

Bioecological systems essay



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The bioecological model, together with its corresponding research designs, is an evolving theoretical system for the scientific study of human development over time (Bronfenbrenner, 2005). In the bioecological model, development is defined as the phenomenon of continuity and change in the

biopsychological characteristics of human beings, both as individuals and as groups. The phenomenon extends over the life course, across successive generations. We are especially grateful for the thoughtful criticisms of earlier drafts of the manuscript generously provided by the following colleagues: Jay Belsky, Rick Canfield, Nancy Darling, Glen H.

Elder Jr. , Steven F. Hamilton, Melvin L. Kohn, Kurt Luscher, Phyllis Moen, Donna Dempster-McLain, Laurence Steinberg, and Sheldon H. White. We owe particular thanks to Professor Susan Crockenberg and her students at the University of Vermont who, in the course of a graduate course, have provided us with a rich and diverse generation, and through historical time, both past and future. The term future raises a question: How is it possible to scientifically investigate phenomena that have not yet taken place? This question is hardly new; indeed, it pervades every field of scientific endeavor.

However, we are the only species that, over historical time, has developed the capacity to engage successfully in scientific inquiry, and thereby, in many respects, has surpassed all other species. We have done our best to meet the high standards that they commendably set. We wish to express gratitude to Richard M. Lerner and William Damon, the editors of the 1998 Volume and of that series as a whole, for their wise advice, encouragement, and patience. Finally, a special thanks goes to our most severe and most constructive critic, Liese Bronfenbrenner. 94 The Bioecological Model of Human Development been able to change the nature of the world in which we live. As a result, within certain limits, we humans have altered the nature and course of our own development as a species (Bronfenbrenner & Evans 2000; <https://assignbuster.com/bioecological-systems-essay/>

Bronfenbrenner & Morris 1998). To place bioecological theory of human development into a larger context, it is important to recognize that many of the general perspectives advanced and elaborated in this theory are also parts of other related lines of theoretical and empirical inquiry into human development.

Examples include life-span psychology (Baltes, Lindenberger, & Staudinger, Chapter 11, this Handbook, this volume), cultural psychology (Cole, 1995; Shweder et al. , Chapter 13, this Handbook, this volume), Magnusson's developmental theory of contextual-interactive holism (Magnusson & Stattin, Chapter 8, this Handbook, this volume), and, especially, the work of Robert Cairns (Chapter 3, this Handbook, this volume), who through communications and publications extending over 3 decades, has played a major role in the evolution of the four defining properties of the bioecological model: (1) Process, (2) Person, (3) Context, and (4) Time. Cairns is best known as the founder and principal protagonist of developmental science, and there are several excellent examples of his books and articles that have been most relevant to the evolution of the bioecological model (Bergman, Cairns, Nilsson, & Nysted, 2000; Cairns, 1970; Cairns & Cairns, 1994).

The specific profile of the bioecological model of human development is its interdisciplinary and integrative focus on the age periods of childhood and adolescence and its explicit interest in applications to policies and programs pertinent to enhancing youth and family development. In this chapter, we undertake to present the ecological model of human development that has been introduced over the course of the prior two editions of this Handbook (Bronfenbrenner & Crouter, 1983; Bronfenbrenner & Morris, 1998).

The main focus of the 1983 chapter was on the empirical and theoretical roots of a model already in use, which centered on the role of the environment in shaping development. In contrast, this chapter is oriented toward the future. The present model introduces major theoretical innovations from the 1983 chapter in both form and content. The present formulation makes no claim as a paradigm shift (if there be such a phenomenon); rather, it continues a marked shift in the center of gravity of the model, in which features of earlier versions are first called into question but then re-ombined, along with new elements, into a more complex and more dynamic structure. The transition in the form and content of the model actually took place over an extended period of time, an expression that will become all too familiar to the reader (Bronfenbrenner, 2005). The transition from a focus on the environment to a focus on processes was first introduced in the context of Bronfenbrenner's unpublished lectures, colloquium presentations, and contributions to symposia. Not until 1986, did reference to an emergent new model first appear in print (Bronfenbrenner, 1986b).

The following extended excerpt conveys both its spirit and intended substance. Because both of these attributes are relevant to the gradual evolution of the model to its present form, we quote from the 1986 statement at some length: It is now more than a decade ago that, being somewhat younger, I presumed to challenge the then-prevailing conventions of our field by describing the developmental research of the day as “ the study of the strange behavior of children in strange situations for the briefest possible period of time” (Bronfenbrenner, 1974).

