

Toward a Metatheoretical Integration of Developmental Paradigms

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Abstract: This paper shows how a partial consilience might be achieved in the field of human development by means of principles from general systems theory. The author concurs with Sameroff (1989) that it is possible to interpret the mechanistic, organismic, and contextualist paradigms/worldviews (Goldhaber, 2000; Pepper, 1970) in terms of general systems theory. The author selects a major developmentalist from each paradigm and interprets that scholar's work in terms of systems principles. The following developmentalists were selected: Arnold Sameroff (contextualism), Erik Erickson (organicism), and Albert Bandura (mechanism). The systems principles employed are *wholeness and order*, *self-stabilization*, *self-reorganization*, *hierarchical interaction*, and *dialectical contradiction* (Sameroff, 1989). The author addresses the conflicting presuppositions of the major paradigms in order to provide for their theoretical subsuming under systems theory. Finally, the author notes areas of inconsistency that will need to be resolved in the future and calls for further scholarship to translate developmental theory in terms of general systems theory for the benefit of students, scholars, consultants and other practitioners familiar with systems theory.

Keywords: Contextualism, developmental systems, general systems theory, mechanism, organicism.

Interpreting Human Development In Terms of Systems Theory

The field of inquiry that studies and theorizes about human development is fragmented. There is no "Big Bang" theory of human development to form the basis of a general consensus nor is there a universally accepted paradigm to guide research. In an effort to integrate the diverse approaches to developmentalist scholarship, Goldhaber (2000) turned to Pepper's (1970) metatheoretical paradigms of *mechanism*, *organicism*, and *contextualism*. (See the appendix for more information on these paradigms). Subsuming a century of developmental research and scholarship under just three paradigms was a major achievement, but still, "this is not a very satisfying state of affairs" (Goldhaber, 2000, p. 10), since theories from one paradigm cannot be directly compared with theories from another paradigm because of conflicting assumptions underlying the various paradigms. Nonetheless, Goldhaber (2000) believed "a broad enough conceptualization" (p. 11) could unite the three paradigms into one.

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Perhaps such a conception exists, if only in embryo. As Laszlo (1996) has noted, “systems thinking gives us a holistic perspective for viewing the world around us, and seeing ourselves in the world. It is a way of organizing, *or perhaps reorganizing* [italics added], our knowledge in terms of systems, systemic properties, and inter-system relationships” (p. 16). In a similar vein, Sameroff (1989) writes:

General systems theory may provide a framework for the combination of [mechanistic, organismic, and contextualist] models. . . . Within such a more general view, interpretations can be made as to why a system appears to function mechanistically from one perspective, organismically from a second perspective, [and] contextually from a third. (pp. 231-232)

Significant scholarship in each of the three major developmentalist paradigms is already based on systems theory, or can readily be interpreted in light of systems concepts. I wish to demonstrate that, in principle, contextualist, organismic, and mechanistic theories can be interpreted using systems principles. Achieving this would be a step in the direction of concillience and allow students, scholars and practitioners steeped in systems theory and systems perspectives to more readily apply the fruits of developmental scholarship to their research and praxis. To demonstrate this conclusively would require an exhaustive analysis and reinterpretation of developmental literature in each of the major developmental paradigms. The goal of this paper is more modest, to take the first tentative steps toward concillience in developmental theory. Using systems principles, I will present and/or interpret the work of one scholar from each of the major developmentalist paradigms, following Goldhaber’s (2000) grouping of major developmental scholars into Pepper’s (1970) metatheoretical paradigms of *contextualism*, *mechanism*, and *organicism*. If this attempt is successful, future scholarship may expand on the approach taken here. We shall begin by examining systems thinking in contextualist research following Goldhaber (2000).

Contextualist Systems Thinking

According to Goldhaber:

All developmental [paradigms] look at persons in context. Mechanists do so in a reductionist way that allows them to disentangle independent variables. Organicists do so in a holistic way that allows them to make universal claims about sequence. For contextualists, however, the phrase *person in context* has a somewhat distinct meaning. Specifically, the person and the context are not two discrete entities interacting in some fashion; instead they form one interdependent but ultimately temporary entity.... For contextualists this interdependence means that [human] development is best studied from a systems perspective. (p. 52)

One of the most straight-forward contextualist system thinkers that Goldhaber (2000) identifies is Arnold Sameroff. Being a systems advocate himself, it will not be necessary to reinterpret Sameroff’s work in terms of systems concepts as he has done so already.

