, but also indices of intrinsic motivation and use of requisite cognitive problem-solving strategies.

In still another study of creativity and innovation, Cummings and Oldham (1997) and Oldham and Cummings (1996) examined creativity among 171 manufacturing workers where creativity was assessed by patent disclosures, contributions to a suggestion program, and supervisory ratings of creativity. Supervisory support for new ideas was found to be related to these indices of creativity with support proving particularly important for those employees who evidenced a disposition towards creativity.

The importance of effective leadership in bringing out innovation among creative people is also illustrated in a study by Andrews (1967). He obtained measures of creative performance in a sample of 200 scientists working in government, industry, and academia along with one measure of creative capacity—specifically Mednick and Mednick's (1967) Remote Associations Test. Subsequent analyses indicated that, when the leader's supervisory style tended to inhibit the introduction of new ideas, creative potential was not related to performance. When, however, a more appropriate style was employed, creative ability was found to be related to performance.

Taken as a whole, the findings obtained in these studies point to two critical conclusions. First, leadership, at least certain types of leadership, is apparently related to creativity and innovation in "real-world" settings. Second, the influence tactics used by leaders apparently affect people's willingness to engage in, and the likely success of, creative ventures.

With these points in mind, our intent in the present article is to examine the attributes of leadership related to creativity and innovation. We will begin by considering the characteristics of leaders that appear to be required in promoting the performance of people engaged in creative work. Subsequently, we will examine the tactics used by these leaders as they interact with two key constituencies: (a) the people doing the work and (b) the broader organization that provides a context for this work. In examining the tactics employed by leaders of creative efforts, we will consider both interpersonal relations as well as distant, structure-based, tactics that appear to contribute to creativity and innovation. Before turning to our observations with regard to leader characteristics, leader influence tactics, and organizational relationships, however, it would seem germane to consider the nature of creative work, and creative people, to set the stage for our subsequent observations about leaders.

1. Creativity and innovation

1.1. The work

Although we typically associate creative work with artists and scientists, creative work is not defined with respect to a particular occupation (Mumford, Whetzel, & Reiter-Palmon, 1997). Instead, creative work occurs on jobs, any job, that involves certain types of tasks. Specifically, creative work can occur when the tasks presented involve complex, ill-defined problems where performance requires the generation of novel, useful solutions (Besemer &

O'Quin, 1999; Ford, 2000; Mumford & Gustafson, 1988; Ward, Smith, & Finke, 1999). Accordingly, creative work can, and does, occur in advertising, engineering, finance, and management, and involves not just idea generation but subsequent idea implementation. Indeed, idea implementation may call for as much creativity as initial idea generation (Mumford, 2002, in press).

Within this framework, creative performance is commonly appraised with respect to the products being produced. A creative product is one where a successful solution has been implemented to a novel, ill-defined problem (Ford, 2000). The focus of most studies, however, has been on the processes people apply in generating these products (Drazin et al., 1999). Broadly speaking, two key sets of processes appear to be involved in creative work: (a) creative processes or the activities underlying initial idea generation and (b) innovation processes or the activities underlying the implementation of new ideas (Vincent, Decker, & Mumford, 2002).

Because creative work occurs on complex, ill-defined problems, the imposition of structure is held to represent a key component of the creative process. Accordingly, problem definition, or problem construction, activities have been found to represent a noteworthy aspect of creative thought in virtually all fields of endeavor (Mumford, Reiter-Palmon, & Redmond, 1994; Okuda, Runco, & Berger, 1991; Pounds, 1969). With definition of the problem, people must proceed to gathering information and formulating a set of concepts that permit an understanding of the problem situation (Davidson & Sternberg, 1984; Perkins, 1992). This acquisition of information, in turn, permits people to combine and reorganize this information in a new way. These new conceptual combinations, combinations often based on analogical reasoning, in turn make it possible for people to generate new ideas (Baughman & Mumford, 1995; Finke, Ward, & Smith, 1992).

With the generation of new ideas, the idea development and implementation activities that characterize innovation become possible. Implementation, of course, depends on the evaluation of ideas (Runco & Chand, 1994). Evaluation, however, serves not only to select ideas, but also as a spur to the progressive refinement of potentially useful ideas (Barlow, 2000). As ideas are extended and refined, plans must be formulated for idea implementation (Berger, Guilford, & Christensen, 1957; Mumford, Schultz, & Osburn, 2002). These plans must be implemented in an opportunistic fashion after acquiring requisite support (Mumford, 2002, in press).

This thumbnail sketch of creative thought, while of some interest in its own right, is noteworthy because of what it tells us about the nature of creative work. One implication of this sketch is that creative work will be *person centered*. People must actively acquire and work with knowledge if creative problem solutions are to be generated. What must be recognized here, however, is that to effectively acquire and manipulate knowledge, people will need expertise—expertise that is acquired only rather slowly (Ericsson & Charness, 1994; Qin & Simon, 1990; Weisburg, 1999). To complicate matters further, one must remember that most "real-world" problems are highly complex requiring multiple different forms of expertise. As a result, creative work often requires *collaborative* efforts of differing composition, duration, and intensity depending on the nature of the problem at hand (Abra, 1994; Cagliano, Chiesa, & Manzini, 2000; Dunbar, 1995). Of course, the need for

collaboration among people places a premium on leadership, particularly leadership behaviors involving the induction of task structure.

In creative work, the parties involved must define a problem, they must gather information, and they must progressively refine and extend initial ideas to permit successful implementation. Because these activities are all difficult to execute, creative work can be expected to be a *demanding and time consuming* activity. One implication of this statement is that creative work hedges on motivation—often rather high levels of motivation (Collins & Amabile, 1999; Pelz & Andrews, 1966). Another implication is that creative work requires attention, sustained attention, over long periods of time, under conditions where ambiguity is high, negative feedback is likely, and stress a part of daily life (Kasof, 1997). Not only is creative work demanding and time consuming for the people involved, from an organizational perspective, creative work is *resource intensive*—multiple people must devote time and effort to solution generation, equipment must be acquired, and development and implementation will require support from multiple groups. Moreover, because support must be acquired to ensure the investment of requisite resources, resources that might be used elsewhere, *persuasion and politics* are likely to play a role in most creative efforts (Dudeck & Hall, 1991; Simonton, 1984).

The impact of politics and persuasion is exacerbated by another characteristic of creative work. Because creative problems are ill-defined, multiple solutions might be generated, and development and implementation are iterative efforts, creative work is *uncertain*. This uncertainty not only evokes politics and persuasion, it also places a premium on actions, such as goal setting and demonstration projects, that serve to reduce uncertainty (Mumford, 2002, in press). Associated with uncertainty is risk and, indeed, most creative efforts are *risky ventures*. Three sources of risk appear to influence creative work. First, the generation of a viable idea is not assured. Second, even if a viable idea can be generated, there is no assurance that the idea can be developed. Third, even when development is successful, there is no assurance that the product can be successfully implemented and will serve current market needs. The risk attached to creative work implies both a need to experiment and a need to tolerate failure (Andriopoulos & Lowe, 2000; Quinn, 1989). It also implies a need for people to appraise, and reappraise, risk (Rubenson & Runco, 1992; Sternberg & Lubart, 1991), being willing to close out, or farm-out, ideas and projects if they cannot be successfully implemented given available resources, likely competitors, extant structures and technologies, and current markets (Cardinal & Hatfield, 2000). The implication here, of course, is that both creative work and the leadership of creative ventures must take the broader organizational strategy into account.

The need to make ideas work within the framework provided by other ongoing organizational activities points to an important, albeit often overlooked, characteristic of creative work. If creative ideas are to be turned into innovative products, they must take context into account both in the initial generation of an idea and its subsequent development and implementation. Thus, creative work is *contextualized* with the success of creative ventures depending on an awareness of the capabilities of, and pressures on, extant socio-technical systems. In fact, it is this contextualization of creative activities that accounts for such well known phenomena as simultaneous invention and the tendency for innovation to occur in spurts within a given industry (Csikszentmihalyi, 1999; Wise, 1992).

1.2. The people

Creative work, as noted above, requires expertise. In fact, one of the most noteworthy characteristics of creative people is that they have a substantial investment in expertise and the ongoing development of expertise. For example, Heinzen, Mills, and Cameron (1993) found that early intense curiosity about some phenomenon was one of the single best predictors of achievement in the sciences. Along similar lines, Feldman (1999) and Weisburg (1999) have shown that creative achievement is linked to extensive practice and intense involvement in the work at hand, often to the exclusion of other life tasks.

This focus on the work, and the acquisition of expertise, is, however, not simply a matter of skill enhancement. As Rostan (1998) pointed out, creative people have their identity bound up in the work being done and their achievements vis-à-vis the work. The use of work as a source of identity has two noteworthy implications for understanding creative people. First, because work serves as a source of identity, opportunities for professional achievement, and the accompanying recognition, are powerful motivators for creative people (Chalupsky, 1953). Second, the locus of evaluation for creative people is typically the profession rather than the particular organization in which they currently find employment (Bradway, 1971; Goulder, 1958; Organ & Green, 1981).

As might be expected based on these observations, creative people evidence substantial achievement motivation (Barron & Harrington, 1981; Mumford & Gustafson, 1988). In one study along these lines, Harrel and Stahl (1981) used activity preferences to assess the achievement, affiliative, and power motives of scientists and managers. They found that scientists obtained higher scores on measures of achievement motivation while managers obtained higher scores on measures of power motives and affiliative needs. In keeping with these observations, creative people evidence a strong orientation towards autonomy, not only seeking out jobs where this autonomy is provided, but also performing better under conditions where they are granted at least a moderate degree of autonomy (Greenberg, 1992; Oldham & Cummings, 1996; Pelz & Andrews, 1966). Unfortunately, these characteristics, autonomy and achievement, coupled with a lack of concern about power and affiliation, may well make the creative person an "odd man out" in many organizational settings.

Although autonomous achievement represents a powerful motive underlying creative work, the pattern of dispositional characteristics evidenced by creative people is somewhat more complex. A reasonably comprehensive description of these dispositional characteristics has been provided by Fiest (1999) and Fiest and Gorman (1998) in a meta-analytic study of the personality characteristics of artists and scientists. In this review, it was found that artists and scientists displayed some noteworthy differences. Artists were more anxious and rebellious while scientists were more conscientious and accepting of authority. Beyond these differences, however, a common personality profile emerged characterized by, not only achievement motivation and autonomy, but also openness, flexibility, cognitive complexity, self-confidence, dominance, and introversion. What is of note here is that creative people consistently seem to express a pattern of characteristics that supports the confident exploration of alternatives under conditions of ambiguity (Mumford & Gustafson, 1988).

