The Journal of Mind and Behavior
Winter 1992, Volume 13, Number 1
Pages 89–108
ISSN 0271–0137

Constructivist Psychology: A Heuristic Framework

William J. Lyddon and James T. McLaughlin

University of Southern Mississippi

Psychologists representing a broad spectrum of psychological specialties use the term "constructivist" to characterize their theories and underscore individuals' active participation in reality-making. In spite of constructivism's apparent widespread influence on psychology, however, significantly different forms of constructivist metatheory may be identified when constructivist assumptions about causal processes are contrasted. Both Pepper's (1942) worldview framework and Aristotle's four-fold classification of causation in natural phenomena are used to distinguish four forms of constructivism—material, efficient, formal, and final. Salient examples of each form as evident in contemporary psychological theory are given with a discussion of implications of these distinctions for the development of a comprehensive conception of cognition and human knowing.

As an epistemological perspective, constructivism is based on the assertion that humans actively create their personal and social realities (Lyddon, 1988; Mahoney, 1988). Identified with a philosophical lineage which includes Giambattista Vico's (1725/1948) notion of "imaginative universals," Immanuel Kant's (1791/1969) analysis of the limits of derived knowledge, and Hans Vaihinger's (1911/1924) neo-Kantian philosophy of "as if" (see Mahoney, 1988, for a detailed historical review), constructivism is also explicitly identified with several psychological domains. Psychological constructivism is evident in contemporary contributions to career theory (Arthur, Hall, and Lawrence, 1989), cognitive psychology (Arbib and Hesse, 1986; Bruner, 1990; Coulter, 1983; Goodman, 1984; Shaw and Bransford, 1977; Weimer, 1977), developmental psychology (Brofenbrenner, Kessel, Kessen, and White, 1986; Cooper, 1987; Feffer, 1988; Piaget, 1981; Scarr, 1985), developmental psychopathology (Keating and Rosen, 1991), emotion (Averill, 1985; Harré, 1986; Mandler, 1984), family therapy (Dell, 1985; Keeney, 1987; Reiss, 1981), feminist psychology (Belenky, Clinchy, Goldberger, and Tarule, 1986;

Requests for reprints should be sent to William J. Lyddon, Ph.D., Counseling Psychology and Counselor Education, University of Southern Mississippi, Southern Station, Box 5012, Hattiesburg, Mississippi 39406-5012.

Hare–Mustin and Maracek, 1988; Unger, 1983; Wittig, 1985), human sexuality (Greenberg, 1988; Shaw and Bransford, 1977; Tiefer, 1987), narrative psychology (Bruner, 1986; Howard, 1989, 1991; Mair, 1989; Polkinghorne, 1988; Sarbin, 1986), personality (Hampson, 1988; Royce and Powell, 1983), psychology of religion (Bergin, 1991; Kwilecki, 1988; Worthington, 1989), psychotherapy (Burrell, 1987; Guidano, 1987; Kegan, 1982; Kelly, 1955; Mahoney, 1991; Masterpasqua, 1989; Neimeyer and Neimeyer, 1987), and social psychology (Gergen, 1982, 1985).

Although constructivism's influence on contemporary psychological theory has been pervasive, psychologists (and constructivists) rarely distinguish among significantly different forms of constructivist thought. At least four types of constructivism may be distinguished, for example, when these theories are reviewed in light of their assumptions about the nature of causation and change. One heuristic framework for contrasting constructivist theories along these dimensions is Pepper's (1942) worldview perspective and his presentation of root metaphor theory. This article therefore has a three-fold purpose. First, we provide a brief overview of Pepper's worldview framework with particular emphasis on the salient Aristotelian causal assumptions associated with each of the four wordviews. Second, based upon this classificatory scheme, we identify four forms of psychological constructivism together with contemporary theoretical exemplars of each form. Third, we discuss the implications of this framework for the development of a comprehensive conception of cognition and knowing.

Root Metaphor Theory

Pepper's (1942) philosophical framework is concerned with the personal and social constitution of world hypotheses (worldviews). A world hypothesis is a tacit frame of reference that is "unlimited" in the scope of observations and inferences it incorporates. As an attempt to provide a comprehensive view of the world, a world hypothesis operates by a set of conceptual assumptions based upon common sense knowledge and understandings. Pepper identified four relatively independent worldviews—formism, mechanism, contextualism, and organicism—each based on a fundamental metaphor with unique, corollary assumptions about causes of world phenomena.

Pepper's World Hypotheses

Formism is based on the root metaphor of *similarity* and the identification of a single recurring descriptor among the phenomena of the world—a descriptor that is used to analyze and assign phenomena to distinct categori-

cal classes, typologies, or ideal forms. As Peterson (1988) states, formism seeks to explain by "categorization, specifying some form that captures the essence of the phenomenon" (p. 106). Regarding causal assumptions, formism relies on the Aristotelian notion of *material cause* (Altman and Rogoff, 1987)—the belief that stable and intrinsic characteristics of phenomena account for their functioning. This type of causal understanding assumes that causes are embodied by the phenomenon itself and are fundamentally material "essences" (Altman and Rogoff, 1987). By way of example, Rychlak (1977) suggests that material cause involves "a substance (such as genes) having certain qualities that set limits on behavior" (p. 245).

Mechanism uses the root metaphor of the *machine* and an interpretation of the world as being composed of discrete, interactive components—each with a specific location, function, and systematic antecedent-consequent relation to other components (Pepper, 1942). As a result, mechanism relies on Aristotle's concept of *efficient cause* (Rychlak, 1973, 1977)—the causal assumption that understands phenomena in terms of linear cause and effect relations. This conception of causation presumes the existence of antecedent and consequent variables, the former identified as "causes" if systematically associated with the latter (Altman and Rogoff, 1987).

Contextualism is based on the root metaphor of the *historical event*—the active, ongoing act embedded in context (Pepper, 1942). This view seeks to explain in terms of the interdependence of a phenomenon and its context (Peterson, 1988). Change is considered continuous within the contextualist worldview and there are no stable or exhaustive categories of assignment. Contextualist understanding does not emerge from an analysis of elements as in formism or discrete causal relations as in mechanism, but rather from an ongoing synthesis of the inseparable details of an act and its context. Contextualism embraces the notion of *formal cause* (Altman and Rogoff, 1987) which Rychlak (1977) describes as "a pattern, shape, outline or recognizable organization in the flow of events or in the way that objects are constituted" (p. 6).