Table 1. Theoretical Principles of Development (Note. Adapted from Sameroff, 1989)

General Systems	Developmental Systems
Wholeness & order	Continuity & identity
Self-stabilization	Development
Self-reorganization	Evolution
Hierarchical interaction	Discontinuity
Dialectical contradiction	Motivation

Sameroff (1989) applies general systems theory directly to human development. “Although there are a large number of . . . systems theories” writes Sameroff, “I have settled on five principles the capture the core issues in such perspectives [a] wholeness and order, [b] self-stabilization, [c] self-reorganization, [d] hierarchic interaction, and [e] dialectical contradiction” (pp. 220-221). He relates each of the selected general systems principles to an analogous developmental principle (see Table 1 above). We will look at each of these in turn beginning with wholeness and order.

Wholeness and order. “The reason that wholes are more than the sum of their parts,” explains Sameroff (1989), “is that relationships are added that can never be assigned to single elements” (p. 221). He goes on to elaborate that wholes and parts form a nexus wherein the parts constrain and define the whole even as the whole constrains and defines the parts.

Sameroff (1989) suggests “the developmental analog of wholeness and order is continuity and identity;” and “as in the organismic metaphor of the cell, continuity is in the relationship of the parts rather than in their specificity (p. 221).” Even more radically, he asserts that “a family is defined independently of the specific actors, although this definition is itself in flux with the evolution of serial parenting in multimarriage families” (Sameroff, 1989, p. 222). Let us now examine Sameroff’s treatment of *self-stabilization*.

Self-stabilization. In the open system of a living organism, self-stabilization is an ongoing process that involves both homeostasis and homeothesis (Waddington, 1962; Sameroff, 1989). Homeothesis, the process of stabilizing around a moving point, constitutes development inasmuch as new forms of organization are required to enable the system to function at higher levels that are not necessary inherent in the organism, but a functional synthesis of organism and environmental conditions. According to Sameroff (1989):

What we observe as development is a product of self-stabilization. An active organism subject to an ordered series of perturbations will respond with an ordered series of adaptations. Most attention has been devoted to internal sources of perturbations, usually labeled as maturation. As the genotype regulates biological changes in the body, there is a continuous process of adaptation while each change is assimilated into the system’s functioning. . . . [Far] less attention has been paid to the ordered series of external

perturbations that also serve to organize and regulate development. I have labeled the regulatory systems for experience the *enviromtype*. The *enviromtype* includes a developmental agenda for raising children in which graded changes in the child trigger changes in the environment [as controlled by parents, care-givers, and educators]. (p. 222)

Having seen how Sameroff has used the principle of *self-stabilization*, let us see how he employs the principle of *self-reorganization*.

Self-reorganization. The process of self-reorganization of an organism in response to environmental change is evolution (Sameroff, 1989). Sameroff cautions that evolutionary changes should not be interpreted to mean that the organism is becoming “better,” but rather more adapted to its environment.

Consider the case of Andy Dufresne in Stephen King’s 1994 motion picture, *The Shawshank Redemption*. Andy never committed a crime until after he was falsely convicted of his wife’s murder. Once behind bars, he uses his knowledge of commerce and finance to create a false identity and bank accounts to launder the proceeds of graft and corruption, eventually embezzling the funds and escaping from the prison.

While we don’t know for sure whether he would have eventually turned to crime, the natural interpretation is that he was driven to these uncharacteristic behaviors by his environment. Superficially, this may appear as a mere change in behavior, but surely there must be underlying psychological and personality changes as well. The principle of *self-reorganization* seems to be related to the principle of *hierarchical interaction* to be examined next.

