PART ONE

FOUNDATIONS OF DEVELOPMENT ACROSS THE LIFE SPAN
CHAPTER 1

Development Across the Life Span

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In this chapter I focus on some ideas that usually rest quietly
in the background when development is explored. Back-
ground ideas are not unlike the foundation of a house. A foun-
dation grounds, constrains, and sustains the nature and style
of the building that can ultimately be constructed. So, too, do
background ideas ground, constrain, and sustain both theory
and methods of investigation in any area of inquiry. A foun-
dation is usually ignored by those who live and work in the
house; at least until something goes wrong—for example,
when cracks appear in walls or the house begins to sink into
the ground. So, too, are background ideas often ignored by
investigators, at least until something goes wrong with theo-
retical or empirical efforts in the field of study. In this chapter
I try to bring these ideas from background to foreground; I
also examine how they form the basis for—and constraints of—both theory and research in developmental psychology.

In scientific discussions background ideas are often termed metatheoretical or metatheories. They transcend (i.e., meta-) theories in the sense that they define the context in which theoretical concepts are constructed, just as a foundation defines the context in which a house can be constructed. Further, metatheory functions not only to ground, constrain, and sustain theoretical concepts, but also to do the same thing with respect to methods of investigation. For convenience, when specifically discussing background ideas that ground methods, these will be termed metamethods. Methodology would also be an appropriate term here if this were under-
stood in its broad sense as a set of principles that guide em-

The primary function of metatheory—including meta-
method—is to provide a rich source of concepts out of which
theories and methods emerge. Metatheory also provides
guidelines that help to avoid conceptual confusions—and
consequently, help to avoid what may ultimately be unpro-
ductive ideas and unproductive methods.

Theories and methods refer directly to the empirical
world, whereas metatheories and metamethods refer to the
theories and methods themselves. More specifically, a
metatheory is a set of rules and principles or a story (narrative) that both describes and prescribes what is acceptable and unacceptable as theory—the means of conceptual explo-
ation of any scientific domain. A metamethod is also a set of
rules and principles or a story, but this story describes and
prescribes the nature of acceptable methods—the means of
developmental psychology was born and spent its early years in a curious metatheoretical world. This world, which began in the seventeenth century, has been called the modern world or modernity. In the past century, the modern world has undergone major crises; these form the context for alternative contemporary metatheories. Before describing this history, a brief examination of the broad ways that metatheory colors an understanding of the nature of development deserves some attention. This discussion will establish a developmental framework serving as a general context for the remainder of the chapter.

**DEVELOPMENTAL INQUIRY AND THE METATHEORETICAL**

How should we understand the field of developmental inquiry? Although it is clear that change is central in any definition of development, the process of identifying the specific nature of this change and identifying what it is that changes in development is shaped by metatheoretical principles. The most popular current text definition of development is some variation of the idea of age changes in observed behavior. Any reflection, however, reveals that serious problems arise when development is shaped by this definition. Age has no unique qualities that differentiate it from time; age is simply one index of time. There is also nothing unique or novel about units of age-time, such as years, months, weeks, minutes, and so on (see Lerner, 2002). Thus, this definition merely states that development is about changes that occur in time. The difficulty with this is that all change occurs “in” time, and—as a consequence—the definition is an empty one, merely restating that development is about change. At a minimum the definition omits what some would consider to be critical features of development, including the idea that developmental change concerns change that has a directional quality to it, change that is relatively permanent and irreversible, and change that entails orderly sequences. However, making a judgment that direction and sequence are central concerns—or making the judgment that they are of marginal interest—is a direct product of the metatheoretical platform from which the definition is launched.

Similar problems arise when the definition of ‘what’ develops is limited to observed behavior. Although observed behavior is clearly central to empirical investigations—the dependent variable of psychological research efforts—whether it is the ultimate goal of inquiry is an issue defined by metatheory. Except in a metatheoretical world identified with behaviorism, observed behavior may be primarily a jumping-off point—a point of inference—for an exploration of unseen processes and patterns of processes that identify mental life. Again, however, making the judgment that
mental events are central to understanding—or the judgment that mental events are marginal—is a metatheoretically motivated judgment.

The Nature of Developmental Change: Transformations and Variations

Perhaps the broadest conceptualization of developmental entails the recognition of two fundamental types of change, transformational and variational (see Figure 1.1). Transformational change is change in the form, organization, or structure of any system. The caterpillar transforms into the butterfly, water transforms into ice and gas, the seed transforms into the plant, cells transform into the organism. All nonlinear dynamic systems, including the human psyche, undergo transformation change. Transformational change results in the emergence of novelty. As forms change, they become increasingly complex. This increased complexity is a complexity of pattern rather than a linear, additive complexity of elements. As a consequence, new patterns exhibit novel characteristics that cannot be reduced to (i.e., completely explained by) or predicted from earlier components (indicated

Figure 1.1 The development of the person: levels of transformational and variational change emerging through embodied action in a sociocultural and physical world.
by the four “person” cubes on the left side of Figure 1.1). This emergence of novelty is commonly referred to as qualitative change in the sense that it is change that cannot be represented as purely additive. Similarly, reference to discontinuity in development is simply the acknowledgment of emergent novelty and qualitative change (Overton & Reese, 1981). Recognizing these features of transformational change is quite important when one considers various notions of stages or levels of development, as these are theoretical concepts that refer to transformational change with the associated emergent novelty, qualitative change, and discontinuity. The philosopher E. Nagel well captured the nature of transformational change when he suggested that the concept of development implies two fundamental features: (a) “the notion of a system, possessing a definite structure [i.e., organization]...”; and (b) “the notion of a set of sequential changes in the system yielding relatively permanent but novel increments not only in its structures [i.e., organization] but in its modes of operation as well” (1957, p. 17).

Variational change refers to the degree or extent that a change varies from a standard, norm, or average (see the arrows on the right side of Figure 1.1). Consider the pecking of the pigeon; changes in where, when, and how rapidly pecking occurs are variational changes. The reaching behavior of the infant, the toddler’s improvements in walking precision, the growth of vocabulary, and the receipt of better grades in school are all examples of variational change. From an adaptive point of view, developmental variational change is about a skill or ability’s becoming more precise and more accurate. This type of change can be represented as linear—completely additive in nature. As a consequence, this change is understood as quantitative and continuous.

Given these two types of change, there have been three metatheoretical solutions proposed for the problem of how they are related in development. The first and most prominent solution—given the history to be described later—has been to treat variation as the bedrock reality of development. This solution marginalizes transformational change by claiming that it is mere description, which itself requires explanation. Essentially this claim embodies the promise that all “apparent” transformational change will ultimately be explained—perhaps as our empirical knowledge increases—as the product of variation and only variation. An important consequence of this solution is that the associated metatheory will prescribe methods that can assess linear additive processes, but will marginalize methods that assess nonlinear processes. A classic example of this general solution was the Skinnerian demonstration that given only variations in pecking and reinforcement, it was possible to train pigeons to hit ping-pong balls back and forth over a net. Thus, it was claimed that the “apparent” developmental novelty of playing ping-pong was in reality nothing but the continuous additive modifications in variation. This solution is also adopted by those who portray cognitive development as either a simple increase in representational content (see Schonlau & Cookson, 1994) or as an increase in the efficiency with which this content is processed (Siegler, 1989, 1996; Sternberg, 1984; Valsiner, 1994).

The second metatheoretical solution treats transformational change as the bedrock reality and marginalizes the significance of variation. Here, variation is seen as rather irrelevant noise in a transformational system. Although this solution is seldom actually articulated, some stage theories, such as Erik Erikson’s (1968) theory of psychosocial development, have elevated transformational change to a point that the importance of the variational seems to disappear below the horizon.

The third metatheoretical approach does not approach transformation and variation as competing alternative, but rather it understands them as fundamentally real, necessary, and interrelated features of development. This solution asserts a reality in which each assumes a different functional role, but each explains and is explained by the other. Transformational systems produce variation, and variation transforms the system (this solution is illustrated in Figure 1.1). This relational metatheoretical posture is discussed later in this chapter as a “take on reality” that resolves many of developmental inquiry’s most controversial problems and opens new paths of investigation.

In relation to this and to other discussions of systems and dynamic systems explored in this chapter, it should be noted that the term systems is ambiguous unless clarified through articulation of its metatheoretical roots (see Overton, 1975). As pointed out by Ludwig von Bertalanffy (1968a, 1968b), the acknowledged father of general systems theory, systems has different meanings, depending on the background assumptions that frame its definition. Bertalanffy’s own systems approach—and the one explored in the present chapter—begins from background assumptions that stress the central significance of irreducible activity and organization. Other definitions, however, emerge from background assumptions that stress an ultimate absolute foundation of static uniform objects and a reductionism of any apparent activity and organization to this foundation. Bertalanffy himself referred to these alternative approaches to systems as the organismic and mechanistic respectively.

What Changes in Development? The Expressive and the Instrumental

As with development itself, the what of development has classically entailed two alternatives. Any action, at any level
from the neuronal to the molar, can be considered from the perspective of what it expresses or from the perspective of the instrumental value of the behavior. The expressive-constitutive function refers to the fact any action may be considered the reflection of some underlying organization or dynamic system. For example, in human ontogenesis we speak of cognitive systems, affective systems, and motivational systems (see the systems described in the cubes on the left of Figure 1.1). These systems have characteristic forms of activity that are expressed as actions and patterns of action in the world (center horizontal lines of Figure 1.1). A verbalization may reflect the nature of the child’s system of thought, a cry in a particular context may reflect the status of the child’s attachment system, and a series of behaviors may reflect the child’s intentional system. The expressive function is constitutive in the sense that it reflects the creative function of human action. It reflects the base from which new behaviors, new intentions, and new meanings are constituted. When inquiry is directed toward the assessment or diagnosis of the nature, status, or change of the underlying psychological system, the expressive function is central. It can also be central when explanations are presented from the perspective of biological systems. When exploring the expressive function of an action, the what that changes in development is the dynamic system that is reflected in the action expression. Dynamic systems become transformed (left cubes of Figure 1.1) through their action (center horizontal lines of Figure 1.1). Thus, dynamic systems as a what of change and transformation as a type of change are closely related.

The instrumental function of an action is understood as a means of attaining some outcome; it is the pragmatic and adaptive dimension of action (see center horizontal lines of Figure 1.1). For example, in human ontogenesis a cognition or thought may be the means to solve a problem, the emotion of crying may lead to acquiring a caregiver, or walking around may be instrumental in acquiring nourishment. Communicative actions are instrumental actions that extend into the domain of the intersubjective (relation of the person cubes at the left and social world at the right of Figure 1.1). When inquiry is directed toward the adaptive or communicative value of an action, the instrumental function is central. What changes when the instrumental is focal is the behavior itself, but the new behavior is some variation of the original. Thus, instrumental behaviors as a what of change and variation as a type of change are also closely related.

In a fashion analogous to the earlier discussion of types of developmental change, solutions to the relation of the expressive and instrumental functions of change emerge from three different metatheoretical postures. The first takes the instrumental-communicative as bedrock and marginalizes the expressive. This, for example, is the solution of any perspective that advocates an exclusively functional approach to a topic of inquiry (e.g., see the work on the functional theory of emotions, Saarni, Mumme, & Campos, 1998), of any theory that advocates an exclusively adaptationist view of a domain of interest, and of any theory that explicitly denies or marginalizes the status of mental structures, mental organization, or biological systems as legitimate—if partial—explanations of behavior.

