
Time and Timelessness: Creativity in (and out of) the Temporal Dimension

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ABSTRACT: Although time has been frequently used as a variable or as an implied dimension in creativity research, very few systematic attempts to date have been undertaken to integrate diverse findings and knowledge about the relation of time with creativity. This article proposes a theoretical framework for understanding the various associations between time and creativity in terms of 3 temporal modes: cyclicity, linearity, and timelessness. Cyclical time underlies the periodic and recurring dimensions of creativity, linear time underlies its evolutionary and contextual aspects, and timelessness is related to the deep immersion states of the creative process. This article illustrates the links between creativity and each of the temporal modes with selected findings from the multidisciplinary literature on creativity and discusses implications and further directions for the study of time and creativity.

For more than two millennia the relation between time and creativity has attracted the interest of scholars and poets, from Plato to Bergson, and from Pindar to Eliot. Time surrounds, shapes, even determines creativity, in a variety of intriguing, sometimes mysterious, and largely unexplored ways. Runco (1999) recently wrote the only available overview on the role of time in the creativity literature, in which he stated, “What may be most important is that there is a broad conception of time as a variable. Also significant is that no overviews or meta-analyses [on creativity] have been conducted with a focus on time” (p. 659). Runco summarized the relations between time and creativity in seven areas of study: the role of time in the creative process, the use of time in creativity tests, the effects of cultural time norms on creativity, the time invested in the development of domain expertise, time as a developmental variable, time as a personal construct,

and the role of time in interpersonal processes and attribution approaches to creativity.

In this article I extend Runco’s (1999) analysis and suggest that the various conceptions and uses of time in creativity research, no matter how broad and diverse, reflect the notions of either cyclical or linear time. Cyclical and linear time, also known as *time’s cycle* and *time’s arrow* (Coveney & Highfield, 1990; Davies, 1995; Gould, 1987), are two notions that inform daily experience as much as they inform science, and when studied together, they help us distinguish the fundamental underlying patterns that connect time and creativity. I also suggest that because creativity is related to timelessness at least as much as it is related to time, it is necessary to examine the role of timelessness along with the roles of cyclicity and linearity. In the next section I introduce briefly the three temporal modes, and in the following sections I illustrate their relation to creativity with selected research findings and theoretical insights from the creativity literature.

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Time's Cycle, Time's Arrow, and Timelessness

The most popular distinction made in the interdisciplinary literature of time is between two dialectical perspectives known as time's cycle and time's arrow (Coveney & Highfield, 1990; Davies, 1995; Gould, 1987). The time's cycle perspective emphasizes the predictable, recurring, and generalizable elements of time. Cyclical time is related to various forms of repetitive motion, which may be periodic (e.g., phasic, epochal, seasonal, etc.) or monotonic (i.e., subject to replication, recurrence, and prediction). Time's cycle is a view of time inspired by images of renewal, periodicity, and repetition, like the four seasons or the sunset and sunrise.

Time's arrow, on the other hand, is a perspective on time inspired by Heraclitus's everflowing river, in which one cannot step twice because other waters flow by. Viewing time as an arrow means that recurrence is replaced by irreversible flow, change is more important than stability, events are more important than laws, contexts are more important than universals, and possibilities are more salient than predictions (Maturana, 1995; Maturana & Varela, 1992; Prigogine, 1990). The clearest manifestation of linear time is the personal experience of one's life as an irreversible process, which runs from birth to death, and whose important moments are marked by turning-point events, which are often unexpected, rather than the minutes or hours of the clock.

Cyclical and linear time may be epistemologically dialectical, but in daily life they coexist as two overlapping temporal modes. For example, most people experience on a daily basis both recurring work routines and irreversible events that unfold from the past to the future. Cyclicity and linearity are often called *sociotemporal* modes to emphasize that they are socially constructed notions that vary significantly between eras and cultures (Halpern & Christie, 1996). Also important is the fact that in any era or culture the notions of cyclical and linear time have a catalytic influence on the way people perceive themselves, and select and pursue personal and social goals (Carstensen, Isaacowitz, & Charles, 1999; McGrath & Kelly, 1986; Zimbardo & Boyd, 1999). As Freud, James, Bergson, and other scholars have suggested, the consciousness of the self and the consciousness of time are two inseparable and interdependent processes that delineate the normal

psychological context of adult life (Arlow, 1989; Bergson, 1911; Hartocollis, 1983). The basic internal drives of the self, such as desires and fears, can exist only in time; that is, they presuppose the existence of an ontological dimension that transcends the instantaneous experience of the present moment (Hartocollis, 1983). Time often seems to slow down or pass rapidly because it is a notion that depends on one's emotional states and attention dynamics (Bergson, 1910/1960; Mitchon, 1990; Ornstein, 1970). In a state of boredom, for example, time seems to pass by very slowly, whereas in a state of anxiety it may seem to run fast or slow down (Csikszentmihalyi, 1990b; Pöppel, 1988). But "if all wishes, including superego expectations and demands, are overcome, time as an experience ceases to exist: one then speaks of timelessness" (Hartocollis, 1983, p. 169).

Timelessness is the experience of transcending one's self and sociotemporal reality by becoming immersed in a captivating present-moment activity or event. Whereas cyclical and linear time consist of successions of multiple instants, timelessness emerges when attention is withdrawn from the self and invested in the depth of the here-and-now direct experience (Mainemelis, 2001). Timelessness has been described as a nonlinear, right-hemisphere, mode of being in the world, which does not postulate duration, recurrence, a future, or a past, but only a patterned interrelationship in the moment (Kolb, 1984; Ornstein, 1986). In the state of timelessness one loses self-consciousness (i.e., the concept of the self, one's own desires and fears), and the notions of linear and cyclical time collapse in the continuously unfolding present moment (Hartocollis, 1983; Whyte, 1994). States of timelessness tend to be brief and they may be induced by a variety of ways, including highly intrinsically motivated activities, intense concentration on an optimally challenging task, mystical experiences, epiphanies, or hallucinogenic drugs (Arlow, 1996; Csikszentmihalyi, 1990b; Halpern & Christie, 1996; Hartocollis, 1983; Mainemelis, 2001; Ornstein, 1986).