The root metaphor for organicism is the *organic process* that is presumed to undergird growing, developing, living systems (Pepper, 1942). According to this worldview, phenomena are understood as being in an ongoing process of structural development and transformation. This idea that world phenomena reflect an unfolding of an inherent nature linked to an anticipation of a final form is central to the concept of *final cause* (Peterson, 1988). As Rychlak (1977) points out, final cause is essentially "telic" or teleological in nature and presumes that phenomena operate with some preestablished ends or inherent purposes.

Types of Psychological Constructivism

Applications of root metaphor theory have been made to the fields of aesthetics, education, literature, metaphilosophy, and music as well as psychology (see Efron, 1982). Regarding the latter there has been a growing interest and direct utilization of Pepper's ideas to applied behavioral analysis (Hayes, 1988; Morris, 1988), behavioral medicine and health psychology (Lyddon, 1987; Schwartz, 1984); counseling and psychotherapy (Lyddon, 1989; Lyddon and Adamson, in press), developmental and clinical psychology (Kramer and Bopp, 1989; Lerner and Kauffman, 1985; Santrock and Bartlett, 1986), environmental psychology (Altman and Rogoff, 1987), education (Geddis, 1982; Quina, 1982), hypnosis and psychopathology (Sarbin and Coe, 1979), memory (Belli, 1986), organizational psychology (Payne, 1976), personality and social psychology (Harrell, 1982; Johnson, Germer, Efran, and Overton, 1988), and theoretical psychology (Overton, 1984; Tyler, 1981). Because we contend that the assumptive causes associated with Pepper's worldview typologies can be used to differentiate among various forms of constructivist psychology, the following section offers an outline of material, efficient, formal, and final forms of psychological constructivism.[1]

Material Constructivism

As previously indicated, material causation employs a formistic worldview and assumes that intrinsic and stable properties "within" phenomena themselves account for their functioning. Material constructivism is most evident in the "radical" views set forth by von Glaserfeld (1979, 1984), von Foerster (1984), and Maturana and Varela (1987) who suggest that reality is *exclusively* a function of the structure of the human cognitive system.

Radical perspectives. According to von Glaserfeld (1984), the radical approach to constructivism

> . . . is radical because it breaks with convention and develops a theory of knowledge in which knowledge does not reflect an "objective" ontological reality, but exclusively an ordering and organization of the world constituted by our experience. The radical constructivist has relinquished "metaphysical realism" once and for all. (p. 24)

By rejecting a representational theory of knowledge—the view that persons construct copies or representations of an external reality—the radical per-

[1] Because psychological theories often reflect ideas from more than one worldview, we concur with Altman and Roggoff's (1987) caveat that no psychological theory or research program can be exclusively categorized into one or another worldview. As a result, the theoretical examples we describe under each typology are thought to be only illustrative of the causal assumptions identified with each worldview and not a rigid categorization of particular theories.

spective borders on ontological idealism. It maintains that there is no reality beyond the structurally-determined cognitive activity of the knower.

A structure-determined ontology is also evident in von Foerster's (1984, p. 60) contention that "the nervous system is organized (or organizes itself) to produce a stable reality" and Maturana and Varela's (1987, p. 34) proposition that "all knowing depends upon the structure of the knower." According to these views the organization of a living system is organizationally *closed* and—contrary to popular belief—does not have inputs and outputs. The notion of organizational closure presupposes that the human cognitive apparatus is an autonomous system whose own individual structure fully specifies how it will behave under any and all interactions (see in particular, Varela, 1979). Because it is the cognitive *system* that determines how the organism will behave, "information" has no meaning apart from that given to it by the system. By (a) rejecting any existential claims beyond those encompassed by a system's inherent structure (via recurrence of its forms or self-coherence), and by (b) suggesting that the function of cognition is to organize the experiential world, not to discover or represent an ontological reality, these radical views adhere to a formistic worldview and material theory of causation. To put it perhaps simplistically, the mental map *is* the territory insofar as this view of cognitive reality is concerned.

Efficient Constructivism

As a theory of knowledge constructivism generally is antithetical to mechanism and its metaphor of knower as machine (at least in its deterministic aspect). However, some forms of constructivism exhibit bonds with a mechanistic worldview and tend to endorse efficient causality. Efficient constructivism regards the process of knowing as an active one in which environmental inputs are interpreted and stored as meaningful and potentially useful information. Cognitive theories based on information-processing and social learning constructs (Bandura, 1977; Bransford, 1979; Zimmerman, 1981) appear to exemplify efficient constructivism.

Constructive processing of information. Constructivism in the information-processing paradigm is underscored by Merluzzi, Rudy, and Glass (1981) who declare that this approach to cognition

> . . . views humans as active seekers and users of information. The cognitive system is seen as constantly active, adding to its environmental input and essentially constructing the mind's view of reality. (p. 81)

Information-processing perspectives tend to use a mechanistic metaphor of the brain-as-computer. Most accounts emphasize an "inward" flow of infor-

mation from the environment to the sense organs and the subsequent selective and sequential processing and storage of such information in organized forms, or schemata (Lyddon, 1988). Interactions with the world become a function of the cognitive system's capacity to incorporate sensory data, identify information that is potentially useful in the data, transform this information into meaningful schemata, and use these schemata to choose appropriate responses. Schemata, in turn, are believed to influence or predispose future information processing in a schema-consistent fashion (Fiske and Taylor, 1984).

Social learning theory. A parallel to the information-processing portrayal of relationships among environmental information, constructive cognitive processes, and behavioral responses is Bandura's (1978) cognitive behavioral approach. He states that

> . . . in social learning theory, people play an active role in creating information-generating experiences as well as in processing and transforming informative stimuli. (p. 356)

Social learning theory attempts to explain a person's information interpretation, how that information is translated into action, and under what situations a person will initiate a response. Thus social learning theory is fundamentally cognitive (rule-governed), constructivist (interpretive), and deterministic in viewing cognition and behavior as causally linked in a mutually reciprocal fashion to the environment (Zimmerman, 1981).

Although the information-processing and social learning perspectives view knowing as an active and constructive process, they rely on the ontological claim that what is *known* is to a large extent *derived* from the environment. In other words, the environment directs the process in a linear and efficiently causal fashion by providing the structures that the organism must come to know and to which it must respond. The cognitive system is thought to reconstruct information that is pre-formed in external reality. While recent descriptions of social cognitive theory have begun to assign a greater role to self-generated influences (see Bandura, 1989), most contemporary information-processing and social-learning models tend to conceive of constructed knowledge as composed of discrete *representations* deemed valid or "true" to the degree that they reflect environmental realities accurately (that is, environmental information, social models, and so on). In this case, the cognitive map *represents* the territory.

