CREATIVITY AND DEVELOPMENT

R. KEITH SAWYER
VERA JOHN-STEINER
SEANA MORAN
ROBERT J. STERNBERG
DAVID HENRY FELDMAN
JEANNE NAKAMURA
MIHALY CSIKSZENTMIHALYI

OXFORD
UNIVERSITY PRESS
2003

Whitehead, A. N. (1926). *Science and the modern world*. New York: Macmillan.

Wimsatt, W. C. (1997). Aggregativity: Reductive heuristics for finding emergence. *Philosophy of Science, 64*(Proceedings), S372–S384.

Zinchenko, V. P., & Gordon, V. M. (1979). Methodological problems in the psychological analysis of activity. In J. V. Wertsch (Ed.), *The concept of activity in Soviet psychology* (pp. 72–133). Armonk, NY: M. E. Sharpe.

CHAPTER TWO

Creativity in the Making

Vygotsky's Contemporary Contribution to the Dialectic of Development and Creativity

Seana Moran and Vera John-Steiner

In representing creativity as a social as well as an individual process, L. S. Vygotsky introduced some of the most critical new notions that characterize current systems approaches. Although his contributions are best known in developmental psychology and education, his ideas regarding the growth of creative imagination, the changing impacts of creative activities on individuals over their life spans, and how creativity works in expanding individual and cultural meaning are timely to creativity studies.

Vygotsky died of tuberculosis at age 38, leaving many of his manuscripts unpublished. In addition, his writings were suppressed for more than 20 years in the Soviet Union under Stalin and were further neglected in the West as a consequence of the Cold War. But once his work became more broadly available with the publication of *Thought and Language* (1934/1962), it was acknowledged as an important contribution to the cognitive revolution.

Vygotsky's career was framed by work on creativity, starting with his study of the aesthetic reaction in literary works, *The Psychology of Art* (1965/1971), which was accepted as his dissertation in 1925 but was not published during his lifetime. In this early work, he first formulated his important principle that creative work is profoundly social: "Art is the social within us, and even if its action is performed by a single individual it does not mean that its essence is indi-

vidual. . . . Art is the social technique of emotion, a tool of society which brings the most intimate and personal aspects of our being into the circle of social life. . . . It would be more correct to say that emotion becomes personal when every one of us experiences a work of art: It becomes personal without ceasing to be social" (p. 249).

In these words, Vygotsky captured a powerful synthesis between aspects of experience that are usually separated, issues he returned to later in his career. For example, in a short paper written a couple of years before he died, "On the Problem of the Psychology of the Actor's Creative Work" (1936/1999a), he revisited these issues of aesthetics, experience, and emotion as social phenomena. Whereas his work on creativity is fragmentary, when placed in the broader framework of his theoretical approach, it provides a challenging point of view, which has been largely ignored by both creativity and cultural-historical theorists.

In this chapter, we propose that Vygotsky's work provides an opportunity to both focus and expand the scope of creativity research. In applying his dialectical approach to this domain, he viewed the creative process as interaction, tension, transformation, and synthesis over the parallel timescales of the creative act, the creative life, and historical cultural development. Rather than studying structures that already have been completed and stabilized, he was interested in the origins and interrelationship of functions. In this emphasis on the transformational construction of the new, we find a powerful commonality between Vygotsky's theoretical perspective and emerging complex systems approaches that have arisen with computer modeling (Van Geert, 1994). Vygotsky's approach also shares some important features with Csikszentmihalyi's (1988) systems model, as they both recognize the critical role of social processes in creativity. In stressing the transformation of interpersonal activities into intrapersonal ones, Vygotsky provided the dynamic mechanisms for how the three nodes of Csikszentmihalyi's model—the individual, the domain, and the field—affect each other. In addition, the value of an expanded Vygotskian theory of creativity is reflected in adding time to the multidirectional connections between the individual's mind, the symbolic knowledge base of the domain, and the social and cultural processes of the field.

Therefore, although more than 70 years old, Vygotsky's work is contemporary. His ideas are particularly appropriate for this Counterpoints volume because they present a sophisticated and dynamic understanding of the interweaving of individual and social processes in creative endeavors. He both complements and supports some other approaches presented in this volume, particularly in his emphasis on the development of new ideas, artworks, and scientific undertakings as emergent social and psychological functional systems. In order to argue this position more systematically, we approach Vygotskian and

---

contemporary Western theories dialectically, culminating in an integration that can serve as a springboard for future research. We share Vygotsky's view that creativity is fundamental to the development of all individuals, and through the study of the interweaving of creativity and development, people's true natures are revealed.

THE DIALECTIC OF DEVELOPMENT AND CREATIVITY

Development never ends its creative work.
LEV VYGOTSKY, "The Problem of Age"

We argue that development and creativity are dialectically interrelated processes. Vygotsky conceived of developmental and creative processes as *internalization* or appropriation of cultural tools and social interaction. Internalization is not just copying but rather a transformation or reorganization of incoming information and mental structures based on the individual's characteristics and existing knowledge. He mostly studied internalization in childhood, when it is most apparent, although it is a significant aspect of lifelong learning and development. The dynamic form that results from this process is the individual personality—the embodied social mind—composed of interfunctional psychological systems. A personality is a characteristic way of behaving that constrains future activity.

What is usually referred to as *creativity* in Western psychology involves *externalization* in Vygotsky's and his followers' thinking. Externalization is the construction and synthesis of emotion-based meanings and cognitive symbols. Once expressed, these meanings and symbols are embodied in cultural artifacts—creative products—that endure over time to be used by future generations. The dynamic constructions that result from externalization are materialized meanings, composed of shared ideas, beliefs, knowledge, emotions, and culture.

Therefore, the two social processes, internalization and externalization, and the two symbol-based forms, personality and culture, are in dialectical tension with each other. This tension provides fertile ground for the growth of new ideas and creative products. Internalization is not the grafting of a culture onto a personality but an engagement with existing cultural resources, which leads to newly realized aspects of the self. Externalization is the basis for domain-changing creative transformations that expand the culture. This internal/external movement becomes cyclical, connecting past to future, and the results of these processes over time contribute to a community's history and culture. Creativity, then, depends on development, and development depends on creativity.

The two are interdependent. Figure 2.1 provides a visual map of this relationship. It is a schematic representation of these complex and cyclical connections and serves as a signpost for our own thinking.

In this chapter, we provide a brief review of Vygotsky's cultural-historical theory and methodology, then show how Vygotsky applied his general developmental framework to the formation of the creative imagination. We discuss how Vygotsky conceptualized the creative process in terms of the sharing of emotion and the development of meaning, and how the experience of this cycle of creative development can lead to commitment and a creative personality. Then we portray the important role of historical time in Vygotsky's notions of creativity. We conclude by expanding Vygotsky's approach to collaborations and linking some of the implications of Vygotsky's approach to possible future directions in creativity research.
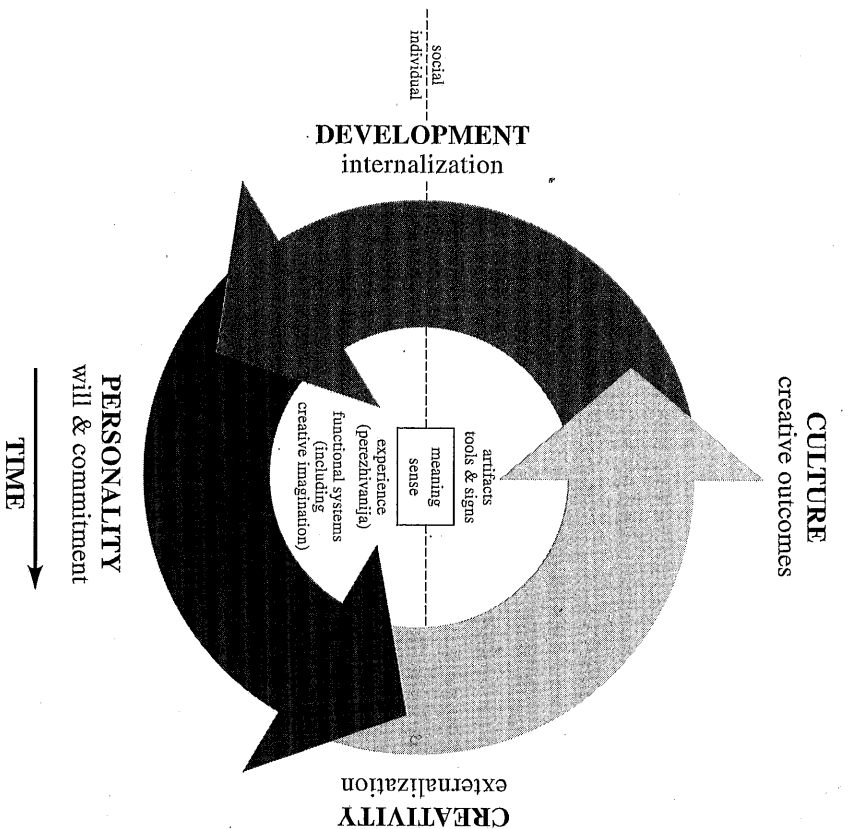

FIGURE 2.1. A visual representation of Vygotsky's dialectical conception of development and creativity

VYGOTSKY'S DEVELOPMENTAL FRAMEWORK

To study something historically means to study it in the process of change. . . . To encompass in research the process of a given thing's development in all its phases and changes—from birth to death—fundamentally means to discover its nature.

