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The Academy of Management Review, Vol. 18, No. 2. (Apr., 1993), pp. 293-321.

Stable URL:
http://links.jstor.org/sici?sici=0363-7425%28199304%2918%3A2%3C293%3ATATOOC%3E2.0.CO%3B2-G

The Academy of Management Review is currently published by Academy of Management.

Academy of Management Review
1993, Vol. 18, No. 2, 293–321.

TOWARD A THEORY OF ORGANIZATIONAL CREATIVITY

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In this article we develop a theoretical framework for understanding creativity in complex social settings. We define *organizational creativity* as the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system. The starting point for our theoretical development is provided by the interactionist model of creative behavior developed by Woodman and Schoenfeldt (1989). This model and supporting literature on creative behavior and organizational innovation are used to develop an interactional framework for organizational creativity. The theoretical framework is summarized by three propositions that can effectively guide the development of testable hypotheses.

The concept of organizational creativity identifies a relatively unexplored area in organizational change and innovation. *Organizational creativity* is the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system. It is, therefore, the commonly accepted definition of creative behavior, or the products of such behavior (e.g., Arieti, 1976; Barron, 1969; Golann, 1963) placed within an organizational context. We frame the definition of organizational creativity as a subset of the broader domain of innovation. Innovation is then characterized to be a subset of an even broader construct of organizational change. Although organizational change can include innovation, much of organizational change is not innovation. Similarly, even though creativity may produce the new product, service, idea, or process that is implemented through innovation (cf. Amabile, 1988), innovation can also include the adaptation of preexisting products or processes, or those created outside of the organization.

It is our belief that the organizational sciences can benefit from systematic investigations of creative behavior in complex social systems. Creativity for individuals and organizations—doing something for the first time anywhere or creating new knowledge—represents a dramatic aspect of organizational change that may provide a key to understanding change phenomena and, ultimately, organizational effectiveness and

survival. In addition, the exploration of organizational creativity may serve to link diverse literatures and research traditions, most specifically behavioral research on individual creativity and organizational research on innovation. West and Farr (1990) argued for the wisdom of bringing these research streams together.

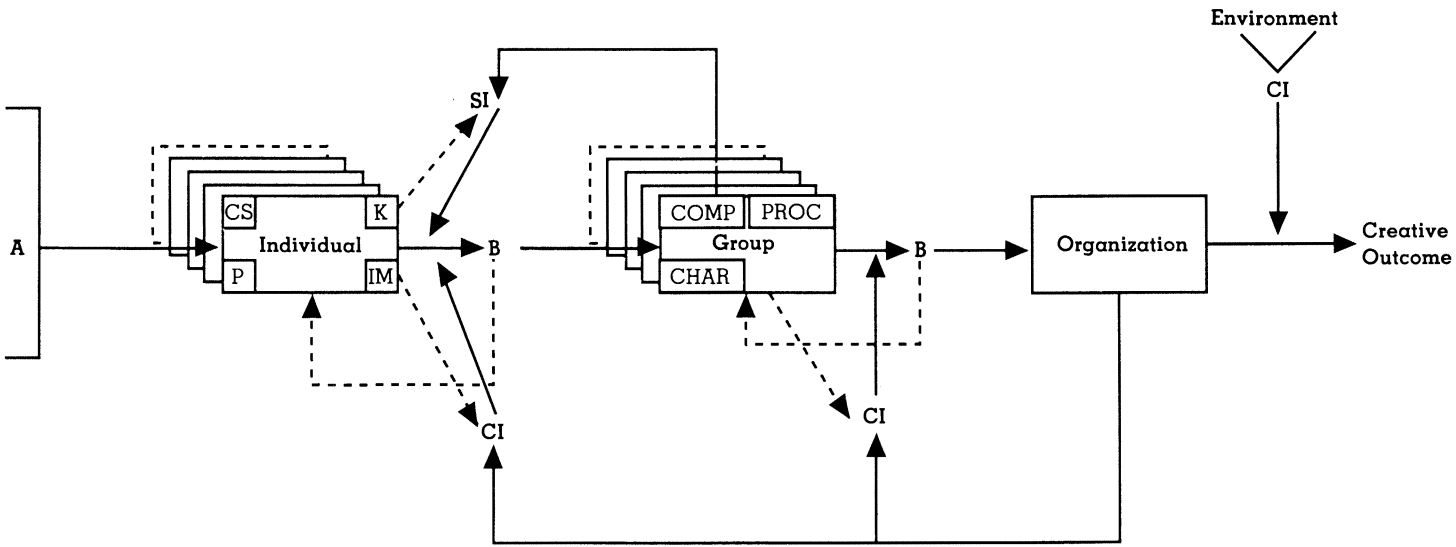
An understanding of organizational creativity will necessarily involve understanding (a) the creative process, (b) the creative product, (c) the creative person, (d) the creative situation, and (e) the way in which each of these components interacts with the others (Brown, 1989; Harrington, 1990). Research by Amabile and her associates (Amabile, 1983; Amabile, Goldfarb, & Brackfield, 1990) documents the value of examining the creativity of individuals and groups within their relevant social settings. The theory developed in this paper brings the perspective of interactional psychology to bear on the integration of process, product, person, and situation into a more comprehensive theory of organizational creativity than previously proposed (e.g., Amabile, 1988; King & Anderson, 1990; Mumford & Gustafson, 1988; Staw, 1990; Steiner, 1965). Interactional psychology provides a strong theoretical base from which to model complex behavioral phenomena (Schneider, 1983; Terborg, 1981), and the interactionist perspective has great promise for explaining human behavior in complex social settings.

AN INTERACTIONIST PERSPECTIVE ON CREATIVITY

Woodman and Schoenfeldt (1989, 1990) have proposed an interactionist model of creative behavior at the individual level. In this model, they suggest that creativity is the complex product of a person's behavior in a given situation. The situation is characterized in terms of the contextual and social influences that either facilitate or inhibit creative accomplishment. The person is influenced by various antecedent conditions, and he or she brings to bear both cognitive abilities and noncognitive traits or predispositions. This interactionist model provides an integrating framework that combines important elements of the personality (e.g., Woodman, 1981), cognitive (e.g., Hayes, 1989), and social psychology (e.g., Amabile, 1983) explanations of creativity.