Time's Cycle and Creativity

Time's cycle is a perspective that emphasizes the periodic and repetitive aspects of time, be they perfectly cyclical or otherwise recurring (Davies, 1995; Coveney & Highfield, 1990; Gould, 1987). Time's

cycle characterizes the stages of the creative process, the peak periods in the life of creators and their domains, the temporal styles of creators, the routines of work organizations, and the uses of clock-time in the psychometric assessment of creative potential.

Recurrence and the Creative Process

According to the model of Wallas (1926), creativity is a process consisting of four stages: incorporation, incubation, illumination, and verification. This process model is recursive (Csikszentmihalyi, 1997; Russ, 1993) and differentiated because time takes different qualities in each stage (Runco, 1999). In the incubation stage time is prolonged, enzymatic, and characterized by “fooling around,” whereas in the verification stage time is more focused and structured in terms of activities. Incorporation requires some time so that one can effectively engage with the task at hand, whereas illumination involves sudden conceptual breakthroughs. Besides Wallas’s model, other perspectives on the creative process reflect time’s cycle, as they involve periods, phases, or recurring stages of creation and destruction (Barron, 1995); attachment and detachment (Bruner, 1962); noetic and noematic processing (Bindeman, 1998); divergent and convergent thinking (Brophy, 1998); assimilation and accommodation (Ayman-Noley, 1999); and so forth. These models reflect time’s cycle because they describe the creative process in terms of recursive, rather than linear, stages, which creators visit in a periodic, rather than irreversible, fashion during their work.

The 10-Year Period Rule of Creative Contributions

Periodic time also characterizes the lives and works of creative individuals who, before making a significant contribution, have to invest about 10 years to master the skills and reality of any given domain (Csikszentmihalyi, 1997; Runco, 1999; Simonton, 2000). After this first period, every additional 10-year period brings a significant creative breakthrough (Gardner, 1993). A last period is known as the *swan song*, in which creators make a last significant, and often benchmark, contribution. For example, Verdi’s

Falstaff, Mozart’s Requiem, and Beethoven’s Ninth Symphony were all composed when their creators were in the last decade of their lives. (CRJ, 2003: 309)

Age, Domains, and Creativity

A common manifestation of time’s cycle in science is the idea that the observed high or low points in the behavior of systems follow recurring patterns over time, and therefore, that they can be successfully predicted (Coveney & Highfield, 1990; Davies, 1995). A relevant application of this idea to creativity research concerns the age in which one’s creativity peaks across different domains. The creativity of poets and mathematicians is said to peak in their 20s, whereas that of social scientists is said to peak in their 30s and 40s (Lehman, 1953; Simonton, 1995, 1998). It has been suggested that the reason for these differences is that philosophers and social scientists need longer periods to master the skills and knowledge of their domains than poets and mathematicians (Amabile, 1996; Root-Bernstein, 1999).

Learning Styles and Time

The recurrence and predictability inherent in cyclical perspectives on time make it possible to investigate whether differences in creative potential are due to individual attitudes toward time. People with reflective learning styles are more patient and take more time to inquire into the nature of the task before acting, whereas those with active (or impulsive) styles tend to jump into the task right away (Kolb, 1984; Kolb, Boyatzis, & Mainemelis, 2000; O’Hara & Sternberg, 1999). O’Hara and Sternberg (1999) summarized research findings that support that people with reflective styles seem to have an advantage because creativity requires substantial waiting and avoidance of premature closure during the incubation stage. This view may be biased, however, in favor of creative thinking (e.g., logical-mathematical creativity), because other forms of creativity, such as the creativity of performance (e.g., jazz, theater, storytelling) involve improvisation and spontaneity (Nemiro, 1997; Sawyer, 1992, 1998). Scholars have also addressed the need for investigating the effects of adaptive flexibility, which is the degree to which one integrates

reflective and active styles, divergent and convergent processes, so as to respond creatively to the contextual complexity of varied challenges and tasks (Brophy, 1998; Kolb et al., 2000; Mainemelis, Boyatzis, & Kolb, 2002).

Time's Cycle at Work: Routines, Schedules, and Time Pressures

The socially constructed nature of cyclical time is nowhere more evident than in work organizations, which are a means for coordinating human behavior through the entrainment of endogenous individual rhythms with periodic work processes (McGrath & Kelly, 1986). Multiple conceptions of cyclical time, such as routines, schedules, and seasonal production, allow organizations to maximize efficiency through standardization, prediction, and control (Bluedorn & Denhardt, 1988; Lee & Liebenau, 1999), but this bounded sociotemporality often involves boring repetitive tasks and extreme time pressures that thwart individual creativity (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Manemelis, 2001). This is not to suggest that all routines are detrimental to creativity. For example, individuals with a high degree of autonomy over their job will often create a routine so as to better structure their work and speed up some of the more mundane aspects of the creative process (Csikszentmihalyi, 1990b, 1997). On the other hand, when work routines are not personally structured by individuals but are imposed on them by their managers, they have detrimental effects on creativity, especially when they involve boring activities that use up most or almost all of individuals' time at work (Amabile et al., 1996; Perlow, 1998).