These dispositional characteristics, moreover, seem consistent with the way creative people approach the work to be done—a work style well suited to the demands of made by novel, ill-defined problems. Creative people approach problems in an exploratory mode examining possibilities, searching for information and anomalies, and seeking out a conceptual model, or near analogies, that might be used to understand the problem situation (Dunbar, 1995; Fiest & Gorman, 1998; Getzels & Csikszentmihalyi, 1976). Accordingly, Pruthi and Nagpaul (1978) found that highly creative scientists, referred to as gatekeepers, engaged in extensive communication with peers and read more, and more widely, than their less creative counterparts. Following exploration, however, creative people seem to adopt a highly analytical, rather evaluative, bent. They look for flaws using flaws identified in "experimentation" as a basis for elaborative refinement of ideas through testing of assumptions and outcome expectations (Fiest & Gorman, 1998). Thus, creative people, while open and curious, will, at times, display a harsh, evaluative orientation with respect to their own work and that of others.

1.3. The leader

These observations about the commonalities observed among creative people, and creative work, are noteworthy, in part, because they indicate that creative efforts may be sufficiently similar in terms of the basic parameters influencing performance to permit a meaningful discussion of creative leadership as a general phenomenon. These commonalities among creative people, and the characteristics of creative problems, of course, do not preclude cross-field content differences in normative expectations and production tasks. Indeed, such differences, the differences between academics, research and development scientists, and symphony musicians may lead to some noteworthy differences in requisite leadership behaviors. Nonetheless, similarity can be expected, by virtue of commonalities in the people and the work, around which one might build a general model for the leadership of creative ventures. In fact, Cardinal (2001), in an examination of the variables shaping creative achievement in research as opposed to development settings, has provided some support for this conclusion as has Damanapour (1991) in his comparison of influences on process and product innovations.

If it is granted that there is a basis for a general discussion of creative leadership, one must ask exactly why the phenomenon is of interest. As noted earlier, ultimately we study creative leadership because effective leadership makes innovation, and thus organizational growth and adaptation, possible (Tushman & O'Reilly, 1997). This apparently straightforward conclusion, however, begs a question. We study leadership in any setting precisely because we believe leadership makes a difference. Thus, one must ask what makes the leadership of creative ventures unique?

One way the leadership of creative ventures differ derives from the nature of the work to be done. Earlier, we noted that creative efforts, by definition, present novel, ill-defined tasks. The leader, as a result, cannot rely on predefined structures but, instead, must be capable of inducing structure and providing direction to work where there is no inherent direction. Accordingly, in Section 2, we will examine the characteristics of leaders that make it possible to induce this structure in a complex, dynamic organizational environment.

Another way creative leadership differs from leadership in other domains pertains to the effective exercise of influence. By virtue of the autonomy, professional focus, intrinsic motivation, and critical orientation, the leader of creative people cannot rely on position power, conformity pressure, and organizational commitment as vehicles for directing the work. Indeed, such actions are likely to prove counter productive by inhibiting requisite exploration. To complicate matters further, creative people will be working on risky, demanding tasks where success is by no means assured. These observations, in turn, imply that, in directing the people and directing the work, different influence tactics will be required than those applied in other settings. In Section 3, we will examine the influence tactics needed by leaders for effective direction of creative people.

A third way creative leadership differs from other leadership endeavors derives from the inherent conflict between innovation and organization. Innovation is an expensive, inherently risky, venture in any organizational setting. Organizations, however, must produce as well as explore. These characteristics of organizations and innovation result in an inherent tension between creative efforts an organizational demands. As occupants of boundary role positions, the leaders of creative ventures must manage organizational relationships in such a way as to promote innovation. In Section 4, we will examine organizational influences with respect to the demands made on leaders of creative ventures.

2. Leader characteristics

2.1. Expertise and creativity

Based on their autonomy and professionalism, some scholars have argued that leaders need not share the expertise and creative problem-solving skills of their followers. Indeed, one might argue that the loss of objectivity entailed may make it more difficult for leaders to effectively evaluate the organizational implications of new ideas. Although these arguments are plausible, they are not supported by the available evidence. In fact, the available evidence indicates that technical expertise and creative problem-solving skills are essential if one is to lead creative people both because they provide a basis for structuring an inherently ill-defined task and because they provide the credibility needed to exercise influence.

In one study along these lines, Andrews and Farris (1967) obtained measures of leader attributes that might be related to innovation including technical skills, critical evaluation, motivating others, and autonomy granted. These perceptual measures of leadership attributes were subsequently administered to 94 scientists working in 21 teams where measures of group members' creative performance were obtained. It was found that leaders' technical skills (r=.53) were not only the best predictor of creative performance but that these skills were better predictors of performance than motivating others, the maintenance of group relationships, and autonomy granted, among other potential predictors. In another study along these lines, Barnowe (1975) examined the productivity of 81 research and development groups, containing 963 chemists, with respect to five leader behaviors: (1) support, (2) participation, (3) closeness of supervision, (4) task emphasis, and (5) technical skill. Again, it

was found that the leaders technical skill (r=.40) was the best predictor of creativity and innovation on the part of group members.

Findings pointing to the importance of technical and creative problem-solving skills appear robust across criteria (e.g., supervisory ratings, patent awards, etc.) Moreover, these skills emerge as important predictors regardless of the methodological approach applied. For example, Tierney et al. (1999) obtained *direct assessments* of leader's creative problem-solving skills, and found these skills were related to the creative performance of group members. In a *qualitative study* of the factors shaping innovation in one research and development laboratory, Mouly and Sankaran (1999) found that creative capacity and technical skills were key determinants of leader performance. Finally, Farris (1969) has shown that expertise and creative capacity, as reflected in past performance, were critical factors influencing *movement into leadership* positions.

Given these findings, the issue at hand is not whether leaders need technical expertise and creative problem-solving skills but, instead, why the leader's technical expertise and creative problem-solving skills are such powerful influences on group performance? Broadly speaking, both social and cognitive phenomena seem to be involved. Social influence, of course, provides one explanation for these effects (Gemmill & Wilemon, 1972). More specifically, the work focus, achievement motivation, and autonomy of creative people frame a situation where expertise is the most powerful form of influence at the disposal of a leader. In keeping with this proposition, Thamin and Gemmill (1974), in an examination of the effects of influence tactics (e.g., reward, coercion, etc.) on perceptions of managerial effectiveness among research and development personnel, found that use of expertise was the one tactic that resulted positive appraisals. Although one must recognize the value of expertise as an influence tactic, the effects of leader technical expertise and creative problem-solving skills on performance may be somewhat more complex in terms of their social consequences (McAuley, Duberley, & Cohen, 2000). Given the strong professional identity of creative people, it may prove difficult for leaders lacking technical expertise and creative problem-solving skills to: (a) adequately represent the group, (b) communicate effectively with group members, (c) appraise the needs and concerns of followers, (d) develop and mentor junior staff, and (e) assess the implications of group members' interactions.

In addition to these manifold social effects of leader expertise and creative problem-solving skills, technical expertise and creative problem-solving skills may represent critical cognitive influences on leader performance. Leaders must evaluate the ideas of creative people (Mumford, Marks, Connelly, Zaccaro, & Reiter-Palmon, 2000). Given the ill-defined nature of creative work and the novelty evident in all creative problem solutions, it may be difficult, if not impossible, to evaluate ideas, and provide feedback to followers or, for that matter, other managers, when leaders lack expertise and creative problem-solving skills. Indeed, Basadur, Runco, and Vega (2000) have shown that people must possess creative problem-solving skills to effectively evaluate creative ideas.

In keeping with these observations, Farris (1972), in a study of communication patterns within research and development groups, found that innovative people, as opposed to their less innovative counterparts, were more likely to communicate with leaders under two conditions: (a) when seeking evaluative feedback about project work and its implications and

(b) when initially defining, or constructing, a problem. Not only does this communication pattern confirm the importance of leaders evaluative capabilities, it also suggests that leaders' expertise and creative problem-solving skills are needed in defining and framing problems. In fact, it seems likely that a key role played by leaders is to help creative people define problems in terms of organizational needs and goals (Mumford, 2000a, 2000b; Redmond, Mumford, & Teach, 1993). These observations about the role of expertise lead to the following propositions:

Proposition 1: *As group tasks become more complex, or more novel and ill-defined, a greater premium will be placed on leader expertise and creative problem-solving skills.*

Proposition 2: *The effective use of influence tactics in creative groups will depend on followers' appraisal of leader expertise.*

With regard to these observations about leader expertise and creative problem-solving skills, however, one further comment seems warranted. In modern organizations, the complexity of creative ventures is such that it may prove difficult for the leader to have all requisite expertise. Under these conditions, leaders must rely on "lieutenants" who have requisite expertise or, alternatively, consultation with relevant team members (Baumgarter, 1957). These observations, in turn, led to the following proposition:

Proposition 3: *Leaders of creative groups will be circumspect about expertise requirements delegating structuring and evaluative activities when they lack requisite expertise.*

2.2. Transformational leadership

If one role leaders play is helping people define the problems that are worth pursuing, then it seems reasonable to conclude that vision-based leadership might also represent a noteworthy influence on creativity and innovation. Although studies examining the effects of charisma on creativity are not available, a few studies have examined the effects of a closely related phenomenon—transformational leadership. One such study, conducted by Jung (2001), examined the effects of transformational leadership in 53 groups, composed of 3 or 4 undergraduates, who were asked to work on a brainstorming task where transformational and transactional leadership were manipulated vis-à-vis task instructions. It was found that fluency (the number of ideas produced by the group) and flexibility (the number of different types of ideas produced) were higher in the transformational, as opposed to the transactional, condition.

In a related study, Sosik, Kahai, and Avolio (1998) had 36 groups composed of 159 undergraduates, work on an electronic brainstorming task where the groups were to generate recommendations for a commercial competitiveness center. Transformational and transactional leadership were manipulated using the comments provided by a confederate as the group interacted on-line under conditions where the confederate had, or had not, been identified (anonymity). Consistent with the findings of Jung (2001), Sosik et al. found that

fluency and flexibility were higher under conditions of transformational as opposed to transactional leadership. However, these effects were moderated by anonymity with transformational leadership having stronger effects under conditions where the leader had not been identified.

In a noteworthy follow-up to this initial investigation, Sosik, Kahai, and Avolio (1999) examined how measures of group members' perceptions of transformational and transactional leadership were related to the emergence of flow, optimal motivational states, and subsequent creativity. A path analysis indicated that perceptions of transformational leadership were unrelated to flow when leaders had been identified. When the leader was not identified, however, transformational leadership was related to flow, and flow, in turn, was related to creativity (B=.51). Thus, transformational leaders vis-à-vis intellectual stimulation and individualized consideration may bring about the engagement needed to stimulate effective work on the part of creative people. Accordingly:

Proposition 4: *Transformational and charismatic leadership may enhance creativity and innovation through motivation and intellectual stimulation.*

With regard to the Sosik et al.'s (1999) study, however, it is important to remember that transformational leadership was *not* consistently related to creativity across conditions. Although this finding may seem surprising, it is not inconsistent with the nature of creative efforts. More specifically, by focusing attention on the leader and his/her vision, transformational actions may distract attention from the work while restricting the autonomy of group members in pursuing their own vision of the work. These two phenomena would, in turn, tend to inhibit innovation among creative people when the leader is highly visible. Consistent with this proposition, Jung (2001), in fact, found that nominal groups outperformed groups in his transformational condition.