Figure 1 provides a conceptual overlay for the interactionist perspective on organizational creativity. This figure essentially extends the Woodman and Schoenfeldt (1989) model of creative behavior into a social context. The creative behavior of organizational participants is a complex person-situation interaction influenced by events of the past as well as salient aspects of the current situation. Within the person, both cognitive (knowledge, cognitive skills, and cognitive styles/preferences) and noncognitive (e.g., personality) aspects of the mind are related to creative behavior. In sum, individual creativity is a function of antecedent conditions (e.g., past reinforcement history, biographical variables), cognitive style and ability (e.g., divergent thinking, ideational fluency), personality

FIGURE 1
An Interactionist Model of Organizational Creativity



INDIVIDUAL CREATIVITY:
$C_I = f(A,CS,P,K,IM,SI,CI)$

GROUP CREATIVITY:
$C_G = f(C_I, G_{COMP}, G_{CHAR}, G_{PROC}, CI)$

ORGANIZATIONAL CREATIVITY:
$C_O = f(C_G, CI)$

Legend:

A = Antecedent Conditions
B = Creative Behavior
CS = Cognitive Style/ Abilities
P = Personality
K = Knowledge
IM = Intrinsic Motivation
SI = Social Influences
CI = Contextual Influences
G_{COMP} = Group Composition
G_{CHAR} = Group Characteristics
G_{PROC} = Group Processes

factors (e.g., self-esteem, locus of control), relevant knowledge, motivation, social influences (e.g., social facilitation, social rewards), and contextual influences (e.g., physical environment, task and time constraints). In Figure 1 the premise that behavior is a complex interaction of person and situation is repeated at each level of social organization. That is, group creativity is a function of individual creative behavior "inputs," the interaction of the individuals involved (e.g., group composition), group characteristics (e.g., norms, size, degree of cohesiveness), group processes (e.g., approaches to problem solving), and contextual influences (e.g., the larger organization, characteristics of group task). Organizational creativity is a function of the creative outputs of its component groups and contextual influences (organizational culture, reward systems, resource constraints, the larger environment outside the system, and so on). The gestalt of creative output (new products, services, ideas, procedures, and processes) for the entire system stems from the complex mosaic of individual, group, and organizational characteristics and behaviors occurring within the salient situational influences (both creativity constraining and enhancing) existing at each level of social organization.

Although the arrows of Figure 1 represent an attempt to diagram the interactions of persons and situations, as well as the cross-level influences among individual, group, and organizational characteristics, such a model does not richly capture the dynamic nature of reciprocal causation with its implied feedback loops. Hence, a further description of the interactionist perspective may be instructive:

> From an interactionist perspective, the behavior of an organism at any point in time is a complex interaction of the situation and something else—this something else is the nature of the organism itself. Both situation and organism and the interaction that unfolds over time must be explained to fully understand the organism-in-its-environment. Sometimes the contingencies of the current situation account for or can be said to explain the greater part of current behavior; sometimes the nature of the organism explains a great deal; sometimes both plus their reciprocal influences are necessary to even begin to understand what is going on. From an interactionist position there is always something more to understanding behavior than just describing the observed behavior *per se*. This "something more" has to do with the essence of the organism and its behavioral potentiality. (Woodman & Schoenfeldt, 1990: 279–280)

The dotted lines in Figure 1 illustrate, in an admittedly contrived fashion, a variety of feedback loops. These include (a) the effects of the consequences of behavior on the subsequent behavior of both individuals and groups, (b) feedback provided to individuals and groups through social and contextual influence processes (SI and CI), and (c) reciprocal influences on the situation (social and contextual) as individual and group behavior unfolds over time.

An important feature of an interactionist model of organizational cre-

ativity is its ability to address influences across levels of analysis. These cross-level influences are captured by the social influence (SI) and contextual influence (CI) arrows in Figure 1. We argue that these cross-level influences are particularly important in identifying and understanding group and organizational characteristics that both enhance and inhibit creative behavior in complex social systems.

In the sections that follow, we use the interactionist model shown in Figure 1 to organize diverse literature and streams of research that focus on (a) individual creativity, (b) group creativity, and (c) organizational creativity. In none of these three areas is the literature reviewed intended to be exhaustive; it is only illustrative of potentially important variables and relationships. Indeed, hundreds of pages would be required in each of these areas to provide an encyclopedic review of the extant literature. Following this theory development (which begins with Figure 1), we will then summarize and extend the interactionist perspective with two additional figures and three propositions that serve to guide the development of testable hypotheses.

INDIVIDUAL CREATIVITY

Antecedent Conditions

Much of the early research on creativity was characterized by catalogs of biographical and historical information on eminent creators. Galton's (1869) *Hereditary Genius* established the prototype for the historiometric approach. That work was followed by studies which attempted to catalog the biographical backgrounds of great creators. Methodological developments by Simonton (1975) helped to advance this approach. Simonton (1986) analyzed 50 biographical characteristics of 315 eminent individuals cataloged by Goertzel, Goertzel, and Goertzel (1978). Results suggested specific sets of biographical variables that had differential associations with creative achievement depending on the area of achievement. Research on the biographies of eminent creators led to several attempts to develop empirically keyed biographical inventories to predict creativity (e.g., Schaefer & Anastasi, 1968). However, the attempts at empirically keying these measures result in factorial complexity that makes theoretical interpretation of the relationships between background data and creativity virtually impossible, and different keys must be constructed for different types of creativity (Barron & Harrington, 1981).

Singh (1986) demonstrated that personality data interact with biographical data to predict creativity. Thus, further work on the development of biographical inventories may prove useful from the standpoint of clarifying gaps in knowledge about situational presses and differential reaction to situational factors (Barron & Harrington, 1981). In terms of an interactionist model, antecedent conditions influence the personality and cognitive characteristics of the individual, and to some extent they probably determine the current situation in which the individual finds himself or herself (Woodman & Schoenfeldt, 1989).

Personality Factors

The search for personality correlates of creativity has provided a diverse set of findings, depending in part on the specific field in which creativity is investigated (Barron & Harrington, 1981). A core of personality traits that are reasonably stable across fields has emerged from divergent areas. These traits include "high valuation of esthetic qualities in experience, broad interests, attraction to complexity, high energy, independence of judgment, autonomy, intuition, self-confidence, ability to resolve antinomies or to accommodate apparently opposite or conflicting traits in one's self-concept, and a firm sense of self as creative" (Barron & Harrington, 1981, p. 453). Amabile (1988) reported that traits of persistence, curiosity, energy, and intellectual honesty were consistently identified by R&D scientists as being important for creativity. In addition, a number of studies have shown that highly creative people tend to have an internal locus of control (Woodman & Schoenfeldt, 1989).

Although researchers are in general agreement that personality is related to creativity (e.g., Martindale, 1989; Runco & Albert, 1990), attempts to develop a personality inventory predictive of creative accomplishment in organizations are no more likely to be useful than were early trait theory approaches to explaining leadership. However, although we advocate moving well beyond a focus solely on individual actors, theorists must nevertheless retain an appreciation for the creative person as a partial explanation for creativity in complex social settings.

Cognitive Factors

Researchers have identified a number of cognitive abilities that relate to creativity. Carrol (1985) found eight first-order factors that all loaded highly on a second-order factor of idea production: associative fluency, fluency of expression, figural fluency, ideational fluency, speech fluency, word fluency, practical ideational fluency, and originality. In addition, field dependence also has been related to creativity. People with high field independence are able to analyze the relevant aspects of the situation without being distracted by the irrelevant aspects, whereas field-dependent people have difficulty separating less important aspects (Witkin, Dyk, Paterson, Goodenough, & Karp, 1962). Guilford (1977, 1984), in his work on the structure of intelligence, has identified the cognitive processes of fluency, flexibility, originality, and elaboration as essential to divergent production. Guilford (1983) discussed the role of transformation abilities in creativity and suggested that a person's disposition toward the application of intellectual abilities to look for transformations was a general cognitive style dimension.