Clock-Time and Psychometric Assessment of Creativity

The purest form of cyclical time is the one that is dominant today: The absolute *clock-time*, which is internally homogeneous (i.e., it consists of strictly equal intervals) and externally independent of observers and contexts (i.e., it is not subject to subjective experience). The assumption that each instant in time is like any other instant independent of the person and context is inherent in the tests that assess traits

and other personal qualities that correlate with creativity (for a review of psychometric approaches to creativity see Amabile, 1996, pp. 22–28; Plucker & Renzulli, 1999; for a review of universal traits see Feist, 1999). Creativity tests measure specific personality traits, attitudes, or divergent-thinking abilities that are believed to remain relatively stable over time and, therefore, once accurately assessed, are expected to predict creativity. Clock-time guides and largely determines the administration, reliability, and validity of such tests. In terms of administration, clock-time is used to decide when and where the test is administered, and how much time is given to the participants to complete the test. In terms of reliability, clock-time is used to determine the temporal stability of the measured traits, usually through the computation of test–retest reliabilities. Clock-time is also the basis for evaluating the concurrent and predictive validity of creativity tests by testing their correlations with a criterion creativity measure.

Time is, in general, a central element of psychometric assessment, but as it applies specifically to the assessment of creative potential, creativity tests raise two questions: whether and to what extent the timed test conditions correspond to the natural creative process a person would follow in her or his life, and whether those individuals identified as having more creative potential in test time are more creative in real life (Amabile, 1996; Plucker & Renzulli, 1999; Runco, 1999). Especially with regard to the divergent thinking tests, there is an ongoing debate between those who question their validity (e.g., Amabile, 1996; Baer, 1998; Brophy, 1998; Gardner, 1993) and those who report results in support of their validity (e.g., Mumford, Marks, Connelly, Zaccaro, & Johnson, 1998; Plucker, 1998, 1999).

It is beyond the purpose of this article to discuss these issues in depth, but it should be noted that an effective way of overcoming some of the potential problems discussed earlier is to use longitudinal studies, which make it possible to test not only the consistency of creative temperament and personality traits over long periods, but also their association with actual creative work and other evolving aspects in one's life (cf. Helson, 1999; Helson, Roberts, & Agronick, 1995; Milgram & Hong, 1999; Plucker, 1999). Another possibility is the historiometric method, which shares with psychometrics the quest for nomothetic statements that are not constrained by any singular time and space, but

studies individuals who have been indisputably creative through collecting data from the actual historical context (Simonton, 1995, 1999).

Time's Arrow and Creativity

Time's arrow is a perspective that emphasizes the irreversible, evolutionary, unique, and unexpected aspects of time (Davies, 1995; Maturana, 1995; Prigogine, 1990). Linear time underlies the less manifest and more complex dimensions of creativity, such as the existential encounter with one's death, unique turning-point events, asynchronies, temporal boundaries, lifelong personal development, and systemic evolution.

Death and Creativity

A popular idea through the centuries has been that creativity is the result of the unconscious drive of human beings to spiritually transcend their physical death. In 385 B.C. Plato (1991) wrote in the *Symposium* that although after their death most people are not remembered for their natural children, the inventive creators (“ευρητικοί δημιουργοί”) are praised for their psychic children (i.e., creative works) that “are more beautiful and immortal” (127, 209c). Several authors have suggested in recent years that creativity is a symbolic quest for immortality (Lifton, 1983), often motivated by the unconscious desire to struggle with, defy, deny, clarify, or even experience death (Abra, 1995). May (1975/1994) suggested that creativity arises out of the struggle of human beings with that which limits them, and physical death is the most certain and inescapable limit of human life. May also urged attention to the fact that the death hypothesis alone cannot explain the contextual dimensions of creativity, nor the joy that creators experience as they become immersed in the creative process (see also Collins & Amabile, 1999, p. 298; Csikszentmihalyi, 1988).

An interesting twist to the death hypothesis was given recently by Arndt, Greenberg, Solomon, Pyszczynski, and Schimel (1999), who found in a laboratory setting that participants who engaged in creative expression after personal mortality was made salient expressed more guilt than those who did not engage in creative expression or were not reminded of

their death. The authors argued that the results support Rank's (1932) earlier idea that, because a creative act is a form of individuation that threatens social connection, creators often experience feelings of guilt over detaching from the dominant social worldview and the security it usually provides in the face of mortality.

Events and Creativity

Of particular interest to creativity research are turning-point events in the life of creators. Some of these critical moments, such as epiphanies, parental loss, and illness, occur in early age and set the course of development and purpose of the creator (Albert, 1971, 1980; Feldman, 1999; Gardner, 1993; Simonton, 1999). Zausner's (1998) study of the physical illness of 21 visual artists is a good example of how life events, rather than cyclical time, can explain important transformations in the life of creators. Modeling the chronological period of illness as creative chaos, Zausner has shown how illness transformed the lives and works of the artists in her sample. For some artists, such as Botticelli and Matisse, illness in childhood was a catalyst for their becoming artists, whereas for others, such as O'Keefe and Degas, illness in the later stages of life was a catalyst in their transition to new forms of expression.

Another type of random events that has captured the interest of creativity researchers is known as serendipity. The term was coined by Walpole in 1754, and it appears increasingly in the scientific literature today. As De Chumaceiro (1999a, 1999b) suggested, pure serendipity is the accidental discovery of things not sought for (e.g., the discovery of penicillin), whereas pseudoserendipity is the discovery through accidental means of things sought for (e.g., the discovery of insulin). Creativity in either case is portrayed as a combination of accidental chronological events and, especially in the case of pure serendipity, insight on the part of the creators who do not discard these accidents as useless errors.