Taken at face value, these findings suggest that the visioning characteristic of charismatic and transformational leaders may not prove especially useful in leading creative people. It is also possible, however, that effective vision may be manifest in somewhat different ways in creative groups. For example, it is possible that the role of a leader is to help the group formulate a shared consensual vision. Indeed, the known importance of participation in the leadership of creative people (Mossholder & Dewhurst, 1980) provides some support for this proposition.

Alternatively, the nature, or content, of the vision required to lead creative people may differ. Creative efforts are novel, ill-defined ventures where goals and paths to goal attainment must be defined vis-à-vis the work and the needs of the organization (House, 1971; Yukl, 2001). Under these conditions, definition of a "mission" oriented vision may prove particularly useful. In keeping with this proposition, Hounshell (1992), in a detailed analysis of Dupont's polymer research laboratories, found that the vision of the laboratories' founders was a key component to the marked success of this enterprise. The vision guiding this work, however, was quite simple and directly focused on the definition of integrative work goals capable of providing an overarching structure for guiding project selection and project work while motivating professionals working in this area—create synthetic fibers that have the desirable properties

of wool. Accordingly, by framing vision in terms of work goals and articulating this vision through project selection and project evaluation, rather than overt affective appeals, a work focused vision, or mission, may be promulgated that will enhance people's creative efforts. Based on these observations, the following propositions appear justified:

Proposition 5: *Vision and direction should be framed in terms of more concrete production missions to define goals and clarify paths to goal attainment.*

Proposition 6: *To prove effective in both directing the work and motivating followers, mission based visions must be used as a basis for routine decision making where participation is used as a vehicle for articulating this mission.*

2.3. Planning and sense making

One implication of our foregoing observations concerning the need to define goals and paths to goal attainment is that a premium would be placed on planning and sense making by the leader. Indeed, there is reason to suspect that leaders' planning skills are an important influence on the work of creative people. Earlier, we noted that creative efforts tend to be ill-defined. As Keller (1989) has shown, under conditions of uncertainty, professional employees, specifically research and development employees, place a higher value on the leader's initiation of structure. In keeping with this finding, Arvey, Dewhurst, and Boling (1976) found that planning and goal clarity emerged as the principal dimension upon which scientists evaluated their supervisors. Mossholder and Dewhurst (1980) have shown that supervisors' planning performance was positively related to scientists' satisfaction with their supervisors.

While there is a reason to hold that leader's planning skills contribute to the performance of creative people, an important caveat warrants mention. Barnowe (1975) has shown that overly close supervision and, thus, presumably highly detailed work plans, will tend to inhibit the performance of creative people. Thus, planning by leaders should not focus on the conduct of a specific piece of work. Rather leaders planning should focus on project progress, the general types of projects that should be pursued, and the consequences of pursuing project results into development (Cardinal & Hatfield, 2000). Of course, this observation suggests that environmental scanning and forecasting activities, two components of planning, may prove to be particularly important for leaders of creative people (Cohen & Levinthal, 1990; Mumford, Schultz, et al., in press). These activities are especially likely to prove valuable when the definition, selection, and timing of projects serves to build synergies among different projects and promote a viable exchange of different experiences among the people working on these projects (Andriopoulos & Lowe, 2000; Mumford, 2000a, 2000b; Pelz & Andrews, 1966; Robbe, 1999). Accordingly, the following two propositions seem indicated:

Proposition 7: *Effective leadership of creative ventures will require substantial planning skills.*

Proposition 8: *Planning activities of leaders will focus more on the structure, timing, and objectives of projects than the specific conduct of the work.*

The nature and significance of leader's planning activities, however, will change as projects move from the idea generation phase to the development and implementation phase. Development of ideas to support subsequent fielding involves more resources, and typically, requires substantially more interaction with a wider range of constituencies. Accordingly, leaders will need to manage resources providing neither too much nor too little support (Nohari and Gullati, 1996). Moreover, they must plan coordination with other constituencies and manage the project development cycle against requisite tasks and timelines. As Sharma (1999) points out, this implementation planning, if it is to prove successful, requires not only an in-depth understanding of the product, process, or technology at hand but also an in-depth understanding of the organization, its capabilities and its markets. Thus, the effective leadership of creative efforts will require organizational expertise as well as substantial technical expertise.

The various complex interactions involved in developing an idea and fielding a new product place another set of demands on leaders. In a qualitative analysis of leader behavior during the development of a complex technology, a new airplane, Drazin et al. (1999) and Kazanjian, Drazin, and Glynn (2000) concluded that the many interactions occurring in multiple teams serve to induce a lack of structure. Under these conditions, they found that leaders' sense making activities, or the creation and articulation of a shared mental model about the causes and consequences of actions (Frankwick, Walker, & Ward, 1994), were a significant influence on performance. The importance of sense making by leaders when multiple parties are interacting to produce a creative product has also been stressed by Dunham and Freeman (2000) in their qualitative analysis of play directors and Kidder (1981) in a study of the development of a new computer.

Some experimental support for this argument has been provided by Mumford et al. (2001). They asked undergraduates working in three or four person groups to solve one of two novel problems: a cognitive problem (involving the distribution of resources) and a social problem (involving poor performance by a team member). The number of ideas available to the group was manipulated through a priming, or a cognitive activation, manipulation while a training manipulation was used to induce shared mental models among group members appropriate to the problem at hand. It was found that the quality and originality of the resulting problem solutions increased when training provided a shared mental model with these models proving particularly important when the priming manipulation required to group to consider a larger number of more diverse ideas. These observations, in turn, imply two propositions:

Proposition 9: *Leaders sense making activities will help insure coordination and joint problem solving by people with different backgrounds or different forms of expertise.*

Proposition 10: *As projects move from generation to development corresponding increases in diversity and complexity of implementation activities will place a greater emphasis on both organizational expertise and sense making activities on the part of the leader.*

2.4. Social skills

A leader's sense making efforts, of course, can only influence performance if the leader can inculcate in others his/her understanding of the task and the relationships among people working on this task. Thus, the success of a leader's sense making activities hedges on social skills—specifically the leader's coaching and communication skills (Senge, 1990). At least two other social skills, however, are likely to be needed by the leaders of creative groups. More specifically, successful leadership of creative efforts will require persuasion and social intelligence.

The need for persuasion in the leadership of creative efforts is, in part, attributable to the people being lead. Due to their autonomy and professionalism, as well as their critical nature, creative people are not easily persuaded. In part, however, the need for persuasion is tied to the importance of resources in creative work. Creative work requires substantial resources and a continuous stream of resources (Dougherty & Hardy, 1996; Nohari & Gulatti, 1996). Moreover, these resources must be invested in an inherently risky efforts where a substantial proportion of the ideas proposed are doomed to failure (Sharma, 1999). These conditions, coupled with negative attitudes towards creativity, too busy for new ideas, discounting the value of new ideas, and negative stereotypes of creative people (Basadur, Taggar, & Pringle, 1999), can lead to the premature rejection of viable ideas. Although training (Basadur, Wakabayashi, & Takai, 1992), and presumably exposure to creative efforts (Mumford, 2000a, 2000b), can offset the effects of these attitudes, the leaders persuasive skills appear to be of paramount importance.

The impact of leader persuasion on the success of creative efforts has been demonstrated by Dudeck and Hall (1991). They examined the factors shaping the success of architects as they moved into leadership positions in the later stages of their careers. It was found that persuasive skills were a critical influence on the success of architects as greater pressure was placed on them to sell projects and to persuade clients of the merits of their proposals. Direct persuasion, however, often must be accompanied by the use of more manipulative, indirect persuasive techniques. For example, Dougherty and Hardy (1996) and Jelnek and Schoonhoven (1990) have shown that early involvement of top management and building support among key interest groups are important influences on the success of new product development efforts.

Implicit in these observations about the use of indirect persuasion is another notion. More specifically, the leaders of creative efforts need social perceptiveness, flexibility, wisdom, and social appraisal skills—attributes commonly subsumed under the rubric of social intelligence (Zaccaro, Gilbert, Thor, & Mumford, 1991). Some support for this proposition may be found in a series of studies by Owens and his colleagues (e.g., Chaney & Owens, 1964; Kulberg & Owens, 1960) indicating that successful engineers in boundary role positions were less introverted than engineers exclusively focused on research and development. Earlier in their lives, furthermore, these engineers displayed both greater social involvement and greater social acumen. Along similar lines, Zaccaro, Mumford, Connelly, Marks, and Gilbert (2000) have shown that wisdom, flexibility, and social perceptiveness are all related to the ability of Army leaders to both formulate and implement creative problem solutions.

Although there is a need for more studies examining how leaders' social skills, or social intelligence, shape the success of various creative ventures, it seems likely that multiple mechanisms will be involved. First, leaders must know when, who, and how to persuade—all requirements that place a premium on social perceptiveness and wisdom. Second, as noted earlier, creative work is person centered where people are working under stressful conditions. Thus, social perceptiveness and wisdom may be needed for effective team management. Third, leaders must be able to manage interactions among diverse people with strong egos. Thus, leaders will not only need to be perceptive, they must also be flexible. Fourth, perceptiveness and flexibility will also be required because leaders must know when and how to provide feedback. These observations, taken with our foregoing observations about persuasion, imply the following propositions:

Proposition 11: *The leaders of creative groups will need substantial social skills particularly the flexibility required to address the needs of different constituencies and the wisdom required to appraise the appropriateness of solutions vis-à-vis these constituencies.*

Proposition 12: *The leaders of creative ventures must have persuasive skills and be able to use direct and indirect tactics to build support for projects.*

Proposition 13: *Leaders of creative ventures must have the social skills to be able to gauge when a project should be sold and on what basis it can be sold.*

3. Influence tactics

However valuable expertise, visioning, sense making, and social skills, ultimately leaders must get other people to produce new ideas and new products. This exercise of influence must, of course, take into account the unique characteristics of creative people—their autonomy, curiosity, and professional focus. To complicate matters further, leaders of creative people must find a set of influence tactics that allows them to manage three sets of apparently contradictory demands. First, leaders must reduce stress and ambiguity, while simultaneously maximizing challenge and risk taking. Second, leaders must encourage exploration while insuring timely production of a viable product. Third, leaders must encourage individual initiative, while promoting integration of group activities.

Although, at first glance, it may appear impossible to reconcile these competing expectations, successful leaders apparently resolve this dilemma by applying a two-fold strategy. One set of influence tactics, tactics concerned *with leading* people, seeks to stimulate and support creative efforts through actions on followers. The other set of influence tactics, tactics concerned with *leading the work*, are based on indirect influence mechanisms applied to integrate people's activities and ensure the timely production of requisite outputs.