Instead, I argued (as if it were simply a matter of choice), we should be studying development in its ecological context; that is, in the actual environments in which human beings lived their lives. I then proceeded to outline, in a series of publications, a conceptual framework for analyzing development in context, and to offer concrete examples of how various elements of the schema might be applied both to past studies and to studies yet-to-come.

I also emphasized the scientific and practical benefits of a closer linkage, in both directions, between developmental research and public policy (Bronfenbrenner, 1974, 1975, 1977a, 1977b, 1979a, 1979b, 1981). Now, a dozen years later, one might think that I have good reason to rest content. Studies of children and adults in real-life settings, with real-life implications, are now commonplace in the research literature on human development, both in the United States and, as this volume testifies, in Europe as well.

This scientific development is taking place, I believe, not so much because of my writings, but rather because the notions I have been promulgating are ideas whose time has come. . . . Clearly, if one regards such scientific developments as desirable, there are grounds for satisfaction. Yet, along with feelings of gratification, I must confess to some discontent. My disquiet derives from two complementary concerns. The first pertains to one of the main roads that contemporary research has taken; the second, to some more promising pathways that are being neglected. Overview 95 Alas, I may have to accept some responsibility for what I regard as the wayward course. It is an instance of what might be called “ the failure of success. ” For some years, I harangued my colleagues for avoiding the study of development in <https://assignbuster.com/bioecological-systems-essay/>

real-life settings. No longer able to complain on that score, I have found a new bete noir. In place of too much research on development “ out of context,” we now have a surfeit of studies on “ context without development. ” One cannot presume to make so brass an allegation without being prepared to document one’s case. I am prepared. Bronfenbrenner 1986a, pp. 286–288) reader to the present formulation of the biological model, a preview follows. OVERVIEW We begin with an exposition of the defining properties of the model, which involves four principal components and the dynamic, interactive relationships among them. The first of these, which constitutes the core of the model, is Process. More specifically, this construct encompasses particular forms of interaction between organism and environment, called proximal processes, that operate over time and are posited as the primary mechanisms producing human development.

However, the power of such processes to influence development is presumed, and shown, to vary substantially as a function of the characteristics of the developing Person, of the immediate and more remote environmental Contexts, and the Time periods, in which the proximal processes take place. The sections that follow examine in greater detail each of the three remaining defining properties of the model, beginning with the biopsychological characteristics of the Person.

This domain was given sequential priority to fill a recognized gap in earlier prototypes of the ecological model. Thus, at midstage in the development of the present model, Bronfenbrenner criticized its theoretical predecessors and acknowledged his share of responsibility for failing to deliver on an empirical promise: Existing developmental studies subscribing to an ecological model

have provided far more knowledge about the nature of developmentally relevant environments, near and far, than about the characteristics of developing individuals, then and now. . . The criticism I just made also applies to my own writings. . . . Nowhere in the 1979 monograph, nor elsewhere until today, does one find a parallel set of structures for conceptualizing the characteristics of the developing person.

(Bronfenbrenner, 1989a, p. 188) What followed was an early version of the newly evolving theoretical framework, but the purpose of the present chapter is better served by presenting the model in its current, albeit still-evolving, form now called the bioecological model.

The term evolving highlights that the model, along with its corresponding research designs, has undergone a process of development during its life course (Bronfenbrenner, 2005). The bioecological model addresses two closely related but fundamentally different developmental processes, each taking place over time. The first process defines the phenomenon under investigation—continuity and change in the biopsychological characteristics of human beings.

The second focuses on the development of the scientific tools—theoretical models and corresponding research designs required for assessing continuity and change. These two tasks cannot be carried out independently, for they are the joint product of emerging and converging ideas, based on both theoretical and empirical grounds—a process called developmental science in the discovery mode (Bronfenbrenner & Evans 2000, pp. 999–1000).

In the more familiar verification mode, the aim is to replicate previous findings in other settings to make sure that the findings still apply. By contrast, in the discovery mode, the aim is to fulfill two broader but interrelated objectives: 1. Devising new alternative hypotheses and corresponding research designs that not only question existing results but also yield new, more differentiated, more precise, replicable research findings and, thereby, produce more valid scientific knowledge. . Providing scientific bases for the design of effective social policies and programs that counteract newly emerging developmentally disruptive influences. This has been an explicit objective of the bioecological model from its earliest beginnings. To orient the Three types of Person characteristics are distinguished as most influential in shaping the course of future development through their capacity to affect the direction and power of proximal processes through the life course.

First, dispositions can set proximal processes in motion in a particular developmental domain and continue to sustain their operation. Next, 796 The Bioecological Model of Human Development bioecological resources of ability, experience, knowledge, and skill are required for the effective functioning of proximal processes at a given stage of development. Finally, demand characteristics invite or discourage reactions from the social environment that can foster or disrupt the operation of proximal processes.

