



Managing in polychronic times

Exploring individual creativity and performance in intellectually intensive venues

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Abstract *As competitive pressures mount, firms are attempting to do more with less – and far more quickly. They are downsizing, using teams, and pushing the time to market. These trends promote polychronic behavior in that they require additional variety in the tasks, activities, and roles that individuals must handle simultaneously. Although evidence suggests that creativity and polychronic preferences are positively related, demands for polychronic behavior appear to be defeating – and resisted – in creative venues such as R&D. This paper addresses this apparent disjunction by focusing on the definition of polychronicity, emphasizing the critical role of agency and the need to count as activities the not particularly visible workings of the mind. The paper proposes, in part, that among creative workers, individual creativity is more related to polychronicity than to monochronicity. Further, volition will play a moderating role in that the relationship between creative performance and either chronicity will be stronger the higher personal agency is in choosing tasks and schedules.*

In a recent *Dilbert* cartoon (Adams, 1998), Catbert, the “evil” human resources director, who appears to be conducting a survey, asks an employee whether he is able to work while being constantly interrupted. The employee responds that he would be totally ineffective, just like anyone else. Catbert then reminds the employee that they are finished with the part of the survey in which the interviewee should give honest answers. The employee replies, “Oh. In that case, interruptions make me stronger.”

As competitive pressures intensify in rapidly changing environments, particularly those for technology-oriented firms, organizations are stretching the normal work day both horizontally and vertically. To meet time-to-market and other speed-oriented imperatives, employees are expected to work more quickly, forcing horizontal extensions in terms of the number of hours worked. Further, employees appear to be expected to engage in an expanding variety of activities, tasks, and roles more or less at once, leading to vertical loading, or “multiplexing” in the workplace vernacular. For researchers in the organizational sciences, the vertical-loading aspect of the speed-oriented trends is known as polychronicity. At its most basic, polychronicity is the doing of two or more things simultaneously (Bluedorn *et al.*, 1992; Hall, 1983).

This overall trend toward doing more things more quickly has momentum, and it does not appear to be merely a bandwagon but a runaway train. Indeed, entire cultures of engineers who work at nights in addition to daytime hours have formed around speed and multiple obligations (e.g. Leibovich, 1998), and legions of books and studies have promoted speed and its associated

imperatives that employees accomplish more things more quickly. For example, research has explored the benefits of speed in strategic decision making (e.g. Eisenhardt, 1989), and in their study, Markides and Williamson (1996) concluded that only those competencies that allow firms to develop new strategic assets faster than their competitors would enable the firm to sustain superior profits. Similarly, speed is by definition associated with first- and early-movers' strategic advantages in environments of rapid growth (e.g. Hill and Jones, 1992). Moreover, a prime example of a trend toward required polychronic behavior is the cross-functional product-development team, which has been employed in large part to capture the speed-enhancing benefits of requiring individual team members to accomplish multiple tasks and assume varied roles more or less at once (e.g. Carter and Baker, 1991; Denison *et al.*, 1996; Eisenhardt and Tabrizi, 1995; Lam *et al.*, 1998). The general consensus seems to be that at least in the shorter term, the implementation of an urgent sense of time and the imposition of multiple commitments can yield positive competitive and other outcomes.

Of particular interest in an increasingly busy, demanding, and polychronically oriented environment is a seeming paradox, a paradox that involves the very workers on whom organizations are relying more and more as the world of work migrates from the factory to the mind. These are the scientists, engineers, and other professionals who are charged with accomplishing highly creative, intellectually intensive tasks. Although there exists some research evidence for a positive relationship between individual polychronicity and individual creativity (Bluedorn, 1998) and abundant evidence that creative workers are multiply inspired and multiply engaged (e.g. Sethia, 1989), it appears that those who labor in creatively oriented, intellectually intensive venues such as research and development (R&D) not only resist polychronic demands from external sources, but that their creative performance is negatively affected by several broad categories of external factors and controls (e.g. Amabile, 1990; Amabile and Gyskiewicz, 1988; McGrath and Kelly, 1986; Oldham and Cummings, 1996). For example, the engineers and scientists in high technology who are creating vast night societies are working dozens of nighttime hours a week in order to avoid the distractions and interruptions that punctuate the day (Leibovich, 1998). Such a practice might not seem that disturbing, but Leibovich also reported that these workers are expressing their intentions to cut back because they are concerned about their families, their health, and their ability to maintain such an onerous schedule over the longer term. Given the research and anecdotal evidence of intellectual workers' impatience with an increasingly polychronically demanding world, one could conclude, then, that most creative workers might be monochronic after all.