LEV VYGOTSKY, *Mind in Society*

Vygotsky's framework is referred to as cultural-historical theory. Within this theory, he emphasized that development is a social process, mediated through signs and tools, that forms and integrates psychological functional systems that change over time. This path is not necessarily linear or smooth: "Our concept of development implies a rejection of the frequently held view that cognitive development results from the gradual accumulation of separate changes. We believe that child development is a complex dialectical process characterized by periodicity, unevenness in the development of different functions, metamorphosis or qualitative transformation of one form into the other, intertwining of external and internal factors, and adaptive processes that overcome impediments that the child encounters" (Vygotsky, 1978, p. 73).

Learning and development are not processes undertaken alone: A person "represents the totality of social relations internalized and made into functions of the individual and forms of his structure" (Vygotsky, 1960/1997b, p. 106). They proceed through the ongoing dialectical tensions and transformations of social processes. Children's past achievements and new cultural symbolic capacities become the springboard for their future growth. Vygotsky did not subscribe to the Cartesian dichotomies underlying most Western psychological research. Instead, Vygotsky focused on the *relationships* between phenomena and the *processes* by which those relationships change over time. His main interest lay in origins, turning points, syntheses, transformations, and interactions of social, psychological, and cultural phenomena.

A central argument of Vygotsky's theory is that all mental functions are first experienced socially. People come to know about the world through transforming the information they receive from the speech and action of others; they co-construct knowledge based on these experiences. One of Vygotsky's best-known concepts is the zone of proximal development, through which a less skilled person learns in collaboration with more skilled individuals. In fact, according to Vygotsky (1931/1998b), it is only through knowing others that one comes to know oneself: "If the thought of the child did not meet with the thoughts of others, the child would never become conscious of himself" (p. 72). Vygotsky's genetic law of development states that internalized joint activity underlies the development of psychological systems. Individuals synthesize diverse influences, which become the basis for their new concepts and cognitive strategies.

This internalization is culturally mediated: "The central fact of our psychology is the fact of mediation" (Vygotsky, 1968/1997f, p. 138). Vygotsky discussed two primary forms of mediation: tools and signs. Tools make changes in external objects, whereas signs make changes in mental processes. He also mentioned artifacts, which are objects that contain past knowledge and experience. As children, we quickly learn to interact with the world indirectly through different sign systems, especially through language. According to Vygotsky, this ability forms the basis for the development of higher mental functions. Higher mental functions are based in culture; they are not aggregates of more elementary, biological functions, but complex wholes that must be studied at their own level of analysis: "Culture creates special forms of behavior, it modifies the activity of mental functions, it constructs new superstructures in the developing system of human behavior" (Vygotsky, 1960/1997b, p. 18). Thus, the focus of Vygotsky's study is the means, the functions, and the processes of becoming within a social, cultural milieu (Vygotsky, 1960/1997b).

These higher mental functions are never completed, but rather continue to develop and interact with other higher mental functions as the child grows into adolescence and adulthood. Through these interactions, a person forms psychological functional systems, or "complex connections that develop between different functions" (Vygotsky, 1982/1997e, p. 92). What develops, then, are not just the functions themselves, but the relationships between them. This development leads to increased flexibility and complexity of thought: "Each step in the child's achievement of a more profound penetration of reality is linked with his continued liberation from earlier, more primitive forms of cognition" (Vygotsky, 1960/1987, p. 349). At first, children need external objects and other people to help regulate their behavior, but later can do so using only internal, symbolic, psychological functions (Vygotsky, 1978, p. 73).

Change over time is key to Vygotsky's framework. He viewed the human mind dynamically, whether within particular activities, over a person's life span, or within a changing social and cultural milieu. These three timescales—social activity, individual life, and history—represent parallel interacting levels at which both development and creativity operate. Furthermore, development and creativity are future oriented. Through the transformation of social interaction and the use of cultural tools and signs, people free themselves from the constraints of the present environment and take control of their own futures. Thus, past experience influences but does not determine what people do; in reorganizing the known, individuals anticipate future needs and goals. In this way, they can be simultaneously experts—based on past experience—and novices in planning the future. There is no end to development: It is an open system. Thus, development is not an unfolding of maturational processes, but the continual reformation of complex relationships that arise over time as a result of the interdependence of the individual and the social world.

VYGOTSKY'S METHODOLOGY

The search for method becomes one of the most important problems of the entire enterprise of understanding the uniquely human forms of psychological activity. In this case, the method is simultaneously prerequisite and product, the tool and the result of the study.

<div style="text-align:right">LEV VYGOTSKY, Mind in Society</div>

The study of change was the primary objective of Vygotskian methodology. To accomplish this objective, Vygotsky (1978) proposed that "the aim of psychological analysis is . . . (1) process analysis as opposed to object analysis; (2) analysis that reveals real, causal or dynamic relations as opposed to enumerations of a process's outer features, that is, explanatory, not descriptive analysis; and (3) developmental analysis that returns to the source and reconstructs all the points in the development of a given structure" (p. 65). One of the experimental approaches devised by Vygotsky was the method of double stimulation. Its aim was to tease apart the developmental process, "to alter the automatic, mechanized, fossilized character of the higher forms of behavior and to turn it back to its source" (Vygotsky, 1978, p. 64). He achieved this objective by first presenting a simple stimulus, then presenting a second (mediating) stimulus whose role was to help participants organize their responses. In this way, he discovered how children create their own mediating signs to help them successfully master certain operations; he also discovered how children acquire word meanings. Although this method was simple, it provided a way to provoke changes that occur right "before one's eyes" (Vygotsky, 1978, p. 61). Even though Vygotsky used traditional experimental methods, he discovered how children invent their own mediational methods. It is this aspect of his thinking that prepared the way for studies of innovative and creative behaviors by Vygotskian scholars (Smolucha, 1992).

In an examination of cross-cultural variations in thinking and reasoning, Vygotsky and his colleague, Alexander Luria, planned an ambitious study in Central Asia. The motivation for such an inquiry drew from their desire to study cognition as it occurs in changing sociocultural settings rather than separated from life in an experimental laboratory. Vygotsky was too ill to join the expedition, so Luria conducted research on problem solving, self-awareness, and reasoning. In studying imagination, he found that isolated farmers remained rooted in their practical experience, whereas those with some education were ready for new expressions of knowledge while still limiting their reliance on imagined situations (Luria, 1976, pp. 134–143). More contemporary studies of creativity among nonindustrial people describe many further examples of sustained innovation and the construction of the new (Cole, 1996; Greenfield, in press; Scribner, 1977).

Vygotsky (1960/1997b) emphasized connections rather than separation and simplification. His methods, therefore, aimed to study creativity and development *in the making* by "converting thing into movement, fossil into process" (p. 71). In this way, he could examine the developmental interrelationships of the social environment, humanly crafted artifacts, and individual cognitive and emotional processes.

THE DEVELOPMENT OF THE CREATIVE IMAGINATION

Imagination is a transforming, creative activity directed from the concrete toward a new concrete . . . with the help of abstraction.