The differentiation of these three forms leads to their combination in patterns of Person structure that can further account for differences in the direction and power of resultant proximal processes and their developmental effects. These new formulations of qualities of the person that shape his or <https://assignbuster.com/bioecological-systems-essay/>

her future development have had the unanticipated effect of further differentiating, expanding, and integrating the original 1979 conceptualization of the environment in terms of nested systems ranging from micro to macro (Bronfenbrenner, 1979b).

For example, the three types of Person characteristics previously outlined are also incorporated into the definition of the microsystem as characteristics of parents, relatives, close friends, teachers, mentors, coworkers, spouses, or others who participate in the life of the developing person on a fairly regular basis over extended periods of time. The bioecological model also introduces an even more consequential domain into the structure of the microsystem that emphasizes the distinctive contribution to development of proximal processes involving interaction not with people but with objects and symbols.

Even more broadly, concepts and criteria are introduced that differentiate between those features of the environment that foster versus interfere with the development of proximal processes. Particularly significant in the latter sphere is the growing hecticness, instability, and chaos in the principal settings in which human competence and character are shaped—in the family, child-care arrangements, schools, peer groups, and neighborhoods. The latter theme speaks to the fourth and final defining property of the bioecological model and the one that moves it farthest beyond its predecessor—the dimension of Time.

The 1979 Volume scarcely mentions the term, whereas in the current formulation, it has a prominent place at three successive levels: (1) micro-,

(2) meso-, and (3) macro-. Microtime refers to continuity versus discontinuity in ongoing episodes of proximal process. Mesotime is the periodicity of these episodes across broader time intervals, such as days and weeks. Finally, Macrotime focuses on the changing expectations and events in the larger society, both within and across generations, as they affect and are affected by, processes and outcomes of human development over the life course.

The treatment of this last topic draws on Elder and Shanahan, Chapter 12, this Handbook, this volume. Our primary emphasis, however, is on the role of developmental processes and outcomes in producing largescale changes over time in the state and structure of the broader society over time, and the implications of those changes for the society's future. Before turning to the task at hand, it is important to make explicit three overarching orientations that define the content and the structure of the chapter as a whole.

First, we use the term development to refer to stability and change in the biopsychological characteristics of human beings over the life course and across generations. There are no restrictive assumptions of change for the better or of continuity in the characteristics of the same person over time. Rather, these are issues to be investigated. Second, from the perspective of the bioecological model, the forces producing stability and change in the characteristics of human beings across successive generations are no less important than stability and change in the characteristics of the same person over his or her lifetime.

The third orientation is perhaps the most essential, and the most difficult to achieve. It was Kurt Lewin (cited in Marrow, 1977) who said that there is nothing so practical as a good theory. But to be “ good,” a theory must also be “ practical. ” In science, a good theory is one that can be translated into corresponding research designs that match the defining properties of the theory. In the absence of such research designs—or worse yet, in the application of research designs that fail to match or even violate the defining properties of the theory—science cannot move forward.

Hence, we have sought, as we proceed through successive stages of theoretical formulation, to specify, and, wherever possible, to illustrate the properties of a research design that corresponds with, or at least approximates, the proposed theoretical structure.

DEFINING PROPERTIES OF THE BIOECOLOGICAL MODEL

An early critical element in the definition of the bioecological model is experience, which indicates that the scientifically relevant features of an environment for human development not only include its objective prop- Defining Properties of the Bioecological Model 97 erties but also the way in which the properties are subjectively experienced by the person living in that environment. This equal emphasis on an experiential as well as an objective view springs neither from an antipathy to behaviorist concept nor from a predilection for existential philosophic foundations but is dictated simply by the fact that very few of the external influences significantly affecting human behavior and development can be described solely in objective physical conditions and events (Bronfenbrenner & Evans 2000; Bronfenbrenner & Morris 1998).

Critical to the foregoing formulation is the word solely. In the bioecological model, both objective and subjective elements are posited as driving the course of human development; neither alone is presumed sufficient.

Moreover, these elements do not always operate in the same direction. It is therefore important to understand the nature of each of these two dynamic forces, beginning on the phenomenological or experiential side.

Both of the terms are relevant because, while related to each other, they are typically applied to somewhat different spheres. Experiential is more often used in relation to cognitive development and pertains mainly to changes in how the environment is perceived at successive stages of the life course, beginning in early infancy and proceeding through childhood, adolescence, adulthood, and, ultimately, old age. By contrast, experience pertains more to the realm of feelings—anticipations, forebodings, hopes, doubts, or personal beliefs.