This paper argues that two issues can be raised that should clarify this apparent conflict between polychronically demanding work environments and presumably polychronic individuals. First, most forms of creative, intellectually intensive work by definition rely heavily on the work of the mind,

and that work is not particularly visible. Its relative invisibility can lead to a mistaken impression of the absence of polychronic behavior – or any work at all, for that matter. Therefore, it is important that cognitive activities are recognized – and thus counted – as tasks in determining an individual's preferences in the direction of polychronicity or monochronicity. Second, although the definition of polychronicity has remained consistent on this point (e.g. Slocombe and Bluedorn, 1999), it must be emphasized again that individual polychronicity is the preference to engage in several activities more or less at once, not the behavior of doing several things at once. The key to understanding why presumably polychronic creative workers do not necessarily thrive in a busy, noisy, polychronically demanding environment is volition, or personal agency. In other words, what matters is whether it is the creative individual who is under most circumstances not only choosing her or his tasks, but also whether to schedule them singly or severally. Albert and Runco (1990), in summarizing Amabile's (1990) contributions to the ongoing discussion and study of creativity, wrote that "her opposing extrinsic, other-directed, task-oriented motivation efforts to please others, and environmental prescriptions, as well as the intrinsic, individualized, ego-motivated efforts at creating, clarify a basic conflict often involved in one's efforts to create" (p. 265). When the stakes are made higher by inflations in expectations for polychronic behavior, the edges of the conflict are sharpened.

Research on creativity has been silent on specific issues of chronicity, however, and with the noted exception (Bluedorn, 1998), polychronicity's relationship to creativity has not been investigated. This paper now explores the polychronicity-creativity paradox and the more general relationships between chronicities imposed from several levels (e.g. supervisory, organizational) and individual-level creativity, first by examining theory and research on the chronicities and then by delving into creativity. Propositions are then offered, and implications for research and practice are discussed.

Polychronicity

Polychronicity defined

Monochronic individuals attend to things serially or one at a time, and polychronic individuals attend to things concurrently or several at a time. Thus, at the level of the individual, polychronicity focuses on the number of related and unrelated tasks, activities, and stimuli an individual attends to, participates in, and is involved with literally at one time or within relatively brief spans of time (Bluedorn *et al.*, 1992; Hall and Hall, 1990).

Bluedorn (1998) defines individual polychronicity as the extent to which an individual prefers to be involved in two or more tasks simultaneously, and Bluedorn *et al.*'s (1999) definition of organizational polychronicity echoes the individual one. In adapting Hall's (1983) characterization of polychronicity for use in their ten-item inventory of polychronic values (IPV), Bluedorn *et al.* (1999) suggest that as a fundamental dimension of organizational culture, polychronicity is the extent to which people in that culture prefer to be engaged

in two or more tasks or events simultaneously and believe that their preference is the best way to do things. These individual-level and organizational-level definitions concentrate on preferences and beliefs about what is right, and this normative slant is of consequence, because it may both reflect and influence managerial policies and practices.

Theory and research on monochronicity and polychronicity

Although research remains sparse, there exists a small and important reserve of work on polychronicity. Hall (1959, 1983) first introduced the notions of monochronic and polychronic time, the latter work in the context of diverse cultures. Indeed, attitudes toward time appear to vary by country, with, for example, Americans and Northern Europeans perceiving time in ways that are more consistent with monochronicity and Mediterranean and Asian cultures viewing time as more polychronic or severable (Hall, 1983). In Schein's (1992) work on organizational culture, he, too, explicitly addressed the chronicities, theorizing that polychronicity is better suited to younger, smaller organizations and monochronicity to older, larger organizations.