LEV VYGOTSKY, "Imagination and Creativity in the Adolescent"

Based on this developmental framework and methodology, Vygotsky put forth a theory of how the creative imagination develops as a higher mental function, in two papers and a lecture: "Imagination and Creativity in Childhood" in 1930 (1930/1998c); "Imagination and Creativity in the Adolescent" in 1931 (1931/1998d); and "Imagination and Its Development in Childhood" in 1932 (1960/1987). Creative imagination introduces "something new into the flow of our impressions, the transformation of these impressions such that something new, an image that did not previously exist, emerges" (Vygotsky, 1960/1987, p. 339). Vygotsky asserted that creative imagination is necessary for effective functioning in society. That is, people with a less developed creative imagination cannot remove themselves from the immediate stimuli of the environment:

We saw that the zero point of imagination . . . appears in the following way—the individual is in a state where he is unable to abstract himself from a concrete situation, unable to change it creatively, to regroup signs to free one's self from under its influence. (Vygotsky, 1931/1998d, p. 152)

The creative imagination makes people more adept at manipulating signs and psychological tools and, therefore, at adapting to their social environments (Vygotsky, 1960/1997b).

Vygotsky theorized that children first learn to create and manipulate symbols and signs during play. Then children's pretend play and object substitution become internalized as fantasy or imagination as inner speech develops. In adolescence, creative imagination results when imagination and thinking in concepts become conjoined, which, in adulthood, can mature into artistic and scientific creativity.

Childhood Play

By dragging a child into a topsy-turvy world, we help his intellect work, because the child becomes interested in creating such a topsy-turvy world for himself in order to become more effectively the master of the laws governing the real world.

LEV VYGOTSKY, *The Psychology of Art*

Vygotsky thought that children first learn to create, manipulate, and give meaning to signs and symbols through play. Play also allows them to tease out relationships, try on and practice different roles, and exercise their growing capabilities (Vygotsky, 1984/1999b). As with other cultural behavior, pretend play starts with social interaction with adults: Somebody first shows a child how a banana can be a phone, or how a broom can be a dancing partner (Smolucha & Smolucha, 1986). At first, children imitate what they have seen or heard or done before. Over time and experience, they become more adventurous, as make-believe objects move further from their real-world characters. As children reach school age, goals and rules become a focus of play, and play becomes an early mechanism for self-mastery: "A child's greatest self-control occurs in play" (Vygotsky, 1978, p. 99). In fact, through play, children can scaffold their own learning, creating a zone of proximal development between their present level of achievement and their more competent future selves. By practicing skills or trying out ideas within a play situation, children become better able to handle real situations (Sawyer, 1997).

Vygotsky's conception of play parallels that of Piaget, who saw play as a symbolic capacity-building process that leads to creative imagination (Ayman-Nolley, 1999). However, whereas Vygotsky asserted that imagination was internalized play developed in conjunction with others, Piaget (1962) suggested that play was externalized imagination that spontaneously arises in playing alone. Smolucha found some evidence to support both Vygotsky's theory and Piaget's: Children do perform spontaneous object substitutions as early as 12 months, but most substitutions occur during their second year through pretend play initiated by caregivers (Smolucha & Smolucha, 1986). Other researchers also support Vygotsky's notion that play is associated with later creativity, especially with divergent thinking (Russ, Robins, & Christiano, 1999; Singer & Singer, 1990). Most of these studies, however, are correlational and cognitive, and they usually do not share Vygotsky's developmental perspective. Rather, they tend to look at the co-occurrence of play and creativity only within a single age group.

Adolescent Fantasy

LEV VYGOTSKY, "Imagination and Its Development in Childhood"

No accurate cognition of reality is possible without a certain element of imagination, a certain flight from the immediate, concrete, solitary impression in which this reality is presented in the elementary acts of consciousness.

Play becomes internalized as fantasy. Fantasy entails a new relationship between visual and verbal phenomena as well as concrete and abstract thought. An object no longer has to be present for children to consider it as part of their activities. Emotion-infused mental images and inner speech replace physical objects and actions as a child's focus of attention (Smolucha & Smolucha, 1986; Vygotsky, 1930/1998c). However, fantasy is not exclusively visual but can incorporate all the senses (Vygotsky, 1930/1998c).

During adolescence, two forms of fantasy develop: subjective and objective fantasy. These become woven together, through further development, in adult creativity. Subjective fantasy orients toward desire fulfillment and private inner life: "The adolescent, with the help of fantasy, illuminates and clarifies himself and turns his emotions, his tendencies into a creative image" (Vygotsky, 1931/1998d, p. 165). In fact, Vygotsky viewed subjective fantasy as a key force in personal transformation. Young people rely on it to shape and master their own emotions. Although Vygotsky criticized Freud's ideas regarding the relationship of wish fulfillment and creativity, Freud's influence on Vygotsky becomes apparent in his construct of subjective fantasy. Objective fantasy, on the other hand, is used in understanding and constructing external reality; its application contributes to cultural transformation. Through objective fantasy, adolescents, as well as adults, anticipate and plan their future behavior, helping to construct the culture of which they are a part (Vygotsky, 1930/1998c).

These two forms of fantasy are conjoined: "Objective expression is colored with bright emotional tones, but even subjective fantasies are frequently observed in the area of objective creativity" (Vygotsky, 1931/1998d, p. 165). Adolescents learn to balance these two kinds of fantasy; they become increasingly reflective and critical about their own imaginative products. The forms of these products change also: Artworks produced in childhood and early adolescence are often syncretic, fusing different styles and techniques in a single product. With further development, creative endeavors come to reflect conventional forms and intentional stylistic elements (Smolucha, 1992; Vygotsky, 1960/1987).

Vygotsky's theory (1931/1998a) anticipated later researchers' findings of a decline in creative productivity due to social influence around puberty: "In the process of an adolescent's development, at its most critical stage, there is usu-

ally a decline in school progress, a weakening of formerly established habits, particularly when productive work of a creative nature unfolds before the child" (p. 13). For example, Gardner (1994) and Winner (1982) found that adolescents may draw less because they are more aware of objective cultural standards and therefore more critical of their own work. As subjective and objective fantasy intertwine in a more sophisticated manner, old ways of thinking succumb to new; and young creators may narrow their areas of interest based on social input (Vygotsky, 1931/1998a). Thus, adolescence is the age of mastering one's internal world and "the age of growing into culture" (Vygotsky, 1983/1997a, p. 251).

Imagination and Thinking in Concepts

LEV VYGOTSKY, "Imagination and Creativity in the Adolescent"

In creative imagination, the emotional and intellectual aspects of the adolescent's behavior find a complex synthesis.

Creative imagination emerges when fantasy becomes infused with thinking in concepts. Then, imagination and the ability to abstract and categorize become integrated into a functional system (Vygotsky, 1931/1998d). Whereas Piaget (Piaget & Inhelder, 1969) based concept formation on direct sensorimotor interaction with objects, for Vygotsky, the key to concept formation was semantic mediation (Vygotsky, 1934/1962). Thinking in concepts does not emerge fully formed, but develops through trial and error, the use of subjective criteria, sensory connections, and finally logical connections. This ability continues to grow throughout a person's life span; however, Vygotsky focused on adolescence when it first develops in all its complexity.

A concept is fully formed when adolescents or adults can use it in their own words successfully in a communicative setting; when they understand its many connections to other concepts. However, it is only in late adolescence and early adulthood that people can objectify and reflect on the concept (Vygotsky, 1934/1962). This reflective function is assisted by the imagination. A person must be able to be in an oppositional, critical, or reflective relationship with reality in order to fully internalize a concept's meaning. The imagination provides the capacity for this type of critical relationship.

Thus, Vygotsky traced the origins of the creative imagination to children's symbolic play. Once play is internalized, it forms the basis of fantasy, which develops further when linked to inner speech. In adolescence, imagination is fueled by the intense needs and emotions of the young person, but it also becomes closely linked to thinking concepts—as Vygotsky remarked, it becomes "intellectualized."

THE DEVELOPMENT OF A CREATIVE PRODUCT

> Creativity exists not only where it creates great historical works, but also everywhere human imagination combines, changes, and creates anything new.
>
> LEV VYGOTSKY, "Imagination and Creativity in Childhood"

The development of the creative imagination, then, is based on what is usually considered creative activity: pretend play, fantasy, and the making of creative products. In accordance with Vygotsky's developmental and dialectic perspective, he viewed creativity not as a trait nor a genetically determined stable property limited to special people. In fact, he never studied "creative people" in the sense of people who had made a transformative contribution to art, science, or invention. Rather, he viewed creativity as a growing, positive capability of all healthy functioning individuals. Vygotsky would have probably agreed with Feldman (1994) that creativity is a "transformational imperative" in everyone. Creativity transforms both the creator, through the personal experience of the process, and others, through the impact of new knowledge and innovative artifacts disseminated through culture. By engaging in creative activity, people weave together the transformation of the known and the new into social forms. What makes this activity particularly salient is the sharing of emotions and the transformative power of jointly negotiated meaning making.