The second metatheoretical solution reverses the bedrock-marginalization process. It establishes the expressive as bedrock and the instrumental as the marginal. Approaches that offer biological systems, mental systems, or both as both necessary and sufficient for the explanation of behavior represent examples of this solution.

The third metatheoretical solution again—as in the case of the nature of change itself—presents the expressive and the instrumental as realities that operate within a relational matrix. The expressive and the instrumental are accepted not as dichotomous competing alternatives, but rather as different perspectives on the same whole (this solution is illustrated in Figure 1.1). Like the famous ambiguous figure that appears to be a vase from one line of sight and the faces of two people from another line of sight, the expressive and instrumental represent two lines of sight, not independent processes. System and adaptation, like structure and function, are separable only as analytic points of view. Focusing inquiry on the diagnosis of underlying dynamic biological and psychological systems in no way denies that behaviors have an adaptive value; focusing on adaptive value in no way denies that the behaviors originate from some dynamic system.

A BRIEF HISTORY OF METATHEORETICAL WORLDS AND THE BIRTH OF DEVELOPMENTAL PSYCHOLOGY

The Modern Period

Modernity was defined both by a quest for absolute certainty of knowledge (Toulmin, 1990) and by an effort to expand individual freedom, especially freedom of thought. Building knowledge on rational and reasoned grounds rather than on the grounds of authority and dogma was understood as the key to each of these goals. The early protagonists who
developed the basic tenets of this metatheoretical story line were Galileo Galilei and his physics of a natural world dis-connected from mind; René Descartes, whose epistemology elevated disconnection or splitting to a first principle; and Thomas Hobbes, who saw both mind and nature in a vision of atomistic materialism. Of the three, Descartes was to have the greatest and most lasting impact on the text and subtexts of this particular metatheoretical story.

Descartes’ major contributions entailed the insertion and articulation of splitting and foundationalism as key interrelated themes into the story of scientific knowledge. Splitting is the formation of a conceptual dichotomy—an exclusive either-or relationship—and foundationalism is a claim that one or the other elements of the dichotomy constitutes the ultimate Reality or bedrock of certainty. Nature and nurture, idealism and materialism (form and matter), reason and observation, subject and object, constancy and change, biology and culture, and so on all can be—and under the influence of Cartesian epistemology are—presented as split-off competing alternatives. Choose a background principle as the “Real”—as the foundation—and it follows, under a split metatheory, that the other is mere appearance or epiphenomenal. It must be cautioned at this point that there is a critical distinction between the use of the term real in everyday commonsense life and the Real of foundationalism. No one argues—or has ever argued—that there is a lack of reality or realness in the experienced everyday world. This is commonsense realism. Commonsense realism accepts the material existence of a real, actual, or manifest world and all metatheoretical perspectives treat people, animals, and physical objects as having such a real existence. The metatheoretical issue of the Real with a capital R (Putnam, 1987) is a very different issue. It concerns the current issue of having an absolute base or foundation from which everything else emerges. In this limited sense, the Real is defined as that which is not dependent on something else—that which cannot be reduced to something else.

Modernity’s foundationalism is identified with a final achievement of absolute certainty and the end of doubt. In this story even probable knowledge is knowledge on its way to certainty (i.e., 100% probable). This foundation is not simply a grounding or a vantage point, standpoint, or point of view, and certainty and doubt are not dialectically related. Descartes’ foundationalism describes the final, fixed, secure base. It constitutes an absolute, fixed, unchanging bedrock—a final Archimedes point (Descartes, 1969).

Cartesian splitting and foundationalism came to operate as a permanent background frame for modernity’s scientific story. However, the specification of the nature of the ultimate foundation remained at issue. It was left to the empiricist branch of modernity to locate the Real within a dichotomy of observation split off from interpretation. Hobbs and later empiricists operated within this frame, in which subject became split from object, mind split from body, ideas split from matter; they built into it a materialist identification of atomistic matter as the ultimate ontological foundational Real. Further, the epistemological rhetoric of Locke, Berkeley, and Hume operated to suppress subjectivity, mind, or ideas, thereby creating objectivism, or the belief that the ultimate material reality exists as an absolute—indepen-dent of mind or knower (Searle, 1992). This constituted, as Putnam (1990) has said, the idea of a “God’s eye view” that would be independent of the mind of the investigator.

Objectivist matter thus came to constitute the ontological Real to which all of commonsense experience would be reduced to arrive at the goal of science: a systematized body of certain empirical knowledge. Support for the materialist foundation arose and was further defined by Newton’s contributions. Central among these was the redefinition of the nature of matter in a way that conceived of all bodies as fundamentally inactive. Prior to Newton, matter was understood as inherently active. Matter had been conceived in terms of the relation of being (the static, fixed) and becoming (the active, changing). Newton, however—through his concept of inertia—split activity and matter and redefined matter as inactivity (Prosch, 1964).

The redefinition of bodies as inert matter and the assumption of the atomicity of matter (i.e., bodies as ultimately aggregates of elemental matter that is uniform in nature, and in combination yields the things of the world), were basic for Newton’s formulation of his laws of motion. However, they were also ideas that a later generation generalized into a metaphysical worldview (i.e., a metatheory at the highest level of generality). This worldview identified the nature of the Real as fixed inert matter and only fixed inert matter. This worldview has been called the “billiard ball” notion of the universe—the notion that basically everything . . . was made up of small, solid particles, in themselves inert, but always in motion and elastically rebounding from each other. . . . and operating mechanically” (Prosch, 1964, p. 66).

With these metatheoretical themes at hand—splitting, foundationalism, materialism, empiricism, and objectivism—it was a short step to the formulation of a completely exclusive scientific metamethod termed mechanical explanation that with relatively minor modifications has extended to the present day as the metamethod of empiricism. This metamethod has gone under various names, including neopositivism and later instrumentalism, conventionalism, and functionalism (Overton, 1998).
Mechanical Explanation

The mechanical explanation metatool continues the splitting process by dichotomizing science into two airtight compartments, description and explanation. There are three steps to mechanical explanation. The first is considered descriptive and the second two are considered explanatory.

Step 1: Reduction-Description. The first step of mechanical explanation entails addressing the commonsense object of inquiry and reducing it to the absolute material, objective, fixed, unchanging, foundational elements or atoms. Terms like reductionism, atomism, elementarism, and analytic attitude all identify this step. In psychology for many years the atoms were stimuli and responses. Today they tend to be neurons and behaviors, or contextual factors and behaviors—the story line changes but the themes remain the same within this metatheory. In keeping with the framework of empiricism and materialism, the broad stricture here is to reduce all phenomena to the visible.

Briefly consider one impact of this first step on developmental inquiry. Immediately the concepts of transformational change, stages of development, and the mental organizations, or dynamic systems that change during development become suspect as being somehow derivative because they are not directly observable. At best under this story line, transformations, stages, and mental organization can only function as summary statements for an underlying more molecular really Real. In fact, the drive throughout this step is toward the ever more molecular in the belief that it is in the realm of the molecular that the Real is directly observed. This is particularly well illustrated in the recent enthusiasm for a microgenetic method (e.g., D. Kuhn, Garcia-Mila, Zohar, & Andersen, 1995; Siegler, 1996) as a method that offers “a direct italics added means for studying cognitive development” (Siegler & Crowley, 1991, p. 606). This approach, an intensive trial-by-trial analysis reduces the very notion of development to a molecular bedrock of visible behavioral differences as they appear across learning trials.

It is important to recognize that the aim of Step 1 is to drive out interpretations from the commonsense phenomena under investigation. Under the objectivist theme, commonsense observation is error laden, and it is only through ever more careful neutral observation that science can eliminate this error and ultimately arrive at the elementary bedrock that constitutes the level of facts or data (i.e., invariable observations).

Step 2: Causal Explanation. Step 2 of mechanical explanation begins to move inquiry into the second compartment of compartmentalized science—explanation. Step 2 consists of the instruction to find the relation among the elements described in Step 1. More specifically, given our objects of study in developmental psychology—behavior and behavior change—this step directs inquiry to locate antecedents. These antecedents, when they meet certain criteria of necessity and sufficiency, are termed causes; the discovery of cause defines explanation within this metatool. The antecedents are also often referred to as mechanisms, but the meaning is identical.

This is another point at which to pause and notice an important impact of metatheory. Here, because of the particular metatheoretical principles involved, the word explanation comes to be defined as an antecedent-consequent relation, or the efficient-material proximal cause of the object of inquiry. Further, science itself comes to be defined as the (causal) explanation of natural phenomena. It is critically important to remember here that Aristotle had earlier produced a very different metatheoretical story of scientific explanation. Aristotle’s schema involved complementary relations among four types of explanation, rather than a splitting. Two of Aristotle’s explanations were causal in nature (i.e., antecedent material and efficient causes). Two, however, were explanations according to the pattern, organization, or form of the object of inquiry. Aristotle’s formal (i.e., the momentary form or organization of the object of inquiry) and final (i.e., the end or goal of the object of inquiry) explanations were explanations that made the object of inquiry intelligible and gave reasons for the nature and functioning of the object (Randall, 1960; Taylor, 1995). Today, the structure of the atom, the structure of DNA, the structure of the solar system, and the structure of the universe are all familiar examples of formal pattern principles drawn from the natural sciences. Kinship structures, mental structures, mental organization, dynamic systems, attachment behavior system, structures of language, ego and superego, dynamisms, schemes, operations, and cognitive structures are familiar examples of formal pattern principles drawn from the human sciences. Similarly, reference to the sequence and directionality found in the second law of thermodynamics, self-organizing systems, the equilibration process or reflective abstraction, the orthogenetic principle, or a probabilistic epigenetic principle are all examples of final pattern principles (Overton, 1994a).

Both formal and final pattern principles entail interpretations that make the phenomena under investigation intelligible. Both—with the Aristotelian relational scheme—constitute legitimate explanations. However, within the split story of mechanical explanation, as guided by reductionism and objectivism, formal and final principles completely lose any explanatory status; explanation is limited to nothing but
observable efficient (i.e., the force that moves the object) and material (i.e., the material composition of the object) causes. At best, within the mechanical story formal and final principles may reappear in the descriptive compartment as mere summary statements of the underlying molecular descriptive Real discussed in Step 1. In this way transformational change and dynamic psychological systems become eliminated or marginalized as necessary features of developmental inquiry.

Step 3: Induction of Interpretation-Free Hypotheses, Theories, and Laws. Step 3 of mechanical explanation installs induction as the foundational logic of science. Step 3 instructs the investigator that ultimate explanations in science must be found in fixed unchanging laws, and these must be inductively derived as empirical generalizations from the repeated observation of cause-effect relations found in Step 2. Weak generalizations from Step 2 regularities constitute interpretation-free hypotheses. Stronger generalizations constitute interpretation-free theoretical propositions. Theoretical propositions joined as logical conjunctions (and connections) constitute interpretation-free theories. Laws represent the strongest and final inductions.