Formal Constructivism

Recently Rosnow and Georgoudi (1986) examined the implications of contextualism for research and theory in the behavioral sciences and asserted that:

> Contextualism underscores the idea that human activity does not develop in a social vacuum, but rather it is rigorously situated within a sociohistorical and cultural context of meanings and relationships. Like a message that makes sense only in terms of the total context in which it occurs, human actions are embedded in a context of time, space, culture, and local tacit rules of conduct. (p. 4)

The contextualist worldview and its root metaphor of the transitory historical event uses the concept of formal cause as noted previously. The formal causal approaches of contextual constructivism assume that processes of reality are active, ongoing, and both individually and socially constituted rather than being static and categorically knowable such as posited in mechanism. What is crucial to this type of constructivism is the idea that meanings emerge from the organizational patterning or form that phenomena take over time and within context. Although the contributions of James, Angyal, and others are significant historically because of their contextualist views, more recent formal constructivism is most evident in the social constructionist movement (Gergen, 1982, 1985) and in the emerging interest in narrative psychology (Bruner, 1986, 1990; Howard, 1989, 1991; Mair, 1989; Polkinghorne, 1988; Sarbin, 1986; Spence, 1982; Tappan, 1989; Vitz, 1990).

Social constructionism. Gergen's (1982, 1985) recent attempt to transcend endogenic and exogenic theories of knowledge through the endorsement of a social constructionist epistemology represents a significant conceptual development in the social and behavioral sciences. "Endogenic" refers to those theories of knowledge associated with the philosophies of Spinoza, Kant, Nietzsche, and various phenomenologists which view as preeminent the constructive and organizational processes of the mind. "Exogenic," on the other hand, refers to the epistemic commitments of thinkers such as Locke, Hume, the Mills, and various logical empiricists that impart priority to external reality. Gergen (1985) points to significant conceptual limitations of both the endogenic and exogenic perspectives when they are taken to their logical extremes (the problems of solipsism and justification, respectively). His advocation of a social constructionist epistemology seeks to place knowledge not exclusively in the minds of single individuals (endogenic) or in the environment (exogenic) but rather in the processes of social exchange and linguistic construction that set conceptual parameters on personal categories of understanding. In other words, social constructionism represents an epistemic reconciliation between a person's *individual* construction of reality through a network of mental schemas and a society's *collective* construction of reality through a network of socially constituted ideologies, language systems, and practices (Lyddon, 1991). The view that personal constructions of understanding are constrained or moderated by the social milieu—that is, the context of shared meaning systems which develop, persist, and evolve over time—is the core of social constructionist psychology. Such a viewpoint

forms the metatheoretical basis for critical revisions in a growing number of domains: career theory (Arthur, Hall, and Lawrence, 1989), cognition (Arbib and Hesse, 1986; Coulter, 1983), emotion (Averill, 1985; Harré, 1986), gender (Bem, 1987), human and family systems (Anderson and Goolishan, 1988; Griffith, 1986; Griffith and Griffith, 1990), human sexuality (Greenberg, 1988; Tiefer, 1987), mental illness (Sarbin, 1990), personhood (Cushman, 1990; Gergen and Davis, 1985; Sampson, 1985), psychotherapy supervision (Hess, 1987), religious development (Kwilecki, 1988), and scientific knowledge (Bevan, 1991; Knorr–Centina, 1981).

Narrative psychology. The narrative, or story, has been suggested as a potentially useful organizing principle for psychology and other human sciences (Sarbin, 1986). According to Sarbin, the basis of narrative is the contextualist root metaphor of the historical act or the unfolding event. "Narrative" may be defined as a "symbolized account of human beings that has a temporal dimension" (p. 3). Conceptual roots of narrative psychology include Goffman's (1959, 1971) dramaturgical analysis of public conduct, the ethnogenic view of social behavior (Ginsberg, 1980; Harré and Secord, 1972), and role theory (Sarbin and Allen, 1968). Sarbin (1986) suggests that the most familiar example of the use of the historical act metaphor is that of the drama. He indicates that in drama

> . . . the actors' performances, the setting, the time and place, the nature of the audience, the script, the props, and so on, must all be taken into account to make sense of an episode or scene. The actors and the audiences play out their parts according to their individual and collective emplotments. Sense making in the drama is openly contextual. The meanings to be assigned to any actor's performance are a function of the context. (1986, p. 7)

Similarly, narrative psychology treats narrative as an organizing metaphor for human action. Narrative psychology is based on the assumption that individuals impose socially constituted narrative structures (or role forms) on the flow of experience and, as a result, are both the authors *of* and actors *in* self-narratives that form their own personal dramas. In other words, the narrative structures provide the context (and pattern parameters) for individuals' personal constructions and descriptions of experience. Bruner (1986, 1990) and Tulving (1983) separately have advocated similar considerations of narrative thought as a major mode of cognition qualitatively distinct from abstract propositional thought.

Howard (1991) has recently applied the narrative approach in assessing virtually all systems of thought as different versions of meaning-making story-telling. He states:

> The insights of scientific psychology and various humanistic disciplines both represent refined insights into human nature that are of the same genus (that is, story-telling), but are of differing species (that is, science and humanities). (p. 189)

On the social level, culture is construed as a community of individuals who see their world in a particular manner and, more importantly, share these interpretations as central to the meaning of their lives and behavior. By contrasting two basically different anthropological viewpoints, enlightenment vs. romanticist, Howard parallels narrative psychology with the romanticists. This viewpoint not only defends the coequality of different frames of understanding (for example, racial tales, religious narratives, political themes, scientific perspectives, and family narratives), but also argues for their fundamental noncomparability. A cross-cultural psychology from this perspective seeks to discover the *viability* and *utility* of "culture tales," Howard believes, rather than the evaluation of their *accuracy* as objectivists would do.

Because of their mutual emphasis on the socially constituted language structures that are believed to provide the context for the emergence and "flow" of personal meaning patterns, social constructionism and narrative psychology demonstrate a contextualist worldview and a commitment to the notion of formal causation. The goal of cognition, according to these perspectives, is the understanding of the pattern of personally constructed meanings embedded in context. Formal constructivism emphasizes an holistic approach to understanding phenomena—understandings are woven from the inseparable psychological (individually constructed), contextual (socially constructed), and temporal dimensions of experience. To use our analogy once again, the map's view *changes* according to mutual comparisons or interactions with the maps of others over time.