The notion that leaders of creative people rely on a mix of individual support and indirect structuring activities is consistent with the results obtained in a number of studies. For

example, McGourty, Tarshis, and Dominick (1996) conducted a qualitative study of Fortune 500 companies who had demonstrated a capability for sustained innovation (e.g., Intel, General Electric, Mereck). Modified critical incident interviews were conducted with research and development personnel who were asked to describe an idea that had succeeded and an idea that failed. A content analysis of interview transcripts indicated that four behaviors of groups, and their leaders, were noteworthy influences on innovation: (1) inquisitiveness, (2) advocating new ideas, (3) collaboration, and (4) goal directedness. Along similar lines, Shipper and Davy (2002), in a study of middle managers in high technology organizations, found that *both* follower reactions and managerial performance were contingent on a mix of interactive skills (e.g., participation and facilitation) and work structuring skills (e.g., time emphasis, control).

3.1. Leading people

Two considerations have led many scholars to stress direct positive support in the leadership of creative people. First, people selectively express creativity with creativity decreasing when opportunities for innovation are rare and support is not available for idea generation (Sessa, 1998). Second, because creativity is demanding, and often stressful, it is held that, without overt social support and encouragement, people are likely to withdraw from creative efforts (Scott, 1995).

Some support for these propositions may be found in Andrews (1967). In a study of research and development personnel, he found that assessed creative potential was related to subsequent innovation only when scientists felt safe enough to make their ideas known and there was encouragement for the active pursuit of new ideas. Along similar lines, Enson, Cottam, and Band (2001) examined the conditions contributing to the production of innovative marketing campaigns in medium and large advertising firms. Applying interview questions based on Amabile, Conti, Coon, Lazenby, and Herron's (1996) work context model, they found that supervisory encouragement, work-group support, freedom, resources, and challenge were all related to manifest creative achievement. These findings, along with those of other scholars (e.g., Oldham & Cummings, 1996), suggest that four key dimensions are especially important in leading creative people: (1) intellectual stimulation, (2) involvement, (3) support, and (4) freedom.

3.1.1. Intellectual stimulation

Creative work requires people to solve complex novel problems that make substantial intellectual demands. Accordingly, leaders, by taking actions that encourage intellectual engagement, and role-modeling active engagement (Mouly & Sankaran, 1999), may do much to encourage innovation. In fact, both the Enson et al.'s (2001) and McGourty et al.'s (1996) studies provide some support for this proposition. Andriopoulos and Lowe (2000), in a study of innovation in three professional firms, obtained similar findings.

If it is granted that intellectual stimulation influences innovation, the next question that comes to fore is how might leaders go about creating an intellectually stimulating environment? In an unusually exhaustive set of experimental studies, Maier and his

colleagues have sought to identify the leader behaviors contributing to intellectual stimulation (Hoffman, Hamburg, & Maier, 1962; Maier, 1950, 1953; Maier & Hoffman, 1960; Maier and Hoffman, 1964, 1965; Maier & Janzen, 1969; Maier & Solem, 1962). Broadly speaking, the design employed in these studies involved presenting small groups with a workplace problem, optimization of human resources in a production facility, where an a prori definition of better, or worse, solutions had been established (better solutions called for a creative idea). Subsequently, the conditions under which groups worked on these problems were varied to identify requisite leader behaviors. The findings obtained in these studies indicate that the leader should: (a) request a creative or innovative solution, (b) define the task in terms of a broader substantive problem rather than a specific financial outcome, (c) encourage group members to consider a variety of factual information bearing on the problem, (d) encourage group members to share information, (e) extend discussions to allow for the generation of multiple ideas since creative ideas emerge rather slowly, and (f) use disagreements to frame integrative solutions.

The findings obtained in these studies not only underscore the role of the leader in creating an intellectually stimulating environment, they suggest that intellectual stimulation occurs with the engagement of requisite creative problem-solving skills. This observation is of some importance because it suggests that a number of other tactics might be used by leaders to promote creative thought. For example, the findings of Schwenk and Crozier (1980) suggest that inquiry and advocacy techniques might, at times, prove useful. Dunbar's (1995) observations, along with those of Mumford and Gustafson (in press), suggest that leaders might also encourage creative thought by pointing out analogies, noting, or calling attention to, anomalous observations, and indicating restrictions that must be taken into account in solution generation. Of course, these interventions by leaders are most likely to prove useful in stimulating creative thought when they are based on an understanding of the problem domain at hand and requisite work strategies—attributes that call for expertise and technical skill. In considering these observations with regard to involvement, two clear-cut conclusions emerge:

Proposition 14: *Leaders of creative groups should use interactional tactics intended to encourage idea generation.*

Proposition 15: *The leader should actively participate in idea generation efforts.*

3.1.2. Involvement

The application of these strategies in creating problem solving is, of course, contingent on motivation. In the case of creative people, leaders need not generate motivation. Creative people are typically highly motivated. Moreover, the external induction of motivation may diminish performance (Collins & Amabile, 1999). Instead, the challenge confronting leaders is to get creative people to direct their motivation and curiosity to the problem at hand. Thus, the critical issue confronting leaders is to find way of encouraging involvement (Santhamani, 1983).

A rather compelling illustration of the importance of involvement has been provided by Keller (1997). He assessed the job involvement of 532 scientists and engineers using a job

involvement scale. When job involvement was correlated with indices of creative achievement (e.g., patents, publications, etc.), job involvement was found to be related to achievement. However, this relationship was stronger for scientists than engineers—findings suggesting that, with professionalization, and greater novelty and complexity in problems, involvement becomes a more significant influence on performance. Moreover, involvement, in turn, was found to be related to complex aspects of motivation including both job satisfaction and organizational commitment. Other studies by Farris (1969) and Pelz and Andrews (1966) also indicate that involvement is related to creative achievement yielding correlations in the .20s or .30s with indices such as patent rates and publication counts.

Given these findings, the question confronting leaders is rather straightforward. What actions can be taken that are likely to increase involvement? Perhaps, the most straightforward approach is to allow people to select the problems they will work on or provide people with problems consistent with their interests and expertise (Arvey & Neel, 1975; Pelz, 1967). Alternatively, involvement will increase when the leader encourages participation in defining the problems to be pursued and the approach to be used in addressing these problems. Thus, Arvey, and Dewhurst (1976) and Mossholder and Dewhurst (1980) found that participation in goal setting was related to satisfaction, and presumably performance, among scientists and engineers working in research and development settings. In addition to participation, however, it appears that involvement will increase when creative people are asked to work in groups with peers (due to social facilitation), when they are presented with challenging goals requiring a substantial personal investment of time and energy (due to escalating commitment), and when there is history of success (due to self/social image) in attaining salient goals (Andrews, 1967; Farris, 1971)—conditions which characterize organizations such as Microsoft. Taken as a whole, our foregoing observations call for two propositions:

Proposition 16: *The leadership of creative people will require involving people in the task as opposed to simply increasing motivation.*

Proposition 17: *A variety of tactics might be used to enhance involvement, including definition of challenging goals and peer pressure, provided these tactics are consistent with the motives of creative people.*

The Farris' (1971) study, along with the earlier work of Pelz (1967), however, suggests that the effects of involvement may be contingent on another variable-influence. The term influence, as used here, refers to the amount of contact creative people have with senior executives, or notables in their field, bearing on decisions made about the course of the work. With upward influence, autonomy is maintained while creative people are provided with the professional recognition that motivates achievement. In addition, influential contact establishes the value of the work while simultaneously providing requisite information about performance and performance expectations. Although these varied effects of influence suggest that it may be a particularly powerful mechanism for increasing involvement, it may also prove to be something of a mixed blessing if influence results in exposure to

political conflict, premature criticism, or loss of autonomy. Thus, leaders must manage when, where, and how upward influence is exercised if influence is to be used as a technique for enhancing involvement. Thus:

Proposition 18: *Involvement can be increased by actively engaging followers with key decision makers, provided that such involvement does not result in undue negative feedback or perceptions of risk.*

3.1.3. Support

As alluded to above, virtually all studies of the interactional context surrounding creative efforts point to the importance of support. In addition to the McGourty et al.'s (1996) and Enson et al.'s (2001) studies, evidence stressing the importance of support has been provided by Bain, Mann, and Pirola-Menlo (2001), Guastello (1995), Oldham and Cummings (1996), and Anderson and West (1998). Although it seems clear that the support provided by leaders will influence creativity, we are left with the question as to what types of support make a difference? Broadly speaking, it appears that three types of support are involved in the leadership of creative efforts: (1) idea support, (2) work support, and (3) social support.

This notion of idea support arises from a common finding in studies of creativity. As noted earlier, creative people explore first and confirm later. The net consequence of this strategy is that creative people will withdraw when confronted with premature criticism—criticism when ideas are still in the formative stage (Galluchi, Middleton, & Kline, 2000). Accordingly, Andrews and Gordon (1970) found that early negative feedback by leaders, or peers, tended to inhibit scientific creativity. These observations about the need for idea support suggest that: (a) leaders must time evaluative feedback carefully providing feedback, especially critical feedback, after initial developmental work has been completed (Farris, 1972); (b) leaders must shelter ideas, particularly new technical ideas, from premature technical evaluations by peers; (c) given the negative attitudes of managers to creative work (e.g., Basadur et al., 1992), leaders must serve as advocates of new ideas; and (d) leaders should explicitly recognize and reward people for producing new ideas.

Of course, for idea support to be effective, it should be accompanied by work support. Work support entails access to the resources needed by people to pursue the generation and implementation of new ideas. The importance of work support is illustrated in a recent study by Ekvall and Ryhammer (1999). They examined a variety of organizational variables that might influence creativity and innovation among scholars working at a Swedish University. They found that the availability of requisite resources (r=.42) was more strongly related to productivity than either climate (r=.25) or structure (r=.02). Accordingly, leaders must, if they are to prove effective, be capable of acquiring requisite resources—an observation that suggests a need for both positioning and persuasiveness, if resources are to acquired, along with skill in effectively distributing available resources once they have been acquired.