In his study, Bluedorn (1998) identified individual polychronicity as one of the correlates of individuals' orientation to change. As he predicted, individual polychronicity and an individual change orientation were positively related, and, also as he expected, individual creativity and individual polychronicity operated in the same direction. Bluedorn's hypotheses grew out of the reasoning that because polychronicity by definition involves change, polychronicity and a change orientation should be related. Moreover, he reasoned that because polychronicity entails continual movement among projects and activities, the opportunities for the exportation of ideas from one project to another would be greater, and that very practice of exportation should be associated with higher levels of creativity. The data for the study were collected from students in undergraduate and graduate management classes at a university.

Also of moment is the recent work of Slocombe and Bluedorn (1999). They found that the greater the congruence between an individual's polychronic preferences and her or his perception that the work unit was polychronic but not oppressively so, the greater the individual's willingness to exert effort on behalf of the organization. This finding, and the wording of the relevant survey items, suggests a sensitivity to the importance of volition in establishing congruence. The Slocombe and Bluedorn study utilized business-school graduates in a wide range of jobs and industries.

Polychronicity at work

Because polychronicity involves doing several things at once or within short spans of time, the polychronic individual is quite busy. Extreme polychronicity can mean doing several things literally at once. Certainly, logic dictates that there have to be at least physical limits to polychronicity, although over longer periods of time, it is reasonable to assume that people can keep the threads of

dozens of activities, tasks, and relationships running by moving among them with some frequency. As mentioned, with the new emphases on time as a competitive advantage have come a number of innovations, most of which introduced additional polychronicity into the life of the organization and its workers. Individual polychronic behavior can derive from teams and other kinds of matrix arrangements and is one consequence of downsizing and flattening the hierarchy, because fewer people are left to do more work and take on more-varied responsibilities. Related trends are re-engineering, benchmarking, the overall quality movement, group-based rewards, outsourcing, and learning organizations. The trends have re-formed the organization around speed, broader roles, and additional internal and external relationships, and most of the changes are borne, at least in part, at the level of the individual.

Creativity

Creativity defined

Creativity is transcendent in that it makes a contribution that surpasses what is known or what exists. It is the production of something new, original, and useful (e.g. Amabile *et al.*, 1996; Oldham and Cummings, 1996; Woodman *et al.*, 1993). That creative contributions must be elaborated to a point where they possess a strong potential for use is critical, because it is likely that in the absence of some reasonable degree of disciplined development, on any given day, thousands or millions of insights, ideas, solutions, or objects make a quick appearance and an equally quick disappearance. Without some development, the new or novel cannot be communicated or transferred to others and thus is of little or no consequence. The new is never given the chance to make a difference.

For this paper, a distinction is made between creativity and innovation, with creativity defined as the production of something new and useful by an individual, and innovation as the comparatively full and successful application or implementation of the creative contribution. Indeed, Amabile *et al.* (1996) write that “creativity ... is a starting point for innovation; the first is a necessary but not sufficient condition for the second” (p. 1155). In a horizontal temporal world, creativity comes first and provides the impetus and content for many but not all innovations.

The creative individual

The focus on the individual in seeking to grasp creativity is legitimate in that most that is new has its genesis with the individual. Indeed, there is evidence that indicates that creativity may be ideally an individual activity. For example, in a laboratory experiment, Thornburg (1989) found that for both the quantity and quality of creative performance, individuals performed better than dyads or groups. In her laboratory study, Shalley (1995) found that the highest levels of creativity were generated under the condition of working alone and the highest levels of productivity were generated under conditions of

working alone and with no expectation of evaluation. Additionally, Abbey and Dickson (1983), in their investigation of the work climate of innovative R&D subsystems, found that indeed, practicing managers viewed the first phase of the process of creativity as an individual activity.