Divergent production has long been considered the cognitive key to creativity and has continued to be a major consideration in creativity research. Basadur, Graen, and Green (1982) postulated a sequential application of ideation (divergent thinking) and convergent thinking through

the stages of problem finding, solution generation, and solution implementation. Thus, for a creative person to produce socially useful products, his or her divergent thinking must come hand in hand with convergent thinking. Basadur and Finkbeiner (1985) developed a survey measure of attitudes toward ideation and convergent thinking for use in research on problem solving in organizations. More recently, Basadur, Wakabayashi, and Graen (1990) demonstrated empirically that training organizational members in creative thinking caused positive improvements in attitudes associated with divergent thinking. If such training-induced shifts in cognitive skills (e.g., divergent thinking) and attitudes toward the use of such skills (i.e., cognitive styles) can be convincingly linked to creative outcomes, this connection will have important implications for organizations.

The influences of cognitive ability and style suggest a point of integration of individual differences with social and contextual influences. Campbell (1960) suggested a model in which creativity is a part of the general process by which people acquire new knowledge. The process is based on trial-and-error learning in which (a) some mechanism introduces variation such as different possible associations, (b) a consistent selection process allows the selection of particular combinations of associations, and (c) some mechanism exists to preserve and reproduce selected variations. Many of the individual differences noted above may influence each of these generative mechanisms. However, contextual and social variables may also influence the process. For example, social pressures toward conformity may reduce allowable variation, or rigidly adhered-to algorithms for evaluation of possible associations may bias selection.

In a similar vein, Hogarth (1987) suggested that much of creativity involves generating explanations or determining causes. Hogarth (1987) discussed four components of causal reasoning that are relevant to creativity: (a) a causal field which provides the context in which judgments are made, (b) cues-to-causality, which are imperfect indicators of the presence or absence of causal relations, (c) judgmental strategies for combining the field and cues in the assessment of cause, and (d) the role of alternative explanations. Note that two of these four components are contextual (i.e., causal field and cues-to-causality), whereas two are cognitive (i.e., judgmental strategies and generation of alternative causal explanations). Hogarth (1987) observed that the order brought to bear on the masses of information confronted by individuals through causal reasoning is bought at the cost of being able to perceive alternative problem formulations. Sawyer (1990) demonstrated that uncertainty in causal relations brought about through contextual ambiguity and low predictability will lead people to follow status quo resource allocation strategies, even when those strategies are clearly suboptimal. However, in subsequent work, contextual ambiguity appeared to free people to explore alternative causal relationships (Sawyer, 1991). Sawyer's work is consistent

with the social judgment approach detailed by Hammond, Stewart, Brehmer, and Steinmann (1986), who identified a process by which individuals and groups come to understand causal relations in the environment. The forces of causal reasoning that serve to restrict our attention may result either from inside the individual (e.g., through field dependence) or from the social context that narrowly defines the causal field, restricts the available cues-to-causality, rigidly defines acceptable judgmental strategies, provides negative sanctions for failure, or guards against the consideration of alternative explanations.

Intrinsic Motivation

An intrinsic motivational orientation has been postulated by many researchers as a key element in creativity (Amabile, 1990; Barron & Harrington, 1981). Simon (1967) postulated that the primary function of motivation was the control of attention. Indeed, much current research on motivation in industry has focused on attentional self-regulation (Kanfer, 1990), and these authors have suggested that goals influence motivation through their impact on self-regulatory mechanisms (Kanfer & Ackerman, 1989). Motivational interventions such as evaluations and reward systems may adversely affect intrinsic motivation toward a creative task because they redirect attention away from the heuristic aspects of the creative task and toward the technical or rule-bound aspects of task performance. Amabile (1979) demonstrated that creative performance was undermined by expectation of evaluation, but technical merits appeared unaffected. Though it is expected that actual positive evaluation would enhance creativity due to positive effects on self-efficacy, such evaluation may adversely affect subsequent creative performance because it leads to expectations of future evaluation (Amabile, 1983). A person's extrinsic reward interacts with his or her choice. Monetary reward given for performance on a task for which the individual has no choice can enhance creativity, but when the individual is offered a reward for consenting to perform the task, creativity may actually be undermined. Amabile (1983) also found that the choice regarding how to perform a task can enhance a person's intrinsic interest and creativity. Thus, task restraints that limit an individual's choice of task strategies, or redirect a person's attention away from the heuristic aspects of the task, may have detrimental effects on creativity. This provides yet another example of the importance of contextual influences (CI) on creative behavior.

In their attempt to explain empirical relations between age and creative achievement, Mumford and Gustafson (1988) suggested that motivational characteristics of life stages may lead young adults to attempt to align their desires and capabilities with the potentials and expectations of adult life. Mumford and Gustafson reasoned that the restructuring and reorganization of cognitive categories inherent in this process may cause young adults to create new and unique understanding of problems, or in terms of the cognitive factors discussed previously, to explore alternative

causal relations. In contrast, persons in middle adulthood may be motivated to adjust or realign existing paradigms. This reasoning may account for the observation of greater numbers of major creative contributions among young adults and more incremental creative contributions among middle-aged adults. However, as recognized by Mumford and Gustafson (1988), knowledge plays a key role in creative achievement. Thus, the age at which major creative contributions are made may depend on the amount of domain-specific knowledge required in a given field.

Knowledge

Finally, it is important for researchers to look carefully at the role that knowledge and expertise play in the ability of the individual to be creative. Amabile (1988) identified both "domain-relevant skills" and "creativity-relevant skills" as being important for creativity. These two categories include the knowledge, technical skills, and talent needed to produce creative products (domain-relevant skills) as well as the cognitive skills and personality traits linked to creative performance (creativity-relevant skills). Amabile's domain-relevant skills are captured by the knowledge (K) component in Figure 1; Amabile's creativity-relevant skills are most closely related to our individual difference categories of personality (P) and cognitive factors (CS).

In an exploration of the relationships between memory and creativity, Stein (1989) identified both positive and negative effects that previous experience and learning had on creativity. Even though previous experience or knowledge could lead to a "functional fixedness" that prevents individuals from producing creative solutions, on balance it is hard to conceive of any creative behavior that is somehow "knowledge free." This finding has been so widely recognized for so long that the crucial role played by knowledge and information may sometimes be overlooked. "Invention is little more than a new combination of those images which have been previously gathered and deposited in the memory. Nothing can be made of nothing. He who has laid up no material can produce no combination" (Sir Joshua Reynolds, 1732–1792; quoted in Offner, 1990).

Summary

In summary, our interactionist model of creativity states that individual creativity is a function of antecedent conditions, cognitive styles and abilities, personality, motivational factors, and knowledge. These individual factors both are influenced by and influence social and contextual factors (see Equation C_I, Figure 1). The group in which individual creativity occurs establishes the immediate social influences on individual creativity. Individual creativity, in turn, contributes to creativity in groups.