Final Constructivism

Final constructivism, one may recall, presupposes an organismic worldview and a metaphor of the knower as biological organism. This approach to constructivism relies on the concept of final causation and views knowledge as a constructed synthesis of the inevitable contradictions found in person-environment interactions. According to this view, knowledge is dynamic, developmental, and directional. That is to say, as time progresses, knowledge structures are believed to undergo qualitative shifts or organizational transformations in the direction of increased complexity and abstraction. Cognitive-developmental theory (Kegan, 1982; Piaget, 1970, 1981), dialectical approaches (Basseches, 1984a; Pasqual-Leone, 1987; Reigel, 1979), living systems models (Ford, 1987; Guidano, 1987; Jantsch, 1980; Prigogine and Stengers, 1984) and transpersonal perspectives (Walsh and Vaughan, 1980; Wilber, Engler, and Brown, 1986) tend to exemplify forms of psychological constructivism based on the organic metaphor.

Developmental and dialectical theories. Equilibration is the fundamental organismic principle that guides cognitive development (Piaget, 1970, 1981). Mischel (1971) describes equilibration as

> . . . a process of self-regulation which maintains a balance between "assimilation" and "accommodation," compensates for internal and external disturbances, and in doing so leads to the development of more and more complex, integrated, and balanced structures. (p. 328)

Piaget (1970) rejected the "passive mind" view of empiricists that experience imposes knowledge upon the individual and that its form merely reflects the external world. On the other hand, he also rejected *a priori* claims that forms of knowledge function as innately given structures that are actively and arbitrarily imposed by persons on the external world. Piaget contended instead that knowledge is actively constructed (and reconstructed) over time through the interplay of assimilative and accommodative processes. Assimilation entails the ongoing integration of moment-to-moment experience into existing cognitive structures, while accommodation involves a proactive and developmental change in the structures themselves as they respond to emergent discrepancies between ongoing reality and cognitive capacities. While the forms of knowledge are managed by mental structures, these are neither fixed nor innately given, but are constructed. Furthermore, the role of experience within the Piagetian perspective is not to dictate the form of knowledge, but rather to create disequilibrium—a disequilibrium that challenges the knower to actively construct novel forms of understanding. A dynamic state of equilibrium is thus enjoined at a higher, more complex developmental level. The self, redefining (or reconstructing) its relationship to the world in increasingly more coherent and integrated ways, is an organismic notion that has become a foundational assumption associated with several lifespan developmental thinkers recently (Basseches, 1984a; Downing, 1982; Guidano, 1987; Kendler, 1986; Lerner and Kauffman, 1985; Levinson, 1986; Worthington, 1989). Emerging from this line of thought are models of adult cognitive development that reach beyond Piaget's adolescent "formal operations" stage and begin to describe various "postformal operations" and cognitive shifts. Cognitive development throughout the lifespan is viewed as an ongoing dialectical process whereby inevitable tensions and contradictions emerge from each synthesis of previous thesis-and-antithesis tensions (Basseches, 1984a, 1984b; Pasqual–Leone, 1984).

Systems perspectives. Contemporary descriptions of systems theory also differentiate, like developmental and dialectical approaches, between two types of dynamic "tensions" that a system may undergo in its adaptation to both internal and external sources of stress. These include *equilibrium* and *dissipative* change. Equilibrium change refers to a dynamically maintained (ordered)

state where changes function to preserve the basic structure of a system. Dissipative change represents a nonlinear transformation of system structures and a qualitative reformulation of the system and its very capacities (Capra, 1982; Jantsch, 1980; Prigogine and Stengers, 1984). Systemic *self-organization* via dissipative change processes has become a significant feature in some final constructivist views of humans as active, self-construing, open, and emerging systems (Brent, 1978; Ford, 1987; Guidano, 1987; Mahoney and Lyddon, 1988; Sampson, 1985). Ford (1987), for example, in a theoretical analysis of humans as self-constructing living systems states:

> People display properties of self-construction, self-direction, self-control, and self-regulation, properties which give the appearance of purposive or goal-directed behavior. People's functioning appears to be directed towards maintaining and elaborating the effectiveness and complexity of their behavioral organization and the organization of their relationships with environments. To a considerable extent they are producers of their own development. (pp. 28–29)

According to Ford, there are three fundamental kinds of change processes: self-organizational, self-construction, and disorganizational-reorganizational. Self-organizational processes serve to maintain a dynamic equilibrium of existing patterns of organization by assimilating new yet compatible information into existing schemata. Self-construction processes create behavioral options and capabilities by altering existing patterns of organization to accommodate new information that cannot be readily assimilated. Disorganizational-reorganizational processes transform functional patterns to a new dynamic equilibrium when disrupting influences are too great to be accommodated by existing capabilities (Ford and Ford, 1987).

Transpersonal trajectories. Some contend that neither systemic nor humanistic perspectives do justice to the holistic "paradigm shift" occurring from the encounter of Western thought with Eastern worldviews (Wulff, 1991). The diverse transpersonal psychology movement beginning around the late 1960's, for example, appears in some ways to be a search for a synthesis of all realms of experience that favors an all-embracing vision of reality. The telic emphasis of final constructivism can be seen in the models of writers such as Wilber (1981, 1986) who see an evolution of human kind both collectively and individually toward integral wholeness and spirit. His "full-spectrum" developmental model tries to bridge conventional (Western) and contemplative (Eastern) orientations. Nine levels of self-development are posited which are bracketed in three realms—prepersonal or self-emergent, personal or ego-differentiation, and transpersonal or self-transcendant. The first two realms encompass traditional considerations of development, but the transpersonal perspective considers even complete ego development as a potential developmental arrest rather than as a level of normalcy. The fullest

development involves ego-transcendence which Wilber regards as fundamental to the full realization of human potential (Lyddon, 1989). Other synthetic approaches contingent upon final causality have also been made for dialectical developmental views of spirituality and faith development in psychological terms (for example, Fowler, 1981; Fowler and Keen, 1978). Although these more traditional approaches tend not to prescribe the self-transcendence level of ego development, they nonetheless allude to a telic principle at work where the ego seeks to serve interests beyond itself. Fowler's integration of Piagetian cognitive development and Kohlberg's moral development with faith systems assume such an epigenetic principle where the spiritual realm is included as a primary organizing aspect of the person's environment. One writer has reminded fellow psychologists that the development of religious faith shows this ever-emerging cognitive dialectic as persons seek to make meaning of their experiences (Worthington, 1989). Bergin (1991), in discussing psychotherapy, maintains that while cognitive growth is essential to most therapy, the cultural content of clients' religious worldviews must be acknowledged as a viable framework for dialectical development as much as any other form of cultural diversity. In short, cognitive development is a directional process whereby old forms of knowing emerge to new, more comprehensive forms from the knower continuing to construct more epistemologically powerful (that is, inclusive, viable, integrated) ways of making sense of the world.