In addition to idea support and work support, leaders may exhibit support by validating the individual's sense of self-worth. Given the demands and risks associated with creative

efforts, actions by the leader that recognize the value of the individual's contributions are likely to prove useful. However, such support should not be expressed in terms of interpersonal regard (Andrews & Farris, 1967; Dipboye, Zultowski, Dewhurst, & Arvey, 1978). Instead, given the novel, ill-defined nature of the tasks at hand, path-goal theory (House, 1971) indicates that leaders should try to build feelings of efficacy and competence on the part of people with regard to the work being done. This point is illustrated in a study by Redmond et al. (1993). Here, undergraduates were asked to work on a marketing task, developing advertising campaigns for a new product, the 3-D TV, under conditions where confederate leaders either did, or did not, stress follower competence. It was found that leader behavior intended to build feelings of self-efficacy not only lead to the production of higher quality, more original campaigns, but also more effective application of expertise and creative problem-solving skills. Based on these observations, the following two propositions seem indicated:

Proposition 19: *Leaders should provide people working on creative projects with multiple forms of support (e. g, idea, work, and social support).*

Proposition 20: *Resources supporting work activities, tangible manifestations of support, are likely to have a particularly powerful impact during idea development and implementation while idea support and social support are likely to prove more important in initial idea generation.*

3.1.4. Freedom

The final interactional variable commonly held to be a noteworthy influence on creativity and innovation is the freedom, or autonomy, granted by leaders. There is reason to suspect that freedom, or autonomy granted, contributes to creativity both by motivating creative work and allowing individuals to pursue their unique insights (Amabile et al., 1996; Enson et al., 2001). By the same token, however, it does not appear that freedom and autonomy are necessarily a universal good. Pelz and Andrews (1976, 1966) used survey techniques to assess the degree of "looseness versus tightness" exhibited by the managers of scientists. They found that both overly loose and overly tight control tended to inhibit innovation with productivity and motivation peaking at moderate levels of control.

A potential explanation for this curvilinear relationship has been provided in a recent study by Trevelyan (2001). She studied five research and development organizations where varying levels of "control" were applied using a combination of questionnaire, interview, and observational techniques. She found that when leaders were involved in, and knowledgeable about the work, it allowed them to provide timely support and guidance. If "control" became too tight, however, involvement, and motivation, decreased due to loss of autonomy. Accordingly, the following proposition seems indicated:

Proposition 21: *Leaders should allow followers freedom when working on creative efforts provided that this freedom does not result in a lack of clarity about goals and goal attainment strategies.*

3.2. Leading the work

The Trevelyan's (2001) study is also noteworthy because it points to the importance of the imposition of structure in the leadership of creative people. Given the ill-defined nature of creative work and the need to integrate the activities of autonomous people, it is not surprising that the leadership of creative people would require structure. Indeed, most recent studies of creativity explicitly recognize the need for the imposition of some structure. For example, the Bain et al.'s (2001) study examined two structure dimensions, objectives and task orientation, along with the two interactional dimensions, participative safety and support for innovation. Like Anderson and West (1998), they found that these structuring activities were at least as important as interactional style in shaping creativity and innovation. In an extension of this line of work, Taggar (2001) has shown that innovation in group settings will decrease with the presence of more creative people when adequate structure is not available.

Although there is reason to suspect that structuring activities, direction of the work, represents a necessary attribute of those leading creative people, it is less clear exactly how leaders should induce structure. Clearly, some structuring techniques will reduce autonomy, involvement, and participation thereby inhibiting creative work. Ideally, moreover, the structure of group interactions should be arranged in such a way that exploration also brings about integration. Although a number of influence tactics might be used to induce structure, mechanisms appear especially useful: (a) output expectations and feedback, (b) project structure, (c) diversity, and (d) contact.

3.2.1. Output expectations and feedback

As noted above, objectives, or output expectations, have been found to contribute to creativity. Another illustration of the importance of output expectations may be found in Cardinal (2001) who examined control strategies and their relationship to drug introductions and drug enhancements in the pharmaceutical industry. Although the presence of specific goals was *negatively* related to innovation, broader output expectations were *positively* related to innovation. The induction of structure through output expectations will, for two reasons, provide a particularly appropriate control technique. First, use of output expectations, as opposed to specific goals, allows leaders to direct the work without undue interference with how people go about doing the work. Second, output expectations, as opposed to highly specific work goals, encourage people to seek feedback from leaders during problem definition and idea evaluation—the points at which creative people find a leader's guidance helpful (Farris, 1972).

The merits of inducing control and structure through output expectations is nicely illustrated in a study by Andrews and Farris (1972). They asked 178 scientists working for the National Aeronautics and Space Administration to complete a set of self-report measures of perceived time pressure. It was found that most scientists not only experienced time pressure but that time pressure was related to productivity both initially and 5 years later (r=.26). Ekvall and Ryhammer (1999) have also found that work pressure is related to productivity producing correlations in the .20s with indices of achievement in a university setting.

Taken at face value, the positive relationships of output expectations and work pressure with innovation would seem to contradict the earlier findings of Redmond et al. (1993).

Redmond et al.'s findings indicate that, by giving people time to think before starting work on a problem, creativity is enhanced. The issue here, however, may be one of timing—with output expectations and work pressure proving useful after people have formed an initial idea. Moreover, the findings of Ekvall and Ryhammer (1999) suggest that output expectations and work pressure may depend on the interactional environment confronting the individual with output expectations and work pressure proving most effective when involvement, support, and autonomy are present.

Even bearing these caveats in mind, the influence of output expectations and work pressure on innovation suggest a number of techniques that might be used by leaders in directing work. Some techniques that might prove useful include: (a) the imposition of deadlines (Turkel, 1997); (b) explicit definition of constraints on desirable characteristics of the product or product development process (Kidder, 1981); (c) the identification and analysis of competitors (Quinn, 1989; Shalley & Oldham, 1997); (d) selective availability of certain resources (Mumford, 2000a, 2000b; Quinn, 1985); (e) social visibility of the work (Weintroff, 1992); and (f) individual, or team, accountability for defined outputs (Wild, 1992).

Of course, the use of output expectations as a directive mechanism is likely to prove most successful if accompanied by rewards and feedback. Although the merits of rewarding creative work has been questioned based on the need for intrinsic motivation (Collins & Amabile, 1999), evidence is available indicating that rewards can contribute to creativity (Eisenberger & Cameron, 1996) by providing recognition, indicating desirable behaviors and work strategies, and establishing normative output expectations (Mumford, 2002, in press). In keeping with these observations, Cardinal (2001) found that rewards were positively related to both drug enhancements and new drug introductions in the pharmaceutical industry. What should be noted here, however, is that the leaders' use of a range of rewards, in addition to pay and bonuses, including time to pursue new ventures, providing additional space or equipment, and insuring professional recognition, may prove particularly useful by capitalizing on both intrinsic and extrinsic motives (Amabile, 1997).

While leaders should reward those meeting output expectations, perhaps the most clear-cut conclusion emerging from this literature is that people should not be punished for failure to meet these objectives (Quinn, 1989; Scott, 1995). Rather appraisals of performance (and feedback) under conditions of ambiguity and risk should be based on progress towards stated objectives (Mullin & Sherman, 1993). Thus, leaders, by encouraging periodic self-assessments of progress on projects, coupled with requisite technical feedback, may do much to enhance innovation while inducing requisite direction (Zhou & Oldham, 2001). Thus, the following propositions seem indicated:

Proposition 22: *Leaders should use output expectations, and a variety of different output expectations, as well as ongoing progress monitoring, as methods for inducing structure in creative work.*

Proposition 23: *Reward, and a range of both intrinsic and extrinsic rewards, should be provided for meeting output expectations.*

Proposition 24: *People should not be punished for failure to meet output expectations provided there has been adequate progress.*

3.2.2. Project selection

Output expectations, of course, must be framed with respect to the work to be done. Accordingly, one of the most powerful techniques for the direction of creative people may be found in the leader's selection of the projects to be pursued (Andriopoulos & Lowe, 2000; Mumford, 2000a, 2000b). Project selection not only specifies the work to be done, it also develops the competencies needed for future work and establishes the framework around which people will interact. In one of the few studies examining project selection, Sharma (1999) used semistructured interviews to examine some of the factors shaping project selection in start-up firms and established firms. His findings indicate not only that project selection is a significant influence on performance, and a necessary aspect of risk management, but that innovation is most likely to occur when (a) the selected projects were consistent with the core competencies of the organization; (b) served to build new expertise; (c) were at a point where technical development was feasible and commercially advantageous; and (d) when development cycles were managed to insure appropriate timing of movement from idea generation to initial fielding.

Mumford (2000a, 2000b), moreover, has argued that project selection and project organization may represent a key mechanism serving both to structure creative efforts and stimulate creativity. In his view, leaders should not initiate projects but, rather, define work themes where people develop new ideas or potential projects. The leaders' vision (or the group's technical mission) is thus articulated in the three to five related themes being pursued. Within each theme, a number of different exploratory projects are generated with evaluation occurring as exploratory projects move from development to demonstration and initial fielding (Roberts, 1988). It is expected that resource requirements will increase as projects move towards fielding along with the need for integration (Baker & Wilemon, 1977).

This research theme model is attractive as a vehicle for inducing structure for five reasons. First, exploratory work, particularly low-cost exploratory work, can be buffered from organizational demands. Second, a continuous stream of innovations can be generated even granting that relatively few ideas will move into development. Third, development and exploration efforts can be managed differently with goal specificity, control, and coordination increasing as projects move towards fielding. Fourth, the range of projects available allows synergies to emerge among projects and work themes. Fifth, and finally, the availability of multiple projects, within an integrated set of work themes, provides the diversity of work experience that promotes creative thought while allowing people to move across projects, and projects in different stages of development, thereby minimizing the negative effects of prolonged membership in a particular project group (King & Anderson, 1990; Root-Bernstein, Bernstein, & Garnier, 1993). Based on these observations, the following two propositions seem indicated:

Proposition 25: *Project selection will represent a critical mechanism for both directing the work of creative people and managing interactions in the group.*

Proposition 26: *Project selection will represent an important mechanism for articulating the vision or mission of the group.*

3.2.3. Diversity

As noted above, one advantage of the kind of work theme structure recommended by Mumford (2000a, 2000b) is that it promotes diversity. In point of fact, the available evidence indicates that structures that encourage exposure to a range of projects, people, and ideas tend to promote creativity (e.g., Basadur & Head, 2001; Farris, 1969; Pelz & Andrews, 1966, 1976). There are a number of actions leaders might take that promote diversity. For example, the leader might review project assignments and seek to bring together people with complementary skills but somewhat different technical orientations (King & Anderson, 1990; Mumford, 2000a, 2000b). Alternatively, the leader might limit the time frame over which team members work together to compensate for the loss of diversity that occurs over time (Katz, 1982). Still another strategy that might be applied is to initiate actions intended to reduce cohesion, such as the induction of alternative skill sets or the articulation of technical differences since the available evidence indicates that highly cohesive teams tend to be less creative (Nystrom, 1979).

These observations about cohesion, however, point to certain limitations on the value of diversity. For example, diversity may not prove as valuable in late cycle development and fielding efforts where cohesion, communication, and coordination are at a premium. Moreover, the price of diversity may be high with respect to stress, turnover, and conflict. This point is aptly illustrated in a recent study by Keller (2001). He argued that, based on diversity, the availability of multiple perspectives, and reduction in coordination difficulties, use of multifunctional teams can be expected to enhance the technical quality and schedule performance of project work. However, diversity, and the resulting loss of cohesion, will result in an increase in stress. In a study of 93 applied research and product development groups, Keller obtained some support for both these propositions. These findings, moreover, suggest that leaders, as they induce diversity, must also implement techniques intended to reduce conflict and minimize stress by applying strategies such as sense making or focusing attention on common outcomes and likely competitors.