Hierarchical interaction. Sameroff appeals to the general systems principle of *hierarchical interaction* to explain developmental discontinuities. Such discontinuities are a result of alternative descriptions of organic subsystems (Patee, 1973). Sameroff explains:

Each part of a system has a number of properties that can place it in relation to other parts. . . . In a hierarchy, superordinate levels . . . only utilize some properties (i.e., alternate descriptions) of the subordinate level. . . . At the behavioral level society is composed of institutional [systems] composed of individual subsystems. [Individuals] are only valued if they fulfill some defined . . . role in the organization. Whether the individual is male or female, white or black, young or old, physically handicapped or retarded, may be relevant or irrelevant for certain role [descriptions]. Discontinuity is found when alternative descriptions are important in different social contexts or . . . developmental periods. (Sameroff, 1989, p. 225)

In some cases the discontinuities found as a result of *hierarchical interaction* might lead to *dialectical contradictions*.

Dialectical contradiction. Dialectical contradiction is the “motivational force” in behavioral change (Sameroff, 1989, p. 226) and psychological development (Piaget, 1971). Such contradictions arise naturally as a result of unintended, adverse consequences of actions.

Contradictions may also arise as a result of immature and/or incorrect understandings of objects in the environment of the organism.

Equilibration is the result of an individual's efforts to overcome contradictions between the subject's cognitive organization and the object. Each assimilation requires some accommodation to occur because no two experiences are ever identical: and each new accommodation means that the next experience will be assimilated somewhat differently because the subject will have been changed. (Sameroff, 1989, pp. 226-227)

Sameroff is a thoroughgoing systems thinker who presents his theories in terms of systems concepts. Next we will look at a developmentalist from the organismic paradigm who does not claim to be a systems thinker, but who can be readily interpreted in those terms.

An Organismic Theory of Lifelong Development

I asserted earlier that significant work in each paradigm either employs systems thinking or can be interpreted from a systems perspective. In the last section we considered the former; in this one we shall attempt the latter, interpreting an organismic theory using the concepts of systems thinking. We will be looking at the work of one of the great psychodynamic theorists of organicism identified by Goldhaber (2000), Erik Erikson.

Erikson's Theory of Psychosocial Development

One of the appealing things about Erikson's work is that he considers human development to be a lifelong process. Trained as a psychoanalyst, Erikson articulated an original developmental theory based on epigenetic, psychodynamic, and sociological principles (Goldhaber, 2000).

Table 2. Erikson's Stages of Psychosocial Development (Note. Adapted from Erickson, 1997)

Stages	Psychosocial crisis	Significant relations	Basic strengths	Core pathologies
I Infant	Trust vs. mistrust	Maternal person	Hope	Withdrawal
II Toddler	Autonomy vs. shame, Doubt	Paternal persons	Will	Compulsion
III Preschooler	Initiative vs. Guilt	Nuclear family	Purpose	Inhibition
IV School age	Industry vs. Inferiority	School, neighborhood	Competence	Inertia
V Adolescence	Personal identity vs. role confusion	Peer groups, out groups, role models	Fidelity	Repudiation

VI Young adult	Intimacy vs. isolation	Friends, sexual partners	Love	Exclusivity
VII Mature adult	Generativity vs. stagnation	Coworkers, colleagues, members of household	Care	Rejectivity
VIII Older adult	Integrity vs. despair	Humanity (or ethnic group)	Wisdom	Disdain

His theory has eight stages (see Table 2) beginning with infancy with its focus on the maternal person and ending with old age with its greatly expanded focus on humanity (Erikson, 1997). Each stage has its central crisis. If the crisis is resolved positively, the individual will acquire the basic strength of that stage; a negative resolution engenders the core pathology of that stage. Each stage must be resolved, whether positively or negatively, before the next is entered. However, no resolution is final, both in that regression is possible, and that subsequent life events can lead to the revision of the resolution of a previous stage. Also each strength acquired at a prior stage must find a new expression in the current stage. For instance, the hope engendered in infancy should mature into faith in the older adult (Erikson, 1997).

Now let's examine Erikson's theory of psychosocial development from a systems perspective.

A Systems Interpretation of Erikson's Theory

We will interpret Erikson's theory of psychosocial development using the systems concepts discussed above in the section on Sameroff, namely (a) wholeness and order/continuity and identity, (b) self-stabilization/development, (c) self-reorganization/evolution, (d) hierarchical interaction, and (e) dialectical contradiction. We begin with wholeness and order.