Feelings, emerging in early childhood and continuing through life, are characterized by both stability and change: They can relate to self or to others, especially to family, friends, and other close associates. They can also apply to the activities in which we engage; for example, those that we most or least like to do. But the most distinctive feature of such experiential equalities is that they are emotionally and motivationally loaded, encompassing both love and hate, joy and sorrow, curiosity and oredom, desire and revulsion, often with both polarities existing at the same time but usually in differing degrees. A significant body of research evidence indicates that such positive and negative subjective forces, evolving in the past, can also contribute in powerful ways to shaping the course of development in the

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future (Bronfenbrenner & Evans 2000; Bronfenbrenner & Morris 1998). But these forces are not the only powerful ones at work, other forces are more objective in nature. This presence does not mean, however, that the forces are necessarily either more or less influential, mainly because the two sets of forces are interdependent and affect each other. Like their subjective counterparts, these more objective factors also rely on their assessment of corresponding theoretical models and associated research designs, which evolved over time. These more objective relationships are documented propositions presented later (see too Bronfenbrenner & Evans 2000; Bronfenbrenner & Morris 1998). The first proposition specifies the theoretical model, and provides concrete examples; the second foreshadows a corresponding research design for their assessment.

However, before proceeding with formal definitions, it may be useful to point out that traditionally such phenomena as parent-child interaction—or, more generally, the behavior of others toward the developing person— have been treated under the more inclusive category of the environment. In the bioecological model, a critical distinction is made between the concepts of environment and process, with the latter not only occupying a central position, but also having a meaning that is quite specific. The construct appears in Proposition I stipulating the defining properties of the model.

To place its meaning in context, we cite Proposition II as well. Proposition I Especially in its early phases, but also throughout the life course, human development takes place through processes of progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external

environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of time. Such enduring forms of interaction in the immediate environment are referred to as proximal processes.

Examples of enduring patterns of proximal process are found in feeding or comforting a baby, playing with a young child, child-child activities, group or solitary play, reading, learning new skills, athletic activities, problem solving, caring for others in distress, making plans, performing complex tasks, and acquiring new knowledge and know-how. For the younger generation, participation in such interactive processes over time generates the ability, motivation, knowledge, and skill to engage in such activities both with others and on your own.

For example, through progressively more complex interaction with their parents, children increasingly become agents of their own development, to be sure only in part. 798 The Bioecological Model of Human Development Proximal processes are posited as the primary engines of development (see Gottlieb, Wahlsten, & Lickliter, Chapter 5, this Handbook, this volume; Tobach, 1981; Tobach & Schneirla, 1968). A second defining property, the fourfold source of these dynamic forces is identified in Proposition II.

Proposition II The form, power, content, and direction of the proximal processes effecting development vary systematically as a joint function of the characteristics of the developing person, the environment—both immediate and more remote— in which the processes are taking place, the nature of the developmental outcomes under consideration, and the social continuities and changes occurring over time through the life course and the

historical period during which the person has lived. does not do the job, nor do activities that are often interrupted. 3. Why not? One reason is that, to be developmentally effective, activities must continue long enough to become “ increasingly more complex. ” Mere repetition does not work. 4.

Developmentally effective proximal processes are not unidirectional; there must be influence in both directions. For interpersonal interaction, this means that initiatives do not come from one side only; there must be some degree of reciprocity in the exchange. 5.

Proximal processes are not limited to interactions with people; they also can involve interaction with objects and symbols. In the latter circumstance, for reciprocal interaction to occur, the objects and symbols in the immediate environment must be of a kind that invites attention, exploration, manipulation, elaboration, and imagination. 6. The powerful moderating factors specified in Proposition II produce substantial changes in the content, timing, and effectiveness of proximal processes. In particular: a.

As children grow older, their developmental capacities increase both in level and range; therefore, to continue to be effective, the corresponding proximal processes must also become more extensive and complex to provide for the future realization of evolving potentials. At the same time, in view of the ongoing developmental advance, the intervals between periods of “ progressively more complex” activity can be increasingly longer, although they must still occur on a “ fairly regular basis. ” Otherwise, the pace of development slows, or its course may even reverse direction. b.

The principal persons with whom young children interact “ on a fairly regular basis over extended periods of time” are parents, but especially as children get older, other persons—such as caregivers, relatives, siblings, and peers—also function in this role. These are soon followed by teachers or mentors in other activities, and then by close friends of the same or opposite sex, spouses or their equivalents, and coworkers, superiors and subordinates at work. As the examples indicate, the involvement of persons functioning

Propositions I and II are theoretically interdependent and subject to empirical test.