Organizational researchers have explored a third type of events, that of major organizational crises and their effects on creativity in the workplace. People's need to create sometimes is triggered by clashes between organizational rules and anomalies or exceptions (Hamden-Turner, 1999). For example, project

crises temporarily shift the balance of power among the subcultures participating in the project and trigger cognitive disorganization in the sense-making frameworks of both the managers and the technical staff. Different types of crises shift the negotiated order of the collective structure to favor the sense-making framework of either the managers or the technical staff who, depending on the type of crisis, engage in creative behavior. Crises in functionality favor creative behavior by the technical staff, whereas crises in cost or scheduling favor creative behavior by the managers (Drazin, Glynn, & Kazanjian, 1999). Unlike project-level crises, serious organizational-level crises, such as downsizing, have negative effects on the creativity of the organizational members and the perceived creativity-supporting structures of the work environment. During downsizing organizations become more mechanistic, and their members exhibit rigid, rather than creative, behavior patterns (Amabile & Conti, 1999).

The Product Creation–Product Recognition Asynchrony

Another manifestation of the relation of evolutionary time to creativity is the observed asynchrony between the time a product is created and the time it receives social recognition. The examples here are numerous and asymmetrical, and range from Van Gogh's paintings, which during his lifetime did not receive much recognition, to Aristotle's works, which during his lifetime were broadly recognized and popular, in the millennium that followed his death were almost totally forgotten, and in the next millennium they became the foundation of modern philosophy and science. Such asynchronies depend on a number of factors such as the cultural reality of the era, the social processes involved in the judgment of creative products, and the actions the creators themselves take to promote their work (Csikszentmihalyi, 1995; Runco, 1999).

The concept of asynchrony, however, should not be understood only as the retrospective observation of the time lag between the time a product is created and the time it receives social recognition. What seems more important is that such time lags are often related to the fact that creators intentionally seek to maintain a distance from conventional wisdom so

they can make significant creative contributions to their domains (Gardner, 1993). Economic theories of creativity provide probably the most direct link between creators' motives and the observed time lags associated with the recognition of their work. Sternberg, O'Hara, and Lubart (1997) suggested that creators "buy low" and "sell high"; that is, they invest time and energy on developing ideas that are unknown or not very popular, and after some time has passed, they try to convince others about their worth. Viewed from that perspective, the occurrence of asynchronies is not only a matter of chance, but also the result of conscious behavior on the part of creators, who are both aware that creativity requires a certain degree of asynchrony and willing to take the risks involved in investing on the buy low–sell high time lag (Sternberg et al., 1997). Gardner (1993) noted that although creativity requires some "fruitful" asynchrony, too much or too little asynchrony are usually detrimental to creativity.

Temporal Boundaries and Creative Production

The making of creative products is often marked by random or intended alterations of the temporal boundaries they involve. Sometimes random events introduce multiple temporal boundaries between different parts of creative production, as was the case with the film *Casablanca*, which was shot day by day without anyone (director, writers, actors, etc.) knowing how the story would end, nor how the story would evolve the next day. Eco (1994, p. 127) wrote, "Ingrid Bergman looks charmingly mysterious in the film because, while acting her role, she did not know which man she would choose, and so gave both of them her tender and ambiguous smile." Another example is the Bible whose parts were written by different authors at different times. Eco's hypothesis is that what contributes to the development of a cult around a creative work is its "disjointedness," that is, the degree to which its parts can be put out of joint, having thus various and more complex forms rather than sharing a singular artistic form. Whyte (1994) too noted that those poems that stand the test of time and become broadly popular across generations have a "fractal" quality in them; that is, they are characterized by powerful images that consist of multiple

levels of meaning that can be assessed individually by different people at different times. Eco (1994) clarified that his hypothesis does not suggest that all poetry or fiction are reflections of cults, nor that the extent to which a particular work can be put out of joint depends on its aesthetic value. Rather, the disjointedness hypothesis proposes that those creative products that become cult objects are characterized by disjointedness, and that one of the factors that contribute to the disjointedness of creative works is the temporal boundaries separating the different stages of their production.

In some cases it is the blurring, rather than the separation, of temporal boundaries that contributes to the cult character of creative products. Homer's *Odyssey* is a classical example of a "built-in" kind of temporal boundary blurring: Although the story proceeds in a linear fashion, the time of the plot starts at Book 1 (t_1) and runs forward until Book 8 (t_2), when suddenly the plot returns back to the time before t_1 , and only later returns to and continues on from t_2 . Similar kinds of narration can be witnessed in some popular artistic creations of our time, such as Milan Kundera's *Unbearable Lightness of Being*, Kurt Vonnegut's *Slaughter House Five*, Quentin Tarrantino's *Pulp Fiction*, or Krzysztof Kieslowski's *Trois Couleurs: Bleu, Blanc, Rouge*. In those cases the disruption of the temporal boundaries of the plot is anything but accidental. As ancient tragic poets knew well, the blurring of the temporal boundaries of a plot portrays life as ephemeral and evokes in the audience deep emotional reactions (Eco, 1994).

Blurring the temporal boundaries that usually separate the functions of design, production, marketing, and sales is a technique that can effectively stimulate creativity in work organizations. Japanese firms often gather into the same building experts from different production stages to develop new ideas and products through the "cross-fertilization" of knowledge and insight. For instance, the Japanese bullet train was developed between aeronautical and locomotive engineers, and the Seiko quartz resonant was created after quartz experts, traditional watchmakers, and jewelry experts were shut into one building for a time (Hampden-Turner, 1999). Challenging earlier ideas that creativity develops better in isolation, Sutton and Kelly (1997) have shown how industrial design firms can stimulate creativity by allowing their clients to attend business meetings or even live and work side

by side with their designers. The suspension of the typical boundary between the time a product is designed and the time it is presented to the client may stimulate creativity because clients bring into the design process knowledge and fresh ideas, they can help designers break down stereotypes, and they can support the smooth transmission of creative products into the market.