Emotion

> Art systematizes a very special sphere in the psyche of social man—his emotions.
>
> LEV VYGOTSKY, *The Psychology of Art*

Vygotsky (1965/1971) thought that emotion motivates imagination, thinking, meaning making, and the understanding and use of signs: "All psychological systems which attempt to explain art are nothing but various combinations of the theories of imagination and emotion" (p. 200). Through the embodiment of creative process and subjective experience into objective form and meaning, creativity makes the emotions of the artist and audience public in a systematic way, and it achieves an aesthetic effect from the tensions between form and meaning. Society thus uses art as a means to bring intimacy into the social realm. In *The Psychology of Art*, Vygotsky (1965/1971) wrote that art "introduces the effects of passion, violates inner equilibrium, changes will in a new sense, and stirs feelings, emotions, passions and vices without which so-

ciety would remain in an inert and motionless state" (p. 249). In viewing the role of art in this manner, he explored the mobilizing and cathartic effects of creativity and the placing of these feelings into the social realm. He further wrote that "art is the organization of our future behavior. It is a requirement that may never be fulfilled but that forces us to strive beyond our life toward all that lies beyond it" (p. 253). Creativity's emotional energy drives us toward future possibilities.

Therefore, underpinning creativity is the conscious awareness of the interaction of one's own and others' subjective, emotional experiences. The sharing of emotions through art does not mean that each individual experiences that emotion in the same manner; each internalizes the experience through his or her own lens and background. Emotion may start out simply as a bodily reaction, but it takes on new, productive functions in the context of cultural mediation (Vygotsky, 1959/1987). In fact, emotion operates under the social and cultural norms of the person's time: "Complex emotions emerge only historically. They are combinations of relationships that develop under the conditions of historical life" (Vygotsky, 1982/1997e, p. 103).

Vygotsky (1936/1999a) continued this line of thinking in a short essay on the psychological "paradox of the actor" first noted by Diderot (1773/1936). Actors embody feelings that become what the entire audience feels. But these embodied feelings are not necessarily the actors' real feelings; the actors do not live through or subjectively experience the emotions they convey. Still, these emotions are interpreted as real by the audience (see Sawyer, in press). Vygotsky surmised that understanding this phenomenon lies at the intersection of the qualities of the actors and the general psychological and ideological patterns prevalent in a particular culture at a specific historical period: in the interaction of personality and culture. The actor draws from "idealized passions" of his or her culture that are similar to the conventional literary or artistic forms on which novelists and sculptors draw. The art of the actors is the crystallization of these social passions in dialectic with the audience.

Vygotsky's thinking parallels the early studies of Gardner (1994), which emphasized art as an exchange between creator, performer, viewer, and critic. Through a Vygotskian lens, this exchange could be a resonance between ways in which these different roles create meaning from the artwork, as described later in this chapter. Through imagination, emotion is invested in and separated from the art object or performance by each participant in the aesthetic encounter. Leontiev (1990) followed up on this idea by asserting that objects become "colored" with personal meaning and that art reflects this subjective transformation.

New systems are not just linked with social signs but also with ideology and meanings which function in the consciousness of people.

LEV VYGOTSKY, "On Psychological Systems"

Meaning and Sense

Through signs, people can create secondary mental stimuli that mediate their own and others' interaction with people and objects: People can give things meaning. According to Vygotsky (1930/1997d, p. 111; 1968/1997f), meaning relates emotion to activity and activity to emotion via a complex process of shared understanding. Meaning is the socially agreed-on definition of something—the dictionary definition for a word, for example. Creativity involves bringing something new into the realm of social meaning. Vygotsky used the term sense to refer to how this something new emerges. Sense is "the sum of all the psychological events aroused in our consciousness by the word" (Vygotsky, 1934/1962, p. 149). It can fluctuate over time, from person to person, and across situations. It includes meanings no longer used and possible future meanings; connotations and metaphorical connections; and latent properties of the sign or object. For example, the sense of a literary work's title becomes deepened by the text, which is the context that enriches it. Through the interaction of the title and other words in the text, it acquires new significance, a broader sense.

Creative thought, then, starts as an imaginary sense of how things might be, which is expressed in an ongoing dialectic between the general categories of the culture and the specific materials and emotional experiences with which the individual works (Prawat, 1999; Vygotsky, 1936/1999a). Creative work builds on the fluidity and personal influences of sense. For example, an artist's subjective experience can be combined with different senses of his or her medium and symbol system and externalized as an artifact whose social meaning is intersubjectively negotiated (John-Steiner, 2000). This expansion of meaning into sense could correspond to Guilford's (1970) divergent thinking, and the acceptance of the new meaning into intersubjective agreement parallels both Wallas's (1926) notion of verification and Csikszentmihalyi's (1988) "gatekeeper" field functions. The subtle use of sense when brought into the social sphere through art is part of the challenge creative people face as they build new relationships and externalize their own understanding.

Vygotsky's writings on meaning focused on language. His exploration of the psychology of art relied heavily on his analysis of Hamlet and many other literary examples (Vygotsky, 1965/1971). The power of words (in bridging time and space, personal and social experience, and the past and the present) is well understood by creativity researchers. As Csikszentmihalyi (1996) noted: "The first narrative stories telling of real or imaginary events, the myths and campfire stories of our ancestors, extended dramatically the range of human

experience through imagination" (p. 238). As mentioned above, inner speech is a critical component in the development and use of fantasy during adolescence. When Vygotsky traced language from its external, communicative manifestations to its most condensed inner representation, he concluded that inner speech "is to a large extent thinking in pure meanings. It is a dynamic, shifting, unstable thing" (Vygotsky, 1934/1962, p. 249). Inner speech, then, is the condensation of meaning derived from social interaction. It is related to our own experience, to form a more intricately interconnected web of understanding of oneself and one's world.

In Thought and Language, Vygotsky (1934/1962) used an example from Tolstoy's Anna Karenina to capture the condensed nature of inner speech and the depth of understanding that it requires to follow another's telegrams of thought. In elaborating on the role of inner speech in creative activity, John-Steiner (1997) proposed that "inner speech writing," such as that found in Virginia Woolf's journals, are cryptic forms of creative thought that help individuals plan, organize, and transform their ideas: "Creative thinking is that search for meaning which encompasses rapid bursts of ideas embedded in the sustained thought activities of the thinker. There is a continuing interaction between generative thought, which is often condensed, fluctuating, and unstable and communicated thought, which is expanded and organized for maximum impact" (p. 218). Inner speech assists the person in creating new meanings.

Although Vygotsky focused on language, he realized that it is not the only symbol system to which this meaning-making process applies. In "The Instrumental Method in Psychology" (1997c) he elaborated on the many domains available: "The following may serve as examples of psychological tools and their complex systems: language, different forms of numeration and counting, mnemotechnic techniques, algebraic symbolism, works of art, writing, schemes, diagrams, maps, blueprints, all sorts of conventional signs, etc." (p. 85). John-Steiner (1995) called this array of psychological tools and artifacts "cognitive pluralism." Particular types of thought develop depending on what activities people participate in, how they represent experiences, and which situations they prefer (John-Steiner, 1997). Therefore, they can develop and create in many different ways, depending on what the culture has available to match their talents and goals. There are usually many thinking styles present in a given culture (Wertsch, 1991). However, it should be noted that domains and thought processes are not synonymous: Different kinds of psychological systems can be used in a variety of domains. As John-Steiner (1997) and Gardner (1983, 1993) pointed out, a dancer could be primarily a musical or a geometric thinker; a scientist could be strong in either algorithmic or spatial thinking or both.

Therefore, the creative process builds on the externalization of emotions, imagination, concepts, and the varied meanings and senses of words as they are synthesized and transformed into creative products. This systematic process of

cultural development changes the interfunctional relationships of social and psychological systems over time.

The dynamic of the personality is drama.

LEV VYGOTSKY, "The Problem of the Cultural Development of the Child"

THE DEVELOPMENT OF A CREATIVE PERSONALITY

Through the use of creative imagination and the personal experience of developmental internalization and creative externalization, a personality forms and transforms. A personality is a characteristic way of behaving brought about by increasing, conscious mastery of these processes. This mastery, in turn, regulates further behavior. Therefore, Vygotsky (1960/1997b) emphasized the changing process of personality formation rather than the personality as a set of stable traits: "The transformation from outside inward transforms the process itself, changes its structure and functions" (p. 106). A personality develops over one's life span through struggle and continuous change, internally and in tandem with the environment; the stage on which this drama unfolds is the individual mind within a cultural-historical context (Vygotsky, 1929/1994a). Depending on their experiences, some individuals can develop personalities that become characteristically creative.