An operational research design that permits their simultaneous investigation is referred to as the Process-Person-ContextTime (PPCT) model.

Characteristics of the person actually appear twice in the bioecological model—first as one of the four elements influencing the form, power, content, and direction of the proximal process, and then again as developmental outcomes—qualities of the developing person that emerge at a later point in time as the result of the joint, interactive, mutually reinforcing effects of the four principal antecedent components of the model.

In sum, in the bioecological model, the characteristics of the person function both as an indirect producer and as a product of development (see Lerner, 1982, 2002; Lerner & BuschRossnagel, 1981). Finally, because in the bioecological model the concept of proximal process has a specific meaning, it is important that its distinctive properties be made explicit. For present purposes, the following features of the construct are especially noteworthy:

1. For development to occur, the person must engage in an activity. . To be effective, the activity must take place “ on a fairly regular basis, over an

extended period of time. ” For example, this means that with young children, a weekend of doing things with Mom or Dad From Theory to Research Design: Operationalizing the Bioecological Model 799 in this role is not limited to the formative years. Borrowing a term from G. H. Mead (1934), we refer to such persons as significant others. The foregoing constitute the principal elements of the emergent theoretical model.

If so, the question arises in what sense is the model bioecological? Where and how does biology come into the picture? We present three answers to that question in an order of decreasing certainty about their validity. The first is an unqualified disclaimer. Little in the pages that follow speaks to the operation of biological systems within the organism. By contrast, considerable scientific attention is accorded to characteristics of the person generally regarded as biologically based that influence proximal processes and their developmental outcomes.

Finally, the present model rests on the assumption that biological factors and evolutionary processes not only set limits on human development but also impose imperatives regarding the environmental conditions and experiences required for the realization of human potentials. The position is taken that, to the extent that the necessary conditions and experiences are not provided, such potentials will remain unactualized (Bronfenbrenner & Ceci, 1993, 1994a, 1994b).

It is our belief that, when applied, the bioecological paradigm is scientifically productive. At the present time, however, its most distinguishing characteristic is not its proven scientific power, but its rarity. To be sure, the

rarity is hardly surprising, given the fact that successive revisions of the emerging model began to be published only in the past several years (Bronfenbrenner, 1989a, 1990, 1993, 1994, 1995; Bronfenbrenner & Morris, 1998; Bronfenbrenner & Ceci, 1994a). Paradoxically, some concrete examples nevertheless existed much earlier.

They were the product of what Bronfenbrenner and Crouter referred to in the 1983 edition of this Handbook as “latent paradigms”; that is, theoretical models that were not explicitly stated, but were implicit in the research designs used in analyzing the data (Bronfenbrenner & Crouter, 1983, pp. 373–376). Indeed, a partial precursor of the bioecological model appeared in the 1983 Handbook chapter under the rubric of a “person-process-context model.” In that chapter, however, what is meant by process is never specified, and the overwhelming majority of the examples cited do not include a proximal process component as defined in Proposition I.

The same holds true for developmentally relevant characteristics of the Person. The 1983 chapter also made no reference to Time as a defining property of the theoretical model. In these and other respects to follow, today’s bioecological model goes far beyond its predecessors both with respect to basic constructs and their bidirectional, synergistic interrelationships.

FROM THEORY TO RESEARCH DESIGN: OPERATIONALIZING THE BIOECOLOGICAL MODEL

We have come to the point where it is both possible and necessary to examine the requirements imposed by the bioecological model for corresponding research designs.

We begin with a concrete example of the latter. In the 1950s and 1960s, Cecil Mary Drillien (1957, 1964), a physician and professor of child life and health at the University of Edinburgh, carried out a 7-year longitudinal investigation of psychological development in two groups: 360 children of low birthweight and a control group selected “ by taking the next mature birth from the hospital admission list ” (1957, p. 29).

In her follow-up assessments, the investigator found that children of low birthweight were more likely to exhibit problems in physical growth, susceptibility to illness, impaired intellectual development, and poorer classroom performance, with all of these tendencies being more pronounced in boys (1964). In a comparison of children’s school performance with what would have been expected on the basis of their scores on an intelligence test, Drillien found that those of low birthweight were especially likely to be working below their mental capacity.

In relation to this finding, the author comments as follows: “ In most cases, failure to attain a standard commensurate with ability was associated with problems of behavior, which were found to increase with decreasing birthweight [and] to be more common in males” (1964, p. 209). Figure 14. 1 depicts the results. The figure does not appear in Drillien’s monograph, but was constructed from data presented in tables in that volume.