Duration, Development, and Lifelong Creativity

Bergson (1911, 1910/1960) used the term *duration* ("temps durée") to suggest that time is a unified, continuous, cumulative, and heterogeneous experience. Unlike absolute clock-time, duration is not a set of discrete moments, because it consists of qualitatively different elements that cannot be repeated (Lacey, 1989). The concept of duration suggests that what we understand as past and future are notions that exist only in the continuously changing present (Maturana, 1995; Ornstein, 1986; Varela, 1999), and thus opens the door to what may be called "creative perception" of one's life: If both the past and the future are always reconstructed in the unfolding present, creativity has a lot to do with the way one transforms the memory of the past so as to reconceptualize current reality, and by doing so, one opens oneself in the present moment to the opportunities for creative future action. According to Fritz's (1989) principle of creative tension, the source of lifelong creativity is the ability to maintain the structural tension between one's perceived current reality and future vision. The duration of this tension is also what makes creativity an important developmental phenomenon that is quite distinct, per Fritz, from the idea of creativity as mere problem solving. The ancient idea that if the gods hate someone they grant him or her, his or her most cherished wish is evident today in the works of Feldman (1995, 1999), Fritz (1989), Gardner (1993; Policastro & Gardner, 1999), and Gruber (Gruber & Davis, 1995; Gruber & Wallace, 1999), who have pointed out that an ever-evolving and growing vision about the future is a necessary requirement for lifelong creativity. In Bergson's (1911, 1946) terms, the peak manifestation of individual creativity is one's personal "unfolding" in time.

Systemic Evolution, Zeitgeist, and Creativity

Evolutionary time is central to systemic perspectives on creativity. According to the triangular framework suggested by Csikszentmihalyi (1990a, 1995, 1999), creativity emerges as a phenomenon through the interaction of the individual creator with her or his domain and the field of people in the domain who judge what is creative. Time becomes a central element here because what determines creativity is not a universal law of beauty or abilities, but the timing, or adaptive fit, among the needs of a particular domain, the emergence of the products and ideas of an individual, and the role of people who have a critical opinion both on the future of the domain and on the work of individual creators. Csikszentmihalyi (1997) noted, for example, that only five people understood Einstein's theory of relativity when it first appeared, but given the structure of that domain at that time and who these five individuals were, their opinion was enough to grant the theory broad scientific and social recognition.

Time is therefore a variable to be taken into serious consideration as a means of understanding how the concept of creativity is construed and constructed in different eras, and how creative breakthroughs arise at particular moments in the evolution of domains (Csikszentmihalyi, 1990a, 1995). Gardner (1993) employed Csikszentmihalyi's triangular framework to illustrate with biographical examples how seven exceptionally creative individuals shaped the evolution of their domains and society in the 20th century. Using his theory of multiple intelligences, Gardner described how different individuals made significant creative breakthroughs in different domains with time, as an era, being the underlying and shared dimension.

Other studies have discussed the influence of zeitgeist on creative production in terms of cultural, societal, economic, and political factors (for a review see Simonton 1999, 2000). The historical centers of creativity—classical Athens, the Arab cities in the 10th century, Florence during the Renaissance, Venice in the 15th century, Paris, London, and Vienna in the 19th century, and New York in the 20th century—were affluent and cosmopolitan, big trade centers, culturally heterogeneous, had some surplus of wealth, and often emerged from victorious nationalistic revolts against oppressive rulers (Barron, Montuori, &

Barron, 1997; Csikszentmihalyi, 1997; Simonton, 2000). Simonton (2000) noted that such zeitgeist factors can explain the general level of creativity at a particular time, but they cannot easily account for individual differences in creative expression within a particular era.

Timelessness and Creativity

The deep immersion in the creative process is often characterized by timelessness, which is the experience of being out of cyclical and linear time. Poet David Whyte (1994, p. 154) wrote that in each one of us there is a portion “that understands physically what it means to live in eternity, where *eternity* is not an endless amount of time but an experience out of time, free from the stress of never being enough or having enough, a numinous experience of the present where we forget ourselves in the consummation of the moment.” The intense states in which one experiences timelessness tend to be brief, but their impact on creativity is important, as May (1975/1994) and Csikszentmihalyi (1990b) among other authors have noted in the last three decades.

According to May (1975/1994), the heart of the creative process is the intense direct encounter with one's work, the absorption and deep involvement in the actual process of creation. In this intense state the artist or scientist becomes oblivious to the passage of time and does not experience fear, anxiety, gratification, or satisfaction, but only joy which is the “emotion that goes with heightened consciousness, the experience of actualizing one's own potentialities” (p. 45). May emphasized that heightened awareness does not mean increased self-consciousness, but on the contrary, abandonment of the usual split between self and object. He used the term *ecstasy*, which literally means to “stand out from,” to describe the state in which one transcends the normal psychological context delineated by the notion of time and the consciousness of the self. Ecstasy is neither irrational nor passive, but a suprarational state in which one integrates intellectual, volitional, and emotional functions.

The deep immersion in the creative process has been described as “flow,” a highly intrinsically motivated state characterized by enjoyment and intense concentration on the task (Csikszentmihalyi, 1997).

Timelessness is the quintessential experience that characterizes the most complex and advanced stages of the flow state. When all the other dimensions of flow are present (i.e., clear goals and immediate feedback, intense concentration, an optimally challenging activity, no fear of failure, and a merging of action and awareness), one loses self-consciousness, the experience becomes autotelic (i.e., an end in and of itself), and the notion of time becomes distorted (Csikszentmihalyi, 1990b, 1997). A more accurate statement would be that in the very intense stages of the flow state the notion of time disappears, and it is only later, when one resurfaces from the flow state, that the recognition of time distortion occurs. As physicist Richard Feynman and time theorist Ernst Pöppel (1988, pp. 85–86) wrote, “Time is what happens when nothing else happens . . . when we experience a great deal we do not think of time.”