CREATIVITY IN GROUPS

Although most observers are likely to agree that individual creativity can be influenced by social processes, research on creativity in social settings has taken a back seat to research on individual differences and antecedent conditions. In introducing a social psychological theory of creativity, Amabile (1983) noted that there are very few experimental social psychology articles on creativity in the predominant social psychology journals. In contrast, she noted that there "is considerable informal evidence that social-psychological factors have a significant impact on the creativity and productivity of outstanding individuals" (Amabile, 1983: 5). In this review, Amabile highlighted several studies by herself and colleagues that provided evidence of the effects of social inhibition and modeling on individual creativity. In particular, she argued that (a) creative performance may be inhibited when others are present in an evaluative capacity, (b) exposure to creative models may have a positive impact on early creative achievement, and (c) models can improve a person's performance on creativity tests, but only if the modeled behavior is very similar to the performance assessed (Amabile, 1983).

Conditions for Group Creativity

The extant literature suggests a number of group composition, group characteristics, and group process factors (see Figure 1) that are related to creative outcomes in work groups and research teams. For example, King and Anderson (1990) listed leadership, cohesiveness, group longevity, group composition, and group structure as antecedents of group creativity and innovation. To briefly summarize, the probability of creative outcomes may be highest when leadership is democratic and collaborative, structure is organic rather than mechanistic, and groups are composed of individuals drawn from diverse fields or functional backgrounds. Group cohesiveness and longevity represent group characteristics whose relationship to creativity, though seemingly important, is problematic. Some evidence suggests a curvilinear relationship between group cohesiveness and creative performance (Nystrom, 1979).

In his examination of the effectiveness of research teams, Payne (1990) identified resource availability, leadership, group size, cohesiveness, communication patterns, and group diversity as crucial factors in creative performance. Resource availability provides another good example of the contextual influence (CI) dimension of Figure 1. The other factors are captured by the group composition, characteristics, and process elements in our interactionist model. In one of the more definitive empirical studies in this arena, Andrews (1979) presented evidence that group diversity explained 10 percent of the variance in scientific recognition, effectiveness, and publication records of R&D teams.

Group composition and characteristics also influence important as-

pects of group process, such as how the group approaches solving problems. Considerable evidence links problem-solving processes to group creativity.

Group Process and Problem Solving

Various aspects of the process and interactions among members of a task group may place similar restraints on how the task is approached or on group members' attention to heuristic aspects of the task. Group problem-solving techniques, such as brainstorming, were developed with the belief that rules or norms that restrain evaluation of ideas being generated would allow members to build off of others' ideas and would result in a greater number of novel ideas being generated. Subsequent research (reviewed by Stein, 1974) has provided overwhelming evidence that individuals produce fewer ideas in such groups. The group constitutes the social context in which the creative behavior occurs. Hackman and Morris (1975) offered a useful framework for analyzing the group-interaction process. They proposed three summary variables that can explain group effects on group task performance. Their taxonomy can readily be applied to an interactionist model of creativity. Hackman and Morris (1975) postulated that group performance is reduced due to processes, coordination, or motivational losses. Process losses result from errors in task-performance strategies. Coordination and motivational losses can result from poor integration of group members' efforts or from reward systems that reinforce inappropriate behavior. On the other hand, motivational gains can occur from social facilitation or production pressure coming from other members.

Problem-solving groups can be made more effective by training individuals in problem-solving skills (Bottger & Yetton, 1987). Indeed, it appears that increased achievement on creativity tasks by interacting groups over nominal groups is due to the groups' ability to assign more weight to responses of the most able persons (Yetton & Bottger, 1982). Interacting groups composed of persons with above-average problem-solving ability were better able to identify and, thus, to give more weight to higher quality solutions than groups composed of persons with below-average ability (Yetton & Bottger, 1983).

Social Information

In addition to identifying appropriate and useful knowledge of group members to apply to the group problem solving, groups provide an arena in which members can use others as resources to augment their own knowledge. In this manner, the member does not just add to his own knowledge but uses others' knowledge to stimulate the usefulness of his or her own skills. Beyond knowledge as a type of information that is shared in groups, other types of information available in the work context

will affect individuals and group processes/outcomes. The role of social information in the workplace is now well documented (cf. Griffin, 1983; Salancik & Pfeffer, 1978). Social information consists of verbal and nonverbal cues and signals that people provide to others regarding what factors they value in the workplace and how they evaluate those factors in their current situations. Social information has been shown to influence a variety of individual perceptual, attitudinal, and behavioral outcomes (cf. Griffin, 1983; Griffin, Bateman, Wayne, & Head, 1987). There are sound arguments that can be made regarding the potential impact of social information on, and in interaction with, creative processes in organizations. For example, Bateman, Griffin, and Rubinstein (1987) investigated the extent to which different types of tasks were more or less susceptible to the influence of social information. Among other things, they found that perceptions of unstructured problem-solving tasks requiring high levels of creativity were more susceptible to social influence than were perceptions of structured routine tasks requiring little creativity.

Summary

Group creativity is not the simple aggregate of all group members' creativity, although group creativity is clearly a function of the creativity of individuals in the group. In addition, group creativity is influenced by group composition (e.g., diversity), group characteristics (e.g., cohesiveness, group size), and group processes (e.g., problem-solving strategies, social information processes), and contextual influences stemming from the organization (see Equation C_G in Figure 1).

Throughout this section, we have focused on formal groups. We chose formal groups because most researchers have investigated creativity in such groups. We suggest that similar processes occur in informal groups. One might reasonably argue that creative individuals may champion new ideas within an organization and thus have a direct effect on the creativity of the organization. Although we do not disagree with this argument (and the model suggested in Figure 1 would support it), we suggest that individuals function within, at least, informal groups. Thus, the social and contextual influences of the informal group may have effects on the individual in ways similar to those of formal groups. It is hard to conceive of an individual working within a complex social system totally without the influence of the informal group.

Thus, according to the model in Figure 1, individual creative behavior is mediated through the group to influence organizational creativity. This mediational model may be conceived of either as the informal influences of the social context on individual behavior or as the formal processes of converting individual creative behavior into group behavior. Thus, researchers who investigate idea champions need to consider the influences of informal groups on their behavior.

CREATIVITY IN ORGANIZATIONS

Creativity Training

Much of the work on creativity in organizational settings has explored the match between individual cognitive styles and organizational contexts or the training of creative problem-solving approaches. For example, Kirton and Pender (1982) demonstrated that R&D personnel were more innovative than were engineering instructors and apprentices. Kirton and Pender explained that engineering instructors and apprentices are bound by a narrower range of paradigms, more rigid training, and more closely structured environments than R&D personnel. Kirton and Pender also found that people who score in the innovative end of their adaptor-innovator scale were more likely to self-select into courses described as innovative. Additional support for the idea that occupations tend to support different cognitive styles was provided by Hayward and Everett (1983). Further, Schneider (1987) suggested that organizations may attract and select persons with matching cognitive styles. Organizational culture, as well as other aspects of the organization, may be difficult to change because people who are attracted by the old organization may be resistant to accepting new cognitive styles. When a change is forced, those persons attracted by the old organization may leave because they no longer match the newly accepted cognitive style. Among other things, this culture-cognitive style match suggests that organizational conditions (including training programs) supportive of creativity will be effective only to the extent that potential and current organizational members know of and prefer these conditions.