It shows the impact of the quality of mother-infant interaction at age 2 on the number of observed problem behaviors at age 4 as a joint function of social class and three levels of low birthweight—those underweight by a pound or more, not more than one pound, and those of normal birthweight.

Measures of maternal responsiveness were based on 800 The Bioecological Model of Human Development 12 Average Score on Behavior Problems 10 8 6 4 2 0 Poor Process Good Process Nrm Low Vlow High SES

Nrm Low Vlow Middle SES Nrm Low Vlow Low SES Nrm = Normal Birthweight

Low = Between Normal and 5.5 lbs. Vlow = 5.5 lbs. or Less Figure 14. 1

Effect of mother's responsiveness on problem behavior of child at age 4 by birthweight and social class. observations in the home and interviews with the mother. The investigator's measure of social class was a composite index that took into account not only parental income and education but also the socioeconomic level of the neighborhood in which the family lived.

The quality of interaction was assessed by extent to which the mother was responsive to changes in the state and behavior of the infant. The measure of the developmental outcome was the frequency of reported behavior disturbances such as hyperactivity, overdependence, timidity, and negativism. Our primary interest is not in the research findings, but in the extent to which the structure of the research design corresponds with the defining properties of the bioecological theoretical model.

The first point to be noted in this regard is that Proposition I defines Proximal Processes as bidirectional. Drillien's measure of process, however, was based only on the mother's responsiveness to changes in the state and behavior of the infant, and no data are reported that would permit calculating a complementary measure of the infant's responsiveness to changes in the state and behavior of the mother. This means that the

operational measure available in Drillien's research taps only one side of the theoretical definition of proximal process.

For that reason, it appears likely that, to the extent the infant's contribution to reciprocal interaction carries any weight, the obtained results may underestimate the true magnitude of the observed effects. Nevertheless, as revealed in Figure 14. 1, maternal responsiveness across time, a one-sided measure of proximal process, still emerges as the most powerful predictor of developmental outcome. In all instances, responsive maternal treatment reduces substantially the degree of behavioral disturbance exhibited by the child.

Herein lies the main justification for distinguishing between proximal process on the one hand, and, on the other, the environments in which the processes occur; namely, in accord with Proposition I, proximal processes turn out to be the most potent force influencing the developmental outcome (in this case, the frequency of problem behaviors at 4 years of age). Furthermore, as stipulated in Proposition II, the power of the Process varies systematically as a function of the environmental Context (i. e. social class) and of the characteristics of the Person (i. e. , weight at birth). The process appears to have made its greatest impact on young children growing up in the most disadvantaged environment (i. e. , the lowest socioeconomic level), but in that environment, it is those who at birth were of normal weight who benefited most. Moreover, it was in this same disadvantaged Context that, under high levels of maternal responsiveness, birthweight showed its most consistent effect, with the number of behavior problems steadily rising as birthweight fell.

Finally, across the board, maternal responsiveness had the general result of decreasing or buffering against environmental differences in developmental outcome. Thus, at high levels of mother-child interaction, social class differences in problem behavior became much smaller. From the perspective of developmental science, what is most noteworthy about these findings is not their specific content but that their simultaneous discovery was made possible by a research design based on a theoretical model that allowed for the emergence of patterns of this form.

Not only are the four key components of Process, Person, Context, and Time all represented but the design also provides for the detection of the kinds of synergistic¹ interdependencies among these components that are posited in the bioecological model as a dynamic theoretical system. Two specific examples of such interdependencies are revealed in the analysis of Drillien's data: 1. Proposition II stipulates that the developmental effects of proximal processes vary as a joint function of 1

Synergism refers to “ cooperative action of discrete agencies such that the total effect is greater than the sum of the two or more effects—taken independently” (Webster's Third New International Dictionary). From Theory to Research Design: Operationalizing the Bioecological Model 801 Person and Context; that is, the indirect effects of Person and Context on the relation of Process to outcome are not to be conceived as simply additive. Consistent with this expectation is the finding that proximal processes had their greatest impact in the most disadvantaged environment but on the healthiest infant.

The combination of Person and Context exhibit a mutually reinforcing, multiplicative, indirect effect on the power of proximal processes as the “engines of development.” 2. In Drillien’s research, the frequency of problem behaviors was assessed at two points in time—first when the infants were 2-years-old, and then again at 4-years-old. If one makes the not unreasonable assumption that mothers continued to interact with their children over the intervening period, then the results shown in Figure 14. 2 provide evidence for the effect of proximal processes that have taken place over an extended period of time.