Wholeness and order/continuity and identity. Physically, the system has a continuous discrete identity from birth to death of the organism. Psychologically, continuity is a function of memory and to some extent, imagination—both in the sense in which a child can imagine life as an adult and in the sense that an adult must psychically grapple with the impending existential discontinuity of death.

Psychologically, identity is more complex. Temporal succession notwithstanding, the different stages of one's life and the different roles one must play (lover, scholar, mother) are distinct; therefore a cohesive sense of personal identity is a construct that either coheres or crumbles depending as much on one's psychic fortitude as on the social storms and communal anchors one encounters in life. Now let us see how the principle of *self-stabilization* can be found in Erikson.

Self-stabilization/development. Each of Erikson's stages has two opposing attractors (an attractor being a point that draws the system to it): a positive one and a negative one. As the system first enters a stage it is unstable and of indeterminate valence (at least with respect to the

current stage) because it is out of equilibrium, having not yet settled on either of the attractors. Development is the movement from an indeterminate state to a determinate equilibrium. If the system moves to a point of equilibrium around the positive attractor, the system can be said to have a positive valence; that is, the individual has a positive outlook and is psychologically healthy for the stage of life she is in.

So, if a toddler who left infancy well nurtured, hopeful, and trusting of her mother is subsequently orphaned and placed with authoritarian foster parents, she may resolve her next stage of development in a state of doubt with compulsive tendencies. This is a psychological development albeit a negative one. Having found the principle *self-stabilization* in Erikson, let us see how the principle of *self-reorganization* might be understood.

Self-reorganization/evolution. Over time the system loses its equilibrium, becoming unstable once more due to either endogenous or exogenous changes to the system. The attractor that previously held the system in equilibrium is no longer sufficient so the system reorganizes itself and must seek a new “higher” equilibrium. This change in state is what is meant by evolution.

Imagine a construction worker in his fifties who is in stage VII, middle adulthood. Now suppose he develops arthritis and other age-related physical conditions that force him to retire. Due to endogenous changes in his bodily subsystems he is compelled to evolve into stage VIII, older adult. Perhaps an engineer works for the same company who is also in her fifties. Due to an organizational restructuring, she is offered an early retirement package which she chooses to accept. In her case it was exogenous changes that lead to her evolving to stage VIII, but from a systems perspective it is irrelevant whether the evolution is caused by endogenous or exogenous changes. Let us now consider the systems principle of *hierarchical interaction*.

Hierarchical interaction. Erikson’s own words sound very much like a systems theorist at this point:

[We] begin with the assumption that a human being’s existence at every moment [depends] on three processes of organization that must complement each other. There is...the biological process of the hierarchic organization of the organ systems constituting a body (*soma*); there is the psychic process organizing individual experience by ego synthesis (*psyche*); and there is the communal process of the cultural organization of the interdependence of persons (*ethos*). (pp. 25-26)

One may infer that the *psyche* mediates between the levels of *soma* and *ethos*, the hierarchical levels directly below and above it; the individual experiences input from both his body (e.g. in the form of hunger or sexual arousal) and from the culture (e.g. in the person of a parent, or priest) which must then be synthesized in some manner (e.g. I can eat *after* father says grace—or—I can discretely have sex with this partner, *but* I cannot marry her because she is not of my people.) Finally let’s look at *dialectical contradiction*.

Dialectical contradiction. Although he used different terminology, Erikson (1997) recognized the principle of dialectical contradiction at work in the process of *sublimation*, as this excerpt shows:

[At present] *sexual frustration* is recognized as pathogenic, while *generative frustration*, [resulting from] the dominant technological ethos of birth control, is apt to remain unrecognized. Yet, sublimation, or a wider application, is the best use of frustrated drive energies. Thus...a new generative ethos may call for a more *universal care* concerned with...the lives of all children. (p. 68)

In this example the biological generative urge is dialectically contradicted by the technological ethos of birth control which leads to the (at least potential) synthesis of a universal care for the lives of all children. We turn now from one of the great organicists that Goldhaber (2000) classified to perhaps greatest mechanist he selected, Albert Bandura (It may be worth noting that Bandura's work may be regarded as either expanding or transcending the mechanist paradigm).