In their work in training positive attitudes toward divergent thinking among manufacturing engineers, Basadur, Graen, and Scandura (1986) found that training of work groups promoted far superior transfer of training over training of individuals, presumably because of the establishment of social support for divergent thinking among the work group. Wheatley, Anthony, and Maddox (1991) have advocated creativity training for organizational strategic planners. Their argument is based on the observation that the strategic planning process is characterized by high uncertainty, which places a premium on people's imaginative attempts to reframe old issues and explore new ideas. Thus, they reason, the improvement of creativity and problem-solving skills would improve the strategic planning process in organizations.

In terms of the interactionist model of Figure 1, the availability of creativity training programs could be regarded as part of the contextual influences that establish or encourage an organizational culture supportive of creative behavior. Further, to the extent that such training actually affects cognitive skills and styles, then creativity training has potential links to these variables in our model as well.

Even though we have no quarrel with creativity training per se (nor do

we wish to get sidetracked in debate concerning the effectiveness of such training), we are concerned that much writing about creativity in organizations has a relatively narrow training focus. The field must broaden its focus considerably to understand conditions that encourage and inhibit creative behavior by individuals and groups in the work setting.

Conditions for Organizational Creativity

Only a handful of organizational scientists have employed creativity as a major explanatory variable in understanding organizations (e.g., Amabile, 1988; Staw, 1984; Steiner, 1965; Woodman & Sawyer, 1991). The vast majority of organizational-level research that is relevant here has focused on organizational innovation in a broader sense (e.g., Damanpour, 1991; King, 1990), including its implementation phases and the adaptation of products or ideas developed outside the system.

Fortunately, constructs and models used to study innovation can facilitate research on creativity (and vice-versa, cf. Staw, 1990). For example, studies relating organizational policy, structure, and climate to overall organizational or R&D work group innovations (e.g., Burkhardt & Brass, 1990; Tushman & Nelson, 1990) provide some insight into the question of specific organizational variables that may have an impact on creativity or be influenced by it. Indeed, Burkhardt and Brass (1990) found that the process of innovation altered the structure and power roles of organizational members.

Cummings and O'Connell (1978) suggested that the generation of alternative solutions to problems should be separated from the evaluation of those alternatives. This concept has been suggested by numerous theorists and researchers (e.g., Basadur et al., 1982). They also suggested that the organization should encourage risk taking and free exchange of ideas, and it should legitimize conflict, stimulate participation, and rely on intrinsic rather than extrinsic rewards. These concepts are the same as those developed by Cummings (1965) on the basis of knowledge about creative people. Except for some research by Amabile (1983), there is little empirical support for the effects of these concepts on specific creative behaviors in organizations. However, correlational evidence with ratings of overall innovation has been provided by Paolillo and Brown (1978) and Abbey and Dickson (1983).

For example, using ratings by employees of the overall innovation of their own R&D laboratories, Paolillo and Brown (1978) found positive correlations for innovation with autonomy, information flow, creativity, rewards, and training. They also found that the number of formal supervisory levels and the number of R&D employees were negatively correlated with innovation, whereas the size of the research project teams (ranging from 2 to 5 in their sample) were positively correlated with innovation. Abbey and Dickson (1983) found that performance reward dependency, flexibility, and perceived innovativeness on the part of R&D employees were positively related to the number of innovations initiated, adopted,

and implemented. Level of rewards and achievement motivation were also positively related to the number of innovations initiated but not the number of innovations adopted or implemented. A number of cross-level links are suggested by the work of Paolillo and Brown (1978) and Abbey and Dickson (1983) as well as by numerous other studies.

For example, Siegel and Kaemmerer (1978) found that innovative versus traditional schools could be distinguished by a priori dimensions of leadership support for innovation, employee ownership of ideas, norms for diversity and continuous development, and consistency between process and product. Leadership was also postulated to have an impact on innovation (Cummings and O'Connell, 1978). Katz and Allen (1985) studied the relationship between project performance and the relative dominance of project and functional managers in matrix-managed project teams. They found that appropriate separation of roles between project and functional managers in R&D matrix structures promoted overall R&D productivity. Appropriate roles for project managers include influence in the larger organization, interaction with other components of the organization, and the acquiring of critical resources. Functional managers are responsible for the control of decisions related to the technical content of the project. Their results suggest that although the functional manager has knowledge about the technical expertise of personnel and can make appropriate assignments, control over rewards for performance is either best held by the project manager or shared between the project and functional manager. This last point has implications for risk taking. Even though new developments may appear to be violations of the current state of technical knowledge, they also may lead to valuable new product developments. A reasonable conjecture is that when functional managers control rewards, engineers fear that nonroutine behavior will be evaluated negatively by these managers. However, when project managers control rewards, the overall outcome is evaluated regardless of the means used to accomplish the task. Engineers may therefore feel more free to experiment with innovative ideas to reach project goals when project managers control rewards or when this control is shared by project and functional managers.

On the basis of their review of the literature, Cummings and O'Connell (1978) suggested that organizational innovation (and, by extension, creative behavior) is stimulated by (a) the organization's evaluation of its performance in relation to its goals, (b) opportunistic surveillance, and (c) environmental characteristics. More recent empirical evidence obtained by Ettlie (1983) has provided support for specific aspects of these precursors. Using expert ratings based on four dimensions of innovation, Ettlie found evidence that technical policy toward innovation led to more radical process innovation and to a lesser extent to incremental process innovation. Top management's orientation toward marketing led to direct market selling, which resulted in radical product innovation. Three forms of environmental uncertainty were related to the mediating variables.

Uncertainty was related to a recognition of performance gaps, a policy of top management-customer involvement, and a policy of direct market selling. Thus, environmental uncertainty leads to specific managerial policies that subsequently lead to the initiation of innovation. Research by Ettlie (1983) provides a good example of the contextual influences stemming from the environment that are identified in Figure 1.

Information exchange with the external environment was suggested by Cummings and O'Connell (1978) to influence idea generation. Allen, Lee, and Tushman (1980) studied the interaction of locus of communication and project type on overall technical performance of R&D work groups. Technical service projects were found to have significantly more intraorganizational communication than research and development projects. Additionally, there was greater variability in the amount of intraorganizational communication among members of research project teams than among technical service project teams. Allen and his colleagues (1980) found that overall technical performance of engineers working on developing new products or processes obtained greater benefit from technical communication within the lab than engineers who worked on other projects. Also, development projects were enhanced by having all members communicate equally with other parts of the organization. Other types of projects were not influenced by intraorganizational communication. There were no differences in total amount of intraproject communication across types of projects, but research projects were harmed by a large variability across project participants in intraproject communication. More recently, Cohen and Levinthal (1990) posited that the ability of an organization to recognize and use external information is crucial for innovation. This ability, which Cohen and Levinthal labeled *absorptive capacity*, may be related to a variety of innovation activities, including investment in R&D, the conduct of basic research (thus providing a link to creativity), and the adoption and diffusion of innovation.