Experience

The essential factors which explain the influence of environment on the psychological development of children, and on the development of their conscious personalities, are made up of their emotional experiences [perezhivanija].

LEV VYGOTSKY, "The Problem of the Environment"

The basis of personality development is a person's experience. Although the role of experience in cognitive development is widely discussed among students of Vygotsky, his exploration of it in emotion and personality are less well-known. In "The Problem of the Environment," Vygotsky (1935/1994b) describes the concept of perezhivanija (p. 339). This word refers to subjective experience or living through an event. Vygotsky (1935/1994b) thought that psychologists need to find the particular "prism" that determines the role and influence of the environment, or "how a child becomes aware of, interprets, [and] emotionally relates to a certain event" (p. 341). The developing individual internalizes the impact and meaning of the experience of an event.

Perezhivanija is an important part of the transformative mechanisms of internalization and externalization; it is a reason that social culture and individual personality are not exact replicas of each other. Because one person may emotionally experience an event, artwork, object, or sign differently from another person, that event, artwork, object, or sign will have a different influence on each of these individuals. As a result, these individuals will follow different developmental trajectories over their life spans. An event's objective meaning has little relevance; what is important, developmentally and creatively, is the meaning from the point of view of the person as influenced by social context. Perezhivanija is the relationship between people and their environments; this prism leads to different colorings of life for different people, which leads to different personalities.

Personality Development

We shall never understand fully the human personality if we are to look at it statically as a sum of phenomena, of acts, and the like, without an integral biographical plan of personality, without a main line of development which transforms the history of man's life from a row of disconnected and separate episodes into a connected, integral, lifelong process.

LEV VYGOTSKY, "The Dynamics of Child Character"

Vygotsky's (1983/1997a) conception of the personality is not as broad as that of some contemporary theorists: "We will not include here all the traits of the individual that distinguish it from a number of other individualities, that make up its uniqueness or relate it to one specific type or another. . . . The personality is a social concept. . . . It is not innate but arises as a result of cultural development because 'personality' is a historical concept. It encompasses unity of behavior that is marked by the trait of mastery" (p. 242). Personality is the process, based on one's distinct interactional pattern of higher mental functions, of mastering one's experiences in the world and using those experiences for future development.

Increasing mastery allows for better allocation of one's psychological and social resources toward goals, decision making, and self-reflection: "Intention is a type of process of controlling one's own behavior by creating appropriate situations and connections" (Vygotsky, 1983/1997g, p. 211). In a seeming contradiction, we observe two related developments in the formation of personality: As people become more social and more effective in society, they also become more thoroughly individuated. Each person is a subset of human possibilities, because he or she can only appropriate a fraction of culturally provided possibilities. As people developmentally integrate and master these possibilities, they construct their personalities.

Mastery also has a more subjective component, that of personal transformation. For example, the more positively people experience creative activities, the more creativity becomes a part of their personalities. Over time, they gain more recognized patterns and more formal systems of concepts to draw from and to transform into creative, cultural products within their chosen domains. Creativity, then, not only transforms objective materials into creative products; it also transforms the creator: "In fulfilling the activity, the subjects also change and develop themselves. The transforming and purposeful character of activity allows the subject to step beyond the frames of a given situation and to see it in a wider historical and societal context. It makes it possible for the subject to find means that go beyond the possibilities given" (Engeström, Miettinen, & Punamaki, 1999, p. 39). In fact, Vygotsky (1931/1998d) went so far as to suggest that personal transformation is perhaps one goal of creativity: "It is for oneself, in the mind, that poems and novels are produced, dramas and tragedies are acted out, and elegies and sonnets are composed" (p. 165). Creativity creates the self as well as external artifacts.

In the midst of rapid historical and cultural change, creative individuals need to sustain their sense of integrity and determination. As Vygotsky saw this process, continuity is maintained as fragments of existence are integrated into life narratives. Vygotsky's ideas of personality development are similar to Howard Gruber's (1989) evolving systems theory of creativity, which emphasizes the construction of a creative life based on the ways people make a sustained commitment to their creative tasks. Gruber argued that the interaction between work and personal integrity is guided by a "network of enterprises." In a Vygotskian framework, we speak of a lifelong "zone of proximal development." "Past acts, current experiences, and future plans expand and mobilize the resources of creative individuals. Through their experiences playing with materials and ideas, using their creative imaginations, and seeking distant teachers through cultural artifacts, creators scaffold further possibilities for themselves. Creativity forms a lifelong zone of proximal development that contributes to the sustained development of a creative personality.

THE DEVELOPMENT OF CULTURE

Every inventor, even a genius, is always the outgrowth of his time and environment. His creativity stems from those needs that were created before him, and rests upon those possibilities that, again, exist outside of him.

LEV VYGOTSKY, "Imagination and Creativity in Childhood"

Creativity results in the proliferation of culture: "In the process of historical development, social man changes the methods and devices of his behavior . . . and develops and creates new forms of behavior—specifically cultural" (Vygotsky,

1960/1997b, p. 18). How a culture changes historically—via institutions, technologies, semiotic tools, and variations in values, beliefs, and practices—impacts people's thinking, literacy, numeracy, art, and other capabilities. Because creativity produces an artifact with which others can interact, it crystallizes subjective experience for others. Existing tools and symbols are the fossilized thought and ideas of people who have come before in history. When these tools and symbols do not serve current needs, new ones can be created (Vygotsky, 1960/1997b). Thus, cultural development progresses and is both supported and constrained by the possibilities of a particular historical time.

Historical Time as Support

The application of psychological tools enhances and immensely extends the possibilities of behavior by making the results of the work of geniuses available to everyone.

LEV VYGOTSKY, "The Instrumental Method in Psychology"

Internalization of what is already available in one's culture and society is the foundation for what a person can later contribute (Scribner, 1985). In fact, Vygotsky (1935/1994b) suggested that the environment is not a setting but a "source of development of these specifically human traits and attributes, most importantly because these historically evolved traits of human personality . . . exist in the environment, but the only way they can be found in each individual human being is on the strength of his being a member of a certain social group, and that the represents a certain historical unit living at a certain historical period and in certain historical circumstances" (p. 352).

Signs, tools, and artifacts develop over time and are only incompletely determined at a given point in history (John-Steiner, 1995). Historical conditions dynamically create new contexts and opportunities for development and creativity. John-Steiner (2000) notes that certain innovations within a domain, such as music, cannot occur until the supporting tools (in this case, instruments) are available to allow it, and changes in tools can dramatically alter how a domain progresses. For example, Vygotsky (1965/1971) showed how Shakespeare's and other authors' creativity is based on selecting and combining certain elements within socially accepted standards and aesthetic tastes of their time. New tools, signs, and artifacts provide the gradient on which even more tools, signs, and artifacts can be created in the future. Because historical context is always changing, there can be no universal representation of these developmental dynamics (John-Steiner & Mahn, 1996).

This line of thinking also parallels historiometric research, which uses aggregate data to determine which historical periods, geographical locations, and sociocultural circumstances have best nurtured creativity in Western civiliza-

tion. Simonton (1997) found that "the coming and going of great creative genius in various times and places can be better attributed to changes in the cultural, social, political, and economic circumstances that determine the extent to which the resulting milieu nurtures the development of creative potential and the expression of that developed potential" (p. 3). One of his most intriguing assertions is that the zeitgeist—or spirit of the times—influences and perhaps even determines creativity. Simonton suggests that the designation of greatness goes to those who best fulfill the expectations of their age. Getzels and Csikszentmihalyi's (1976) study came to a similar conclusion: The most successful painters, 10 years after art school, were those whose methods corresponded to the institutionally valued styles of that historical period. Through a Vygotskian lens, we can explain these results: The most eminent are those creators who best utilize the social and cultural tools and best fit with the social and cultural expectations of their time.

LEV VYGOTSKY, "Imagination and Creativity in Childhood"

Historical Time as Constraint

Creativity is an historically continuous process in which every next form is determined by its preceding ones.

Creators, then, are of their time; also, their creativity is made apparent by their products' juxtaposition to other "reference" products from past and present creators. In his theory of expansive learning, Engestrom (1987, 1996) represents Vygotsky's developmental-creativity processes in terms of activity that becomes increasingly disruptive. Once internal contradictions can no longer be ignored, internalization turns into critical self-reflection. It is followed by externalization, which at first is a violation of cultural norms. When the activity reaches its apex, new solutions are produced. Participants then switch back to internalization in their sustained processes of learning (Cole & Engestrom, 1993).