Sethia (1989) summarized the literature on creativity by highlighting these characteristics of the creative individual: knowledgeable, flexible, intelligent, imaginative, and capable of integrating diverse ideas and information. Keller and Holland (1983), in their review of the vast literature on the creative individual, reported similar characteristics, and Oldham and Cummings's (1996) summary highlighted a core set of personality characteristics that relate consistently to creative performance. Those characteristics are broad interests, self-confidence, attraction to complexity, intuition, aesthetic sensitivity, and a tolerance for ambiguity.

The creative context

Creative individuals appear to have attitudes and exhibit behaviors that do not necessarily respond well to some organizational imperatives and initiatives. For example, Sethia (1989) and Roweton (1989) reported that creative individuals tend not to be dependent on social approval and are perceived by others as non-conformists. Amabile (1985, 1990) found that creative workers are highly intrinsically motivated and impatient with attempts at external control via reward systems and other managerial policies and practices. Indeed, in Amabile's (1990) summary of her and others' experimental evidence on creativity, she identified several inhibitors of creativity, including evaluations, contracted-for rewards, surveillance of work, competition, and constrained choices in how to accomplish the work.

Amabile offered convincing arguments that these external, contextual manipulations and characteristics inhibited creative performance because they undermined intrinsic motivation. She derived this argument, in part, from another of her studies. Amabile and Grysiewicz (1988) found that environmental factors were mentioned far more frequently than individual ones in a study of creativity in scientists in R&D, an emphasis that led Woodman *et al.* (1993), Amabile *et al.* (1996), and Oldham and Cummings (1996) to argue that the context of creativity is of undeniable importance. In their study, Amabile and Grysiewicz (1988) used a critical-incident method to interview 120 R&D scientists from more than 20 firms. Each was asked to cite an example of high creativity and one of low creativity in their work experience. Out of a detailed content analysis of the interviews, Amabile and Grysiewicz (1988) identified a number of environmental factors as inhibitive of creativity, most of which have been noted. Of the factors found to favor creativity, one of the most frequently mentioned was an appropriate amount of time to think about a problem and to explore perspectives and alternatives – as opposed to being required to employ a prescribed approach. Similarly, Kanter (1983), in her study of innovation, concluded that the better environment for innovation features strong local autonomy.

In their major study of individual and contextual contributions to employee creativity, Oldham and Cummings (1996) found that in general, employees performed at a higher level of creativity when they themselves were creative, when they viewed their supervisors as non-controlling and supportive, and when they worked on complex, challenging jobs. Oldham and Cummings focused on 171 employees in manufacturing, and based on an analysis of the results, they concluded, among other things, that “if creativity at work is to be enhanced, an individualized or selective approach to management may be warranted” (p. 626). They continued by advocating for the full range of contextual conditions that support rather than inhibit intrinsic motivation, although they cautioned that some of these conditions may not be appropriate for some workers or necessarily consistent with some favored organizational practices or outcomes.

Time, specifically, appears to be another prominent contextual factor, with both positive and negative effects. In listing the resource demands of creative workers, Sethia (1989) summarizes a number of studies that identify the prominence of time, including Gruber and Davis’s (1988) conclusion that probably the most consistent result is that creative tasks simply require a great deal of it. Fortunately, the creative individual is capable of the sustained involvement that allows for creative achievement (Csikszentmihályi, 1990). However, it is also likely that some time pressures may be functional for some. For example, in their longitudinal study of engineers and scientists at a National Aeronautics and Space Administration laboratory, Andrews and Farris (1972) concluded that time pressures were positively associated with aspects of performance such as usefulness, innovation, and productivity, although pressures that were perceived as too great were defeating in that they were associated with lower performance. The consensus appears to be that inappropriately frequent or difficult deadlines and other time pressures inhibit creativity (e.g. Bryan and Locke, 1967; McGrath and Kelly, 1986; Peters *et al.*, 1984). As suggested by Peters *et al.* (1984) and supported by studies by Andrews and Farris (1972), Kelly and McGrath (1985), and McGrath and Kelly (1986), the overall relationship between deadline pressure and performance, if graphed, usually forms an inverted U (Persing, 1991).