Deduction later reenters modernity’s story of empirical science as a split-off heuristic method of moving from inductively derived hypotheses and theoretical propositions to further empirical observations. When later editions of the story introduced a “hypothetico-deductive method” it was simply more variation on the same theme. The hypothesis of this method has nothing to do with interpretation, but is simply an empirical generalization driven by pristine data; the generalization then serves as a major premise in a formal deductive argument. Similarly, when instrumentalism moved away from the hypothetico-deductive stance to the employment of models, models themselves functioned merely as the same type of interpretation-free heuristic devices.

Another important variation—but a variation nevertheless—on this same theme was the so-called covering law model of scientific explanation. This model was introduced by Carl Hempel (1942) and became the prototype of all later explanations formulated within this metatheory. The covering law model was particularly important for developmental inquiry because it treated historical events as analogous to physical events in the sense that earlier events were considered the causal antecedents of later events (Ricoeur, 1984).

Here, then, is the basic outline of the quest for absolute certainty according to the empiricist modernity story of scientific methodology:

- Step 1. Reduce to the objective (interpretation-free) observable foundation.

- Step 2. Find the causes.

- Step 3. Induce the law.

As noted, variations appear throughout history. In fact, it would be misleading not to acknowledge that probability has replaced certainty as the favored lexical item in the story as it is told today. Indeed, induction is itself statistical and probabilistic in nature. However, as mentioned earlier, this change represents much more style than it does substance, because the aim remains to move toward 100% probability, thereby arriving at certainty or its closest approximation. This type of fallibilistic stance continues to pit doubt against certainty as competing alternatives rather than understand doubt and certainty as a dialectical relation framed by the concept of plausibility. More generally, all of the variations that have been introduced since the origin of Newtonian explanation—including those formulated under the methodological banners of neopositivism, instrumentalism, conventionalism, and functionalism—have not at all changed the basic themes.

There is scarcely any doubt that modernity’s empiricist metatheory of objective certainty has failed. This failure is too long a story to retell here. It has been thoroughly documented in the arena of scientific knowledge by numerous historians and philosophers of science, including Stephen Toulmin (1953), N. R. Hanson (1958), Thomas Kuhn (1962), Imre Lakatos (1978), Larry Laudan (1977), Richard Bernstein (1983), and—most recently—Bruno Latour (1993). Despite this discrediting, ghosts of modernity’s mechanistic worldview continue to haunt the scientific study of development. Nature (material cause) and nurture (efficient cause) are still presented as competing alternative explanations. Biology and culture still compete with each other as fundamental explanations of development (see Lerner, 2002). There are still those who argue that emergence of genuine novel behavior is not possible and that any apparent novelty must be completely explained by antecedent causal mechanisms. Indeed, the claim is still put forth that if a causal mechanism is not identified, then there is no real explanation—only mysticism (Elman et al., 1996) or miracles (Siegler & Munakata, 1993). This is the same mechanistically defined argument that claims there can be no discontinuity or transformational change in development. All change, according to this mechanistic argument, is (i.e., must be) nothing but additive or continuous in nature; all qualitative change must be reduced to nothing but quantitative change. There are also those who still argue that development must be explained by causal mechanisms and only causal mechanisms. And—last but not least—there are still those who argue that all scientific knowledge about development
must begin and end in a world of interpretation-free pristine observations of what “the child actually does,” a world that exalts the instrumental-communicative and excludes the expressive.

There are probably several reasons for the failure to recognize and accept the demise of modernity’s empiricist metatheory. One of these reasons has to do with socialization. For psychologists who were reared in the strictures of mechanical explanation, these strictures are difficult to abandon, and the values tend to be passed from generation to generation without deep reflection. Indeed, because this metatheory is virtually inscribed with the motto Don’t think, find out (Cohen, 1931), it is not surprising that fledgling investigators are often discouraged from taking the very notion of metatheory seriously; hence, they seldom evaluate the merits and flaws of alternative background assumptions. Another (perhaps more important) reason, however, has been the apparent lack of viable empirical scientific alternatives—and the seeming abyss of uncertainty that is faced when one abandons a secure rock-solid base. The rise of postmodern thought did nothing to assuage this fear.

The Postmodern Period and the Chaos of Absolute Relativity

Like its predecessor, postmodernism is identified with the ideal of achieving individual freedom. However, the proponents of the postmodern agenda have approached this ideal almost exclusively through attacks directed at modernity’s rational quest for absolute certainty. This has left in place the splitting of categories. The effect of this continued splitting is that postmodern thought has tended to define itself in terms of categories that reflect the opposite of those that defined modernity. Thus, if modernity was rational, the postmodern celebrates the emotional; if modernity was objectivist observational, the postmodern celebrates subjectivist interpretation; and if modernity aimed for the universal, the postmodern argues for the particular. Despite the fact that advocates of postmodernism explicitly reject foundationalism and explicitly reject the notion of metatheory—“metanarratives,” as they are termed in the postmodern vernacular (Overton, 1998)—splitting into oppositional categories of necessity creates a new (if implicit) foundationalism. In this new foundationalism, modernity is turned on its head. The apparent reality of modernity becomes the real foundational reality of postmodernism. The foundational elevation of interpretation over observation in some versions of hermeneutics and deconstructivism is illustrative. When interpretation is valued to the exclusion of observation, the end result is a complete (i.e., absolute) relativism. If there is no neutral observational territory to help decide between your judgment and my judgment, then all knowledge is purely subjective and (hence) relative. But this situation is chaotic and precludes any stable general base from which to operate; this is complete relativity and uncertainty. Given this chaotic alternative, it is little wonder that the generation of developmental psychologists that followed the destruction of neopositivism and instrumentalism tended to cling for support to the wreckage of modernity’s descending narrative. In their split world, the slow death of fading relevance is less terrifying than the prospect of chaotic fragmentation.

Although much of postmodern thought has moved towards the chaotic abyss, one variant has attempted to establish a stable base for knowledge construction by developing a new scientific metatheory. This position emerged from the hermeneutic and phenomenological traditions (Latour, 1999) and has come to operate parallel to and as a reaction against neopositivism’s quest for reductionistic causal explanation. This alternative picture champions understanding (in contrast to explanation) as the base of scientific knowledge—at least as this scientific knowledge pertains to the behavioral and social sciences, including the humanities.

Broadly, hermeneutics is the theory or philosophy of the interpretation of meaning. Hermeneutics elevates to a heroic role the very concept that mechanical explanation casts as demon error—interpretation. For our purposes, we can pass by the periods of classical, biblical, and romantic hermeneutics, as well as Vico’s historical hermeneutics. Our brief focus here is on the effort that Dilthey (1972) promoted at the turn of the present century to construct a metamethod for the social sciences; this was Verstehen or understanding. Within this metamethod, understanding operates as an epistemological rather than a psychological concept. Furthermore, most important is that interpretation operates as the procedure that results in understanding.

As a metamethod of the social and behavioral sciences, understanding is closely related to action theory. Action theory is a person-centered approach to inquiry into processes and operations of the meaning-producing, living embodied agent (Brandtstadter, 1998; Brandtstadter & Lerner, 1999; Overton, 1997a, 1997b). Action theory stands in contrast to exclusively variable approaches to human behavior, which are externalist and event oriented in their focus. Paul Ricoeur has clearly outlined—in the context of Wittgenstein’s language games, which are themselves metatheoretical background principles—the distinction between variable-centered events and person-centered actions (see also Magnusson & Statton, 1998), and in the following outline Ricoeur (1991)
suggested the distinction between mechanical explanation and hermeneutic understanding:

It is not the same language game that we speak of events [variables] occurring in nature or of actions performed by people. For, to speak of events [variables], we enter a language game including notions like cause, law, fact, explanation and so on. . . . It is . . . in another language game and in another conceptual network that we can speak of human action [i.e., a person-centered frame]. For, if we have begun to speak in terms of action, we shall continue to speak in terms of projects, intentions, motives, reasons for acting, agents, [interpretation, understanding] and so forth. (pp. 132–133)

Unfortunately, the creation of a distinct metatheory for the social sciences is yet another example of proceeding within a split background frame. Verstehen is presented as a competing account of human functioning to that found in the natural sciences. However, the articulation of this dichotomy may also provide a clue to the possibility of its resolution—the possibility of a rapprochement between the futility of a search for absolute certainty and the chaos of absolute uncertainty. Verstehen as a metatheory—and action theory as an approach to human functioning—are closely related by the intentional quality of action. Intention is never directly observable by a third party. To intend is to do something for the sake of; it involves direction and order. There is a goal toward which action moves, and a sequence of acts lead to that goal. To explain (understand) action, it is necessary to make interpretative inferences about patterns of acts that make the specific behavioral movements intelligible and give a reason for the movements. For example, the act we term reaching in the young infant is only that if the inference is made that the infant intends a particular goal object. Under another inference the observed movements might be termed stretching. Making inferences about action patterns is in fact identical to Aristotle’s formal and final explanations as they were designed to make the object of inquiry intelligible and give reasons for the nature and functioning of the object. Thus, a rapprochement between developmental psychology as an adherent of a so-called natural science perspective might view it—and as an adherent of an action perspective might view it—may reside in a metatheoretical perspective that can integrate the mechanical causal explanation and action pattern explanation.

RELATIONAL METATHEORY: A SYNTHESIS OF OPPOSITES

The historian of science Bruno Latour (1993) has sketched just such a rapprochement in his analysis of the modern agenda and postmodernism. Latour begins by rejecting both modernity and postmodernism. He refers to the latter as “a symptom, not a fresh solution” (p. 46) to the problems of modernity.

It [postmodernism] senses that something has gone awry in the modern critique, but it is not able to do anything but prolong that critique, though without believing in its foundations (Lyotard, 1979). . . .

Postmodernism rejects all empirical work as illusory and deceptively scientistic (Baudrillard, 1992). Disappointed rationalists, its adepts indeed sense that modernism is done for, but they continue to accept its way of dividing up time (p. 46).

Although adversaries, both groups have played on the field of identical background assumptions. Latour’s solution is to move from this to another much broader field of play where foundations are groundings, not bedrocks of certainty; and analysis is about creating categories, not about cutting nature at its joints. Viewed historically, Latour calls this approach “amodernism” as a denial of both modernity and postmodernism. Viewed as a metatheoretical background it is termed “relationism” (p. 114) and its basic identity is defined by a move away from the extremes of Cartesian splits to the center or “Middle Kingdom,” where entities and ideas are represented not as pure forms, but as forms that flow across fuzzy boundaries.