Traditionally, diversity has referred to the characteristics of the people doing the work. There is reason to suspect, however, that diversity is also desirable among the leaders of creative people. Murmann and Tushman (1997) have provided evidence indicating that diverse management teams seem to perform better on complex, novel problems than more homogenous teams. Moreover, because most "real-world" creative problems are complex, it seems unlikely that any single individual will possess all of the organizational and technical knowledge needed to make informed decisions.

The construction of diverse leadership teams offers two other advantages in the direction of creative efforts. First, Pelz (1968) has provided evidence indicating that creative performance among scientists is higher when people have exposure to one leader, or a more senior peer, who is similar to them, *and* exposure to another leader, or a more senior peer, who differs from them in technical orientation. Thus, more diverse leadership teams should provide the balance needed by followers. Second, in creative groups, certain people, stars within a

communication network, appear to generate more internal and external contacts while typically displaying higher creative performance (Allen & Cohen, 1969; Friedlander, 1971; Keller & Holland, 1983; Pruthi & Nagpaul, 1978). Accordingly, it seems reasonable to expect that leaders who consciously seek out stars displaying different technical orientations as lieutenants will not only have higher performing groups but will provide high potential followers with requisite leadership experience. Thus:

Proposition 27: *Leaders of creative ventures should build leadership teams intended to represent diverse perspectives.*

Proposition 28: *Leaders should assign people to project teams to ensure appropriate levels of diversity.*

Proposition 29: *Requisite levels of diversity will increase as tasks become more novel and ill-defined, but decrease as more concrete development and fielding issues come to fore.*

3.2.4. Contact

As implied by our foregoing observations, information exchange, or contact, appears critical in creative efforts. Indeed, studies ranging from Farris' (1969) examination of scientific productivity to Keller's (2001) examination of multifunctional teams all point to the importance of internal communication within the group. Moreover, the evidence compiled by Ancona and Caldwell (1992), Dougherty and Hardy (1996), McGourty et al. (1996), and Vanpalli and More (2000) all point to the need for ongoing communication external to the group.

What should be recognized here, however, is that information gathering is a costly, time consuming, activity. As a result, people appear to follow the path of least resistance in establishing contacts and gathering information (Gerstenberger & Allen, 1968). An illustration of this point may be found in Anderson, Glassman, McAfee, and Pinelli (2001). They found that research and development personnel were more likely to acquire information through local verbal sources as opposed to less convenient sources such as journal articles, professional meetings, and benchmarking. This preference for local verbal communication can, in highly cohesive, relatively isolated, groups, become quite pronounced, resulting in a rejection of external information and emergence of a "not invented here" syndrome (Katz & Allen, 1982).

Accordingly, leaders must take actions, not only to promote within group communication (through strategies such as collocation or the creation of "common's areas") they must also take actions to promote the acquisition of external information. To encourage the acquisition and use of external information (information from outside the group), leaders can apply techniques such as rotational assignments and source vetting during briefings (Andrews, 1968; Mumford et al., 1997).

Although it seems clear that leaders of creative enterprises must manage contact and information gathering, contact demands also create certain dilemmas. For example, the focus of creative people on professional work, and the pressures of work demands, may led them to discount the value of rotational assignments or exposure to other functions in the organiza-

tion. Thus, leaders may need to create incentives to encourage broader exposure. Moreover, under some conditions, conditions where the issues at hand are primarily professional, broader organizational exposure may not necessarily prove beneficial (Katz & Tushman, 1979). Accordingly, Cardinal and Hatfield (2000) found that proximity to headquarters promoted the development of products, but inhibited the generation of new patents. Thus, leaders, in generative phases of the work, may need to rely on indirect integrative mechanisms, such as linking pins (Stumpf, 1977) or project champions (Howell & Higgins, 1988), to articulate broader organizational needs. Based on these observations, the following two propositions seem indicated:

Proposition 30: *Leaders must manage the nature and amount of contact as a function of project needs and the point in the development cycle.*

Proposition 31: *Leaders should arrange or encourage contacts to insure that a range of relevant information is considered, including a range of technical information.*

4. Organizational characteristics

4.1. Structure and climate

The Cardinal and Hatfield's (2001) study reminds us that creativity and innovation will be effected by the organizational context. Accordingly, how leaders, as the occupants of a boundary role position, interact with, and respond to, these contextual demands, may have some noteworthy effects on innovation. This observation, in turn, poses a question. Exactly what aspects of the organizational context surrounding the work influence creativity and innovation?

Over the course of the last half-century, numerous scholars have sought to identify the organizational variables influencing creativity and innovation (e.g., Burns & Stalker, 1961; McGourty et al., 1996). This research has led to a simple, apparently straightforward, conclusion. More specifically, creativity and innovation appear to occur more frequently in organic, as opposed to mechanistic, organizational contexts. Thus, Keller (1978), in a study of 44 small firms, found that the presence of an organic context was related to the successful development and fielding of innovative new products. The impact of an organic context on creativity and innovation is not surprising when one recognizes that this type of context promotes the contact and autonomy known to influence the generation and implementation of new ideas (Pelz, 1969). However, there is also a need to understand the nature of the structural and climatic variables that are the sources of these effects.

4.1.1. Structure

Perhaps, the most comprehensive study of the structural variables related to creativity and innovation may be found in Damanpour (1991). He conducted a meta-analysis of prior studies examining the relationship between structure and innovation (e.g., Daft, 1978;

Kimberly & Evanisko, 1981) with two questions in mind: (a) what structural variables are consistently related to innovation? and (b) what contextual variables (e.g., innovation type, industry, etc.) moderate these relationships? As Cardinal (2000) points out, the moderator variables under consideration in the Damanpour's (1991) study, did not exert sizable, consistent effects—a finding suggesting that the structural variables shaping innovation display remarkable generality.

It was found, however, that two sets of structural variables were consistently positively related to innovation. One set of variables, including specialization, functional differentiation, professionalism, and technical knowledge resources (r=.35), indicate that a division of labor based on expertise contributes to innovation. The other set of variables, including internal and external communication (r=.26), indicates that structures promoting open, dynamic contact contribute to innovation. The implications of these findings for the leadership of creative people are clear. Leaders should structure groups based on the technical work and establish a flat structure that promotes ongoing communication.

As might be expected based on these observations, variables such as formalization and centralization ($r = -.08$), characteristics of mechanistic organizations, were negatively related to innovation in the Damanpour's (1991) study. However, the effects of these variables, like the findings obtained for size in other studies (e.g., Arad et al., 1997; Sharma, 1999) were rather weak. One potential explanation for these rather weak effects may be found in Pierce and Delbecq (1977). They argued that the successful fielding of new ideas can, at times, be facilitated by formalization and centralization, in part, because centralization may reduce coordination demands. Along related lines, Sharma (1999) notes that size may provide the resources and diversity needed for initial idea generation. Thus, formalization, centralization, and size, the characteristics of large mechanistic organizations, need not always inhibit innovation depending on how the leaders of creative groups manage organizational relations.

Quinn (1985, 1989), in a study of blocks to innovation, found that certain specific characteristics of large mechanistic organizations tended to inhibit innovation. These inhibitors of innovation included: (a) short time frames, (b) strong financial control, (c) strong process control, and (d) top management discounting of innovation. In keeping with these observations, Katz and Tushman (1979) found, in a study of research and development groups, that, as the number of administrative communications, as opposed to functional communications, increased, innovation decreased. These findings are noteworthy because they suggest that, in large mechanistic organizations leaders must seek to buffer creative people from negative contextual influences that distract from their focus on the work at hand. Indeed, at times leaders need to buffer especially creative individuals from these demands.

One way this buffering might be accomplished is, by separating idea generation efforts, but not necessarily development and fielding, from the organization (Cardinal & Hatfield, 2000). Another buffering strategy that might prove useful is to manage projects based on a general budget pool, as opposed to costing each specific exploratory project. Still another, albeit often overlooked strategy, is for the leader to insure that sufficient administrative support is available (Mumford, Scott, et al., in press). Although these and a number of other buffering

tactics appear to have some merit, research is needed examining when, where, and how these tactics are best applied. These observations, in turn lead to the following three propositions:

Proposition 32: *Leaders should seek to buffer creative groups, or creative individuals, from off-task organizational demands.*

Proposition 33: *Leaders of creative groups should develop open, flexible structures that stress the importance of relevant technical expertise.*

Proposition 34: *Structure and formalization should be increased as projects move from generation to subsequent development and fielding.*

4.1.2. Climate and culture

It seems likely, however, that a leader's ability to execute these buffering tactics will, to some extent, depend on the climate and culture of the organization. In fact, climate, people's perceptions of organizational interactions, and culture, normative expectations for desirable behavior, have been found to be a reasonably powerful, and persuasive, influence on creativity and innovation. Nystrom (1990), for example, examined innovation, as reflected in new product developments, across four divisions of a successful manufacturing company. In contrasting these divisions, he found that certain dimensions of climate and culture, specifically risk taking, challenge, and intrinsic enjoyment of the work, distinguished innovative divisions from their less innovative counterparts within the same organization.

Since the 1970s (Ellison, James, & Carron, 1970), a number of studies have sought to identify the climate and culture dimensions that contribute to creativity and innovation. These studies typically do not attempt to distinguish between the climate dimensions contributing to creativity (idea generation) and innovation (idea implementation), nor do the clearly distinguish between culture and climate. Nonetheless, a consistent set of interactional dimensions has been identified (e.g., Amabile Conti, Coon, Lazenby, & Herron, 1989; Amabile & Gryskiewicz, 1989; Ekvall & Ryhammer, 1999; Ellison et al., 1970; Isaksen et al., 2001; Mumford & Gustafson, 1988; Ryhammer & Anderson, 2001; Witt & Boerkrem, 1989) including: (a) risk taking, (b) freedom, (c) work challenge, (d) openness, (e) trust, (f) support, (g) intellectual orientation, (h) intrinsic involvement, and (i) activity/experimentation. The presence of these climatic variables has been shown not only to influence people's perceptions of the favorableness of the environment for creativity (Isaksen et al., 2001), and thereby their willingness to initiate creative efforts, but also the rate of idea generation and the likely success of implementation efforts (Ekvall & Ryhammer, 1999).

Climate and culture, however, do not arise in a vacuum. Rather, they represent collective social constructions—social constructions over which leaders have significant influence (Schneider, 1987; Tesluk, Farr, & Klein, 1997). While there is reason to suspect that leaders shape climate and culture, less research is available examining how leaders should behave to insure a culture and climate likely to support innovation. One particularly useful tactic, however, is for leaders, in their day-to-day interactions, to exhibit involvement, intellectual

stimulation, and idea support. In fact, Mouly and Sankaran (1999) found that this kind of role modeling may be an important aspect of the leadership of creative people.