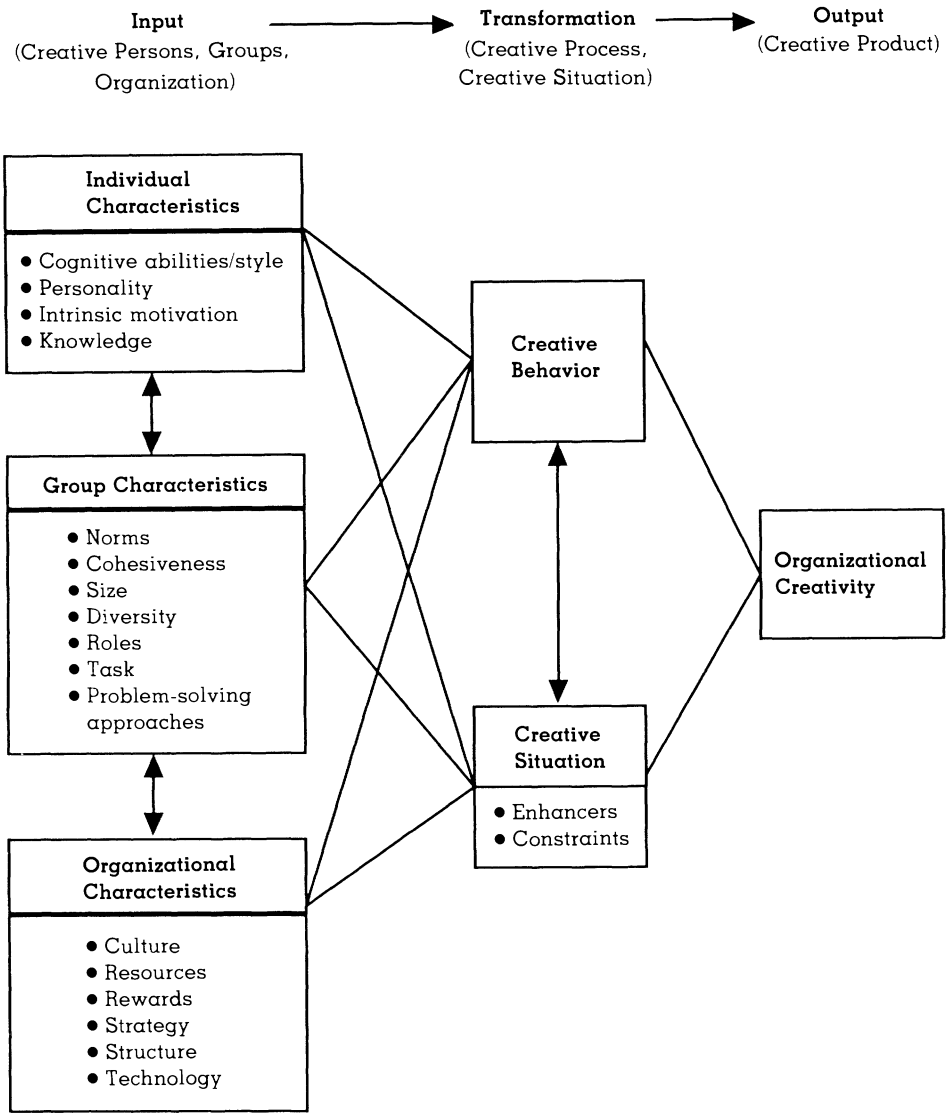
Summary

We postulate that organizational characteristics create the contextual influences that operate on both individuals and groups to influence their creativity. Organizational creativity (the creative outcomes of a complex social system) is then a function of group creativity and contextual influences, including those which come from the environment (see Equation C_O in Figure 1).

RESEARCH FRAMEWORK AND PROPOSITIONS

A framework that summarizes the ideas, variables, and relationships explored in the previous sections is presented by Figure 2. This figure complements and extends the information contained in Figure 1; at the same time, it provides another perspective on the same ideas. Both fig-

FIGURE 2
Conceptual Links Among Creative Persons, Processes, Situations, and Products



ures are needed for a full explication of our theory of organizational creativity. Figure 1 captures the dynamic, interactive nature of persons and situations across multiple levels of social organization. Through Figure 2, which is a systems model, we suggest that individual, group, and organizational characteristics have an impact on the creative process and situation, resulting in the creative product for the organization.

As stated in a previous section, the components of creative persons, creative processes, creative situations, and creative products are essential for a comprehensive understanding of creativity in complex social systems. Figure 2 provides a way to conceptualize the crucial links among persons, processes, situations, and creative product. The characteristics shown in Figure 2 are illustrative and not intended to suggest an exhaustive list. The research summarized in the first part of this article suggests that numerous variables at the individual, group, and organizational levels can be linked with creative behavior. For example, individual characteristics believed important for explaining some aspects of creativity can be grouped into cognitive, personality, motivational orientation, and knowledge categories (Amabile, 1988; Barron & Harrington, 1981; Woodman, 1981; Woodman & Schoenfeldt, 1989). These individual characteristics interact with social influence processes and environmental influence processes at both the group and organizational level. An important aspect of social influence is determined by such group characteristics as norms, enacted roles and task assignments, degree of cohesiveness, and so on (Amabile, 1983; King & Anderson, 1990; Stein, 1974). In addition, group characteristics such as cohesiveness, size, leadership, and diversity directly influence individual and group creativity (King & Anderson, 1990; Kolb, 1992; Thornburg, 1991). Important organizational characteristics include cultural influences, resource availability, organizational mission and strategy, reward policies, structure, and technology (Burkhardt & Brass, 1990; Damanpour, 1991; King, 1990; Tushman & Nelson, 1990).

This complex mosaic of individual, group, and organizational characteristics creates the context—the creative situation—within which individual and group behaviors are played out. Many of these characteristics can be investigated in terms of their ability to enhance or constrain the creative accomplishment of individuals and groups (Amabile, 1988; Burnside, 1990). From an interactionist perspective, the organizational creative process is composed of both salient behaviors and creative situations. The *creative situation* is defined as the sum total of social and environmental (contextual) influences on creative behavior. The creative process in the organization results in the creative product—novel ideas, products, services, procedures, or processes.

Figure 3 presents our preliminary formulation of a theory of organizational creativity in a form more directly amenable to empirical investigation. There are three basic propositions that could guide the development of testable hypotheses for each level of analysis in the model as well as hypotheses which cross these levels.

Proposition 1: The creative performance of individuals in a complex social setting is a function of salient individual characteristics, social influences that enhance or constrain individual creativity (e.g., group norms), and contextual influences that enhance or constrain individual creativity (e.g., organizational reward structure).