Rejecting Splits and Bedrocks

A relational metatheory begins by clearing splitting from the field of play. Because splitting and foundationalism go hand in hand, this also eliminates foundationalism. Splitting involves the belief that there are pure forms, but this belief itself springs from the acceptance of the atomistic assumptions that there is a rock bottom to reality and that this rock bottom is composed of elements that preserve their identity, regardless of context. Thus, acceptance of atomism leads directly to the belief that the mental (ideas, mind) and the physical (matter, body) are two absolutely different natural kinds of things. And if nature is composed of such natural kinds, then it is possible to cut nature at its joints. A relational metatheory abandons atomism and replaces it with a more holistic understanding, which proposes that the identity of objects derives from the relational context in which they are embedded. As a consequence of this form of background idea—as the philosopher John Searle (1992) has suggested—“the fact that a feature is mental does not imply that it is not physical; the fact that a feature is physical does not imply that it is not mental” (p. 15). Similarly, the fact that a feature is biological does not suggest that it is not cultural, the fact that a feature is cultural does not suggest that it is not biological, and so forth.
The rejection of pure forms or essences has broad implications for developmental psychology. To briefly give but one example, consider the seemingly never-ending nature-nurture or biology-culture debate. This debate is framed by the modern agenda of splitting and foundationalism. In the debate’s current form, virtually no one actually asserts that matter-body-brain-genes or society-culture-environment provides the cause of behavior or development; however, the background idea of one or the other as the real determinant remains the silent subtext that continues to shape debate. The overt contemporary claim is that behavior and development remains the silent subtext that continues to shape debate. The background idea of one or the other as the real determinant of the two determines the origin versus the appearance of the split foundational agenda, battles continue over the relative merits of each entity. As a consequence, the debate simply becomes displaced to another level of discourse. At this new level, the contestants agree that behavior and development are determined by both nature and nurture, but they remain embattled over the relative merits of each entity’s contribution. Within the split foundationalist agenda, battles continue over which of the two is more important for a specific behavior, which of the two determines the origin versus the appearance of a specific behavior, or how much one or the other contributes to that behavior. Thus, despite overt conciliatory declarations to the contrary, the classical which one and how much questions that have long framed the split debate (see Anastasi, 1958; Schneirla, 1956) continue as potent divisive frames of inquiry. In fact, it would be impossible to cast questions of development as issues of nativism and empiricism (Spelke & Newport, 1998) were it not for the assumption of pure forms (see Lerner, 2002, for a further elaboration).

The Identity of Opposites

Rejecting atomism eliminates the idea of pure forms and consequently makes any notion of natural foundational splits untenable. This in itself destroys the scientific legitimacy of questions such as the which one and how much questions of nature-nurture. However, the mere rejection of atomism does not in itself offer a positive approach to resolving the many fundamental dichotomies that have framed developmental as well as other fields of inquiry (see Table 1.1). A general positive resolution requires a second component; this component is the generation of a context in which the individual identity of each formerly dichotomous member is maintained while simultaneously it is affirmed that each member constitutes and is constituted by the other. Thus, a general context is needed in which (for example) both nature and nurture maintain their individual identities while simultaneously it is understood that the fact that a behavior is a product of biology does not imply that it is not equally a product of culture, and that the fact that a behavior is a product of culture does not imply that is not equally a product of biology—that is, it must be shown that while there are both biology and culture, there is no biology that is not culture and no culture that is not biology.

Splitting entails casting categories into an exclusive either-or form that forces an understanding of the terms as contradictions in the sense that one category absolutely excludes the other (i.e., follows the logical law of contradiction that it is never the case that A = not A). The next step in the formulation of a relational metatheory involves replacing this exclusive framework with an inclusive one. The inclusive framework must accomplish the seemingly paradoxical task of simultaneously establishing both an identity between the opposite categories and retaining the opposite quality of the categories; this is accomplished by considering identity and differences as two moments of analysis.

Guided by a more holistic contextual background assumption that assumes that parts and wholes define each other, the identity among categories is found by recasting the previously dichotomous elements not as contradictions, but as differentiated polarities of a unified matrix—as a relation. As differentiations, each pole is defined recursively; each pole defines and is defined by its opposite. In this identity moment of analysis the law of contradiction is suspended and each category contains and in fact is its opposite. Further—and centrally—as a differentiation this moment pertains to character, origin, and outcomes. The character of any contemporary behavior, for example, is 100% nature because it is 100% nurture. There is no origin to this behavior that was some other percentage—regardless of whether we climb back into the womb, back into the cell, back into the genome, or back into the DNA—nor can there be a later behavior that will be a different percentage. Similarly, any action is both

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expressive and instrumental, and any developmental change is both transformational and variational.

In the second or oppositional moment of analysis, the law of contradiction is allowed to operate and each category again asserts its individuality. The parts are opposites and they assert their differences. In this oppositional moment nature is nature, it is not nurture, and, nurture is nurture, it is not nature. This moment of analysis pertains to settings or momentary context. Thus, it is possible to analyze any behavior from the standpoint of either nature or nurture when this either-or is considered as an inclusive rather than an exclusive disjunction. I return to this point in the following section.

Because the idea and implications of suspending the law of contradiction on the one hand and applying it on the other hand is not a familiar idea, some clarifying comments are needed. Here it must be noted that the relational stance owes much to the notion of the *dialectic* as this was articulated by the nineteenth century philosopher G. W. F. Hegel (1807–1830). For Hegel, historical—and by extension developmental—change is a dynamic expressive-transformational process of growth, represented and differentiated into a second concept or feature of a dynamic system. The essence of Hegel’s dialectic is that of a process through which concepts or fundamental features of a dynamic system differentiate and move toward integration. Any initial concept or any basic feature of a dynamic system—called a *thesis* or an *affirmation*—contains implicit within itself an inherent *contradiction* that, through action of the system, becomes differentiated into a second concept or feature—the *antithesis* or *negation* of the thesis. As a consequence, even in the single unity of thesis there is the implicit contradictory relation of thesis-antithesis, just as in the unity of the single organic cell there is the implicit differentiation into the unity of multiple cells. This points to the fundamental relational character of the dialectic.

As thesis leads to antithesis—thus producing the differentiation of a relational polarity of opposites—a potential space between them is generated, and this becomes the ground for the *coordination* of the two. The coordination that emerges—again through the mechanism of action of the system—constitutes a new unity or integration called the *synthesis*. The coordinating synthesis is itself a system that exhibits novel systemic properties while subsuming the original systems. Thus, a new relational dynamic matrix composed of three realms—thesis-antithesis-synthesis—is formed. The integration that emerges from the differentiation, like all integrations, is incomplete. The synthesis represents a new dynamic action system—a new thesis—and thus begins a new growth cycle of differentiation and integration.

In this relational scheme, the polarity of opposites (i.e., thesis and antithesis) that emerges from the initial relatively undifferentiated matrix (i.e., thesis) does not constitute a cutoff (split) of contradictory categories that absolutely exclude each other. Having grown from the same soil as it were, the two, while standing in a contradictory relation of opposites, also share an identity. Hegel, in fact, referred to this relation as the “identity of opposites” (Stace, 1924) and illustrated it in his famous example of the master and slave. In this example Hegel demonstrated that it is impossible to define or understand the freedom of the master without reference to the constraints of slavery; and it is consequently impossible to define the constraints of slavery without the reference to the freedom of the master. Freedom thus contains the idea of constraint as constraint contains the idea of freedom, and in this we see the identity of the opposites freedom and constraint.

The justification for the claim that a law of logic—for example, the law of contradiction—can reasonably both be applied and relaxed depending on the context of inquiry requires a recognition that the laws of logic themselves are not immune to background ideas. In some background traditions, the laws of logic are understood as immutable realities given either by a world cut off from the human mind or by a prewired mind cut off from the world. However, in the background tradition currently under discussion, the traditional laws of logic are themselves ideas that have been constructed through the reciprocal action of human minds and world. The laws of logic are simply pictures that have been drawn or stories that have been told. They may be good pictures or good stories in the sense of bringing a certain quality of order into our lives, but nevertheless they are still pictures or stories, and it is possible that other pictures will serve us even better.

The twentieth century philosopher Ludwig Wittgenstein (1958), whose later works focused on the importance of background ideas, made this point quite clearly when he discussed another law of logic—the law of the excluded middle—as being one possible picture of the world among many possible pictures.

The law of the excluded middle says here: It must either look like this, or like that. So it really . . . says nothing at all, but gives us a picture. . . . And this picture *seems* to determine what we have to do and how—but it does not do so. . . . Here saying ‘There is no third possibility’ . . . expresses our inability to turn our eyes away from this picture: a picture which looks as if it must already contain both the problem and its solution, while all the time we *feel* that it is not so. (1953, para. 352)

The famous ink sketch by M. C. Escher titled *Drawing Hands* (Figure 1.2) presents a vivid graphic illustration both of the *identity* of opposites that is found when the law of contradiction is relaxed in this second phase of a relational
Relational Metatheory: A Synthesis of Opposites

In this sketch a left and a right hand assume a relational posture according to which each is simultaneously drawing and being drawn by the other. Each hand is identical with the other in the sense of each drawing and each being drawn. This is the relaxed moment of the law of contradiction. Yet they are opposites and contradict each other in that one is a left hand and one is a right hand. Identity is achieved in the context of opposites that define and are defined by each other. It is a useful exercise to write on each hand one term of traditionally split concepts and to explore the resulting effect. Terms that can be written in this fashion range from nature and nurture, biology and culture, transformation and variation, expressive and instrumental to pairs such as subject-object, intrapsychic-interpersonal, interpretation-observation, certainty-doubt, absolute-relative, unity-diversity, stability-change, universal-particular, reason-emotion, ideas-matter, analysis-synthesis, and so on. This exercise is more than merely an illustration of a familiar bidirectionality of effects suggested in many instances by many scientific investigators. The exercise makes tangible the central feature of the relational metatheory; seemingly dichotomous ideas that have often been thought of as competing alternatives can in fact enter into inquiry as complementary supportive partners.

This transformation of competing alternatives into complementary partners is illustrated in a recent exchange of comments concerning research on the topic that social psychology refers to as the fundamental attribution error. In this exchange, one group (Gilovich & Eibach, 2001) proceeds from a split position and notes that “human behavior is not easily parsed into situational and dispositional causes” (p. 23) and it is difficult to establish “a precise accounting of how much a given action stems from the impinging stimulus rather than from the faculty or disposition with which it makes contact” (p. 24). The reply to this comment, from a group committed to an identity of opposites (Sabini, Siepman, & Stein, 2001), asserts that they reject such a position because it reflects confusion between competing and
complementary accounts. They argue that the problem with the question of

How much John’s going out with Sue stems from her beauty rather than from his love of beautiful women. . . . is not that it is difficult to answer; it is that it is conceptually incoherent. It is incoherent because it construes two classes of accounts that are in fact complementary as if they were competing. The heart of our argument is that one must take this point seriously. All behavior is jointly a product of environmental stimuli and dispositions.

(p. 43)

A similar but subtler example is found in a recently published dialogue on spatial development. Uttal begins this dialogue with the seemingly complementary view that his claims about spatial development “are based on the assumption that the relation between maps and the development of spatial cognition is reciprocal in nature” (2000, p. 247). However, in a commentary on Uttal’s article, Liben (2000) raises the question of whether Uttal is in fact operating within the context of an identity of opposites, which she proposes as her own approach.

As I read his thesis, Uttal seems to be suggesting an independent contribution of maps, positing that exposure to maps can play a causal role in leading children to develop basic spatial concepts.

My own preference is to propose a more radically interdependent [italics added] role of organismic and environmental factors. (p. 272)

The Opposites of Identity

If we think of the identity of opposites as a kind of figure-ground problem then, to this point, the figure has primarily been the proposition that within a relational metatheory, ideas—that in other metatheoretical systems act as bedrock foundational competing alternatives—exhibit an underlying identity. Equally important, but operating as ground to this point, is the already alluded-to fact that this identity is one of opposites. To now make these opposites the figure, opens the way to a third component of a relational metatheory: generating relatively stable platforms from which to launch empirical inquiry.