Mainemelis (2001) has recently proposed a model for the experience of timelessness associated with engrossment in attractive work activities. He portrayed timelessness as a constellation of four retrospectively reported experiences (immersion, time distortion, sense of mastery, and sense of transcendence), and suggested that timelessness is facilitated, among other factors, by intrinsic motivation, autonomy, and meaningful work, and is hindered by extreme pressures and distractions in the work environment.

It has been suggested that intrinsic motivation is the catalyst that allows the experience of timelessness and the autotelic engagement with the task at hand (Collins & Amabile, 1999; Csikszentmihalyi, 1990b; Deci & Ryan, 1985; Ryan & Deci, 2000). Although much more empirical work is needed in this area, the relationship between intrinsic motivation and timelessness is supported by the few available studies conducted in educational (Conti, 2001) and organizational settings (Mainemelis, 2000).

Conclusion

Drawing on diverse disciplines, from philosophy, psychology, psychoanalysis, and semiotics to organizational behavior, in this article I suggest that time is a notion that should be taken seriously by creativity research. The reviewed empirical findings and theoretical insights support the thesis that time underlies creativity whether we talk about the creative person,

product, process, environment, domain, or culture, or whether we assess biographically the creativity of Einstein or psychometrically the creative temperament of a psychology student. I also emphasize that besides the culturally dominant perspective of time today, that of the absolute and precise intervals of the clock, time is also events, asynchronies, temporal boundaries, cumulative duration, *zeitgeist*, and an existential quest. Each of these diverse conceptions of time adds something distinctive to our understanding of creativity.

I propose that the multifaceted relations of time to creativity can be effectively understood in terms of three temporal modes: cyclicity, linearity, and timelessness. Each of these modes consists of a different set of assumptions and interests vis-à-vis the nature of time and its effects on creativity. Cyclicity, linearity, and timelessness shed light on the underlying patterns of some antithetical and yet coexisting aspects of creativity, such as recurrence and evolution, the periodicity of the 10-year rule and the uniqueness of serendipitous discoveries, the quest for immortality and the eternity experienced in the intense moments of creative production, and so forth.

The three temporal modes should not be interpreted as a framework for classifying creativity methods and authors into mutually exclusive paradigms (e.g., Rickards & DeCock, 1999). Although it is apparent that, for instance, psychometric methods rely more on clock-time and biographical inquiries rely more on duration and turning-point life events, one should also notice that many successful psychometric studies target specific events (e.g., Amabile & Conti, 1999) and many acclaimed studies with biographical and historical data generalize findings beyond the limits of any specific historical context (e.g., Simonton, 1998, 1999). The proposed framework of cyclicity, linearity, and timelessness is not a classification system but a means for increasing the complexity and integrative capacity of creativity theory and research. To understand fully the impact of time on creativity we should seek to explore how the socially constructed notions of time's cycle and time's arrow, and the subjective experience of timelessness, interact at different levels and dimensions of the phenomena under study.

In this article I tried to stimulate interest in the study of time and creativity and show that creativity researchers are likely to discover novel and interesting

insights about time by looking far beyond the limits of their respective disciplines. Besides the obvious benefits associated with the cross-fertilization of scientific knowledge, the interdisciplinary study of time and creativity can also provide researchers with many opportunities for exploring largely uncharted thematic territories. Future integrative analyses should explore more specific areas of study in depth, such as the use of time scales in creativity research, or the sets of temporal assumptions that underlie diverse approaches to the study of creativity. More empirical research is needed in each of the time-related theme categories presented earlier. Possible research topics include the subjective experience of timelessness in the deep immersion states of the creative process; how time experience and time perception vary across creative individuals and domains and the relation between cultural, educational, or organizational time norms and individual creativity, to name just a few.