We believe that systematic investigation of cross-level social and contextual influences that enhance or constrain creativity would provide

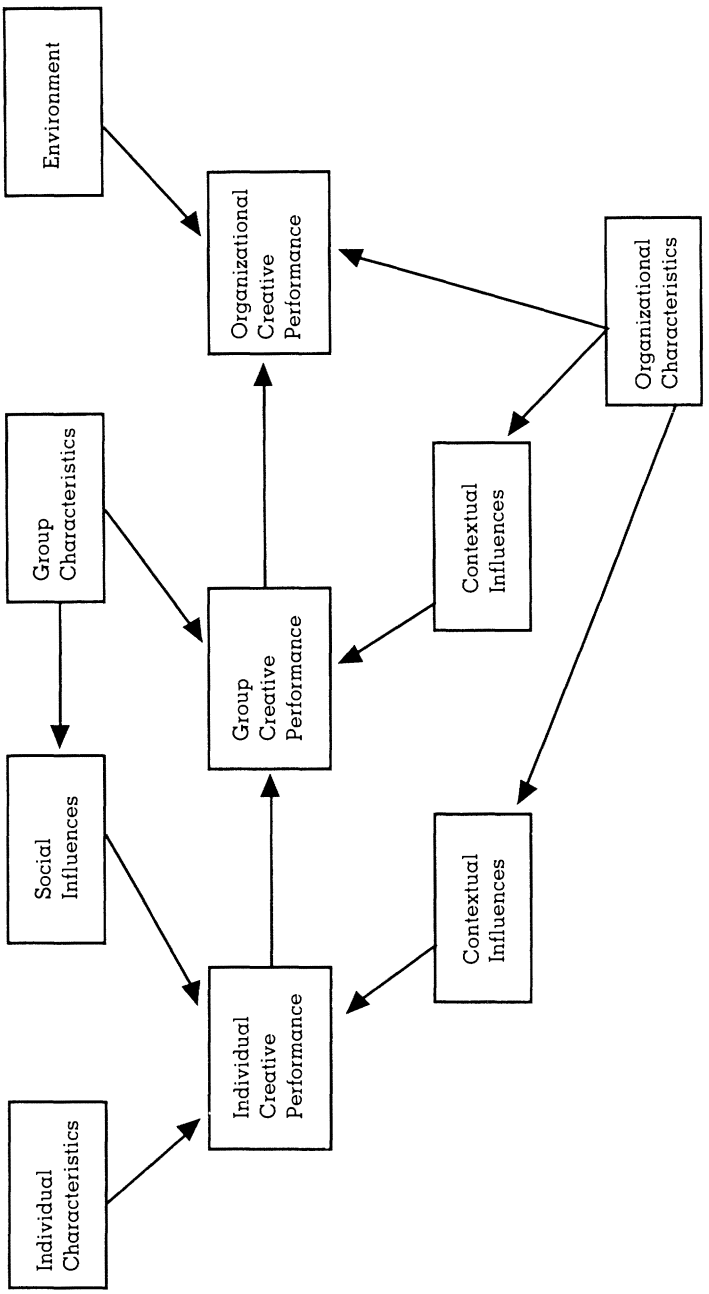


FIGURE 3
Hypothesized Linkages Among Factors Related to Organizational Creativity

a particularly fruitful line of inquiry. Within the framework of Proposition 1 and Figure 3, previous research suggests several hypotheses. (These hypotheses are intended to be illustrative; they are not a complete list of predictions that might be made within this theoretical framework.)

The construct of norms captures much of the group influences on the individual. Further, evidence suggests that the free exchange of information is crucial for creativity in social settings and, thus, norms that promote open information exchange should facilitate creative performance (Amabile, 1988; Kanter, 1988; King & Anderson, 1990).

> *Hypothesis 1a: Individual creative performance will be increased by group norms that support open sharing of information.*

Conversely, norms can have a negative impact on creativity. For example, high conformity appears to be anathema to creative behavior in many settings; therefore, rigid and/or punishing norms leading to high conformity should constrain creativity (Amabile, 1988; Kanter, 1988).

> *Hypothesis 1b: Individual creative performance will be decreased by group norms that create high conformity expectations.*

Important contextual influences stemming from the organization that influence individual behavior at this level of the model include culture and reward systems. Evidence suggests that creativity is enhanced in an environment where risk taking is encouraged and supported; thus, cultures that provide this support should increase creativity (Amabile, 1988; Burnside, 1990; Nystrom, 1990).

> *Hypothesis 1c: Individual creative performance will be increased by organizational cultures that support risk-taking behaviors.*

Considerable previous research supports the notion that ill-considered evaluation and the use of extrinsic rewards can suppress creativity (Amabile, 1979, 1983, 1990; Amabile, Goldfarb, & Brackfield, 1990). These research results pose an interesting challenge for the design of organizational reward systems.

> *Hypothesis 1d: Individual creative performance will be decreased by reward systems that rigorously evaluate creative accomplishment and link these outcomes tightly to extrinsic rewards.*

Proposition 2: The creative performance of groups in a complex social setting is a function of the creative performance of group members, salient aspects of the group itself that enhance or constrain creativity (e.g., size), and contextual influences on group functioning (e.g., organizational culture).

Within the framework of Proposition 2 and Figure 3, research suggests the following representative hypotheses. Group composition repre-

sents an explanatory variable in a number of investigations. Some consistency in research results suggests that homogeneity among group members, while desirable from some perspectives, is not particularly facilitative of creative group outcomes. Rather, diversity seems to foster group creativity (Andrews, 1979; King & Anderson, 1990; Payne, 1990; Thornburg, 1991).

Hypothesis 2a: Group creative performance will be increased by group diversity.

Evidence also suggests that influence processes used by group leaders or other key actors can influence group creativity. Specifically, participative leadership enhances creativity, whereas more autocratic styles seem likely to diminish it (King & Anderson, 1990; Kolb, 1992; Payne, 1990).

Hypothesis 2b: Group creative performance will be decreased by the use of autocratic styles of leadership.

A number of group characteristics have the potential to have an impact on group creativity. For example, the cohesiveness-creativity relationship may be similar to the inverted-U-shaped relationship that, conventional wisdom suggests, exists between group cohesiveness and group effectiveness. That is, there is some optimal level of cohesiveness that facilitates group creativity; at very low or very high levels of cohesiveness, group functioning may be impaired (King & Anderson, 1990; Nystrom, 1979).

Hypothesis 2c: Group creative performance will have a curvilinear relationship to group cohesiveness.

Both organizational culture and structure provide good examples of contextual influences that have the potential to influence group creativity. Again, evidence suggests that participative, high-involvement work systems and cultures have a positive impact on creative behavior (Burnside, 1990; Farr, 1990; Katz & Allen, 1985; Rubinstein & Woodman, 1984).

Hypothesis 2d: Group creative performance will be increased by the use of highly participative structures and cultures (e.g., a high performance-high commitment work system).

Proposition 3: The creative performance of the organization, as a complex social system, is a function of the creative performance of its constituent groups, and salient aspects of the organization that enhance or constrain creativity (e.g., resource availability).