The root metaphor of the organic process and the concept of final causality binds transpersonal perspectives with their systems, developmental, and dialectical counterparts. By these accounts the human organism is (a) fundamentally teleological or always in the process of becoming and (b) capable of organizing and reorganizing itself throughout the lifespan. In terms of our map analogy, the map *rewrites* itself as it reciprocates with the territory—perhaps by anticipation of final forms.

Toward a Comprehensive Constructivist Psychology

Psychologists have begun to reexamine the tacit philosophical implications of their theories and methods (Altman and Rogoff, 1987; Barclay, 1978; Howard, 1986; Mahoney, 1991; O'Donohue, 1989; Polkinghorne, 1983; Rosnow and Georgoudi, 1986; Stam, Rogers, and Gergen, 1987; Weimer, 1979). These writers variously illustrate that any specific psychological theory or concept presupposes a more general philosophical viewpoint or paradigm within which the specific theory or concept is framed. To acknowledge the influence of this embeddedness, we have suggested that related constructivist theories by no means reflect a unified and internally consistent philosophical base when contrasted along the dimension of causal assumptions, despite their shared epistemic commitment to constructivism.

We have employed Pepper's root metaphor theory as a heuristic framework and, more specifically, Aristotle's four-fold theory of causation, to propose that at least four forms of psychological constructivism may be differentiated. (1) Material constructivist theories rely on notions of material causation as well as the idea that knowledge is derived exclusively from the structures or fundamental materials of the knower. Ontologically, reality is structure-determined and does not exist independent of the cognitive system's closed organizational structure. (2) Efficient constructivist theories, on the other hand, assume the existence of a separate ontological reality—one which "informs" the knower in a linear and efficiently causal fashion. Reality is actively "processed" (reconstructed), and these constructions become useful and adaptive to the extent that valid cognitive representations are developed. (3) Formal theories of constructed knowledge, based on formal causal assumptions, view knowing as an ongoing cognitive "search" for meaningful patterns in the contextual flow of moment-to-moment experience. Important to formal constructivism is the notion that personal realities are constrained by the socially and historically constituted roles, values, language structures, and cultural narratives that make up the changing contexts of individuals' lives. (4) In contrast, final constructivist theories assume the concept of final cause or the view that knowledge is fundamentally teleological by its anticipation of some larger unfolding structure. In final constructivism, new, more inclusive forms of knowing emerge from the achievement of synthesis of inevitable discrepancies, contradictions, and tensions involved in person-environment interactions.

Distinctions between these various forms of constructivist psychology may be somewhat unsettling to some constructivists (especially to those unified around a common epistemic commitment to constructivism's root idea of personal construction). These differentiations, however, are not meant to preclude the possibility that *all forms of constructivist psychology may reflect different yet viable accounts of human knowing*. The advantage of this conjecture is its openness to the possibility that an encompassing paradigm of constructivist psychology may be developed; one perhaps concerned more with viability than with validity. Pepper (1942), it should be noted, suggested in his careful delineation of root metaphor theory that all four world hypotheses offer their own unique "window" into the understanding of reality. Moreover, while Pepper traced his analysis to antecedents in Aristotle's formulations, it is significant to note that the latter developed his causal theory in an attempt to fully render the nature of phenomena and their inherent, apparently paradoxical properties of stability and change. According to Aristotle we have not given a full causal account of a phenomenon until its material, efficient, formal, and final causal properties are addressed comprehensively and collectively (Robinson, 1985).

When this comprehensiveness is applied to the areas of cognition and human knowing, the contentions of Pepper and Aristotle may be instructive. A full rendering of human knowing, for example, would begin by considering those aspects of cognition that are more or less "hard-wired" and function as material structures of the human nervous system. These "material" forms of knowing may include but not be limited to such features as infant attachment processes, facial recognition, color vision, and the nervous system's ability to construct meaning through contrast and distinction (Bateson, 1979; Hayek, 1952; Mahoney, 1985). A comprehensive constructivist psychology would also incorporate those aspects of cognition that reflect a capability to almost mechanically or "efficiently" process environmental information. For example, short term and semantic memory processes and various forms of analog cognition (that is, mental representations that have an underlying physiological analogy to the external stimulus) may be most clearly implicated here.

An encompassing constructivist paradigm would also be able to integrate the dimension of formal cause and the assertion that what we know of ourselves and the world may be historically and contextually situated. The implication is that structures of knowledge shared by individuals of a community, such as social roles and values, may coalesce into a patterned reality of social schema external to each individual—social schema that serve to constrain personal categories of knowing. Finally, along with material, efficient, and formal dimensions of human cognition, a comprehensive constuctivist psychology must come to acknowledge human knowing as having telic characteristics (Rychlak, 1981). The conceptualization of personal and social construct systems as evolving (or co-evolving) in their developmental journeys through space and time puts human knowing in a systems/process framework of continual becoming. What emerges is a recognition of the agentic, purposeful, and generative (creative) aspects of human knowing in addition to accentuating temporal and developmental features (Howard, 1986). Such an organismic perspective would also renew an openness to studies of human meaning-making systems such as cultural, philosophical, and spiritual traditions as telic features of individuals' development.

Constructivism has emerged as a powerful epistemic perspective in 20th-century psychological science. As it continues to influence the development of psychological theory, constructivism will become increasingly important if distinctions can be clarified among its various forms of expression. It is our hope that such distinctions, rather than being divisive, may provide the catalyst for the development of a more encompassing model of human knowing—one which allows for a diversity of viable perspectives.

References

Altman, I., and Rogoff, B. (1987). World views in psychology: Trait, interactional, organismic, and transactional perspectives. In D. Stokols and I. Altman (Eds.), *Handbook of environmental psychology* (pp. 7–40). New York: Wiley-Interscience.

Anderson, H., and Goolishan, H.A. (1988). Human systems as linguistic systems: Preliminary and evolving ideas about the implications for clinical theory. *Family Process, 27*, 371–393.

Arbib, M.A., and Hesse, M.B. (1986). *The construction of reality*. London: Cambridge University Press.

Arthur, M.B., Hall, D.T., and Lawrence, B.S. (1989). Generating new directions in career theory: The case for a transdisciplinary approach. In M.B. Arthur, D.T. Hall, B.S. Lawrence (Eds.), *Handbook of career theory* (pp. 7–25). New York: Cambridge University Press.

Averill, J. (1985). The social construction of emotion: With special reference to love. In K.J. Gergen and K.E. Davis (Eds.), *The social construction of the person* (pp. 89–109). New York: Springer-Verlag.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, New Jersey: Prentice-Hall.