References

- Abra, J. (1995). Do the muses dwell in Elysium? Death as a motive for creativity. *Creativity Research Journal*, 8, 205–217.
- Albert, R. S. (1971). Cognitive development and parental loss among the gifted, the exceptionally gifted, and the creative. *Psychological Reports*, 29, 19–26.
- Albert, R. S. (1980). Family positions and the attainment of eminence: A study of special family positions and special family experiences. *Gifted Child Quarterly*, 24, 87–95.
- Amabile, T. M. (1996). *Creativity in context*. Boulder, CO: Westview.
- Amabile, T. M., & Conti, R. (1999). Changes in the work environment for creativity during downsizing. *Academy of Management Journal*, 42, 630–640.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39, 1154–1184.
- Arlow, J. A. (1989). Time as emotion. In J. T. Fraser (Ed.), *Time and mind: Interdisciplinary issues, The study of time VI* (pp. 85–96). Madison, CT: International Universities Press.
- Arndt, J., Greenberg, J., Solomon, S., Pyszczynski, T., & Schimel, J. (1999). Creativity and terror management: Evidence that creative activity increases guilt and social projection following mortality salience. *Journal of Personality and Social Psychology*, 77, 19–32.
- Ayman-Noley, S. (1999). A Piagetian perspective on the dialectic process of creativity. *Creativity Research Journal*, 12, 267–275.
- Baer, J. (1998). The case for domain specificity of creativity. *Creativity Research Journal*, 11, 173–178.
- Barron, F. (1995). Putting creativity to work. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 76–98). New York: Cambridge University Press. (Original work published 1988)
- Barron, F., Montuori, A., & Barron, A. (1997). *Creators on creating*. New York: Tarcher Putnam.
- Bergson, H. (1911). *Creative evolution* (A. Mitchell, Trans.). New York: Holt.
- Bergson, H. (1946). *The creative mind* (M. L. Andison, Trans.). New York: Philosophical Library.
- Bergson, H. (1960). *Time and free will: An essay on the immediate data of consciousness*. (F. L. Pogson, Trans.). New York: Harper & Row. (Original work published 1910)
- Bindeman, S. (1998). Echoes of silence: A phenomenological study of the creative process. *Creativity Research Journal*, 11, 69–77.
- Bluedorn, A. C., & Denhardt, R. B. (1988). Time and organizations. *Journal of Management*, 14, 299–320.
- Brophy, D. R. (1998). Understanding, measuring, and enhancing individual creative problem-solving efforts. *Creativity Research Journal*, 11, 123–152.
- Bruner, J. S. (1962). *On knowing: Essays for the left hand*. Cambridge, MA: Harvard University Press.
- Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist*, 54, 165–181.
- Collins, M. A., & Amabile, T. M. (1999). Motivation and creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 297–312). New York: Cambridge University Press.
- Conti, R. (2001). Time flies: Investigating the connection between intrinsic motivation and the experience of time. *Journal of Personality*, 29, 1–26.
- Coveney, P., & Highfield, R. (1990). *The arrow of time*. New York: Fawcett Columbine.
- Csikszentmihalyi, M. (1988). The flow experience and its significance for human psychology. In M. Csikszentmihalyi & I. S. Csikszentmihalyi (Eds.), *Optimal experience: Psychological studies of flow in consciousness* (pp. 15–35). New York: Cambridge University Press.
- Csikszentmihalyi, M. (1990a). The domain of creativity. In M. A. Runco & R. S. Albert (Eds.), *Theories of creativity* (pp. 190–212). Newbury Park, CA: Sage.
- Csikszentmihalyi, M. (1990b). *Flow: The psychology of optimal experience*. New York: Harper & Row.
- Csikszentmihalyi, M. (1995). Society, culture, and person: A systems view of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 325–339). New York: Cambridge University Press. (Original work published 1988)
- Csikszentmihalyi, M. (1997). *Creativity: Flow and the psychology of discovery and invention*. New York: Harper Perennial.
- Csikszentmihalyi, M. (1999). Implications of a systems perspective for the study of creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 313–335). New York: Cambridge University Press.
- Davies, P. (1995). *About time: Einstein's unfinished revolution*. New York: Simon & Schuster.
- de Chumaceiro, C. L. (1999a). Serendipity. In M. A. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity, Volume 2* (pp. 543–549). San Diego, CA: Academic.
- de Chumaceiro, C. L. (1999b). Sortes Walpoliane: Discoveries “almost” like serendipity. *Creativity Research Journal*, 12, 339–341.

- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Drazin, R., Glynn, M. A., & Kazanjian, R. K. (1999). Multilevel theorizing about creativity in organizations: A sensemaking perspective. *Academy of Management Review*, *24*, 286–307.
- Eco, U. (1994). *Six walks in the fictional woods*. Cambridge, MA: Harvard University Press.
- Feist, G. J. (1999). The influence of personality on artistic and scientific creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 273–296). New York: Cambridge University Press.
- Feldman, D. H. (1995). Creativity: Dreams, insights, transformations. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 271–297). New York: Cambridge University Press.
- Feldman, D. H. (1999). The development of creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 169–186). New York: Cambridge University Press.
- Fritz, R. (1989). *The path of least resistance*. New York: Fawcett Columbine.
- Gardner, H. (1993). *Creating minds*. New York: Basic Books.
- Gould, S. J. (1987). *Time's arrow, time's cycle*. Cambridge, MA: Harvard University Press.
- Gruber, H. E., & Davis, S. N. (1995). Inching our way up Mount Olympus: The evolving-systems approach to creative thinking. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 243–270). New York: Cambridge University Press. (Original work published 1988)
- Gruber, H. E., & Wallace, D. B. (1999). The case study method and evolving systems approach for understanding unique creative people at work. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 93–115). New York: Cambridge University Press.
- Halpern, J. M., & Christie, T. L. (1996). Time: A tripartite sociotemporal model. In J. T. Fraser & M. P. Soulsby (Eds.), *Dimensions of time and life: The study of time, Volume VIII* (pp. 187–198). Madison, CT: International Universities Press.
- Hampden-Turner, C. M. (1999). Control, chaos, control: A cybernetic view of creativity. In R. E. Purser & A. Montuori (Eds.), *Social creativity, Volume 2* (pp. 17–31). Cresskill, NJ: Hampton.
- Hartocollis, P. (1983). *Time and timelessness: A psychoanalytic inquiry into the varieties of temporal experience*. Madison, CT: International Universities Press.
- Helson, R. (1999). A longitudinal study of creative personality in women. *Creativity Research Journal*, *12*, 89–102.
- Helson, R., Roberts, B., & Agronick, G. (1995). Enduringness and change in creative personality and the prediction of occupational creativity. *Journal of Personality and Social Psychology*, *69*, 1173–1183.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2000). Experiential learning theory: Previous research and new directions. In R. J. Sternberg & L. F. Zhang (Eds.), *Perspectives on thinking, learning, and cognitive styles*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Lacey, A. R. (1989). *Bergson*. London: Routledge.
- Lee, H., & Liebenau, J. (1999). Time in organizational studies: Toward a new research direction. *Organization Studies*, *20*, 1035–1058.
- Lehman, H. (1953). *Age and achievement*. Princeton, NJ: Princeton University Press.
- Lifton, R. J. (1983). *The broken connection: On death and the continuity of life*. New York: Basic Books.
- Mainemelis, C. (2000). When the muse takes it all: A conceptual and empirical investigation of timelessness and its effects on creativity in organizations (Doctoral dissertation, Case Western Reserve University, Cleveland, OH. UMI Number 3027305).
- Mainemelis, C. (2001). When the muse takes it all: A model for the experience of timelessness in organizations. *Academy of Management Review*, *26*, 548–565.
- Mainemelis, C., Boyatzis, R. E., & Kolb, D. A. (2002). Learning styles and adaptive flexibility: Testing experiential learning theory. *Management Learning*, *33*, 5–33.
- Maturana, H. R. (1995). *On the nature of time*. Santiago, Chile: Instituto de Terapia Cognitiva.
- Maturana, H. R., & Varela, F. J. (1992). *The tree of knowledge: The biological roots of human understanding*. Boston: Shambhala.
- May, R. (1994). *The courage to create*. New York: Norton. (Original work published 1975)
- McGrath, J. E., & Kelly, J. R. (1986). *Time and human interaction: Toward a social psychology of time*. New York: Guilford.
- Milgram, R. M., & Hong, E. (1999). Creative out-of-school activities in intellectually gifted adolescents as predictors of their life accomplishments as young adults: A longitudinal study. *Creativity Research Journal*, *12*, 77–88.
- Mitchon, J. A. (1990). Implicit and explicit representations of time. In R. A. Block (Ed.), *Cognitive models of psychological time*, pp. 37–58. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Mumford, M. D., Marks, M. A., Connelly, M. S., Zaccaro, S. J., & Johnson, J. F. (1998). Domain-based scoring of divergent-thinking tests: Validation evidence in an occupational sample. *Creativity Research Journal*, *11*, 151–164.
- Nemiro, J. (1997). Interpretive artists: A qualitative exploration of the creative process of actors. *Creativity Research Journal*, *10*, 229–239.
- O'Hara, L., & Sternberg, R. J. (1999). Learning styles. In M. A. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity, Volume 2* (pp. 147–153). San Diego, CA: Academic.
- Ornstein, R. E. (1970). *On the experience of time*. New York: Penguin.
- Ornstein, R. E. (1986). *The psychology of consciousness*. New York: Penguin.
- Perlow, L. A. (1998). Boundary control: The social ordering of work and family time in a high-tech corporation. *Administrative Science Quarterly*, *43*, 328–357.
- Plato (1991). *Συμπόσιον ἢ περὶ ἐρώτος* [Symposium]. Athens, Greece: Cactus.
- Plucker, J. A. (1998). Beware of simple conclusions: The case for content generality of creativity. *Creativity Research Journal*, *11*, 179–182.
- Plucker, J. A. (1999). Is the proof in the pudding? Reanalyses of Torrance's (1958 to present) longitudinal data. *Creativity Research Journal*, *12*, 103–114.
- Plucker, J. A., & Renzulli, J. S. (1999). Psychometric approaches to the study of human creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 35–61). New York: Cambridge University Press.