Polychronicity, monochronicity and creativity

In general, engineers, scientists, and others involved in creative, intellectually difficult work appear to dislike external controls and manipulations that directly or indirectly shape their work days toward polychronic behavior (see Amabile, 1990; Amabile and Grysiewicz, 1988; McGrath and Kelly, 1986). Nonetheless, in virtually every list of the characteristics of creativity or the traits of the creative individual, there are references to tendencies that are clearly consistent with polychronicity, including broad interests, the capability to integrate diverse ideas and information, and attraction to complexity. Thus, the definitions of polychronicity and monochronicity need to be revisited and the issue of personal agency must be addressed.

Expanded definitions

As noted, within creative and other intellectually intensive contexts, the activities of the mind should be acknowledged as tasks that count in determining polychronic preferences. Often, these cognitive labors are not accompanied by physical motions (e.g. writing, speaking, reading) that look like work. Nonetheless, cognitive activities are critical to intellectual work, and they should be considered in understanding behavior in creative venues. It must be acknowledged, too, that the relative invisibility might account for the apparent tendency of some supervisors to manage creative work too closely. A lack of visible activity and progress can give rise to anxiety, particularly for those who are ultimately responsible for a project or a group (see Persing, 1991). Thus, this paper offers slightly expanded definitions of the two poles of Hall's (1983) continuum. First, in individual polychronicity, the individual prefers to do several things more or less at once, including not only visible activities, but the tasks of thought. Individual polychronicity is not a single behavior but a relatively enduring preference. In individual monochronicity, the individual prefers to do things one at a time, including not only visible activities, but the tasks of thought. Likewise, individual monochronicity is not a single behavior but a relatively enduring preference. By adopting these slightly more detailed definitions, some progress is made toward solving the polychronicity-creativity paradox in that preferences are re-emphasized and behaviors are explicitly excluded. Moreover, the work of the mind is explicitly recognized.

The role of personal agency

In addition to giving cognitive activities their due, to address further the polychronicity-creativity paradox and the relationships between the chronicities and creativity in general, personal agency must be brought to the fore. At a fundamental level, behaviors grow out of interactions between people and situations, and generally one or the other has more power. For example, a polychronic man (i.e. a man with a polychronic preference) may operate monochronically because that is what his highly involved supervisor requires. The man's choices of tasks and scheduling are seriously constrained, and thus his level of personal agency is low. The disconnect in this example is obvious. Yet in another example it is not so obvious, but of distinct interest, because it goes to the heart of the paradox of polychronic workers resisting polychronic demands. In this example, a woman who has a polychronic preference may operate polychronically but not in a polychronic way of her own choosing. In other words, she is required to schedule things more or less at once and the tasks she must undertake are generally defined by others. Thus, although there appears to be an across-the-board match – polychronic preferences-polychronic demands-polychronic behaviors – her personal agency is low. Thus, the pivotal issue extends beyond chronicity to volition in the kinds of work where personal agency is important and theoretically possible; certainly, most creative work qualifies in this regard. The presence or absence of this personal agency is

likely the key to the impatience that seemingly polychronic people have with externally imposed polychronicities. And again, it is not only the externally mandated polychronic scheduling, but imposed tasks that violate the strong local autonomy (e.g. Kanter, 1983) that appears to be necessary for creative performance. For example, while the polychronic biochemist may want to run two experiments together while reading a journal article, the biochemist's supervisor might expect that he or she field telephone calls from a valued client while writing a report on a completed experiment.

There is a wide range of agency connected with the realities of different jobs and positions within an organization. An assembly-line worker's tasks are largely machine-paced and defined by others, indicating low personal agency. Likewise, a receptionist's tasks and scheduling tend to come from without, as telephones ring and employees and clients appear at the reception desk. However, in creative kinds of work, although some general direction, definition, and deadlines can and should be expected, such as the charge to create a virtual-reality software program for use in dental surgery in four months, the day-to-day and week-to-week scheduling and tasks can be the purview of the person expected to break new ground and to create something new.