As time passes, however, what was once new becomes traditional. Csikszentmihalyi (1988) reinforces this point: A work is considered creative at a certain historical time when it is first recognized as a significant, domain-changing contribution. But it frequently loses its novel status as it is embraced by the domain and becomes conventional. Other researchers have come to similar conclusions. Gardner's (1993) notion of fruitful asynchrony as applied to Csikszentmihalyi's (1988) systems model parallels Engestrom's notion of violation. Feldman's (1994) continuum of domain development shows how a new idea or variation starts first as idiosyncratic and, as it becomes perceived as useful and significant, undergoes several reorganizations. At the end of this process, members of the next generation learn and internalize the assimilated ideas. In the creative domain of poetry, Martindale (1975) showed how writers work within

culturally defined aesthetic traditions. At the same time, however, they can only gain prestige by breaking from that tradition. This continued pressure toward greater originality eventually destroys existing styles and requires the construction of new conventions. In summary, people and artifacts are conferred creative status socially: They are creative because others, at a certain time, think they are creative. That creative status changes over historical time.

Turning our attention to the collective creativity, which unites all these insignificant fragments, comes the realization of what a great part belongs to the collective creative work or unknown inventors.

LEV VYGOTSKY, "Imagination and Creativity in Childhood"

The Relationship of Individual and Historical Creativity

Contemporary researchers have separated creativity into variations that a person adds to socially standardized practices or procedures ("little c") and breakthroughs that are accepted by the field, which transform the domain ("big C") (Csikszentmihalyi, 1988; Gardner, 1993). Most creativity researchers have focused on big C creators—such as Einstein, Picasso, and other high-level performers—to determine what makes these individuals different from others who have not made a domain-transforming contribution (Gardner, 1993; Gruber, 1989). Other researchers, especially those following the cultural-historical tradition, have focused more on little c introductions of variations (Engestrom, 1987; Rogoff, 1990). Vygotsky's ideas would suggest that the considered little c, or individual inventiveness, and big C, or historical creativity, as dialectically connected.

Most people who engage in creative activities do not make a major impact on cultural domains; they go unrecognized. For Vygotsky (1965/1971), there is no basic difference in the creative process between a storyteller and a famous creator. According to his theory, both appropriate the results of big C Creativity from the historical past through social interaction and cultural artifacts, then adapt that information and expand it on the basis of their own experiences. These variations are shared with others, which may lead to the variation's being conventionalized by the domain and passed on to the next generation.

Although artists, scientists, and inventors have many tools and symbols at their disposal, when they are being potentially big C creative, they are operating at the edge of their domains, in the fuzzy boundary between the field's meaning and the individual's sense (John-Steiner, 1995). There are no socially agreed-on terms or definitions for what they are working on. They are walking an ideational tightrope without a cultural web of meaning to support them. There are no reliable reference points, at the time the creator engages in a particular

new process, for others to know that the work is creative. As Gardner (1993) described this experience: "These are the times that try the mettle of the creator. No longer do the conventional symbol systems suffice; the creator must begin, at first largely in isolation, to work out a new, more adequate form of symbolic expression" (p. 34). In Vygotskian terms, potential big C creators have internalized what the domain has to offer at a particular historical moment and must now try to make socially acceptable new meaning. They have met the future before the rest of their field and are traveling on a journey without any landmarks.

CREATIVITY AND COLLABORATION

> Every symbolic activity . . . was at one time a social form of cooperation.
> LEV VYGOTSKY, "Tool and Sign in the Development of the Child"

Collaboration is a particularly fruitful social venue for people on the edge of transforming their domains because it provides scaffolding in expanding social meaning. Although Vygotsky did not study groups, his concept of the zone of proximal development provides an important basis of exploration. Collaboration is shared creation and discovery of "two or more individuals with complementary skills interacting to create a shared understanding that none had previously possessed or could have known on their own" (Schrage, 1990, p. 40). It is not just an intellectual endeavor; rather, it is like an affair of the mind in which emotions can transform the participants and the work itself is interesting and supportive. Because the emotional intensity of collaboration is quite high, the process can also be painful at times. In Vygotskian terms, as collaborators form new functional relationships, they create varied social expressions of their joint commitment. The zone of proximal development is not solely dyadic; it can also apply to thought communities and communities of practice.

Creativity often thrives in a collaborative environment. Although some studies by organizational theorists (Abra & Abra, 1999; Paulus, Brown, & Ortega, 1999) claim to study collaboration, they are not addressing the same phenomenon as we are here. In some of their studies, collaboration helps spur creativity, whereas in others, creativity is hindered. These contradictory findings reflect an experimental design that throws strangers together and does not allow time for trust and complementarity to emerge. These researchers do not take the developmental perspective that Vygotsky asserted is crucial to creative development and production. Brainstorming and other similar group processes do not represent the characteristics of collaboration, which are long-term engagement, voluntary connection, trust, negotiation, and jointly chosen projects. These are the features we have found essential to successful collaboration (John-Steiner, 2000).

A particularly well documented case of creative collaboration is the invention of cubist painting at the turn of the 20th century (John-Steiner, 2000). Sometimes, this creative breakthrough is attributed solely to Pablo Picasso. However, this domain-transforming process was the result of an intense collaboration between Picasso and Georges Braque. Each painter played off the other's techniques and visions when dealing with the same subject matter, such as harbor landscapes. Their interaction formed a mutual zone of proximal development in which the two painters negotiated their shared meanings. By working together so closely, they expanded the possibilities of their talents. Each grew as an artist by being exposed to and appropriating the perspective offered by the other. In addition, they scaffolded each other professionally and emotionally by sharing the risks of rejection and self-doubt that arise in creative endeavors. As their techniques and subject matter became interrelated, so, too, did their personalities. Picasso remembered, "At that time our work was a kind of laboratory research from which every pretension of individual vanity was excluded" (as quoted in Richardson, 1991, p. 245–246). The simultaneous juxtaposition and intertwining of the temperaments, skills, interests, and processes of these two painters led to a painting method that not only changed the way artists viewed art, but how the general public saw the world.

Methodologically, studying creative collaborations follows Vygotsky's call to research the creative process as it happens; the study of collaborative activity aids in discovering covert processes, because they are expressed and verbalized. Engestrom (1987) concurs: "One of the most persistent methodological difficulties of studying thinking has to do with access to online data from thought processes. When thinking is defined as a private, individual phenomenon only indirect data is accessible. Thinking embedded in collaborative practical activity must to a significant degree take the form of talk, gesture, use of artifacts, or some other publicly accessible mediational instrumentality; otherwise mutual formation of ideas would be rendered impossible. Collaborative thinking opens up access to direct data on thought processes" (p. 45).

Another interesting tie between Vygotskian theory and collaboration is that many tensions within creativity and development are present within these long-term partnerships: the dialectics of personality and culture, meaning and sense, emotion and cognition. Collaborations provide a microcosm for the study of creativity and development. In certain learning dyads, a novice's problem or solutions are more likely to be socially presented and found useful in the larger society. Through collaboration, individuals can form thought communities and mutual zones of proximal development in which to continue their own and each other's creative development. Most of these collaborations are domain-specific, following the lines of Vygotsky's cognitive pluralism perspective.

BUILDING ON VYGOTSKY'S IDEAS TODAY

Psychology has for a long time ascribed too great a significance to just such established stereotypic forms of development that were themselves the result of already developed and fixed processes of development, that is, processes that are concluded and are only repeated and reproduced.

LEV VYGOTSKY, "The History of the Development
of Higher Mental Functions"

Vygotsky left much work to be done; he primarily mapped the terrain and left to others the task of empirical exploration. As we have shown, his work is not separate from, but supports and is supported by, much creativity research completed after his death. Contemporary creativity researchers have done an admirable job of understanding the cognitive and personality traits associated with creativity; now it is time to study how those traits come to be, how they develop in specific contexts. The main challenge is to capture creativity *in the making*, to focus on where turning points are most likely to occur, and to focus on the social transformation of emotional and cognitive experience.

The promise of Vygotsky's approach contrasts with creativity research that has focused on persons, products, and short-term events. Researchers using a psychodynamic or cognitive approach have begun to take a more developmental and life-span perspective. In fact, one of the great contributions of creativity research to the developmental literature has been to show that development continues beyond physical maturation. In addition, *systems* and *dynamics* have become key terms in the study of creative people and processes (Csikszentmihalyi, 1988; Gruber, 1989; Sawyer, this volume). However, these methods often still fall short of Vygotsky's more comprehensive developmental perspective, because they do not take into account all three timescales of creative activity, individual life span, and historical time. History is usually the timescale left out.