Another potentially useful tactic is for leaders to expressly seek to recognize and reward people who have exhibited both creative output *and* the pattern of interactions known to promote creativity (Quinn, 1989). Thus, leaders should not punish failure, or risk taking, they should recognize support provided for the work of others, and they should encourage people to challenge other's ideas. Still another tactic that might prove useful in establishing a culture and climate likely to support creativity is for the leader, in telling stories about past accomplishments, to emphasize the role of these climatic variables in shaping successful projects (Tesluk et al., 1997).

In addition to these rather straightforward tactics, other, somewhat more subtle, tactics might be used by leaders in defining a culture and climate consistent with the needs of creative people. One such tactic has been described by Drazin et al. (1999). In their study of complex technology development projects, they found that crises arise rather frequently. The manner in which leaders handled these crises, moreover, appeared crucial to overall performance with leaders who approached crises as an intellectual challenge, where risks were accepted and creative solutions sought, engendering a project climate encouraging innovation. Moreover, by virtue of the power of crises in defining culture, and the stories that transmit culture, it seems likely that this approach to crises may have a persuasive impact, not just on project climate, but also the broader culture and climate of the organization.

Along somewhat different lines, the more mundane decisions made by leaders may also shape climate and culture. Jacobsen and House (2001) have argued that a leader's vision can exert lasting indirect effects by shaping decisions about standard operating procedures, legitimate goals, and normative interactional expectations. This observation, in turn, suggests that leaders can build a culture and climate contributing to innovation by framing decisions, not just in objective economic terms, but in terms of the impact of these decisions on variables such as openness, trust, and challenge. In fact, over time, the framing of decisions in terms of the climatic variables shaping creativity and innovation may represent one of the more powerful effects of leadership on the innovative capacity of the organization. These observations lead to the following two propositions:

Proposition 35: *Leaders should use crises and achievements, and stories about these crises and achievements, as a vehicle for defining a climate and culture likely to encourage creativity and innovation.*

Proposition 36: *Leaders should build normative structures and apply decision rules consistent with the kind of climate known to encourage creativity and innovation.*

4.2. Interactions with the organization

To this point, we have focused primarily on the leaders actions vis-à-vis the work and the people doing creative work. Earlier, however, we noted that creativity and innovation occur within the context of other ongoing organizational interactions and the broader

environment confronting the organization. Accordingly, the actions leaders take as they interact with the broader organization, as well as the way they shape expectations about these interactions among followers, may have some noteworthy effects on creativity and innovation. Broadly speaking, in interactions with the organization leaders must build support for what, from a broader organizational perspective, is an inherently risky venture. To build support, leaders must, in turn, be able to build and maintain relationships, persuade others of the value of creative efforts, and integrate creative efforts with broader organizational strategy.

4.2.1. Strategy

Qualitative studies of innovation in organizations, specifically the successful introduction of new products, all make a similar point. Innovations are unlikely to succeed in the absence of top management support (Dougherty & Hardy, 1996; Jelnek & Schoonhoven, 1990). Top management support, however, is not easily obtained, in part, due to the risk and expense associated with creative efforts and, in part, due to the likelihood of failure (Sharma, 1999).

In a study examining the organizational conditions that lead top managers to support innovation, Hitt et al. (1996) examined the effects of evaluative standards. They found that firms applying a financial, or bottom-line, control strategy were less likely to support new product introductions while firms applying a strategic control strategy were more likely to support the introduction of new products. These observations imply that leaders of creative groups must not only have requisite professional expertise, they must have a clear understanding of the organization's strategy. Moreover, leaders must be able to frame requests for support in terms of broader strategic objectives (Hirschorn, 2001).

The leader's mastery of, and involvement with, broader strategy, however, is important not only in gathering support. As technology, innovation, and creativity have become more important influences on competitive success, innovation, and innovative capabilities, have become more important considerations shaping overall business strategy. As a result, creative leaders serve a crucial scouting function where their expertise is used to identify emerging new trends and their implications for the organization (Cohen & Levinthal, 1990).

To successfully serve the scouting function however, leaders must have a rather broad knowledge about emerging processes, technologies, and markets as well as their implications for current organizational operations. The need for this breadth of knowledge becomes especially significant when it is recognized that advances often emerge from the margins of a field (Kuhn, 1970). Moreover, it seems likely that the successful leader of creative people will expressly build such scouting activities into followers roles to ensure that: (a) important advances are identified and (b) themes and projects are formulated in such a way as to take these advances into account. Of course, this observation underscore a point made by Scott (2001) that leaders must build plans for creative efforts that expressly take strategy into account. Thus:

Proposition 37: *Leaders of creative groups must acquire an understanding of organizational strategy and use this knowledge as a basis for structuring creative ventures.*

Proposition 38: *Leaders of creative groups should screen and sell projects based on their implications for broader organizational strategy.*

Proposition 39: *Leaders of creative groups should actively monitor emerging technologies that might influence business strategy now or in the more distant future.*

4.2.2. Sales and relationships

Involvement in strategy formulation and the integration of projects into broader strategy, makes it easier to involve top management and build support for projects. However useful these techniques may be, it seems likely that the leaders of creative efforts will often have to "sell" the new idea. Indeed, as noted earlier, the need to "sell" new ideas is a key reason why persuasive skills appear essential to the leadership of creative people.

Mumford (2002, in press) and Mumford and Van Doorn (2001) have examined the strategies used by Franklin in building support for a number of innovative efforts. These innovative ideas included establishing the police and fire departments, introduction of street lighting, and the establishment of nonsectarian universities among other innovations. The results obtained in these studies indicate that support for innovative efforts is likely to increase when: (a) a low-cost demonstration projects that illustrate potential benefits have been conducted; (b) the successful use of the idea, or variations on the idea, by other organizations can be demonstrated; (c) the idea is relatively easily integrated into existing systems; (d) both the short-term and long-term benefits of the innovation for various constituencies can be established; (e) relevant constituencies are actively involved in early development of the idea; and (f) support is garnered from relevant elites for the value of the idea.

The need to involve groups with a vested interest in idea development along with the need to build elite support indicates that leaders of creative efforts need to be able to marshal social support. The importance of acquiring this social support is illustrated in studies of product champions. Product champions are typically conceived of as people *outside* the creative group who recognize the significance of an idea, actively seek to build support for an idea, and acquire the resources, both social and fiscal, needed for its development (Howell & Higgins, 1988). Studies of new product introductions indicate that most successful introductions have one or more champions (Markham, Green, & Basu, 1991; Markham & Griffin, 1998). These product champions not only help to acquire resources, but play an essential role in persuading others to adopt the innovation (Markham & Aiman-Smith, 2001).

The question confronting the leaders of creative efforts is not the need for champions but, rather, the identification and recruitment of potential champions. For champions to be effective, they must have a well-developed network of connections in the organization. Thus, leaders of creative people need to seek out and establish relationships with highly networked organizational members. Markham and Aiman-Smith's (2001) review of the characteristics of project champions, moreover, suggests that champions are: (a) most likely to emerge from groups that have a vested interest in the innovation; (b) are persuasive visionary leaders; (c) are in a position to take risks; and (d) are politically skilled. Accordingly, leaders of creative groups need to: (1) actively seek out transformational leaders who have an interest in the

innovation and (2) be able to "pitch" these leaders as to how the innovation will serve their interests. Thus, the leaders of creative efforts will need political, coalition-building skills—skills that will be at a premium in larger formalized and centralized environments (Kacmar & Baron, 1999). These observations lead to our final three propositions:

Proposition 40: *The leaders of creative groups to show seek out elites and transformational leaders whose interests would lead them to champion or support a project.*

Proposition 41: *Leaders of creative groups should use demonstration projects as a strategy for building support.*

Proposition 42: *The leaders of creative groups must be aware of, and willing to engage in organizational politics impinging on the pursuit and adoption of new ideas.*

5. Conclusions

Before turning to the broader conclusions flowing from the present effort, certain limitations inherent in the approach applied herein should be noted. To begin, we have, in the present effort, treated creative leadership as a general phenomenon referencing our conclusions about creative leaders against known characteristics of creative work and creative people. Accordingly, only scant attention has been given to cross-field content differences—the differences we see between scientist, artists, engineers, and marketing executives.

In drawing an initial set of conclusions about the nature of creative leadership, this approach is appropriate. Moreover, it is an approach that seems well justified based on the similarities in the conclusions arising from studies of creative leadership in different occupational fields. Nonetheless, it should be recognized that differences in the context and structure of creative tasks, along with cross-field differences in normative social and professional expectations, may moderate some of the conclusions drawn herein.

The nature of creative people, and creative work as a generative activity occurring in a social and organizational context, indicates that creative leadership, like creative achievement, must be understood in a multilevel framework (Csikszentmihalyi, 1999; Drazin et al., 1999). Accordingly, in the present study, we used a multilevel approach examining individual, group, and organizational influences on requirements for the effective exercise of influence in creative efforts. Although this kind of multilevel framework is necessary for understanding innovation is general (Csikszentmihalyi, 1999) and the leadership of innovative efforts in particular (Drazin et al., 1999), it should be recognized that few, if any, conclusions were drawn with respect to cross-level influences due to both the complexity of the literature and the recent reemergence of interest in the leadership of creative efforts.

Hopefully, future research will begin to examine these potential cross-level influences on the leadership of creative efforts. In fact, the material considered in the present effort suggests some promising directions for research along these lines. For example, it seems likely that in financially driven organizations, more emphasis will be placed or industry trends and

imitation in selecting projects and framing ideas (Abrahamson, 1991). Alternatively, in supportive, highly democratic cultures where subordinate expertise is high, the leader may have to apply mechanisms other than output expectations in directing work perhaps relying more on ownership, resource control, and social interdependencies as a means of structuring the work.

Our foregoing observations bring us to another limitation of the present effort. Clearly research on the leadership of creative ventures has proceeded in fits and starts with a substantial proportion of the relevant research having been completed in the fist wave of studies—studies occurring from 1955 through 1975. A 20-year hiatus ensued before a renewal of research in the mid-1990s. During this period, however, not only has our understanding of creative performance advanced (Mumford, 2002, in press) but organizations have gone through a radical set of changes (Howard, 1995).

As a result, there is a need to reexamine some of the issues broached, and conclusions obtained, in earlier studies. For example, the emergence of multifunctional teams may have placed a new premium on breadth, as well as a depth, of expertise in the leadership of creative ventures. Moreover, any emphasis on teams, and collective control, may require leaders to exert direction through more interactive and participative mechanisms such as initiation of critical contacts. Put more directly, organizations may now need jazz group leaders rather than orchestra directors.

In reviewing the extant literature, we took these changes into account by considering older studies within the context of current research on creativity and the leadership of creative ventures. Indeed, recent research on idea evaluation (Basadur et al., 2000; Sharma, 1999) continues to stress the importance of evaluation, expertise, and output control in the appraisal of ideas and the management of creative efforts. Along similar lines, the need for structure emphasized in earlier studies is consistent with more recent research on sense making and coordination (Mumford et al., 2001; Taggar, 2001).