As noted, this creativity-polychronicity paradox is of consequence, because the conflicts exist not just in theory, but in practice. The recent anecdotal evidence from high technology (Leibovich, 1998, p. A1) reinforces the need for a better understanding. The engineers Leibovich interviewed desired the quiet and solitude of after-hours work, characterizing their interactions with the "suit-and-tie people" during the day as distracting interruptions. Those same engineers referred to the need to focus, to concentrate, to sustain an effort, to achieve a "hyperfocused" state of "intense concentration," "to shut out the world," and to "keep working until you're finished with a problem." One programmer stated that it is "hard to walk away before you're done creating." Again, as Leibovich discovered, the creative workers found this sustained attention much easier to achieve at night, when the activities and requirements of the day did not intrude on what they clearly saw as their most important, most stimulating work – their *raison d'être*. Although the interviewed engineers seemed to regard many of the activities of the organization as unnecessary and disruptive, as already argued, those feelings do not necessarily preclude polychronic preferences among many of those engineers. Instead, the feelings suggest a resistance to mandated polychronic behavior.

Propositions

Based on the review and discussion of the literatures on polychronicity, monochronicity, and creativity, several propositions that address the relationships between and among creativity, creative performance, and the chronicities can be offered. Although the relationships are likely to be more complicated, these propositions are part of the work of clarifying and establishing foundational linkages. Further, although the paper's primary interest is in what has been termed the polychronicity-creativity paradox, in

any examination of polychronicity, monochronicity must be looked at as well, because it anchors the other end of the continuum.

Polychronicity, monochronicity, and creative work

Because, as noted, the evidence suggests that for the creative worker, particularly the researcher in R&D and other intellectually intensive venues, there are strong currents of individual polychronicity, generally along the lines of multiple inspirations and multiple engagements (e.g. Keller and Holland, 1983; Oldham and Cummings, 1996; Sethia, 1989), the scientists, engineers, and professionals engaged in R&D and other creatively oriented jobs should have a polychronicity profile reflecting those tendencies. Of the known work, one study (Bluedorn, 1998) surveyed business students in exploring, among other things, the relationship between polychronicity and creativity. Thus, a need exists to move to the field to study employees who are active in work that should feature a substantial creative component. It is expected that

PIa: Individuals engaged in creative, intellectually intensive work will have more tendencies toward polychronicity than toward monochronicity.

Further, in addition to looking at the chronicity preferences of workers in creative venues, there exists the slightly different question of whether polychronicity and creativity are related for those scientists, engineers, and other professionals who labor in creative venues. That is, not only is it asserted that in intellectually intensive work there will be more individuals who tend toward polychronicity than toward monochronicity, but it is also asserted that measured polychronic preferences and measured creative tendencies will be positively related. Thus

PIb: The higher the polychronicity of the individual in intellectually intensive venues, the stronger her or his creative tendencies will be.

Also, the direct question of whether creative performance differs for monochronically oriented and polychronically oriented workers in intellectually intensive venues is of distinct interest. Because polychronicity is thought to be more related to creativity than is monochronicity, creative performance should benefit more from the former. Therefore

PIc: In creatively oriented, intellectually intensive venues, the level of creative performance will be higher for individual polychronic workers than for individual monochronic workers.

As established, it appears that in creative, intellectually intensive areas, researchers and others have little in the way of a need for – or perhaps even an active dislike of – the social, “busyness” (Ehrenreich, 1985), and other imperatives of induced polychronic behavior (e.g. Amabile, 1990; Amabile and Grysiewicz, 1988). Thus, personal agency is necessary, and that personal agency must include both tasks and schedules. In creative work in particular, the freedom to choose a schedule would be rendered virtually meaningless if

the professional did not also have the freedom to choose which tasks to schedule. Again, although an overall, longer-term task may be imposed from above (e.g. to determine why a new drug has certain side effects), for personal agency to be present, the researchers would need to be able to choose the day-to-day activities that would lead to the completion of the larger task of solving the problem. Therefore, because polychronicity and creative tendencies are thought to be associated with the quality of creative performance, and because volition or personal agency should play a moderating role (Slocombe and Bluedorn, 1999) in that its presence can serve as a buffer from external polychronicity, it is posited that

P2a: In creatively oriented, intellectually intensive venues, the relationship between polychronicity and creative performance will be stronger for polychronic individuals who experience higher personal agency in choosing tasks and schedules than for polychronic individuals who experience lower personal agency in choosing tasks and schedules.