Another way to look at creativity research is on a temporal-methodological continuum. At one end are psychometric testing and laboratory experiments, which focus on the isolated individual at one time; at the other end are cultural-historical theorists and, more recently, systems and dynamics theorists, who present a complex picture of the interaction of individual creators, other people, tools, artifacts, socioeconomic forces, and historical time, all in motion. Vygotsky's approach supports the latter. However, it used to be believed that such a high number of variables in motion simultaneously could only be studied qualitatively or narratively; as a result, case studies were often used.

The case-study approach tries to re-create the process of creation over time through the close examination of highly creative people's lives, works, works in progress, and journals (Gardner, 1993; Gruber, 1989; John-Steiner, 1997). For example, John Steinbeck's daily letters to his editor provide detailed data of the

microgenesis of his novels (John-Steiner, 1997, p. 130). These case studies place the individual's motivations, thoughts, and actions within his or her specific cultural-historical milieu and often examine the influences of others, artifacts, symbols and tools on the creative person's developing ideas. These approaches have led to the realization, as Vygotsky suggested, that creativity is not an individual phenomenon, but rather relies on the interaction and judgment of people, socially and historically.

Newer complex systems methods are providing possible avenues to capture and explain the complexity quantitatively. Complex systems theory has barely acknowledged creativity as a topic for research. This theory—which parallels many of Vygotsky's ideas of transformation, interacting systems and multiple timescales—argues that the whole is more than the sum of its parts and is irreducible. It is a mathematical approach that emphasizes *becoming* over *being*, interaction with the environment, and emergence or self-organization (Sawyer, this volume). As a result, a complex system is difficult to study retrospectively, as Vygotsky suggested about both development and creativity. Researchers are just beginning to use the new mathematical methods that have become accessible with increasing computing power. For example, Van Geert (1994) has presented a mathematical model that shows how Vygotsky's zone of proximal development might operate to form different developmental trajectories based on the interaction of different actual and potential growth rates, equilibrium levels, and goals. However, this methodology is relatively untapped in both developmental and creativity research.

In addition to tying in with these new complex systems concepts and tools, Vygotsky's ideas provide a foundation for a synthesize-and-build approach, as opposed to the Cartesian-inspired approach of positivist science. It welcomes and makes use of the contradictions so characteristic of creativity, rather than trying to explain them away. In fact, Vygotsky's own work is full of contradiction; in the process of his own creativity, he picks up and occasionally discards different ideas (e.g., his move from studying signs to studying meaning). In addition, although his theory focuses on the importance of social interaction, he often falls back on describing the interaction's impact on personal experience, not the interaction itself. He understood the methodological and conceptual difficulties of researching creativity formatively, and it may be because of these challenges that many contemporary cultural-historical researchers did not follow in his footsteps in studying creativity.

Because of its focus more on stable elements than dynamic relationships, conceptual and methodological progress has been slow in mainstream Western research. Many contemporary theorists have said that no one element is sufficient to explain creativity. Vygotsky's approach concurs with this belief. With theoretical systems frameworks (including Vygotsky's) and the new dynamic tools available, now is the time to study creativity in relationship, not in isola-

tion. Such an approach will be demanding and complex, and it will require scholars to collaborate in new ways. But as Csikszentmihalyi (1993) observed: "The desire to achieve complexity will have limited value as long as it is held by separate individuals, each nursing it in the privacy of his or her own consciousness. It must be shared to become effective" (p. 281). From the new possibilities that arise in developmental and creativity research as a synthesized domain, we need to cultivate, not reduce, contradictions. Vygotsky's work has inspired us to bring to light and synthesize tensions, to hold and move among different perspectives, and to build on the dynamics of the individual and the social in the construction of the new.

REFERENCES

Abra, J., & Abra, G. (1999). Collaboration and competition. In M. A. Runco & S. R. Pritker (Eds.), *Encyclopedia of creativity* (pp. 283–293). San Diego: Academic Press.

Ayman-Nolley, S. (1999). A Piagetian perspective on the dialectic process of creativity. *Creativity Research Journal, 12*(4), 267–275.

Cole, M. (1996). *Cultural psychology: A once and future discipline.* Cambridge, MA: Harvard University Press.

Cole, M., & Engestrom, Y. (1993). A cultural-historical approach to distributed cognition. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations* (pp. 1–46). New York: Cambridge University Press.

Csikszentmihalyi, M. (1988). Society, culture, and person: A systems view of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 325–339). Cambridge, UK: Cambridge University Press.

Csikszentmihalyi, M. (1993). *The evolving self.* New York: HarperCollins.

Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention.* New York: HarperCollins.

Diderot, D. (1936). Paradoxe sur le comédien. In F. C. Green (Ed.), *Diderot's writings on the theatre* (pp. 249–317). New York: Cambridge University Press. (Original work published in 1773)

Engestrom, Y. (1987). *Learning by expanding. An activity-theoretical approach to developmental research.* Helsinki, Finland: Orienta-Konsultit Oy.

Engestrom, Y. (1996). Development as breaking away and opening up: A challenge to Vygotsky and Piaget. *Swiss Journal of Psychology 55,* 126–132.

Engestrom, Y., Miettinen, R., & Punamaki, R-L. (1999). *Perspectives on activity theory.* Cambridge, UK: Cambridge University Press.

Feldman, D. (1994). *Beyond the universals of cognitive development* (2nd ed.). Norwood, NJ: Ablex.

Gardner, H. (1983). *Frames of mind.* New York: Basic Books.

Gardner, H. (1993). *Creating minds.* New York: Basic Books.

Gardner, H. (1994). *The arts and human development.* New York: Basic Books.

Getzels, J. W., & Csikszentmihalyi, M. (1976). *The creative vision.* New York: Wiley.

Greenfield, P. (in press). *Weaving generations together: Evolving creativity in the Maya of Chiapas.* Santa Fe, NM: School of Americas Research Press.

Gruber, H. (1989). The evolving systems approach to creative work. In D. B. Wallace & H. E. Gruber (Eds.), *Creative people at work* (pp. 3–24). New York: Oxford University Press.

Guilford, J. P. (1970). Traits of creativity. In P. E. Vernon (Ed.), *Creativity: Selected readings* (pp. 126–136). Baltimore: Penguin Books.

John-Steiner, V. (1995). Cognitive pluralism: A sociocultural approach. *Mind, Culture, & Activity, 2*(1), 2–11.

John-Steiner, V. (1997). *Notebooks of the mind: Explorations in thinking* (Rev. ed.). New York: Oxford University Press.

John-Steiner, V. (2000). *Creative collaboration.* New York: Oxford University Press.

John-Steiner, V., & Mahn, H. (1996). Sociocultural approaches to learning and development: A Vygotskian framework. *Educational Psychologist, 31*(4), pp. 191–206.

Leontiev, D. A. (1990). Personal meaning and the transformation of a mental image. *Soviet Psychology, 28*(2), 5–24.

Luria, A. R. (1976). *Cognitive development: Its cultural and social foundations.* Cambridge, MA: Harvard University Press.

Martindale, C. (1975). *Romantic progression: The psychology of literary history.* Washington: Hemisphere.

Paulus, P. B., Brown, V., & Ortega, A.H. (1999). Group creativity. In R. E. Purser & A. Montuori (Eds.), *Social creativity* (Vol. 2, pp. 151–176). Cresskill, NJ: Hampton Press.

Piaget, J. (1962). *Play, dreams and imitation in childhood.* New York: W. W. Norton.

Piaget, J., & Inhelder, B. (1969). *The psychology of the child.* New York: Basic Books.

Prawat, R. S. (1999). Social constructivism and the process-content distinction as viewed by Vygotsky and the pragmatists. *Mind, Culture, and Activity, 6*(4), 255–273.

Richardson, J. (1991). *The life of Picasso.* New York: Random House.

Rogoff, B. (1990). *Apprenticeship in thinking.* New York: Oxford University Press.

Russ, S. W., Robins, D., & Christiano, B. (1999). Pretend play: Longitudinal prediction of creativity and affect and fantasy in children. *Creativity Research Journal, 12,* 129–139.

Sawyer, R. K. (1997). *Pretend play as improvisation: Conversation in the preschool classroom.* Mahwah, NJ: Erlbaum.