These observations, in turn, bring us to what is perhaps the single most important conclusion that might be drawn from the present effort, despite protestations otherwise (Jung, 2001), it appears that we know a good deal more about the leadership of creative people than at first glance might appear to be the case. Since the 1950s, scholars from a number of disciplines, including engineering (e.g., Baker and Wilemon, 1977), the sciences (e.g., Pelz & Andrews, 1976), marketing (e.g., Enson, Cottam, & Band, 2001), psychology (e.g., Redmond et al., 1993), and management (e.g., Keller, 2001), have sought an understanding about how one should go about leading creative people. The results obtained in this research not only describe a complex, perhaps unusually complex, phenomenon, they suggest that the leadership of creative people cannot be understood through the rote application of extant (traditional) models.

One traditional view is, in a sense, nihilistic holding that creative people, by virtue of their autonomy and professionalism, simply do not need leaders. The evidence compiled in the course of this review, however, provides a rather compelling argument against this position. Characteristics of the leader, particularly technical expertise and creativity (Andrews & Farris, 1967; Tierney et al., 1999) are clearly strongly related to indices of followers' creative performance. Moreover, it appears that behaviors of the leader including intellectual

stimulation, support, and involvement, condition whether people can express their creative capacity (Oldham & Cummings, 1996).

An alternative to the nihilistic view holds that the role of leader is simply to support, or facilitate, the creative work of others. In the sense that leaders must acquire resources and encourage the generation of new ideas (e.g., McGourty et al., 1996), there is some truth to this view. However, leaders seem to serve a number of other roles when people are engaged in creative work: evaluating their ideas (Sharma, 1999), integrating their ideas with the needs of the organization (Mumford, 2000a, 2000b), and creating conditions where people can generate ideas in the first place (Andrews & Gordon, 1970). Thus, however important it is for the leader of creative people to be a cheerleader, it is clear the leader of creative people is something more. Indeed, at times becoming perhaps the most demanding critic of an idea and its potential (Cardinal & Hatfield, 2000).

Another common conception of creative leadership holds that the leader of creative people must inspire providing followers with a meaningful, motivating vision of the work and its implications (Sosik et al., 1999). It is, however, open to question whether visionary leadership has much relevance to creative leadership for a simple reason. Creative people are already motivated autonomous entities where the imposition of an external vision seems, if anything, to inhibit performance (e.g., Jung, 2001; Sosik, Kahai, & Avolio, 1999). Instead, the problem confronting leaders appears to be engaging extant motivation through involvement, participation, and a professionally meaningful mission (Farris, 1971; Keller, 1997).

A final traditional conception of creative leadership is that the leaders of creative people must be the consummate professional—a technical guru. Certainly, the evidence considered in the present review seems to provide some support for this argument. Not only are leaders technical skills a powerful influence on follower performance (Andrews & Farris, 1967), it is difficult to see how a leader can evaluate the work of creative people, or direct this work, lacking relevant technical skills. However, the evidence examined in the review suggests that technical skills per se are not a sufficient basis for the leadership of creative ventures. Leaders must be able to get diverse people to work together, they must be able to build support for risky new ventures, and the must be able to create a climate supporting others' idea generation. All of these demands suggest that something more than technical skill, however valuable, is involved in the leadership of creative people.

Apparently, our traditional conceptions of the requirements for leading creative people do not fit the data. Thus, one must ask exactly what model does apply? At this point, it is, in our view, inappropriate to present a grand theory. However, in our reading of the available research, an analogy does come to fore that not only seems to describe the research to date but suggests a certain style that may be necessary for the leadership of creative people. More specifically, the leadership of creative efforts seems to call for an *integrative* style—a style that permits the leader to orchestrate expertise, people, and relationships in such a way as to bring new ideas into being.

This integrative style seems to involve three crucial elements. The first major element of this style is *idea generation*. Indeed, the bulk of the available research on creative leadership stresses the role of the leader in facilitating others' idea generation. Thus, intellectual stimulation, or the application of creative problem solving techniques in guiding

others, seems required along with support for new ideas, involvement with the people in developing ideas, and granting these people the freedom to pursue the ideas thus generated. Not only must leaders help people generate ideas, they must construct an environment where such ideas and likely to emerge. Thus, leaders must insure diversity in the group, open communications, and through role modeling, crisis management, and policy decisions seek to create a climate and culture where people are likely to generate and pursue new ideas.

One of the more important findings to emerge in recent studies of creativity is that ideas, especially a plethora of diverse ideas, are something of a mixed blessing in organizational settings (Mumford et al., 2001; Taggar, 2001). Thus, this integrative style involves a second component *idea structuring*. Idea structuring is not day-to-day direction or close supervision of the work. Indeed, the available evidence indicates that this kind of individual direction inhibits innovation (Cardinal, 2001). Instead, idea structuring refers to guidance with respect to the technical and organizational merits of the work, setting output expectations, and identifying and integrating the projects to be pursued. These idea structuring activities, to contrast to idea generation, tend to be indirect involving the creation of action, or project, frameworks so as to maximize the autonomy of the individuals doing the work. In other words, it may be more useful to set a deadline than to show someone how to meet this deadline.

The third aspect of this style of leadership is *idea promotion*. Idea promotion involves gathering support form the broader organization for the creative enterprise as a whole as well as implementation of a specific idea or project. For the leaders of creative people, these promotional activities are essential primarily because they insure that the resources needed to carryout the work will be available. Idea promotion, however, places the leader in a persuasive mode where ideas must be placed in the context of broader organizational strategies if they are to succeed (Hitt et al., 1996).

One attractive feature of this tripartite model is that it explicitly acknowledges the complex, perhaps somewhat contradictory, nature of creative leadership. By the same token, however, one is left with a question. How can any one person effective pursue these three distinct types of activities at the same time? One potential answer to this question may be found in Casimir (2001). More specifically, leaders might shift between these aspects as a function of the needs of the project and its place in a broader cycle of idea development. Thus, leaders might be stress idea generation when addressing issues in early cycle projects becoming more concerned with idea structuring and idea promotion as projects move to latter phases of their development.

As attractive, and potentially effective, as this shift strategy may be, it may not always prove fully effective. For example, when working on highly complex projects in large organizations, it simply may not prove possible for one leader to acquire the advanced technical expertise needed to appraise new ideas and the practical production expertise needed to structure production activities. Under these conditions, leaders may cope with these competing demands by forming leadership teams (Goulder, 1958; Gronn, 1999; Kidder, 1981). Indeed, by applying a team approach to cope with these multiple potentially competing aspects of creative leadership, the diversity needed for her effective internal and

external interaction can be insured. The question that rises at this juncture, however, concerns the nature of requisite exchange relationships among members of leadership teams.

Implicit in these observations about leadership teams is another overarching conclusion. Different creative tasks, different organizations, and different group expectations may emphasize certain aspects of creative leadership. This point is of some importance because in some settings, for example, when a leader has highly experienced, professional subordinates working on a relatively well structured implementation problem, idea promotion, and service to the group may be at a premium. When tasks lack structure and new ideas must be generated, then idea generation is likely to be at a premium.

The tripartite model of creative leadership sketched out above is also attractive because it provides a framework for resolving some of the apparent contradictions found in the literature. One debate that has a long history is studies of creativity, and the leadership of creative people, bears on the need for separation (e.g., Katz & Tushman, 1979) versus the need for integration (e.g., Dougherty & Hardy, 1996). When idea generation and structure are contingent on interaction with others, the leader must encourage integration through techniques such as the use of multifunctional teams even as he/she accepts potential losses in cohesion and increases in stress (Keller, 2001). When, however, the requisite information is available in the group for idea generation and the concern at hand is initial idea generation, then separation may prove more useful than integration. Thus, novel exploratory efforts appear to benefit from separation while developmental refinements appear to benefit from integration (Cardinal, 2001).

Another debate that has plagued the literature pertains to the nature of the leader. More specifically, should the leader of a creative group have technical expertise? Or should greater value be place in organizational knowledge? In point of fact, the model presented above suggests that the leader of creative people should, ideally, have both forms of expertise. However, it appears that greater emphasis should be placed on technical expertise because both idea generation and structuring activities depend on the leaders' understanding of the work to be done. The need for technical, as opposed to organizational, expertise, however indicates that it may be crucial for leaders to establish relationships with project champions—using the project champions' persuasive skills and organizational knowledge as a basis for idea promotion (Howell & Higgins, 1988).

These observations about when leaders need project champions point to another advantageous characteristic of the tripartite model presented above. More specifically, this model makes it possible to formulate a number of new propositions, readily testable propositions, about the nature of creative leadership. In fact, a number of propositions flowing from this model have been noted in the preceding discussion. For example, to encourage idea generation, it may be useful for the leaders of creative ventures to select lieutenants who differ from the leader in technical background and approach—an uncommon strategy, but one suited to the demands of creative leadership. Moreover, the leader of creative people may need to give more attention to issues of climate and culture because climate and culture provide a context for idea generation. Still another example of the application of this model in generating propositions may be found in the notion that vision should be expressed indirectly through project selection or the identification of work themes.

In addition to these propositions, all propositions that have at least some support in the extant literature, this tripartite model also provides a basis for framing some new propositions about the nature of creative leadership. The indirect nature of leaders structuring activities immediately brings to mind two propositions. First, change in creative groups is most likely to be brought about by defining new seed projects or by seeding extant projects with people from rather different technical backgrounds. Second, leaders will prove more effective if they are actively engaged in the initial project definition, in part because early involvement reduces ambiguity and, in part, because early involvement allows the leader to frame the problem in terms of organizational needs.

Beyond suggesting some propositions about how leaders should exercise influence, the model of creative leadership sketched out above points to some unique characteristics of leadership in creative groups. One unique characteristic arises from the need for idea generation. More specifically, when high levels of personalized conflict exist in a group, it may prove impossible for leaders to either promote idea generation or effectively integrate projects. Thus, successful leaders of creative ventures may go to unusual lengths to minimize disruptive interpersonal conflict, while simultaneously creating technical conflict. Along somewhat different lines, while the leader must encourage diversity and technical debates in idea generation, idea promotion, vis-à-vis persuasive requirements, requires a common, consistent message. As a result, leaders of creative people may have rather different expectations for internal and external interactions—with debate being encouraged internally but not outside the creative group.

Not only do these observations suggest that this tripartite model of creative leadership might prove useful in formulating new propositions, these propositions, like many of those articulated earlier, suggest that the leadership of creative people may not always conform to our extant expectations about leader behavior. When this observation is considered in light of the new premium placed on creativity and innovation in organizations (Dess & Pickens, 2000; Gryskiewicz, 2000; Tushman & O'Reilly, 1997), it seems that further research along these lines is not only useful but essential. Hopefully, the present effort, by reviewing what we know about creative leadership, will provide a foundation for further research along these lines.

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