Further, although it is asserted that polychronicity and creativity are positively related, there exists no particular rationale for suggesting that monochronic workers are simply not creative at all. Thus, the question of the creative performance of more monochronically oriented workers bears examination. Indeed, for monochronically oriented creative workers, the role of personal agency may be quite important, because the obvious mismatch of imposing tasks and polychronic schedules on a monochronic worker should affect creative performance. Thus, it is asserted that

P2b: In creatively oriented, intellectually intensive venues, the relationship between monochronicity and creative performance will be stronger for monochronic individuals who experience higher personal agency in choosing tasks and schedules than for monochronic individuals who experience lower personal agency in choosing tasks and schedules.

More distant effects

The propositions now move beyond the more immediate realm of the individual's tasks and schedules for those tasks to the general realm of the organization, including its policies and practices in staffing, performance appraisal, and reward systems. For example, compensation practices often reward team rather than individual performance in R&D (e.g. Welbourne and Gomez-Mejia, 1991), and myriad other managerial practices and policies might be more disruptive than helpful because they run the risk of undermining intrinsic motivation and drawing the scientist into relationships, activities, and requirements that take her or him away from the work of creating (see Amabile, 1990; Oldham and Cummings, 1996). Of importance here is that the individuals in intellectually intensive work actually know of and feel these pressures or expectations, because as Amabile *et al.* (1996) suggest, there can be numerous work environments for creativity within an organization, and it is the perceived work environment that counts. With this proposition, the focus is

not so much on imposed chronicity, but on the general supportiveness of creativity as evidenced by non-controlling managerial policies and practices (e.g. Oldham and Cummings, 1996). Thus, it is posited that

P3a: For the polychronic or monochronic creative worker in intellectually intensive venues, the weaker the perceived chronicity-related elements of the managerial policies and practices, the higher her or his creative performance.

Related to managerial policies and practices is the general polychronicity dimension of organizational culture, for which Bluedorn *et al.* (1999) have developed the IPV. Again, it is expected that to the extent that individual creative workers feel more global pressures to conform to demands for outward manifestations of polychronicity, there should be performance decrements. Thus, it is submitted that

P3b: For the polychronic or monochronic creative worker in intellectually intensive venues, the weaker the perceived chronicity-related aspects of the organizational culture, the higher her or his creative performance.

Discussion

In this paper, the literatures on polychronicity and creativity were reviewed in an attempt to resolve a conflict between intellectual workers' seeming tendencies toward polychronicity, particularly polychronicity as an aspect of creativity, and the workers' impatience with an array of external polychronic requirements in organizational life. Scientists, researchers, engineers, and others in intellectually intensive venues appear to regard a number of these external polychronicities as disruptive. As proposed, not only should the definitions of polychronicity and monochronicity be revisited to highlight the role of preferences, but also to add the not particularly visible work of thought as an activity to be counted. Moreover, the key to the conflict between seemingly polychronic workers and polychronic environments may well be the source of the polychronicity, with volitional polychronicity serving creative performance well and imposed polychronicity inhibiting that performance. Essentially, the propositions suggest that creativity and polychronicity are positively related and that individual creative workers have more tendencies toward polychronicity than monochronicity. Thus, creative performance for polychronic creative workers should be higher than for monochronic creative workers. Then the notion of volition, or personal agency, comes into play in looking more carefully at creative performance, with agency playing a moderating role between polychronicity and creative performance as well as between monochronicity and creative performance. Also, it is proposed that creative performance is negatively related to the individual creative worker's perceptions of polychronicities in managerial policies and practices and in the organizational culture. Although the focus in this paper was on the individual working individually, not on the individual within a group, not only can group

and team activities be imposed, which is a violation of the notion of agency, but those group activities can fundamentally alter behaviors.