Youngsters experiencing low levels of interaction with their mothers exhibited an accelerating increase in the number of problem behaviors from 2 to 4 years of age, whereas those exposed to substantially higher levels of this proximal process showed only a modest rise. Developmental Science in the Discovery Mode What about the possibility that the preceding results are chance findings? Some of them are statistically significant, yet others could not be tested because the variances needed for calculating error estimates were not reported.

But that is not the principal issue at stake. With concrete 10 Average Score on Behavior Problems Poor Process—Unresponsive Mothers Good Process—Responsive Mothers 8 6 4 2 0 High SES Mid SES Low SES High SES Mid SES Low SES Age 2 Age 4 Figure 14. 2 Effect of mother’s responsiveness on problem behavior of child at ages 2 and 4 by social class. examples of the relation between theoretical and operational models now before us, we can address what turns out to be a complex and consequential question: What is the function of research design in the bioecological model?

The first point to be made in this regard is that the main function is not the usual one of testing for statistical significance. Rather, the research design must provide for carrying out an equally essential and necessarily prior stage of the scientific process: that of developing hypotheses of sufficient explanatory power and precision to warrant being subjected to empirical test. We are dealing with science in the discovery mode rather than in the mode of verification. In this earlier phase, theory plays an even more critical role.

From its very beginnings, the bioecological model, through its successive reformulations, represents a sustained effort to meet this scientific need. What are the appropriate characteristics of research designs for developmental science in the discovery mode? Finding an answer to this question is complicated by the fact that, compared with the physical and natural sciences, developmental science is admittedly still in an earlier stage of development. Furthermore, because its scope falls between the natural and the social sciences, the discovery process must to some extent be adapted to the requirements of both.

Perhaps in part for these reasons, we were unable to find any discussion of the issue in the developmental literature. Under these circumstances, we concluded that the best we could do was to try to make explicit the characteristics of the research designs that had been employed over the past several years to arrive at successively more differentiated formulations of the bioecological model. These design characteristics depend on the constructs, and the possible relations between them, that are posited in the theoretical model at its present stage of development.

Both the constructs, and the possible interrelationships, have been indicated in Propositions I and II, but as yet they appear in a relatively undifferentiated form. For example, the directions of the expected effects of Person and Context on proximal processes for different types of outcomes are not specified. The reason for such lack of specificity is that a more precise formulation could not be deduced either from the theory in its present, still evolving state, or induced from any already available data (at least, to our knowledge). Given these limitations, we concluded that an appropriate design strategy at this point in the discovery process could be one that involves a series of progressively more differentiated formulations and corresponding data 802 The Bioecological Model of Human Development analyses, with the results at each successive step setting the stage for the next round. The research designs employed must be primarily generative rather than confirmatory versus disconfirming. In this generative process, implications derived from the theoretical model play a more prominent role than those drawn from research findings, but the latter are also critical.

Their importance is best conveyed by specifying a key feature of the corresponding research design: It must provide a structured framework for displaying the emergent research findings in a way that reveals more precisely the pattern of the interdependencies that are obtained in the data available. Of primary scientific interest are not those aspects of the observed pattern already anticipated in the existing theoretical model, but those features that point to more differentiated and precise theoretical formulations.

These can then be evaluated in the light of new evidence, and, if deemed scientifically promising, can be incorporated in the research design for a next step. The proposed strategy for developmental investigations in the discovery mode involves an iterative process of successive confrontations between theory and data leading toward the ultimate goal of being able to formulate hypotheses that both merit and are susceptible to scientific assessment in the verification mode. In presenting this definition of the discovery mode, we acknowledge that, in actual scientific practice, it is hardly likely to be a discovery.

The process we have described, or something like it, is what scientists have always done. Our primary reason for seeking to make that process explicit was the belief that doing so could further the discovery process. But we also hope that the explication and examples of the discovery mode presented in this chapter will have broader utility in developmental research. To return to the task at hand, the proposed criteria have more specific implications for the critical role in research design played by statistical analysis. First, in the discovery phase, Type I errors can entail an even greater risk than errors of Type II.

To state the issue more broadly, dismissing as invalid a finding that points the way to a fuller and more precise explanation for the phenomenon under investigation may result in a greater loss than that produced by accepting a finding that is highly significant because of as yet undifferentiated and thereby confounded factors producing the phenomenon in question (e. g. , the failure to distinguish Process from Context). The greater risk in the discovery process of dismissing findings as Type I errors is further

compounded by the phenomenon of magnification of early environmental differences over time.