A System's Interpretation of Bandura's Mechanistic Social Learning Theory

Bandura has significant elements of systems thinking in his Social Learning Theory, perhaps most notably his concept of reciprocal determinism (see Figure 1). Reciprocal determinism means that both the person and the environment influence behavior, and vice-versa; the environment shapes the person, and the person shapes the environment (Bandura, 1977).

Bandura's Social Learning Theory

Reciprocal determinism and observational learning form the core of Bandura's (1977) Social Learning Theory. Simply put, observational learning occurs when persons respond with matching performances to events modeled in their environment. Observational learning has four sub-processes: *attentional, retention, motor (re)production, and motivational processes*.

Attentional processes are a function of the modeling stimuli and observer characteristics (Bandura, 1977). Modeling stimuli are characterized by distinctiveness, affective valence, complexity, prevalence, and functional value. Observer characteristics include sensory capabilities, arousal level, perceptual set, and past reinforcement.

Retention processes. Retention of the modeled events by the individual is accomplished by *symbolic coding, cognitive organization, symbolic rehearsal, and motor rehearsal* (Bandura, 1977). The first three of these are cognitive processes; the last is a psychomotor process.

Motor (Re)production Processes. Motor (re)production is dependant on the individual's physical capabilities, availability of component resources, self-observation of reproduction, and accuracy of feedback (Bandura, 1977).

Motivational Processes include *external reinforcement, vicarious reinforcement, and self-reinforcement*. External reinforcement is traditional *Skinnerian* conditioning. The discovery of vicarious reinforcement was Bandura's major breakthrough. Self-reinforcement, whereby an individual internalizes standards of praiseworthiness, is also a significant motivational process, especially as the individual develops her own moral standards (Bandura, 1977).

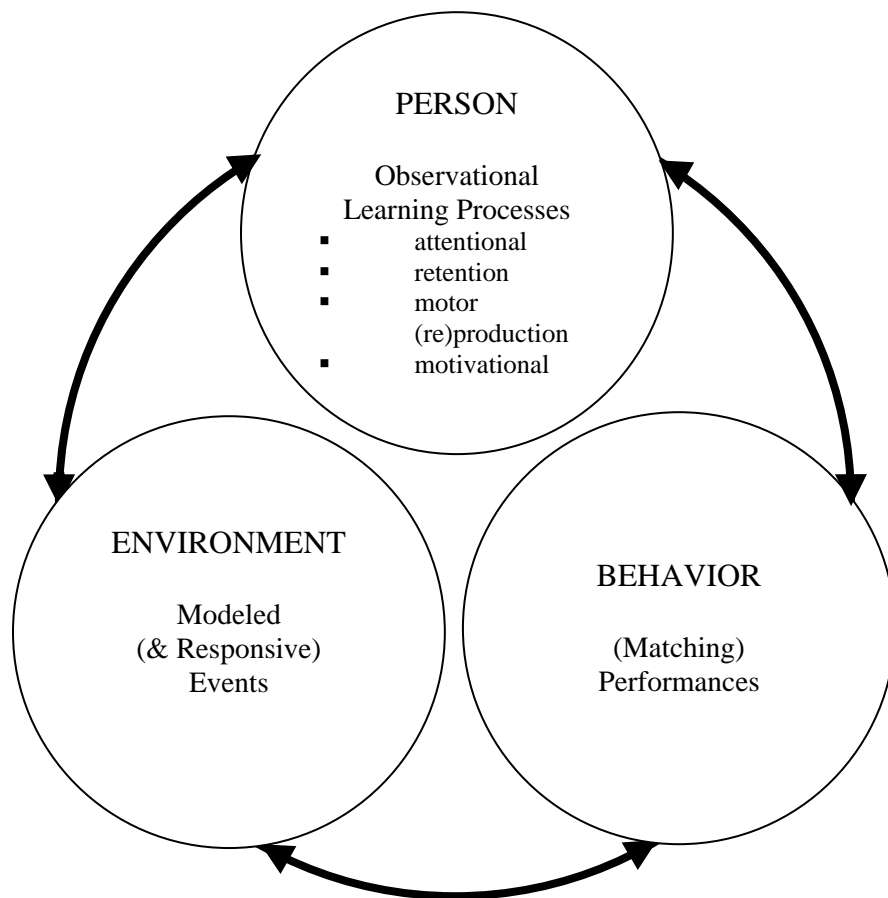


Figure 1. Reciprocal Determinism (Note. Adapted from Bandura, 1977)

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A System's Interpretation of Bandura's Theory

We will interpret Bandura's Social Learning Theory using the same systems concepts employed above, namely wholeness and order, self-stabilization, self-reorganization, hierarchical interaction, and dialectical contradiction.