Certainly, methodological issues and implications for practice are of importance, in part because the slight recasting of the definitions of polychronicity and monochronicity not only suggests some shifts in measurement but also in how managers regard intellectually intensive endeavors.

Conducting research on creativity and the chronicities

Instruments. Several instruments exist for capturing the creative personality and the polychronic tendencies of the individual. Gough's (1979) creative personality scale (CPS), which Oldham and Cummings (1996) adapted for use in their study of the context of creativity, comprises 30 adjectives. The individual who takes the test is asked to describe herself or himself using the adjective list. The adjectives that correspond to highly creative people include informal, individualistic, insightful, intelligent, inventive, and unconventional. The adjectives that describe less-creative people include cautious, conservative, conventional, honest, mannerly, submissive, and suspicious. The CPS is a respected instrument that has been validated (e.g. Oldham and Cummings, 1996), and it should be of use in testing the propositions related to creative tendencies.

Likewise, some aspects of Amabile *et al.*'s (1996) KEYS: assessing the climate for creativity instrument might be of interest, because KEYS is intended for use in capturing perceptions of the work environment for creativity. Aspects of workers' perceptions of managerial polychronicities and the organizational culture could be tapped via such KEYS elements as the encouragement of creativity, autonomy, resources, and workload pressures. Workload pressures are of particular interest given the evidence of their sometimes detrimental effects on creative performance. It must be kept in mind that in validating the instrument, Amabile *et al.* focused on individuals working in project teams, not on individuals working individually.

The individual version of Bluedorn *et al.*'s (1999) IPV also should be of use in assessing individual tendencies toward monochronicity or polychronicity. Also, the original ten-item IPV is of interest in assessing the intellectual workers' perceptions of the organizational culture. Likewise, the critical-incident technique might be of service. For example, Amabile and Gyskiewicz's (1988) use of the technique in their interviews of people in R&D could apply in understanding an individual's polychronicity profile.

Issues. First and foremost, given this paper's explicit addition of the tasks of thought to the definitions of polychronicity and monochronicity, assessments of creativity, creative performance, and the chronicities would need to take them into account as appropriate. Moreover, for investigating creative performance, independent ratings would be preferable to supervisory ratings, because of the tendency to confuse work processes with work outputs (e.g. Persing, 1991). Given that intellectual workers may engage in non-linear – and,

as stressed, not particularly visible – work habits, managers who have had a chance to see the workers in action might be far more strict in their ratings than would independent experts who evaluate the work product in the absence of a knowledge of work processes. For example, Persing found evidence for a bias against uneven, non-traditional work processes in her laboratory study of evaluations of intellectual workers and their work.

In future research, it also might be wise to consider a third chronicity alternative – the non-preference of reactivity. Because this paper focused on highly intellectually demanding work, reactivity was not really an issue. However, the possibility exists that there are workers who have no particular preference for choosing tasks or for scheduling those tasks. These employees simply take work and schedules as they come, either from people or circumstances. Certainly, given the characteristics of creative workers, one would expect a negative relationship between reactivity and creativity.

Preliminary implications for practice

At this juncture, the most obvious implication for the practicing manager is based on Oldham and Cummings's (1996) suggestion that creative work benefits from a perception of non-controlling and supportive supervision. Although Oldham and Cummings did not address the chronicities, it would seem reasonable for managers to consider the role they themselves might play in allowing individuals to select and schedule their own tasks, particularly on a day-to-day or week-to-week basis. Moreover, managers may wish to consider how other policies and practices, including the use of teams and group-based rewards, might interrupt, disrupt, or interfere with a creative subordinate's preferred chronicity and thus ultimately inhibit her or his creative performance.

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