Without the opposites of identity there would be only the identity of identities and this would present little opportunity for serious empirical work. It has already been noted that a relational metatheory rejects splits and bedrocks. If this were the end of the story—as would be the case with an identity of identities—then we would have eliminated the absolute objective realism of modernity, but we would still be in danger of falling into the absolute relativism of post-modernism. What is needed is some way to introduce a relative relativism or a relative realism—both would mean the same—in order to establish a stability sufficient to make empirical inquiry possible and meaningful. This goal is met by taking the oppositional moment of analysis as figure and the identity moment of analysis as ground. When relational terms are viewed as opposites, each asserts a unique identity that differentiates it from other identities. These unique differential qualities are stable within any general system and thus may form a relatively stable platform for empirical inquiry. These platforms become standpoints, points of view, or lines of sight in recognition that they do not reflect absolute foundations (Harding, 1986). Again, considering Escher’s sketch, when left hand as left hand and right as right are the focus of attention, it then becomes quite clear that—were they large enough—one could stand on either hand and examine the structures and functions of that hand. Thus, to return to the nature-nurture example, while explicitly recognizing that any behavior is 100% nature and 100% nurture, alternative points of view permit the scientist to analyze the behavior from a biological or from a cultural standpoint. Biology and culture no longer constitute competing alternative explanations; rather, they are two points of view on an object of inquiry that has been both created by and will only be fully understood through multiple viewpoints. To state this more generally, the unity that constitutes human identity and human development becomes discovered only in the diversity of multiple interrelated lines of sight.

Synthesis: The View From the Center

Engaging fundamental bipolar concepts as relatively stable standpoints opens the way and takes an important first step toward establishing a broad stable base for empirical inquiry within a relational metatheory. However, this solution is incomplete because it omits a key relational component. The oppositional quality of the bipolar pairs reminds us that their contradictory nature still remains and still requires a resolution. As suggested earlier, the resolution of this tension between contradictions is not found in the reduction of one of the system polarities to the other. Rather, moving to the middle and above the conflict—and here discovering a novel system that coordinates the two conflicting systems—establishes the resolution. This position is a position of synthesis and it constitutes another standpoint.

At this point the Escher sketch fails as a graphic representation. Although Drawing Hands illustrates the identity of opposites and shows the middle ground, it does not present a coordination of the two. In fact, the synthesis for this sketch
is the unseen hand that has drawn the drawing hands. The synthesis of interest for the general metatheory would be a system that is a coordination of the most universal bipolarity we can imagine. Undoubtedly there are several candidates for this level of generality, but the polarity between matter and society seems sufficient for present purposes. What then represents the synthesis of matter and society? Arguably it is the human organism (Latour, 1993). Because our specific focus of inquiry is psychology, we can reframe this matter-society synthesis of interest for the general metatheory would be a system that is a coordination of the most universal bipolarity we can imagine. Undoubtedly there are several candidates for this level of generality, but the polarity between matter and society seems sufficient for present purposes. What then represents the synthesis of matter and society? Arguably it is the human organism (Latour, 1993). Because our specific focus of inquiry is psychology, we can reframe this matter-society polarity as the polarity of biology and culture. In the context of psychology, then, as an illustration write “biology” on one and “culture” on the other Escher hand, and what is the resulting synthesis?—the human organism, the person (see Figure 1.3). Persons—as integrated self-organizing dynamic systems of cognitive, emotional, and motivational processes—represent a novel level or stage of structure and functioning that emerges from and constitutes a coordination of biology and culture (see Magnusson & Stattin, 1998).

At the synthesis, then, there is a standpoint that coordinates and resolves the tension between the other two members of the relation. This provides a particularly broad and stable base for launching empirical inquiry. A person standpoint opens the way for the empirical investigation of universal dimensions of psychological structure-function relations (e.g., processes of perception, thought, emotions, values), their individual differences, and their development—(transformational-variational) across the life span. Because universal and particular are themselves relational concepts, no question can arise here about whether the focus on universal processes excludes the particular; it clearly does not, as we already know from the earlier discussion of polarities. The fact that a process is viewed from a universal standpoint in no way suggests that it is not contextualized. The general theories of Jean Piaget, Heinz Werner, James Mark Baldwin, William Stern, attachment theory and object relations theories, and theory of John Bowlby, Harry Stack Sullivan, Donald Winnicott all are exemplars of developmentally oriented relational person standpoints.

It is important to recognize that one synthesis standpoint is relative to other synthesis standpoints. Human and society are coordinated by matter, and thus—within psychological inquiry—biology represents a standpoint as the synthesis of person and culture (Figure 1.3). The implication of this is that a relational biological approach to psychological processes investigates the biological conditions and settings of psychological structure-function relations. This exploration is quite different from split-foundationalist approaches to biological inquiry that assume an atomistic and reductionistic stance towards the object of study. The neurobiologist Antonio Damasio’s (1994, 1999) work on the brain-body basis of a psychological self and emotions is an excellent illustration of this biological relational standpoint. And in the context of his biological investigations, Damasio points out A task that faces neuroscientists today is to consider the neurobiology supporting adaptive supraregulations [e.g., the psychological subjective experience of self] . . . I am not attempting to reduce social phenomena to biological phenomena, but rather to discuss the powerful connection between them. (1994, p. 124) . . . . Realizing that there are biological mechanisms behind the most sublime human behavior does not imply a simplistic reduction to the nuts and bolts of neurobiology (1994, p. 125).

A similar illustration comes from the Nobel laureate neurobiologist Gerald Edelman’s (1992; Edelman & Tononi, 2000) work on the brain-body base of consciousness:

I hope to show that the kind of reductionism that doomed the thinkers of the Enlightenment is confuted by evidence that has emerged both from modern neuroscience and from modern physics. . . . To reduce a theory of an individual’s behavior to a theory of molecular interactions is simply silly, a point made clear when one considers how many different levels of physical, biological, and social interactions must be put into place before higher order consciousness emerges. (Edelman, 1992, p. 166)

A third synthesis standpoint recognizes that human and matter are coordinated by society, and again granting that the inquiry is about psychological processes, culture represents a standpoint as the synthesis of person and biology (Figure 1.3). Thus, a relational cultural approach to psychological
processes explores the cultural conditions and settings of psychological structure-function relations. From this cultural standpoint, the focus is upon cultural differences in the context of psychological functions as complementary to the person standpoint’s focus on psychological functions in the context of cultural differences.

This standpoint is illustrated by cultural psychology, or developmentally oriented cultural psychology. However, not all cultural psychological perspectives emerge from standpoint background ideas. When, for example, a cultural psychology makes the social constructivist assertion that social discourse is “prior to and constitutive of the world” (Miller, 1996, p. 99), it becomes clear that this form of cultural psychology has been framed by split-foundationalist background ideas. Similarly, when sociocultural claims are made about the “primacy of social forces,” or claims arise suggesting that “mediational means” (i.e., instrumental-communicative acts) constitute the necessary focus of psychological interest (e.g., see Wertsch, 1991), the shadows of split-foundationalist metatheoretical principles are clearly in evidence.

A recent example of a relational developmentally oriented cultural standpoint emerges from the work of Jaan Valsiner (1998), which examines the “social nature of human psychology.” Focusing on the social nature of the person, Valsiner stresses the importance of avoiding the temptation of trying to reduce person processes to social processes. To this end he explicitly distinguishes between the dualisms of split-foundationalist metatheory and dualities of the relational stance he advocates. Ernst Boesch (1991) and Lutz Eckensberger (1990) have also presented an elaboration of the cultural standpoint. Boesch’s cultural psychology and Eckensberger’s theoretical and empirical extensions of this draw from Piaget’s cognitive theory, from Janet’s dynamic theory, and from Kurt Lewin’s social field theory, and argues that cultural psychology aims at an integration of individual and cultural change, an integration of individual and collective meanings, and a bridging of the gap between subject and object (e.g., see Boesch, 1991).

In a similar vein Damon offers a vision of the cultural standpoint in his discussion of “two complementary developmental functions, . . . the social and the personality functions of social development” (1988, p. 3). These are presented by Damon as an identity of opposites. The social function is an act of integration serving to “establish and maintain relations with other, to become an accepted member of society-at-large, to regulate one’s behavior according to society’s codes and standards” (p. 3). The personality function, on the other hand, is the function of individuation, an act of differentiation serving the formation of the individual’s personal identity that requires “distinguishing oneself from others, determining one’s own unique direction in life, and finding within the social network a position uniquely tailored to one’s own particular nature, needs, and aspirations” (p. 3). Although others could be mentioned as illustrative (e.g., Grotevant, 1998), it should be noted in conclusion here that Erik Erikson (1968), was operating out of exactly this type of relational standpoint when he described identity as “a process ‘located’ in the core of the individual and yet also in the core of his communal culture” (p. 22).

As a final point concerning syntheses and the view from the center, it needs to be recognized that a relational metatheory is not limited to three syntheses. For example, discourse or semiotics may also be taken as a synthesis of person and culture (Latour, 1993). In this case biology and person are conflated and the biological-person dialectic represents the opposites of identity that are coordinated by discourse.

As a general summary to this point, the argument has been made that metatheoretical principles form the ground out of which grow the theories and methods of any domain of empirical inquiry. This has been illustrated by exploring several issues that frame the field of developmental psychology. Historically, both the modern and postmodern eras have articulated broad metatheoretical paradigms that have functioned as competing alternatives in the natural and social sciences. The commonality of these paradigms has been that each shares the background assumptions of splitting and foundationalism. A relational paradigm, which begins by rejecting these assumptions, offers a rapprochement of the alternatives through an elaboration of the principles of the identity of opposites, the opposites of identity, and the synthesis of opposites. The question of the specific nature of this rapprochement remains.

**A RAPPROCHEMENT: EXPLANATION IN A RELATIONAL CONTEXT**

The rapprochement between the natural and social sciences emerges from transforming the historically traditional dichotomies of observation versus interpretation and theory versus data into relational bipolar dimensions. Given this movement in grounding, mechanical explanation and hermeneutic understanding become an integrated metathem in the following manner.

**Step 1: Relational Analysis—Synthesis Replaces Split Reductionism**

Clearly the reduction and atomism of mechanical explanation are split principles and they need to be replaced. Simply
Step 2: Relational Action Pattern—Conditions
Explanation Replaces Split Causes

As noted earlier, the defining marks of mechanical explanation and hermeneutic understanding have been the “nothing but” reliance on causes and action patterns, respectively. By entering into a relational context, these forms of explanation become integrated. In a relational context, causes are transformed from interpretation-free observed objects or events that produce changes in other objects or event into conditions that are associated with changes. A cause is interpretation free only when analysis is split from synthesis; in a relational model conditions—as an analytic moment of inquiry—are understood as functioning under some interpretation and some synthesis (Hanson, 1958). A cause can be a force that produces, influences, or affects the status or change of an object only in a model that splits system and activity; in a relational model, system and activity are joined as a structure-function relation. In a relational model, conditions are identified as necessary, sufficient, or both to the occurrence of the phenomenon under investigation (von Wright, 1971). Thus, rather than inquiry into the causes of behavior or development, inquiry from a relational perspective examines conditions that are associated with behavior or development. For example, if inquiry concerned the development of a plant, food and water would represent necessary conditions for the plant to grow, but would not cause the plant’s development in the sense of producing that development. Similarly, neither nature factors nor nurture factors can be considered the cause of human development; they represent conditions that are associated with that development.