Bandura, A. (1978). The self system in reciprocal determinism. *American Psychologist, 33*, 344–358.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44*, 1175–1184.

Barclay, J.R. (1978). *Foundations of counseling strategies*. Huntington, New York: Kreiger.

Basseches, M.A. (1984a). *Dialectical thinking and adult development*. Norwood, New Jersey: Ablex.

Basseches, M.A. (1984b). Dialectical thinking as a metasystematic form of human organization. In M.L. Commons, F.A. Richards, and C. Armon (Eds.), *Beyond formal operations: Late adolescent and adult cognitive development* (pp. 216–238). New York: Praeger.

Bateson, G. (1979). *Mind and nature: A necessary unity*. New York: Bantam.

Belenky, M.F., Clinchy, B.M., Goldberger, N.R., and Tarule, J.M. (1986). *Women's ways of knowing: The development of self, voice, and mind*. New York: Basic Books.

Belli, R.F. (1986). Mechanist and organicist parallels between theories of memory and science. *Journal of Mind and Behavior, 7*, 63–86.

Bem, S.L. (1987). Gender schema theory and the romantic tradition. *Review of Personality and Social Psychology, 7*, 25–71.

Bergin, A.E. (1991). Values and religious issues in psychotherapy and mental health. *American Psychologist, 46*, 394–403.

Bevan, W. (1991). Contemporary psychology: A tour inside the onion. *American Psychologist, 46*, 475–483.

Bransford, J.D. (1979). *Human cognition: Learning, understanding and remembering*. Belmont, California: Wadsworth.

Brent, S.B. (1978). Prigogine's model for self-organization in nonequilibrium systems: Its relevance for developmental psychology. *Human Development, 21*, 374–387.

Brofenbrenner, U., Kessel, F., Kessen, W., and White, S. (1986). Toward a critical social history of developmental psychology: A propaedeutic discussion. *American Psychologist, 41*, 1218–1230.

Bruner, J. (1986). *Actual minds, possible worlds*. Cambridge, Massachusetts: Harvard University Press.

Bruner, J. (1990). *Acts of meaning*. Cambridge, Massachusetts: Harvard University Press.

Burrell, M.J. (1987). Cognitive psychology, epistemology, and psychotherapy: A motor-evolutionary perspective. *Psychotherapy, 24*, 225–232.

Capra, F. (1982). *The turning point*. New York: Bantam.

Cooper, C.R. (1987). Conceptualizing research on adolescent development in the family: Four root metaphors. *Journal of Adolescent Research, 2*, 321–330.

Coulter, J. (1983). *Rethinking cognitive theory. London: Macmillan*.

Cushman, P. (1990). *Why the self is empty: Toward a historically situated psychology*. American Psychologist, 45, 599–611.

Dell, P.F. (1985). Understanding Bateson and Maturana: Toward a biological foundation for the social sciences. *Journal of Marital and Family Therapy, 11*, 1–20.

Downing, D.B. (1982). "Radical historicity" and common sense: On the poetics of human nature. *Journal of Mind and Behavior, 3*, 303–322.

Efron, A. (Ed.). (1982). The Pepper papers, a symposium on the metaphilosophy of Stephen C. Pepper: Root metaphor theory [Special issue]. *Journal of Mind and Behavior, 3*(3 and 4).

Feffer, M. (1988). *Radical constructionism: Rethinking the dynamics of development*. New York: New York University Press.

Fiske, S.T., and Taylor, S.T. (1984). *Social cognition*. New York: Random House.

Ford, D.H. (1987). *Humans as self-constructing living systems: A developmental perspective on behavior and personality*. New York: Erlbaum.

Ford, M.E., and Ford, D.H. (1987). *Humans as self-constructing living systems: Putting the framework to work*. Hillsdale, New Jersey: Erlbaum.

Fowler, J.W. (1981). *Stages of faith*. New York: Harper and Row.

Fowler, J.W., and Keen, S. (1978). In J. Berryman (Ed.), *Life maps: Conversations on the journey of faith*. Waco, Texas: Word Books.

Geddis, A.N. (1982). Teaching: A study in evidence. *Journal of Mind and Behavior, 3*, 363–373.

Gergen, K.J. (1982). *Toward transformation in social knowledge*. New York: Springer-Verlag.

Gergen, K.J. (1985). The social constructionist movement in modern psychology. *American Psychologist, 40*, 266–275.

Gergen, K.J., and Davis, K.E. (Eds.). (1985). *The social construction of the person*. New York: Springer-Verlag.

Ginsberg, G.P. (1980). Situated action: An emerging paradigm. In L. Wheeler (Ed.), *Review of personality and social psychology* (Vol. I, pp. 295–325). Beverly Hills, California: Sage.

Goffman, E. (1959). *The presentation of the self in everyday life*. New York: Doubleday.

Goffman, E. (1971). *Relations in public*. New York: Basic Books.

Goodman, N. (1984). *Of mind and other matters*. Cambridge, Massachusetts: Harvard University Press.

Greenberg, D.F. (1988). *The construction of homosexuality*. Chicago: University of Chicago Press.

Griffith, J.L. (1986). Employing the God–family relationship in therapy with religious families. *Family Process, 25*, 609–618.

Griffith, J.L., and Griffith, M.E. (1990, May). *The God-construct as an avenue to therapeutic change*. Paper presented at the Constructivism in Psychotherapy Conference, Memphis, Tennessee. (Department of Psychiatry and Human Behavior, University of Mississippi School of Medicine, Jackson, Mississippi.)

Guidano, V.F. (1987). *Complexity of the self: A developmental approach to psychopathology and therapy*. New York: Guilford.

Hampson, S.E. (1988). *The construction of the personality*. London: Routledge.

Hare–Mustin, R.T., and Maracek, J. (1988). The meaning of difference: Gender theory, postmodernism, and psychology. *American Psychologist, 43*, 455–464.

Harré, R. (Ed.). (1986). *The social construction of emotions*. New York: Basil Blackwell.

Harré, R., and Secord, P.F. (1972). *The explanation of social behavior*. Totowa, New Jersey: Rowman and Littlefield.

Harrell, B.J. (1982). The social basis of root metaphor: An application to "Apocalypse Now" and "The Heart of Darkness." *Journal of Mind and Behavior, 3*, 221–240.

Hayek, F.A. (1952). *The sensory order*. Chicago: University of Chicago Press.

Hayes, S.C. (1988). Contextualism and the next wave of behavioral psychology. *Behavior Analysis, 23*, 7–22.