Wholeness and order. Bandura (1977) sees the environment, the organism, and its behavior as codetermining each other. From a systems perspective the person, behaviors, and environmental prompts/responses form a single system—an organized whole—with each of the components mutually influencing the others.

A cycle may begin with an infant forming a facial expression (perhaps she has gas). The grandparents observing the infant interpret the expression as a “smile” and then smile back and hug and kiss her, reinforcing the behavior, and leading to more smiling in the future.

However, it's not merely a case of the environment reinforcing behavior; the infant also influences the environment—she “smiled” first! When she gets older she will learn to smile deliberately to be cute or seductive. Having considered *wholeness and order*, let's see how the principle of *self-stabilization/development* can be found in Bandura.

Self-stabilization/development. Development is a matter of patterns activity in the system stabilizing over time. Recall that in the systems interpretation the individual is just a part of the system. It is not possible to isolate the influence of different components of the system. Bandura (1997) writes:

Even when new responses are formed entirely on the basis of learning experiences, physiological factors serve as contributing influences. While the organization of behavioral components into new patterns results from experience, the rudimentary elements are present as part of the natural endowment. (p. 16)

Along similar lines he notes that, “complex behaviors . . . are formed through [the] integration of many constituent activities of differing origins. For this reason . . . it is [inappropriate] to categorize behaviors as learned or innate or to try to apportion relative weights to these factors” (Bandura, 1997, p. 17).

The development of speech is a good example of this. Speech is modeled in the environment, and the infant responds. But the infant is just as likely to begin babbling and the mother to respond. The child also wants to express certain things—like a desire to have a cookie—so spontaneous and modeled/reinforced behaviors, along with the volitional effort of the child, all coalesce resulting in the development of speech. Over time the child learns to express/respond to increasingly complex language and may even learn to read and write or to speak other languages. We have seen the principle of *self-stabilization/development* illustrated in the acquisition of language, now let's move onto *self-reorganization/evolution*.

Self-reorganization/evolution. Bandura (1977) does not emphasize psychological reorganization/evolution. Perhaps the closest he comes is with his concept of the *cognitive*

organization process, whereby social inputs are symbolically organized in the mind of the learner. However, a systems interpretation in which the social environment is part of the system under analysis (refer to Figure 1 above) lends itself to interpretation in terms of *self-reorganization/evolution*. The “self” in this context is the *system*. It might be helpful to conceive of this “self/system” from a phenomenological perspective. For instance, Heidegger (1962), makes no distinction between an individual and the environment in which she lives, but rather uses the concept of “being-in-the-world.”

Bandura (1986) observes that “through their actions people create [and recreate] their environments” (p. 31). Although the immediate context of this quote emphasizes continuity rather than evolution, interpreting it to support evolution does no violence to Bandura’s thought. After all, he note that, “by [re]arranging environmental inducements, generating cognitive supports, and producing consequences for their own actions, people are able to exercise some measure of control over their own [evolution] (Bandura, 1986, p. 31). The selection of new environments with its concomitant reorganization of one's personal life allows an individual to, for instance, enter graduate school and evolve into a Ph.D. The next systems principle to consider is *hierarchical interaction*.

Hierarchical interaction. Human learning has a biological component, a psychological component, and a sociological component (Bandura, 1977). The psychological component has cognitive, conative, and affective subcomponents. The sociological component consists of persons in the environment (including symbolic actors in the media) modeling certain behaviors. Whether the behavior is emulated is a function of psychological processes (attention, retention and self-motivation), psychosocial processes (external and vicarious reinforcement), and biological processes (physical capabilities and motor reproduction processes) (Bandura, 1977). Bandura doesn’t explicitly express the interaction of these processes as hierarchical, but such an interpretation arises naturally. We move on now to the final principle of *dialectical contradiction*.