The assertion that causes are best understood as conditions leaves open the question of what in fact does produce behavior and change. The issue here is that of mechanisms. As is the case with other key terms, mechanism has several often incompatible definitions. In the present case the meaning is closer to “a process, physical or mental, by which something is done or comes into being” than to “the doctrine that all natural phenomena are explicable by material causes and mechanical principles” (American Heritage Dictionary of the English Language, Fourth Edition (2000 online). Hence, for present purposes, mechanism is defined as an active method or process rather than a cause or set of causes. These mechanisms are found in the structure-function relations that identify action patterns. Any active system constitutes a structure-function relation. The system is not a random aggregate of elements; it has a specific organization, an architecture (i.e., a structure). Further, this structure is not randomly active; it has a characteristic activity (i.e., a function). Even computers (structure)—when they are turned on—compute (function). However, computers do not change—at least they do not change in a transformational manner—and for this reason they are rather limited as models of the human mind (Fodor, 2000). The input and output of a computer may change, and this is the basis for traditional and contemporary split functionalist approaches to explanation (Overton, 1994a). However, the organization-activity of the computer itself does not undergo transformational change. Living organisms, on the other hand, are dynamic systems; they are organizations (structures) that are inherently active (function) and exhibit transformational change (dynamic).

When a system is viewed from the standpoint of function, it is the function itself (i.e., the characteristic action of the system) that constitutes the mechanism of behavior and change. Systems change through their characteristic action on or in the context of external conditions. Thus, the explanation of behavior and change is given by the function of the system (see Thelen & Smith, 1998). Further, because of the relation of structure and function, when a system is viewed from the standpoint of structure, structure then explains function. Consequently, both structure and function enter centrally into the explanatory process.

Structure and function are central to explanation, but they are also fundamentally interpretative in nature; they are not directly observable. Structure-function relations are patterns of action, but patterns are never directly observed; they must be inferred. When examined from the structural standpoint, the patterns constitute Aristotle’s formal and final explanations. From the structural standpoint, action patterns make the object of inquiry intelligible and give reasons for the nature and functioning of the object. From the functional standpoint, action patterns explain by presenting the mechanism of behavior and development. Action patterns, however, necessarily operate within the context of material conditions both internal to the system and external to it. Thus, the
introduction of structure-function relations serves to integrate hermeneutic explanation and natural science conditions explanation. Both types of explanation are necessary, but each operates from a different standpoint.

Developmental psychology offers several illustrations of this explanatory integration. For example, Bowlby’s (1958) theory of infant-caregiver attachment posits a behavioral attachment system (structure) in relation to actions that serve the adaptive function of keeping the caregiver in close proximity. Piaget’s (1952, 1985) theory presents a more general example. This theory represents an attempt to make sense of (i.e., explain) the development of knowing. Like Bowlby’s, Piaget’s is a relational theory that takes seriously the background ideas of structure-function and conditions. Because the theoretical goal is to explain the person and the development of the knowing person, Piaget takes a person (and epistemic) standpoint rather than a biological or a cultural standpoint. The theory conceptualizes the person as a dynamic self-organizing action system operating in a world of biological and environmental conditions. Structure and function constitute thesis and antithesis, and the resulting synthesis is transformational change or stages of new structure-function relations. Structures are the mental organizations that are expressed as patterns of action. On the structural side of the equation, Piaget introduces the theoretical concepts schemes, coordination of schemes, operations, groupings, and group. Each explains (i.e., formal explanation)—at successive novel levels of transformation—the cognitive equipment that the infant, toddler, child, and adolescent come to have available for constructing their known worlds.

Theoretical concepts of adaptation, assimilation—accommodation, equilibrium, equilibration, and reflective abstraction, constitute the functional side of the equation. Schemes, coordinated schemes, operations, and so forth function; they are active and it is through their action in a world of conditions that they change. Piaget’s is an action theory and action is the general mechanism of development. Through the organized actions of the person in the world, the person’s mode of knowing the world changes and these changes are adaptive. Action as the mechanism of development becomes more specific through recognition of its biphasic nature. Assimilation is the phase of action that expresses the mental organization. This expression gives meaning to the world; it constitutes the world as known. However, these meanings—including meanings at a presymbolic, preconceptual stage—have an instrumental function as well as the expressive function. When the instrumental function of the action is not completely successful in securing an adaptive goal, variation occurs in the action. For example, an infant may intend (assimilate) the side of the breast as a nipple by sucking it, but when the satisfaction of feeding does not occur, variations arise in the action and this is exemplified by the sucking in various new locations. Variations open new possibilities that both secure a goal and feedback to transform (differentiations and novel coordinations) the system itself. This action phase of variation and organizational modification is the accommodation phase of any action.

Organization explains in the sense of establishing the form (structure), and action yields the explanatory mechanism (function). This relational polarity operates in the context of conditions, such as parents who do or do not provide appropriate opportunities for the adequate exercise of functioning. It is also the case that at the beginning of any stage of novel structure-function relations, the capacity for successful adaptation is limited. This is theoretically expressed in the idea that there is more assimilation than accommodation at the beginning of a stage; hence, there is a lack of balance or equilibrium between assimilation and accommodation. Through action this imbalance changes and the two phases of action eventually move into equilibrium within a given stage. Of course, given the relational nature of the theory, equilibrium of assimilation and accommodation also means that the underlying structures have reached a stable state (equilibrium) of differentiation and intercoordination.

The movement toward equilibrium of the action phases of assimilation and accommodation describes the development mechanism within a stage. To explain development across stages, Piaget introduces a principle that also has both a structural and a functional face. Structurally, this is the equilibration principle (Piaget, 1985) and it asserts that development change is directed toward improved states or patterns of the just-described equilibrium. Improved here is defined in terms of the adaptive value of one stage of cognitive structures relative to the adaptive value of other stages of cognitive structures. For example, the formal operational structures associated with adolescence represent an improved equilibrium over sensorimotor structures associated with infancy in that the formal structures are more stable, more flexible, and describe a much broader range of potential cognitive experiences than do sensorimotor structures. The equilibration principle introduces hierarchical organization into the theory and explains sequence, order, and direction in the emergence of novel cognitive abilities, just as the second law of thermodynamics explains sequence, order, and direction with respect to the physical world. It reflects Aristotle’s metatheoretical final explanation, and it is consistent with the structural final explanations offered in other developmental theories, including Heinz Werner’s (1957, 1958) orthogenetic principle and Erik Erikson’s (1968) epigenetic principle.

The functional face of the mechanism of development across stages is termed reflective abstraction. Reflective abstraction is action, but it is action that has its own biphasic
character consisting of reflecting in the sense of projecting something from a lower to a higher level, and reflexion, which is the reorganization of what has been projected. The alternation of the reflecting-reflexion phases produces each new stage of cognitive reorganization. Reflection is similar to the act of generalizing; reflexion is acting from the generalized position to consolidate the gains made through generalizing. What is abstracted in this process is the coordination of the differentiated structures of the lower level of organization.

**Step 3: Abductive Logic Replaces Split Induction and Deduction**

The third step towards a relational metamethod that integrates mechanical explanation and hermeneutic understanding addresses the nature of scientific logic. Modern mechanical explanation split acts of discovery and acts of justification and identified the former with a foundational inductive logic and the latter with a deductive logic. Interpretation-free induction from interpretation-free data was the vehicle for the discovery of hypotheses, theories, laws, and interpretation-free deduction was the vehicle for their justification. A relational metamethod introduces the logic of abduction as the synthesis of the opposite identities of theory (broadly considered, including background ideas) and data. Abduction (also called retrodiction) was originally described by the pragmatist philosopher Charles Sanders Pierce (1992), and the historian of science N. R. Hanson (1958) has argued that it has long been the fundamental—if often invisible—logic of scientific activity. In a contemporary version, this logic is termed inference to the best explanation (Fumerton, 1993; Harman, 1965).

Abduction operates by arranging the observation under consideration and all background ideas (here, including specific theoretical ideas) as two Escherian hands. The possible coordination of the two is explored by asking the question of what must necessarily be assumed in order to have that observation (see Figure 1.4). The inference to—or interpretation of—what must in the context of background ideas necessarily be assumed then comes to constitute the explanation of the phenomenon. The abductive process has also been termed the transcendent argument.

Abductive inference is illustrated in virtually any psychological work that assumes a centrality of emotional, motivational, or cognitive mental organization. Russell (1996), for example, has discussed the significance of abduction to the area of cognition. Chomsky’s work in language and Piaget’s work in cognitive development are particularly rich in abductive inference. Consider as an illustration of the process the following example drawn from Piaget:

1. There is the phenomenal observation (O) that it is the case that a certain group of people (children around 6–7 years of age) understands that concepts maintain the same quantity despite changes in qualitative appearances (i.e., conservation).
2. Given the relational background ideas discussed in this paper, Piaget forms the abductive inference that the explanation of this observation (E) is that a certain type of action system, having specified features including reversibility (i.e., concrete operations), must be available to these people. This forms the conditional statement “If (E) concrete operational structure, then (O) conservation, is expected.”
3. Given (O), the conclusion is, “Therefore, concrete operational structure explains the understanding of conservation.”

This, of course, is not the end of the process, as criteria must be established that allow choice among alternative Es—the best E. But this is not a major hurdle, because many of the criteria for theory-explanation selection that were articulated within traditional modern science can readily be incorporated here. These criteria include the explanation’s depth, coherence, logical consistency, extent to which it reduces the proportion of unsolved to solved conceptual and empirical problems in a domain (Laudan 1977), and last but not least, scope, empirical support, and empirical fruitfulness.

Scope, empirical support, and fruitfulness as part criteria for choice of a best theory-explanation all demand a return to the observational grounds for empirical assessment. Some of the statistical and research strategies associated with this return are described in detail by Rozeboom (1997). Scope is assessed through testing the abductive explanation in observational contexts that go beyond the context that generated the explanation. For example, conservation may be assessed in the contexts of number, weight, number, area, volume, or it may be assessed in relation to other skills that should—in the context of the explanation—be associated with it. The assessment of scope also serves the function of establishing that the abductive explanation-observation relation is not viciously circular (i.e., does not constitute an identity of identities).

The fruitfulness of an explanation is measured in terms of the extent to which the explanation combines with other...
Abductive hypotheses to generate (predict) new observations. Each new abductive hypothesis in the relational triangle (Figure 1.4) becomes a part of background (background ideas-theory) and thus creates a new enlarged background (see Figure 1.5). The new background generates novel observations, but these too—because they constitute a background-observation relation—yield opposite identities that require further abductive inferences.

Empirical support for an abductive explanation is the outcome of any assessment of scope. Here, another central feature of a relational metathemethod needs to be differentiated from the traditional modern split metathemethod. Under the rule of split-off induction and deduction, it was assumed that scientific progress moved forward through the deductive falsification of theories (Popper, 1959). The criterion of falsification, however, fell into disrepute through demonstrations by several historians and philosophers of science (e.g., Hanson, 1958; T. S. Kuhn, 1962; Lakatos, 1978; Laudan, 1977; Putnam, 1983; Quine, 1953) that although deductive logic, and hence falsification, is applicable to a specific experimental hypothesis, falsification does not reach to the level of rich theories (i.e., background is abductive in character, not inductive nor deductive). Within a relational metathemory, these demonstrations lead to the principle that falsified experimental hypotheses are important in that they constitute failures of empirical support for the broader abductive explanation, but they are not important in the sense of constituting a refutation of the explanation. T. S. Kuhn, Lakatos, and Laudan describe these failures as anomalous instances for the background, and as such they require evaluation; but they do not in and of themselves require abandonment of the abductive explanation (see Overton, 1984, 1994a).