Hess, A.K. (1987). Psychotherapy supervision: Stages, Buber, and a theory of relationship. *Professional Psychology: Research and Practice, 18*, 251–259.

Howard, G.S. (1986). *Dare we develop a human science?* Notre Dame, Indiana: Academic Publications.

Howard, G.S. (1989). *A tale of two stories: Excursions into a narrative approach to psychology*. Notre Dame, Indiana: Academic Publications.

Howard, G.S. (1991). Culture tales: A narrative approach to thinking, cross-cultural psychology, and psychotherapy. *American Psychologist, 46*, 187–197.

Jantsch, E. (1980). *The self-organizing universe: Scientific and human implications of the emerging paradigm of evolution*. New York: Pergamon.
Johnson, J.A., Germer, C.K., Efran, J.S., and Overton, W.F. (1988). Personality as the basis for theoretical predilections. *Journal of Personality and Social Psychology, 55*, 824–835.
Kant, I. (1969). *Critique of pure reason*. New York: St. Martin's Press. (originally published 1791)
Keating, D.P., and Rosen, H. (Eds.). (1991). *Constructivist perspectives on developmental psychopathology and atypical development*. Hillsdale, New Jersey: Erlbaum.
Keeney, B.P. (1987). The construction of therapeutic realities. *Psychotherapy, 24*, 469–476.
Kegan, R. (1982). *The evolving self*. Cambridge: Harvard University Press.
Kelly, G.A. (1955). *The psychology of personal constructs*. New York: Norton.
Kendler, T.S. (1986). World views and the concept of development: A reply to Lerner and Kauffman. *Developmental Review, 6*, 80–95.
Knorr–Centina, K.D. (1981). *The manufacture of knowledge*. Oxford, England: Pergamon.
Kramer, D., and Bopp, M.J. (Eds.). (1989). *Transformation in clinical and developmental psychology*. New York: Springer-Verlag.
Kwilecki, S. (1988). A scientific approach to religious development: Proposals and a case illustration. *Journal for the Scientific Study of Religion, 27*, 307–325.
Lerner, R.M., and Kauffman, M.B. (1985). The concept of development in contextualism. *Developmental Review, 5*, 309–333.
Levinson, D.J. (1986). A conception of adult development. *American Psychologist, 41*, 3–13.
Lyddon, W.J. (1987). Emerging views of health: A challenge to Rationalist doctrines of medical thought. *Journal of Mind and Behavior, 8*, 365–394.
Lyddon, W.J. (1988). Information-processing and constructivist models of cognitive therapy: A philosophical divergence. *Journal of Mind and Behavior, 9*, 137–166.
Lyddon, W.J. (1989). Root-metaphor theory: A philosophical framework for counseling and psychotherapy. *Journal of Counseling and Development, 67*, 442–448.
Lyddon, W.J. (1991). Socially constituted knowledge: Philosophical, psychological, and feminist contributions. *Journal of Mind and Behavior, 12*, 263–280.
Lyddon, W.J., and Adamson, L.A. (in press). Worldview and counseling preference: An analogue study. *Journal of Counseling and Development*.
Mahoney, M.J. (1985). Psychotherapy and change processes. In M.J. Mahoney and A. Freeman (Eds.), *Cognition and psychotherapy* (pp. 3–48). New York: Plenum.
Mahoney, M.J. (1988). Constructivist metatheory: I. Basic features and historical foundations. *International Journal of Personal Construct Psychology, 1*, 1–35.
Mahoney, M.J. (1991). *Human change processes*. New York: Basic Books.
Mahoney, M.J., and Lyddon, W.J. (1988). Recent developments in cognitive approaches to counseling and psychotherapy. *The Counseling Psychologist, 16*, 190–234.
Mair, M. (1989). *Between psychology and psychotherapy: A poetics of experience*. London: Routledge.
Mandler, G. (1984). *Mind and body: Psychology of emotion and stress*. New York: Norton.
Masterpasqua, F. (1989). A competence paradigm for psychological practice. *American Psychologist, 44*, 1366–1371.
Maturana, H.R., and Varela, F.J. (1987). *The tree of knowledge*. Boston: Shambala.
Merluzzi, T.V., Rudy, T.E., and Glass, C.R. (1981). The information-processing paradigm: Implications for clinical science. In T.V. Merluzzi, C.R. Glass, and M. Genest (Eds.), *Cognitive assessment* (pp. 77–124). New York: Guilford Press.
Mischel, T. (Ed.). (1971). *Cognitive development and epistemology*. New York: Academic Press.
Morris, E.K. (1988). Contextualism: The world view of behavioral analysis. *Journal of Experimental Child Psychology, 46*, 289–323.
Neimeyer, R.A., and Neimeyer, G.J. (Eds.). (1987). *Personal construct therapy casebook*. New York: Springer.
O'Donohue, W. (1989). The even bolder model: The clinical psychologist as metaphysician-scientist-practitioner. *American Psychologist, 12*, 1460–1468.
Overton, W.F. (1984). World views and their influence on psychological theory and research: Kuhn-Lakatos-Laudan. In H.W. Reese (Ed.), *Advances in child development and behavior* (Vol. 18, pp. 191–226). New York: Academic Press.

Pasqual–Leone, J. (1984). Attentional, dialectical, and mental effort: Toward an organismic theory of life stages. In M.L. Commons, F.A. Richards, and C. Armon (Eds.), *Beyond formal operations: Late adolescent and adult cognitive development* (pp. 182–215). New York: Praeger.

Pasqual–Leone, J. (1987). Organismic processes for new-Piagetian theories: A dialectical causal account of cognitive development. *International Journal of Psychology, 22*, 531–570.

Payne, R. (1976). Truisms in organizational behavior. *Interpersonal Development*, 6, 202–221.

Pepper, S.C. (1942). *World hypotheses*. Berkeley: University of California Press.

Peterson, C. (1988). *Personality*. San Diego: Harcourt Brace Jovanovich.

Piaget, J. (1970). *Psychology and epistemology: Toward a theory of knowledge*. New York: Viking.

Piaget, J. (1981). *Intelligence and affectivity: The relationship during child development* [T.A. Brown and C.E. Kaegi, Trans.]. Palo Alto, California: Annual Review.

Polkinghorne, D. (1983). *Methodology for the human sciences: Systems of inquiry*. Albany: State University of New York Press.

Polkinghorne, D. (1988). Narrative knowing and the human sciences. Albany: State University of New York Press.

Prigogine, I., and Stengers, I. (1984). *Order out of chaos: Man's new dialogue with nature*. New York: Bantam.