Within the framework of Proposition 3 and Figure 3, research again suggests a number of hypotheses worthy of investigation. Research on organizational innovation has long supported the notion that slack resources are positively associated with high rates of innovation. A reasonable conjecture within the context of this model is that slack resources also will enhance creative outcomes for the organization (Cohen &

Levinthal, 1990; Damanpour, 1991; Farr & Ford, 1990; Tushman & Nelson, 1990).

> *Hypothesis 3a: Organizational creative performance will be increased by the availability of slack resources.*

As discussed previously, evidence suggests that the availability of information is a crucial variable in the creative process. At the level of the organization, constraints on information and communication would be expected to have a negative impact on creativity (Damanpour, 1991; Kanter, 1988; Paolillo & Brown, 1978; Payne, 1990).

> *Hypothesis 3b: Organizational creative performance will be decreased by restrictions on information flows and communication channels within the system.*

Mechanistic organizational designs should, evidence suggests, constrain the ability of the system to produce creative outcomes; similarly, we expect creativity to be enhanced by adaptive, flexible organizational structures such as network designs and parallel or collateral structures (Damanpour, 1991; King, 1990; Rubinstein & Woodman, 1984; Zaltman, Duncan, & Holbek, 1973).

> *Hypothesis 3c: Organizational creative performance will be increased by the employment of organic organizational designs (e.g., matrix, network designs, collateral group structures).*

Finally, communication flows within the system are not the only crucial information variable. Research evidence suggests that an important contextual variable may well be represented by the ability of the organization to exchange information with its environment (Damanpour, 1991; Paolillo & Brown, 1978; Payne, 1990).

> *Hypothesis 3d: Organizational creative performance will be decreased by restrictions on information exchanges with the environment.*

In summary, Figures 1, 2, and 3 provide a theoretical framework for explorations of creativity in complex social systems. This theoretical perspective is grounded in interactional psychology, especially the notion that human behavior is best understood as a product of both person and situation. As such, the role of individual differences in creative behavior remains important for understanding regardless of context. However, a full understanding of creativity in complex social settings requires that we go well beyond a focus on individual actors and carefully examine the situational context within which the creative process takes place. A variety of social and contextual influences affect creativity at both the group and organizational levels. As suggested by previous work and the propositions stated in this article, many of these influences can be conceptualized as factors that either constrain or enhance the creative performance of individuals and groups working in a social system.

CONCLUDING COMMENTS

The limited amount of research on creativity in organizations, and decades of research on organizational innovation, suggests that testing the above hypotheses may be problematic in the field. Even though laboratory investigations of creative behavior could inform a research program on organizational creativity, eventually strong inference tests of the interactionist model will have to be conducted in the field—within actual rather than ad hoc social systems. Thus, at the risk of stating the obvious, a major category of research problems will be those always associated with field studies and field experiments in real work organizations. In addition to this formidable challenge, research on organizational creativity faces level-of-analysis problems and severe measurement and construct validity problems when operationalizing creativity.

Research on organizational creativity will by definition cross multiple levels of analysis. Theorists have tended to avoid multilevel research because of their theoretical orientations and because of methodological and conceptual problems inherent in aggregating data across different levels of analysis. Theoretically, the various disciplines that have contributed to organizational behavior have held their own dominant theoretical approach. Roberts, Hulin, and Rousseau (1978) pointed out that the basic disciplines contributing to the macro and micro approaches to organizational behavior have in their origins either a concern for the societal, or organizational level of analysis (sociology), or the individual, or small group level of analysis (psychology). Though these roots drive much of organizational behavior theory, the further establishment of organizational behavior as a scientific discipline necessitates the development of theories and analytical methods that cross these basic disciplines.

Authors (e.g., Rousseau, 1985) have suggested procedures to follow in cross-level research designs, including ways of dealing with the problems of aggregation inherent in multilevel research (James, 1982; Roberts & Burnstein, 1980). Thus, although there are significant level-of-analysis concerns regarding any research on organizational creativity, there is a reasonable basis to assume that these concerns can be properly addressed through careful planning and attention before the research commences.

The construct validity issues in creativity measurement are formidable as well (Michael & Wright, 1989; Woodman & Schoenfeldt, 1989). As previously mentioned, an examination of creativity in a complex social setting must necessarily concern itself with product, process, person, and situation. In order to fit appropriately with the theoretical framework developed here, measures used in organizational creativity research cannot safely ignore any of these domains. Whereas measures of creative ability can be used to assess an attribute of the person, outcome measures can be used to assess product while behavioral measures can assess the

process from an individual (and potentially group) perspective. In addition, investigations of organizational creativity will need methods for assessing the creative situation (e.g., Amabile & Gryskiewicz, 1989).

Dealing with these research problems in depth is beyond the scope of this article. Although we recognize this challenge, we still argue that it would be unfortunate if scholars and researchers allowed the (admittedly) difficult construct validity and level-of-analysis research problems to prevent serious, systematic investigations of creativity in complex social systems.

In the previous sections we reviewed selected creativity and innovation research from a variety of perspectives. When that research is critically evaluated, however, one thing becomes very clear—after decades of theory development and empirical research, researchers still know surprisingly little about how the creative process works, especially within the context of complex social systems such as formal organizations. From the standpoint of basic research, for example, we can make few definitive statements regarding the determinants of creativity in organizations, the processes by which it manifests itself, and how it is enhanced or inhibited. From the applied side, we also know little about how organizations can successfully promote and manage individual and organizational creativity. Much of this is due to failure to consider measurement issues, generalization from studies of individual creativity to organizational processes without empirical verifications of these generalizations, and the failure to consider composition theories and aggregation problems when crossing levels of analysis.

However, it is our contention that the major factor in these shortcomings has been the fragmented approach that many scholars have taken regarding the study of creativity. In particular, the dominant approach has been to study creativity from a single perspective and without regard for many of the subtle nuances likely to be associated with such a complex process. The failure to adopt an interactionist perspective, for example, leads almost inevitably to an incomplete perspective on creativity. Another shortcoming has been the failure to specify the constructs under study. In particular, it should be useful to disaggregate the construct of creativity from the broader construct of innovation. Organizational researchers have done a relatively poor job in this respect (West & Farr, 1990). Further, researchers must specify whether creative persons, products, processes, or situations are being investigated, and they must use appropriate measures for the proposed constructs. Various research streams have tended to focus narrowly on only one of these components (Brown, 1989).

Our interactionist model of organizational creativity has the potential to integrate diverse research streams while, at the same time, suggesting promising avenues for future research. In addition to this important integrative function, an interactionist approach to organizational creativity can address a variety of challenging issues. It is difficult to see how

systematic, comprehensive research on organizational creativity might be pursued without crossing levels of analysis. Thus, a theory of organizational creativity must provide a framework encompassing the multiple levels of interest. Finally, to understand creativity in a social context necessitates an exploration of creative processes, creative products, creative persons, and creative situations. A useful theory of organizational creativity must provide a framework of sufficient complexity and richness to integrate these four components.

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