To this point a relational metathemory and an integrative metathemethod have been described, and the manner in which these ground, constrain, and sustain various developmentally relevant issues, theories, and methods has been illustrated. The next section of this paper presents a broad illustration of the application of relational metathemory to developmental inquiry.

**EMBODIED DEVELOPMENT: A RELATIONAL CONCEPT**

This illustration focuses on embodied development. Until recently, the trend of developmental inquiry over the past two decades had been moving towards ever-increasing fragmentation of the object of study. Beginning in the early 1980s the examination of human development aggressively promoted split and foundational approaches to inquiry, including variable-centered, discourse, modular, and domain-specific inquiry. Each of these potentially alternative foci was advanced with claims that it presented the bedrock form of explanation. The result was that inquiry into human development was increasingly split into biologically determined, culturally determined, and bioculturally determined behavior, innate modules of mind, situated cognitions, domain-specific understandings, and communicative and instrumental functioning. What became lost in the exclusivity of these projects was the person as a vital integrated embodied center of agency and action. This is the embodied person—functioning as a self-organizing dynamic action system—expressively projecting onto the world, and instrumentally communicating with self and world, thoughts, feelings, wishes, beliefs, and desires. This is the embodied person who emerges from and transacts with the relational biological-cultural world, thereby developmentally transforming her own expressive and adaptive functioning.

The concept of embodiment was most thoroughly articulated in psychology by Maurice Merleau-Ponty (1962, 1963) and it represents a relational attempt to mend the split understanding of body as exclusively physical and mind as exclusively mental. Embodiment represents the overarching synthesis described earlier between each of the
biology-person-culture relations (see Figure 1.6); thus, embodiment creates a seamless bridge between the biological, the psychological, and the sociocultural. It has a double meaning, referring both to the body as physical structure, and the body as a form of lived experience, actively engaged with the world of sociocultural and physical objects. As Merleau-Ponty (1963) states with respect to embodiment as the form of life or life form (*Lebensform*),

One cannot speak of the body and of life in general, but only of the animal body and animal life, of the human body and of human life; . . . the body of the normal subject . . . is not distinct from the psychological. (p. 181)

Embodiment is not the claim that various bodily states have a causal relation to our perceptions, thoughts, and feelings. It would simply be trivial to suggest, for example, that when we close our eyes we perceive differently from when our eyes are open. Rather, embodiment is the claim that perception, thinking, feelings, desires—that is, the way we experience or live the world—is contextualized by being an active agent with this particular kind of body (Taylor, 1995). In other words, the kind of body we have is a precondition for the kind of experiences and meanings that we generate.

Ultimately, embodiment is the affirmation that the lived body counts in our psychology. Mental processes of motivation, emotion, and cognition, along with the actions they engender, are not products of a split-off physical and cultural world, nor are they the products of a split-off world of genes and a central nervous systems, nor the products of some additive combination of biology and culture. Mind and actions grow from the embodied person constantly engaged in the world. It is this embodied person that both creates world meaning and is created by the meaning of the world. Embodiment makes our psychological meanings about the world intelligible and hence explains these meanings. Embodied processes and action, so conceived, form a bridge between biological and sociocultural systems.

**Person-Centered and Variable Approaches to Developmental Inquiry**

As a bridge concept, embodiment can be examined from a biological, a cultural, or a person standpoint. Operating within a relational metatheory, each standpoint on embodiment is complementary to and supports the others (see Figures 1.6 and 1.7). However, for purposes of exposition it is only possible to stand at one place at a time. Thus, the present discussion focuses from a person-centered standpoint and later briefly describes embodiment from both a biological standpoint and a cultural standpoint.

A person-centered approach to inquiry maintains a theoretical and empirical focus on the psychological processes and patterns of psychological processes as these explain the individual’s activities in the world (see Figure 1.7). Perhaps
this orientation to developmental inquiry is best illustrated by contrast with what has been termed a variable approach (see Figure 1.8). In a variable approach, the focus of inquiry is not on the person, nor on the dynamic action systems that characterize the person’s functioning. In a variable approach, the focus is on biological, cultural, and individual variables; these are understood to operate as predictors, correlates, risk factors, or antecedent causes of behavior. The distinction being drawn here is similar to that described some time ago by Block (1971) and more recently elaborated by Magnusson (1998; Magnusson & Stattin, 1998). As Magnusson has suggested, from a variable approach, various individual variables (e.g., child factors) and contextual variables are understood as the explanatory actors in the processes being studied. From a person-centered standpoint, self-organizing dynamic action systems—which identify psychological mechanisms—operate as the main vehicles of explanation.

Within the context of a relational metatheory a person-centered theoretical orientation (standpoint or point of view; Figures 1.6 and 1.7A) is as necessary to an integrated developmental inquiry as is a relational socioculture-centered standpoint (Figures 1.6 and 1.7B) or a relationally considered biological-centered point of view (Figures 1.6 and 1.7C). In any given inquiry, a focus on the person, or the sociocultural (interpersonal), or the biological is a necessary focus of analysis. However, as suggested earlier, these function as complementary, not alternative competing explanations.

It should also be noted in passing that variable-focused inquiry can be transformed from a split-off exclusivity to yet another necessary point of view of relationally integrated inquiry. Stated briefly, developmental variable-focused inquiry aims at the prediction of events, states, and movements, whereas developmental person-centered inquiry aims to explain psychological processes and their transformation. There is no necessary conflict in these aims. They are only in conflict in the reductionistic case, in which one or the other is asserted as the exclusive foundational aim of inquiry. In a similar vein, it is important to recognize that the complementarity here is one of aim and not one suggesting that variable inquiry is oriented to research methods and person-centered inquiry is oriented to conceptual context. Both approaches entail the translation of theory into the empirically assessable and the translation of the empirically assessable into theory.

The Person-Centered Point of View

Before detailing a person- or child-centered standpoint or point of view, it is worth noting some of the benefits that accrue to taking this standpoint toward developmental inquiry. First, a person-centered standpoint rescues developmental psychology, as a psychology, from becoming a mere adjunct to biology, to culture, to discourse, to narrative, or to computer science. Psyche initially referenced soul and later mind, and if psychology is not to again lose its mind—as it did in the days of behaviorism—keeping the psychological person as the center of action is a necessary guard against explanatory reduction to biology, culture, discourse, and so on.

Second, a person-centered approach highlights the fact that any act can be profitably understood—again in a complementary bipolar fashion—as both expressive-constitutive and as instrumental-adaptive. Split or dichotomous approaches—especially split-off variable approaches—lead to the illusion that acts exhibit only adaptive-instrumental functions. A person-centered approach argues that any act may also be understood as an expression of an underlying dynamic organization of cognitive, affective, and conative
meanings, and this expression operates to constitute the world as known, felt, and desired. Here, Lois Bloom’s work (Bloom, 1998; Bloom & Tinker, 2001) on the development of language provides an excellent illustration of the power of conceptualizing language acquisition in the context of the expression of person-centered cognitive, affective, and conative-motivational meanings, rather than exclusively as an instrumental tool operating solely for communicative ends.

A third benefit derived from a person-centered point of view is that it provides the necessary context for the resolution of certain important problems related to our general understanding of psychological meaning. Specifically, a person-centered approach is a necessary frame for solving the so-called symbol-grounding problem. This is the question of how to explain that representational items (e.g., a symbol, an image) come to have psychological meaning (Bickhard, 1993; Smythe, 1992). I return to this problem in a more detailed fashion later in this chapter.

With these examples of some of the benefits of a child- or person-centered approach to developmental inquiry as background, it is possible to turn to a specific description of this approach. A detailed specification of a person-centered approach to developmental inquiry requires the description of four critical interwoven concepts: person, agent, action, and embodiment.

**Person-Agent**

Person and agent are complementary Escherian levels of analysis of the same whole (see Figure 1.7). The *person* level is constituted by genuine psychological concepts (e.g., thoughts, feelings, desires, wishes) that have intentional qualities, are open to interpretation, and are available to consciousness (Shanoy, 1993); or in other words, have psychological meaning. The *agent* level—called the *subpersonal* level by some (Dennett, 1987; Russell, 1996)—here refers to action systems or dynamic self-organizing systems. *Schemes, operations, ego, attachment behavioral system, and executive function* are some of the concepts that describe these action systems.

Taken as a whole, the person-agent forms the nucleus of a psychological theory of mind. And in this context mind is defined as a self-organizing dynamic system of cognitive (knowings, beliefs), emotional (feelings), and conative or motivational (wishes, desires) meanings or understandings, along with procedures for maintaining, implementing, and changing these meanings. It is important to note and underline that a person-centered theory of mind is not an encapsulated cognition, but rather a theory that includes emotions, wishes, and desires, as well as cognition. Further, there is no question about where mind is located. Mind emerges from a relational biosociocultural activity matrix. In the present context, mind is a person-centered concept because the approach being described takes the person standpoint. As a person-centered concept, mind bridges naturally to both the biological and the sociocultural.

**Action, Intention, Behavior, and Experience**

Person-agency is the source of action. At the agent level, *action* is defined as the characteristic functioning of any dynamic self-organizing system. For example, a plant orients itself towards the sun. Weather systems form high and low pressure areas and move from west to east. Human systems organize and adapt to their biological and sociocultural worlds. At the person level, action is defined as *intentional* activity. Action is often distinguishable from behavior because the action of the person-agent implies a *transformation* in the intended object of action, whereas behavior often simply implies movement and states (von Wright, 1971, p. 199). Thus, when the infant chews (action)—something that from a sociocultural standpoint is called a *basket*—the infant, from a person-centered standpoint, is transforming this part of his or her known world into a practical action *chewable*. Through the intentional act the person projects meaning onto the world.

Action serves at least three major functions in the development of mind (see Figure 1.1). First, action *expresses* cognitive-affective-conative meaning. Here, it is important to recognize that the concept *meaning* itself has a bipolar relational status (Overton, 1994b). “I mean” and “it means” operate in a relational matrix. The former is concerned with person-centered meanings, the latter with sociocultural meanings and reference. From a person-centered standpoint, the focus of analysis is on “I mean” and secondarily on how “I mean” comes to hook up with “it means.” Considered in its expressive moment, action entails the projection of person-centered meanings, thus transforming the objective environmental world (i.e., an object point of view) into an actual world as known, felt, and desired.

The second function that action serves is the *instrumental* function of communicating and adjusting person-centered meanings. Communication, dialogue, discourse, and problem solving all call attention to the relational to-and-fro movement between the expression of the self-organizing system and instrumental adaptive changes. Completely adapted action (i.e., successful) entails only projection. Partially adapted (i.e., partially successful) action results in exploratory action, or *variations*. Exploratory action that is
adaptive leads to reorganization of the system (transformational change) and hence leads to new meanings.