Quina, J. (1982). Root metaphor and interdisciplinary curriculum: Designs for teaching literature in secondary schools. *Journal of Mind and Behavior, 3*, 345–356.

Reigel, K.F. (1979). *Foundations of dialectical psychology*. New York: Academic.

Reiss, D. (1981). *The family's construction of reality*. Cambridge, Massachusetts: Howard University Press.

Robinson, D.N. (1985). *Philosophy of psychology*. New York: Columbia University Press.

Rosnow, R.L., and Georgoudi, M. (Eds.). (1986). *Contextualism and understanding in behavioral science*. New York: Praeger.

Royce, J.R., and Powell, A. (1983). *Theory of personality and individual differences: Factors, systems, and processes*. Englewood Cliffs, New Jersey: Prentice-Hall.

Rychlak, J.F. (1973). *Introduction to personality and psychotherapy: A theory-construction approach*. Dallas: Houghton-Mifflin.

Rychlak, J.F. (1977). *The psychology of rigorous humanism*. New York: Wiley.

Rychlak, J.F. (1981). *A philosophy of science for personality theory* (second edition). Malabar, Florida: Robert E. Kreigar.

Sampson, E.E. (1985). The decentralization of identity: Toward a revised concept of personal and social order. *American Psychologist, 40*, 1203–1211.

Santrock, J.W., and Bartlett, J.C. (1986). *Developmental psychology: A life-cycle perspective*. Dubuque, Iowa: W.C. Brown.

Sarbin, T.R. (Ed.). (1986). *Narrative psychology: The storied nature of human conduct*. New York: Praeger.

Sarbin, T.R. (1990). Toward the obsolescence of the schizophrenia hypothesis. *Journal of Mind and Behavior, 11*, 259[13]–284[38].

Sarbin, T.R., and Allen, V.L. (1968). Role theory. In G. Lindzey and E. Aronson (Eds.), *Handbook of social psychology* (Vol. I, pp. 488–567). Reading, Massachusetts: Addison-Wesley.

Sarbin, T.R., and Coe, W. (1979). Hypnosis and psychopathology: Replacing old myths with fresh metaphors. *Journal of Abnormal Psychology, 88*, 506–526.

Scarr, S. (1985). Constructing psychology: Making facts and fables for our times. *American Psychologist, 40*, 499–512.

Schwartz, G.E. (1984). Psychobiology and health: A new synthesis. In B.L. Hammonds and C.J. Scheirir (Eds.), *Psychology and health* (pp. 149–193). Washington, D.C.: American Psychological Association.

Shaw, R., and Bransford, J. (Eds.). (1977). *Perceiving, acting, and knowing: Toward an ecological psychology*. Hillsdale, New Jersey: Erlbaum.

Spence, D.P. (1982). *Narrative truth and historical truth: Meaning and interpretation in psychoanalysis*. New York: Norton.

Stam, H.J., Rogers, T.B., and Gergen, K.J. (Eds.). (1978), *The analysis of psychological theory: Metapsychological perspectives* (pp. 1–21). New York: Hemisphere.

Tappan, M.B. (1989). Stories lived and stories told: The narrative structure of late adolescent development. *Human Development, 32,* 300–315.

Tiefer, L. (1987). Social constructionism and the study of human sexuality. In P. Shaver and C. Hendrick (Eds.), *Review of Personality and Social Psychology: Volume 7, Sex and Gender* (pp. 70–94). Beverly Hills, California: Sage.

Tulving, E. (1983). *Elements of episodic memory,* New York: Oxford University Press.

Tyler, L.E. (1981). More stately mansions—psychology extends its boundaries. *Annual Review of Psychology, 32,* 1–20.

Unger, R.K. (1983). Through the looking glass: No wonderland yet! *Psychology of Women Quarterly, 8,* 9–32.

Vaihinger, H. (1924). *The philosophy of "as if".* London: Routledge and Kegan Paul. (original work published 1911)

Varela, F.J. (1979). *Principles of biological autonomy.* New York: Elsevier North Holland.

Vico, G. (1948). *The new science* [T.G. Bergin and M.H. Fisch, Trans.]. Ithaca, New York: Cornell University Press. (original work published 1725)

Vitz, P.C. (1990). The use of stories in moral development: New psychological reasons for an old educational method. *American Psychologist, 45,* 709–720.

von Foerster, H. (1984). On constructing a reality. In P. Watzlawick (Ed.), *The invented reality* (pp. 41–62). New York: Norton.

von Glaserfeld, E. (1984). An introduction to radical constructivism. In P. Watzlawick (Ed.), *The invented reality* (pp. 17–40). New York: Norton.

von Glaserfeld, E. (1979). Radical constructivism and Piaget's concept of knowledge. In F.B. Murray (Ed.), *The impact of Piagetian theory on education, philosophy, psychiatry, and psychology* (pp. 109–122). Baltimore, Maryland: University Park Press.

Walsh, R.N., and Vaughan, F. (1980). *Beyond ego: Transpersonal dimensions in psychology.* Los Angeles: J.P. Tarcher.

Weimer, W.B. (1977). A conceptual framework for cognitive psychology: Motor theories of the mind. In R. Shaw and J. Bransford (Eds.), *Perceiving, acting and knowing* (pp. 267–311). Hillsdale, New Jersey: Erlbaum.

Weimer, W.B. (1979). *Notes of the methodology of scientific research.* Hillsdale, New Jersey: Erlbaum.

Wilber, K. (1981). *Up from Eden: A transpersonal view of human evolution.* Garden City, New York: Anchor Press/Doubleday.

Wilber, K. (1986). The spectrum of development. In K. Wilber, J. Engler, and D.P. Brown (Eds.), *Transformations of consciousness: Conventional and contemplative perspectives on development* (pp. 65–105). Boston: New Science Library.

Wilber, K., Engler, J., and Brown, D.P. (1986). *Transformation of consciousness: Conventional and contemplative perspectives on development.* Boston, Massachusetts: Shambhala.

Wittig, A.W. (1985). Metatheoretical dilemmas in the psychology of gender. *American Psychologist, 40,* 800–811.

Worthington, E.L., Jr. (1989). Religious faith across the life span: Implications for counseling and research. *The Counseling Psychologist, 17,* 555–612.

Wulff, D.M. (1991). *Psychology of religion: Classic and contemporary views.* New York: John Wiley and Sons.

Zimmerman, B.J. (1981). Social learning theory and cognitive constructivism. In I.E. Sigel, D.M. Brodzinsky, and R.M. Golinkoff (Eds.), *New directions in Piagetian theory and practice* (pp. 39–49). Hillsdale, New Jersey: Erlbaum.