- Policastro, E., & Gardner, H. (1999). From case studies to robust generalizations: An approach to the study of creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 213–225). New York: Cambridge University Press.
- Pöppel, E. (1988). *Mindworks: Time and conscious experience* (Tom Artin, Trans.). Orlando, FL: Harcourt Brace Jovanovich.
- Prigogine, I. (1990). Foreword. In P. Coveney & R. Highfield, (Eds.), *The arrow of time* (pp. 15–17). New York: Fawcett Columbine.
- Rank, O. (1932). *Art and artist: Creative urge and personality development* (C. F. Atkison, Trans.). New York: Knopf.
- Rickards, T., & DeCock, C. (1999). Sociological paradigms and organizational creativity. In R. E. Purser & A. Montuori (Eds.), *Social creativity, Volume 2* (pp. 235–256). Cresskill, NJ: Hampton.
- Root-Bernstein, R. (1999). Productivity and age. In M. A. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity, Volume 2* (pp. 457–463). San Diego, CA: Academic.
- Runco, M. A. (1999). Time. In M. A. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity, Volume 2* (pp. 659–663). San Diego, CA: Academic.
- Russ, S. W. (1993). *Affect and creativity: The role of affect and play in the creative process*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78.
- Sawyer, K. (1992). Improvisational creativity: An analysis of jazz performance. *Creativity Research Journal*, *5*, 253–263.
- Sawyer, R. K. (1998). The interdisciplinary study of creativity in performance. *Creativity Research Journal*, *11*, 11–19.
- Simonton, D. K. (1995). Creativity, leadership, and chance. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 386–426). New York: Cambridge University Press. (Original work published 1988)
- Simonton, D. K. (1998). Masterpieces in music and literature: Historiometric inquiries. *Creativity Research Journal*, *11*, 103–112.
- Simonton, D. K. (1999). Creativity from a historiometric perspective. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 116–133). New York: Cambridge University Press.
- Simonton, D. K. (2000). Creativity: Cognitive, personal, developmental, and social aspects. *American Psychologist*, *55*, 151–158.
- Sternberg, R. J., O'Hara, L. A., & Lubart, T. I. (1997). Creativity as investment. *California Management Review*, *40*, 8–21.
- Sutton, R. I., & Kelly, T. A. (1997). Creativity does not require isolation: Why product designers bring visitors “backstage.” *California Management Review*, *40*, 75–90.
- Varela, F. J. (1999). Present-time consciousness. *Journal of Consciousness Studies*, *6*, 111–140.
- Wallas, G. (1926). *The art of thought*. New York: Harcourt Brace.
- Whyte, D. (1994). *The heart aroused: Poetry and the preservation of soul in corporate America*. New York: Currency Doubleday.
- Wood, D. (1991). *The deconstruction of time*. Atlantic Highlands, NJ: Humanities Press.
- Zausner, T. (1998). When walls become doorways: Creativity, chaos theory, and physical illness. *Creativity Research Journal*, *11*, 21–28.
- Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable, individual-differences metric. *Journal of Personality and Social Psychology*, *77*, 1271–1288.