This general cycle of projected action and exploratory variational action as the accommodation to encountered resistances (see Figure 1.1) constitutes the third and most general function of action: Action defines the general mechanism of all psychological development. From a person-centered developmental action standpoint, all development is explained by action. However, action is also identified with experience. But caution is necessary here because experience, like meaning and other basic terms, is itself a bipolar relational concept. From a person-centered perspective, experience is the person-agent action of observing, manipulating, and exploring. From a sociocultural and 'objective' environmental point of view, experience is often identified as an event or stimulus that is independent of the person and imposes on or is imposed on the person. For purposes of clarity it would better to retain the former action definition as experience and to redefine the latter as opportunity for experience. Similarly, it should be pointed out that when experience is described as a feeling, the reference here is the person-centered felt meaning of the observational, manipulative, and explorational action.

In defining experience as the developmental action cycle of projecting and transforming the known world while exploring the known world and transforming the system, experience also becomes the psychological bridge between biological and sociocultural systems. There is no sense here of an isolated, cut-off, solitary human psyche. Person-centered experience emerges from a biosociocultural relational activity matrix (e.g., see Gallese, 2000a, 2000b), and this experience both transforms the matrix and is transformed by the matrix. Person development is neither a split-off nativism, nor a split-off environmentalism, nor a split-off additive combination of the two. The neonate is a dynamic system of practical action meanings. These meanings represent the outcome of 9 months of the interpenetrating action (Tobach & Greenberg, 1984) of biology-environment, and this interpenetration stretches all the way down to DNA (Gottlieb, 1997; Lewontin, 1991, 2000).

**Person Development**

Psychological development of the person-agent entails the epigenetic stance that novel forms emerge through the interpenetrating actions of the system under investigation and the resistances the system encounters in the actual environmental world. It is through interpenetrating actions that the system changes and hence becomes differentiated. But differentiation of parts implies a novel coordination of parts and this coordination itself identifies the emergence of novelty. Thus, for example, the neurological action system becomes differentiated through the interpenetrating actions of neurological-environmental functioning. This differentiation leads to a novel coordination or reorganization that constitutes the adapted level of conscious practical action found in the neonate. Consciousness is a systemic property of this emergent action system. The initial adapted practical consciousness entails a minimum awareness of the meaning entailed by an act (Zelazo, 1996). Consciousness cannot be reduced to or squeezed, so to speak, out of lower stages; it is the result of a transformation. Similarly, further developmental differentiations and coordinations of actions—described as higher levels of consciousness—emerge through the interpenetrations of conscious action and the sociocultural and physical worlds it encounters (Figure 1.1). Symbolic meaning and the symbolic representational level of meanings (Mueller & Overton, 1998a, 1998b) describes forms of consciousness that arise from the coordination of practical actions; reflective and trans-reflective (reflective symbolic understandings of reflective symbolic understandings) meanings describe further developmental advances in the coordination of action systems.

To summarize, to this point I have described the nucleus of a relationally informed person-centered developmental theory of mind, whereby mind is defined as a dynamic self-organizing system of meanings that through projection transforms the world as known and through exploration transforms itself (i.e., develops). However, this remains a nucleus and only a nucleus, because it lacks the critical necessary feature of embodiment.

**Embodiment**

As discussed earlier, embodiment is the claim that our perception, thinking, feelings, desires—that is, the way we experience or live the world—is contextualized by being an active agent with this particular kind of body (Taylor, 1995). In other words, the kind of body we have is a precondition for the kind of experiences and meanings that we generate.

At the agent level, embodiment specifies the characteristic activity of any living system. At the person level, embodiment affirms that—from the beginning—intentionality is a feature of bodily acts (Margolis, 1987). Intentionality is not limited to a symbolic, a reflective, or a trans-reflective system of psychological meanings. Intentionality also extends to a system of psychological meanings that characterize practical embodied actions operating at the most minimum level of consciousness. Thus, psychological meanings are as characteristic of the neonate as they are of the adult person. This
in fact solves the symbol-grounding problem described earlier—that is, the explanation for how actual world representational items (e.g., a symbol, an image) come to have psychological meaning resides in the fact that psychological meanings, in the form of practical embodied actions, are present from the beginning. As these become transformed and coordinated, they become available to conventional symbols provided by the sociocultural world.

Embodiment makes our psychological meanings about the world intelligible and hence explains our meanings. Embodied action, so conceived, forms a person-agent bridge between biological and sociocultural systems. Support for the claim that embodiment is central to the explanation of psychological meaning, central to a person-centered developmental action theory of mind, and central as a relational bridge between the several points of view is found in empirical and theoretical work being done from the biological, the cultural, and the person standpoints. The remainder of this chapter reviews some of this evidence.

**Embodiment and Biology.** If we first consider the biological standpoint of the biology-person-socioculture relational matrix (see Figure 1.7C), it is apparent that biology is increasingly taking embodiment seriously. For example, neurobiologists such as Gerald Edelman (1992), Antonio Damasio (1994, 1999), and Joseph LeDoux (1996) all argue that the cognitive-affective-motivational meanings that constitute mind can no longer be thought of as merely a functionalist piece of software or even merely a function of brain processes, but must be considered in a fully embodied context (see also Gallese, 2000a, 2000b). As Damasio says, “mind is probably not conceivable without some sort of embodiment” (1994, p. 234).

Damasio (1994) comments further on contemporary perspectives on mind:

This is Descartes’ error: the abyssal separation between body and mind. . . . The Cartesian idea of a disembodied mind may well have been the source, by the middle of the twentieth century, for the metaphor of mind as software program. . . . [and] there may be some Cartesian disembodiment also behind the thinking of neuroscientists who insist that the mind can be fully explained in terms of brain events, leaving by the wayside the rest of the organism and the surrounding physical and social environment—and also leaving out the fact that part of the environment is itself a product of the organism’s preceding actions. (pp. 249–251)

Similarly, Edelman argues that

The mind is embodied. It is necessarily the case that certain dictates of the body must be followed by the mind. . . . Symbols do not get assigned meanings by formal means; instead it is assumed that symbolic structures are meaningful *to begin with*. This is so because categories are determined by bodily structure and by adaptive use as a result of evolution and behavior. (p. 239)

**Embodiment and the Socioculture Context.** On the sociocultural side of the biology-person-socioculture relational matrix (see Figure 1.7B), social constructivists such as Harre (1995) and Sampson (1996) have increasingly embraced embodied action as a relational anchoring to the relativism of split-off discourse analysis. Sampson, for example, argues for “embodied discourses” as these “refer to the inherently embodied nature of all human endeavor, including talk, conversation and discourse itself” (p. 609). Csordas (1999) approaches culture and embodiment from an anthropological position. Perhaps the most fully articulated contemporary employment of embodiment in a developmentally oriented cultural psychology is found in the work of the German psychologist Ernest E. Boesch (1991). Boesch’s presentation of “the I and the body” is a discussion of the centrality of embodiment for a cultural psychology. Thus, he states that “the body, obviously, is more than just an object with anatomical and physiological properties: it is the medium of our actions [italics added], it is with our body that we both conceive and perform actions” (p. 312).

**Embodiment and the Person.** From the person-centered center of the biology-person-socioculture matrix (see Figure 1.7A), Varela, Thompson, and Rosch (1991) have sketched a general outline for an embodied theory of cognition. Sheets-Johnstone (1990) provides an evolutionary anthropological perspective on human embodiment and thought, and Santostefano (1995) has detailed the emotional and cognitive dimensions of practical, symbolic, and reflective embodied meanings. Further, many who have studied psychopathology, from R. D. Laing (1960) to Donald Winnicott (1971) and Thomas Ogden (1986), argue that disruptions in the embodied actions of the person-agent are central to an understanding of the development of severe forms of psychopathology.

At the level of practical actions, Bermudez’s (1998) recent work on the development of self-consciousness is central to an understanding of the impact of an embodied person conceptualization. Bermudez’s fundamental argument is that late-emerging forms of meaning found in symbolic and reflective consciousness develop from—and are constrained by—embodied self-organizing action systems available to the infant. Most important is that these early systems entail person-level somatic proprioception and exteroception. As
these person-centered processes interpenetrate the physical and sociocultural worlds, proprioception operates as the differentiation mechanism for the emergence of a self-consciousness action system, and exteroception operates as the differentiation mechanism for the emergence of an object-consciousness system. Hence, over the first several months of life, a basic practical action associated with me and other develops, which in turn becomes transformed into the symbolic me and other of early toddlerhood. Thelen’s (2000) work on the role of movement generally, and specifically “body memory” in infant cognitive functioning is another closely related area that illustrates the importance of embodiment at the level of practical actions.

Langer’s (1994) empirical studies represent important demonstrations of the intercoordination of embodied action systems as these intercoordinations move development from the practical to the symbolic plane of meaning. Earlier work by Held and his colleagues (e.g., Held & Bossom, 1961; Held & Hein, 1958), on the other hand, illustrates the significance of voluntary embodied action at all levels of adaptation. Acredolo’s research (e.g., Goodwyn & Acredolo, 1993) on the use of bodily gestures as signs expressing practical meanings in older infants suggests the expressive and instrumental value of embodied practical gesture. Other work has elaborated on the significance of bodily representations at the symbolic and reflective levels of meaning. For example, while the use of fingers for counting is well documented (Gelman & Williams, 1998), Saxe’s (1981, 1995) research has shown cross-culturally that other bodily representations enter into counting systems. Further, earlier research by Overton and Jackson (1973) and more recently by Kovacs and Overton (2001) has demonstrated that bodily gestures support emerging symbolic representations at least until the level of reflective meanings.

At the level of symbolic, reflective, and trans-reflective conceptual functioning, the writings of Lakoff and Johnson (1999; see also Lakoff, 1987) are well known for their detailed exploration of the significance of embodiment. For Lakoff and Johnson, embodiment provides the fundamental metaphors that shape meanings at all levels of functioning. In a parallel but distinct approach, Kainz (1988) has described how the basic laws of ordinary logic (i.e., the law of identity, the law of contradictions, and the law of the excluded middle) can be understood as emerging from the early embodied differentiation of self and other. Finally, Liben’s (1999) work on the development of the child’s symbolic and reflective spatial understanding presents a strong argument for an understanding of this development in the context of an embodied child rather than in the context of the disembodied eye that traditionally has framed this domain.

**CONCLUSIONS**

This chapter has explored background ideas that ground, constrain, and sustain theories and methods in psychology generally and developmental psychology specifically. An understanding of these backgrounds presents the investigator with a rich set of concepts for the construction and assessment of psychological theories. An understanding of background ideas also helps to prevent conceptual confusions that may ultimately lead to unproductive theories and unproductive methods of empirical inquiry. The importance of this function has recently been forcefully articulated by Robert Hogan (2001) who in an article entitled “Wittgenstein Was Right” notes with approval Wittgenstein’s (1958) remark that “in psychology there are empirical methods and conceptual confusions” (p. 27), and then goes on to say that

Our training and core practices concern research methods; the discipline is . . . deeply skeptical of philosophy. We emphasize methods for the verification of hypotheses and minimize the analysis of the concepts entailed by the hypotheses. [But] all the empiricism in the world can’t salvage a bad idea. (p. 27)

**REFERENCES**


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