Sawyer, R. K. (in press). Acting: To appear in J. C. Kaufman and J. Baer (Eds.), *Faces of the muse: How people think, work, and act creatively in diverse domains.* Mahwah, NJ: Erlbaum.

Schrage, M. (1990). *Shared minds: The new technologies of collaboration.* New York: Random House.

Scribner, S. (1977). Modes of thinking and ways of speaking: Culture and logic reconsidered. In P. N. Johnson-Laird and P. C. Wason (Eds.), *Thinking: Readings in cognitive science.* Cambridge, UK: Cambridge University Press.

Scribner, S. (1985). Vygotsky's uses of history. In J. M. Wertsch (Ed.), *Culture, communication and cognition: Vygotskian perspectives* (pp. 119–145). Cambridge, UK: Cambridge University Press.

Simonton, D. K. (1997). Historiometric studies of creative genius. In M. A. Runco (Ed.), *The creativity research handbook* (Vol. 1, pp. 3–28). Cresskill, NJ: Hampton Press.

Singer, D., & Singer, J. L. (1990). *The house of make-believe*. Cambridge, MA: Harvard University Press.

Smolucha, F. (1992). A reconstruction of Vygotsky's theory of creativity. *Creativity Research Journal, 5*(1), 49–67.

Smolucha, L. W., & Smolucha, F. C. (1986). L. S. Vygotsky's theory of creative imagination. *SPIEL, 5*(2), 299–308. Frankfurt, Germany: Verlag Peter Lang.

Van Geert, P. (1994). Vygotskian dynamics of development. *Human Development, 37,* 346–365.

Vygotsky, L. S. (1962). *Thought and language* (E. Hanfmann & G. Vakar, Trans.). Cambridge: MIT Press. (Original work published as *Myshlenie I Rech',* Moscow-Leningrad: Sotsekgiz, 1934).

Vygotsky, L. S. (1971). *The psychology of art* (Scripta Technica, Inc., Trans.). Cambridge: MIT Press. (Original work published as *Psikhologiia iskusstva,* 1965)

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1987). Emotions and their development in childhood. In R. W. Rieber & A. S. Carton (Eds.), *The collected works of L. S. Vygotsky* (Vol. 1, N. Minick, Trans., pp. 325–338). New York: Plenum Press. (Original work published in *Voprosy Psikhologii,* 3, 1959)

Vygotsky, L. S. (1987). Imagination and its development in childhood. In R. W. Rieber & A. S. Carton (Eds.), *The collected works of L. S. Vygotsky* (Vol. 1, N. Minick, Trans., pp. 339–350). New York: Plenum Press. (Original work published in *Razvitie vysshikh psikhicheskikh funktsii,* Moscow: Izd-vo APN RSFSR, 1960)

Vygotsky, L. S. (1993). The dynamics of child character. In R. W. Rieber & A. S. Carton (Eds.), *The collected works of L. S. Vygotsky* (Vol. 2, J. Knox & C. B. Stevens, Trans., pp. 153–163). New York: Plenum Press. (Original work published in *Pedologija I Vospitanie* [Pedology and Education], pp. 99–119, Moscow: Rabotnik Prosveshchenija, 1928)

Vygotsky, L. S. (1994a). The problem of the cultural development of the child. In R. Van der Veer & J. Valsiner (Eds.), *The Vygotsky reader* (pp. 57–72). Malden, MA: Blackwell Publishers. (Original work published in *Journal of Genetic Psychology, 36,* 415–432, 1929)

Vygotsky, L. S. (1994b). The problem of the environment. In R. Van der Veer & J. Valsiner (Eds.), *The Vygotsky reader* (T. Prout, Trans., pp. 338–354). Malden, MA: Blackwell. (Original work published in *Osnovy Pedologii,* pp. 58–78, Leningrad: Izdanie Instituta, 1935)

Vygotsky, L. S. (1997a). Conclusion; further research; development of personality and world view in the child. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 4, M. J. Hall, Trans., pp. 241–251). New York: Plenum Press. (Original work published in *Sobr. Soch. V 6-ti t,* Vol. 3, pp. 5–228, Moscow: Pedagogika, 1983)

Vygotsky, L. S. (1997b). The history of the development of higher mental functions. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 4, M. J. Hall, Trans.,

pp. 1–251). New York: Plenum Press. (Original work published as *Razvitie vysshikh psikhicheskikh funktsii,* Moscow, 1960)

Vygotsky, L. S. (1997c). The instrumental method in psychology. In R. W. Rieber & J. Wollock (Eds.), *The collected works of L. S. Vygotsky* (Vol. 3, R. Van der Veer, Trans., pp. 85–89). New York: Plenum Press. (From Vygotsky's private archives)

Vygotsky, L. S. (1997d). Mind, consciousness, the unconscious. In R. W. Rieber & J. Wollock (Eds.), *The collected works of L. S. Vygotsky* (Vol. 3, R. Van der Veer, Trans., pp. 109–122). New York: Plenum Press. (Original work published in *Elementy obshchej psikhologii,* pp. 48–61, Moscow: Isdatelstvo BZO pri Pedfake 2-go MGU, 1930)

Vygotsky, L. S. (1997e). On psychological systems. In R. W. Rieber & J. Wollock (Eds.), *The collected works of L. S. Vygotsky* (Vol. 3, R. Van der Veer, Trans., pp. 91–108). New York: Plenum Press. (Original work published in *Sobr. Soch. V 6-ti t,* pp. 109–131, Moscow: Pedagogika, 1982)

Vygotsky, L. S. (1997f). The problem of consciousness. In R. W. Rieber & J. Wollock (Eds.), *The collected works of L. S. Vygotsky* (Vol. 3, R. Van der Veer, Trans., pp. 129–138). New York: Plenum Press. (Original work published in *Psikhologija Grammatiki,* pp. 178–196, Moscow: Izd-vo Moscow University, 1968)

Vygotsky, L. S. (1997g). Self control. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 4, M. J. Hall, Trans., pp. 207–219). New York: Plenum Press. (Original work published in *Sobr. Soch. v 6-ti t,* Vol. 3, pp. 5–228, Moscow: Pedagogika, 1983)

Vygotsky, L. S. (1998a). Development of interests at the transitional age. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 5, M. J. Hall, Trans., pp. 3–28). New York: Plenum Press. (Original work published in *Pedologija podrostka,* Moscow: Izd-vo BZO pri Pedfake 2-go MGU, 1931)

Vygotsky, L. S. (1998b). Development of thinking and formation of concepts in adolescence. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 5, M. J. Hall, Trans., pp. 29–82). New York: Plenum Press. (Original work published in *Pedologija podrostka,* Moscow: Izd-vo BZO pri Pedfake 2-go MGU, 1931)

Vygotsky, L. S. (1998c). Imagination and creativity in childhood. *Soviet psychology, 28* (10), 84–96. (Original work published as *Voobrazhenie i tvorchestvo v shkol'nom vozraste,* Moscow-Leningrad: GIZ, 1930)

Vygotsky, L. S. (1998d). Imagination and creativity in the adolescent. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 5, M. J. Hall, Trans., pp. 151–166). New York: Plenum Press. (Original work published in *Pedologija podrostka,* Moscow: Izd-vo BZO pri Pedfake 2-go MGU, 1931)

Vygotsky, L. S. (1998e). The problem of age. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 5, M. J. Hall, Trans., pp. 187–205). New York: Plenum Press. (From Vygotsky's private archives)

Vygotsky, L. S. (1999a). On the problem of the psychology of the actor's creative work. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 6, M. J. Hall, Trans., pp. 237–244). New York: Kluwer Academic/Plenum Publishers. (Original work published in P. M. Yakobson, *Psikhologiya stsenicheskikh chuvstv aktera,* pp. 197–211, Moscow, 1936)

Vygotsky, L. S. (1999b). Tool and sign in the development of the child. In R. W. Rieber (Ed.), *The collected works of L. S. Vygotsky* (Vol. 6, M. J. Hall, Trans., pp. 1–68). New York: Kluwer Academic/Plenum Press. (Original work published in *Sobr. Soch. V 6-ti-t, Vol. 6*, pp. 5–90, Moscow: Pedagogika, 1984)

Wallas, G. (1926). *The art of thought.* New York: Harcourt, Brace, & World.

Wertsch, J. V. (1991). *Voices of the mind: A sociocultural approach to mediated action.* Cambridge, MA: Harvard University Press.

Winner, E. (1982). *Invented worlds.* Cambridge, MA: Harvard University Press.