Dialectical contradiction. Interestingly, Bandura’s social learning theory considers not only the behavior and development of individuals, but also the behavior and development of groups. When writing on groups the principle of *dialectical contradiction* is apparent where he observes, “when self-determination is restricted by prejudice, those who are affected attempt to remove inequities by altering practices that compromise . . . the professed equality of values of society” (Bandura, 1977, p. 202). He is seems to be thinking of the US civil rights movement of the 1960s and in particular of Dr. Martin Luther King’s *I Have a Dream* speech. This concludes my analysis of Bandura; we move now to the broader objective of this paper.

Towards a Systems Synthesis of Contextualism, Organicism, and Mechanism

In the preceding sections of this paper I have shown how the work of developmentalists in each of the major paradigms, following Goldhaber (2000), can be interpreted in terms of the general systems principles of *wholeness and order*, *self-stabilization*, *self-reorganization*, *hierarchical interaction*, and *dialectical contradiction* identified by Sameroff (1989). Having done this demonstrates that, at least in principle, the systems paradigm can subsume the

contextualist, organismic, and mechanistic paradigms. The constraints of time and space (not to mention my limited expertise) prevented me from undertaking a comprehensive interpretation of all relevant scholars in each paradigm.

However, Jerry Snow (2006, private communication) has pointed out that for the systems paradigm to properly subsume the contextualist, organismic, and mechanistic, paradigms it must “transcend but include” the presuppositions of each. Granted, but it doesn’t have to include *all* of their presuppositions, just the compatible ones. To facilitate the analysis, I have adapted Goldhaber’s (2000) table comparing the three paradigms/worldviews (see below).

Table 3. Comparison of Pepper’s Three World Views (Note. Adapted from Goldhaber, 2000)

World View	Mechanism	Organicism	Contextualism
Generalizability	Universal	Universal	Situation-specific
Types of Acceptable Causes	Efficient, material	Efficient, material, formal, final	Efficient, material, formal
Level of Analysis	Reductionist	Holistic	Holistic

Studying the table, we find that both mechanism and organicism hold with universal laws; contextualism sees each situation as unique. Let us also hold with universal laws while recognizing that their manifestation in some contexts will be situation-specific. Mechanism recognizes efficient and material causes. Contextualism recognizes these as well as formal causes. Organicism recognizes all of the above in addition to final causes. Let us recognize that each of these conceptions of causality has explanatory value. Furthermore, let us include the notion of circular causality, what Bandura would call reciprocal determinism. Finally, mechanism employs reductionist analysis, whereas organicism, and contextualism employ holistic analysis. Let us favor holistic analysis while recognizing the contribution of reductionist analysis.

Moving beyond the table, Goldhaber (2000) has related that only organicism asserts that human development has a single ideal unidirectional trajectory; mechanism and contextualism observe multiple trajectories and even the possibility of regression. Let us dispense with the simplistic notion of a single, ideal developmental trajectory and embrace the rich complexity of the phenomenon of human development.

Implications for Scholarship and Praxis

This paper has demonstrated the viability of translating the different paradigms of developmentalism into the language of systems theory, with an eye toward consilience. Of course, total consilience is an ideal that can be at best partially approximated. Nevertheless, if a broader effort were made to translate the work of developmentalists using systems concepts, scholars working in disparate paradigms might more readily comprehend and incorporate research from other developmental paradigms. Students could more easily grasp developmental theory if they didn’t need to learn multiple dialects of technical jargon. Finally, consultants,

coaches, and other practitioners already steeped in systems thinking, could more readily utilize research findings in their praxis.

In this paper five systems principles were used consistently within each section, but not across sections. The smallest set of consistent developmental systems principles needs to be advanced by further scholarship. If consilience is a worthwhile goal in the field of human development, perhaps others will contribute their own translations of key developmental scholarship into systems theory. Ultimately a metatheoretical integration of developmental paradigms may emerge.

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Appendix

A Synopsis of Mechanism, Organicism, and Contextualism

As mentioned earlier, the terms *mechanism*, *organicism*, and *contextualism* were coined by Pepper (1970). Goldhaber (2000) made use of them in his text, *Theories of Human Development: Integrative Perspectives*. (Pepper also discussed a fourth paradigm, *formism*; however Goldhaber didn't make use of it.) Given the thrust of this paper, I have used Pepper's terms as modified and given specific content by Goldhaber. Let us begin with mechanisticism.

Mechanism

Each of the worldviews Pepper (1970) analyzed has a certain root metaphor. In the case of mechanism, it is the machine. As Goldhaber (2000) observes:

Although any machine could be used to illustrate the concept of development as a mechanistic process, two specific machines—the telephone switchboard and the computer—are... most frequently used. The telephone switch board is a simple mechanism.... When someone dials a phone number, a signal is sent to the switchboard... and the phone rings at the other end. This is essentially a process of linking stimuli with responses—and much of the research in the mechanistic tradition involves the linking of stimuli with responses. The introduction of the computer has added another dimension to the mechanistic accounts of [development]. Unlike the switchboard, which simply makes connections, the computer takes input (stimuli) and does something to it; that is, it processes information. What the computer does depends as much on the nature of the program that is processing the input as on the nature of the input itself. (Goldhaber, 2000, p. 18)

While not specifically a member of the information processing school of developmental mechanisticism, Bandura's (1977, 1986) social learning and cognition theories seem to be relying on a computer-like model of human beings, albeit a highly sophisticated model. We turn next to organicism.

Organicism

The following excerpts give a sense of Goldhaber's (2000) conception of organicism.

Pepper's root metaphor for the organismic perspective is the living organism. [The] key element of the organismic view is the process through which elements are integrated to form a *synergistic whole*. In a synergistic whole, the integrated system, unlike the machine, is more than the sum of its parts.

[The] most significant difference between [organicism and mechanisticism] concerns how change occurs. For mechanisticists, change comes about when an external force . . . acts upon an object that is inherently at rest. For organicists, behavioral change is inherent in the living organism itself. . . . Change is therefore one of the defining characteristics of living

organisms. . . . This distinction concerning the reason [organisms] change prompts organicists to view development as a unique form of change, . . . development is directional....

Although the developmental process in organicism is directional, its outcome . . . is not preordained. [There] is no guarantee that any individual will ever reach his or her developmental end point. (Goldhaber, 2000, pp. 32-34)

For Ericson, as we saw above, that endpoint was *wisdom*. Now let's take a look at contextualism.

Contextualism

Finally, here are some excerpts from Goldhaber (2000) on *contextualism*.

Pepper chooses the *historical act* as the root metaphor for contextualism. This choice is not meant to imply that contextualism is a world view rooted in the past but rather the meaning of any behavioral event is dependent on the context in which it occurs. (Goldhaber, 2000, p. 47)

It is the character of the quality and texture of an event or historical act, as viewed by the participant, that defines his or her context. And it is the interdependence between the event and the individual, each defining and at the same time being defined by the other that is the focus for the contextualist. (Goldhaber, 2000, p. 50)

One of the ways in which contextualism differs most from the other two world view concerns the issue of direction in development. [Organicists] argue that it is possible to identify a . . . sequence of developmental stages. . . . Contextualists make no such claim . . . arguing that not one but many developmental trajectories are possible. (Goldhaber, 2000, p. 53)

[The] contextualist perspective on the study of human development directs our attention to the social, political, moral, and economic institutions that sustain and are supported by current assumptions about human activity. (Goldhaber, 2000, p. 55)

Perhaps because of their emphasis on context, contextualists tend to be especially sensitive to the intentional and/or unintentional political and socioeconomic ramifications of developmental theories. This sensitivity is reflected in both their concern for the sociohistorical origin of the hypotheses tested by developmentalists and in their belief the proper purpose of research is in fostering equality and social justice. (Goldhaber, 2000, p. 62)

Given the dispersive character of contextualism, one should not expect any particular contextualist developmentalist to incorporate all or even most of its tenants. Sameroff's (1989) concept of *envirotypes* reflects his awareness of the significance of context on development. Other contextualist notions are less prominent.