Thus, as illustrated by the escalating effects of proximal processes shown in Figure 14. 2, changes in outcome associated with a proximal process at Time 1 can be quite small and nonsignificant statistically. Yet, as shown, they can be powerful predictors of a marked increase in developmental outcome several years later (in the likely event that the process continued to be maintained over the intervening period). At this point, a methodological note is in order. Statistical models widely used for the purpose of hypothesis testing are often ill-suited as operational models for developmental investigations in the discovery mode.

This is particularly true for models that control statistically solely for linear relationships among the factors in the research design to obtain an estimate of the independent contribution of each factor in the statistical model to the outcome under investigation. The validity of such analyses rests on what in mathematical statistics is referred to as “ the assumption of homogeneity of regression. ” To illustrate the assumption in its simplest general case: given a dependent variable y and two independent variables x_1 and x_2 , then the relation between x_1 and y must be the same at all levels of x_2 .

This assumption is often not met in developmental data. For example, when applied to the analysis shown in Figure 14. 2, it would require that the relation between proximal process and frequency of problem behaviors be the same at every social class level, which is not the case. Nor is this requirement likely to hold with respect to any combination of the four

defining properties of the bioecological model. As Bronfenbrenner stated in his 1979 monograph, “ In ecological research, the principal main effects are likely to be interactions” (p. 38, italics in original).

Any research design based on a bioecological model must allow for the possibility of such interactions. However, it is also essential, especially in the discovery phase, that the particular interactions to be examined be theoretically based, and that—if possible—their anticipated direction and form be specified in advance so that discrepancies between theoretical expectation and observed reality can be readily recognized and thus provide the basis for a next step in the typically slow, iterative process of seeking more differentiated formulations that merit further exploration both on theoretical and empirical grounds.

In each case, the new formula- From Theory to Research Design:
Operationalizing the Bioecological Model 803 tion should be consistent with the existing theoretical specifications of the bioecological model, but it also must take into account any old or new research findings bearing on the issue. The foregoing criteria for research in the discovery mode do not imply neglect of the traditional issues of reliability and validity. These are honored in a somewhat different, theoretically guided way. Essentially, the process is one of cross-validation at two levels.

First, in a given study, the results at each successive stage of analysis are validated in the next, more differentiated formulation. Second, the generalizations emerging from a given investigation are cross-validated against findings from other studies of theoretically related phenomena but

with a specific focus on the defining components of the bioecological model. Before we proceed with concrete examples, it is important to emphasize that the criteria we have proposed and applied for conducting developmental science in the discovery mode represent a first attempt to construct a working model.

Moreover, the working model is subject to the curious qualification that it is itself the product of the same sequential design that it proposes. The criteria were developed by examining the changes introduced at each successive stage in the evolution of the bioecological model to identify the theoretical and operational properties leading to improvement in the model's predictive power. The example that follows illustrates these concurrent processes.

Different Paths to Different Outcomes: Dysfunction versus Competence In this instance, our exploratory effort took as its point of departure the stipulation in Proposition II that the effects of proximal processes vary systematically depending on the developmental outcome. Once again, rather than taking time to retrace our steps, we begin with where we ended up; namely, with the following initial formulation: The greater developmental impact of proximal processes on children growing up in disadvantaged or disorganized environments is to be expected to occur mainly for outcomes reflecting developmental dysfunction.

By contrast, for outcomes indicating developmental competence, proximal processes are posited as likely to have greater impact in more advantaged and stable environments. The term dysfunction refers to the recurrent manifestation of difficulties on the part of the developing person in

maintaining control and integration of behavior across situations, whereas competence is defined as the demonstrated acquisition and further development of knowledge and skills—whether intellectual, physical, socioemotional, or a combination of them (e. . , learning how to care for a young infant involves all three). The preceding emergent formulation is based on the following considerations. Most parents have the capacity and the motivation to respond to manifestations of physical or psychological distress on the part of their children. In deprived or disorganized environments, such manifestations of dysfunction have been shown to be both more frequent and more severe (e. g. , in Drillien’s research), thus drawing on more of parents’ available time and energy.

Accordingly, to the extent that, in disadvantaged settings, parents are able to engage in proximal processes, these are likely to have greater impact in reducing dysfunction rather than in enhancing their children’s knowledge about and skill in dealing with the external environment. With respect to problems of dysfunction, in deprived environments there is usually a match between young children’s needs and their parents’ capacity to meet those needs.

This does not mean, however, that children in such environments will end up functioning as well as their age-mates growing up in more favorable circumstance, but rather that, over similar periods of time, they will show greater improvement in control over their own problem behaviors as a function of parental responsiveness. The situation in advantaged and stable environments is rather different. Manifestations of dysfunction are likely to occur less often and to be less intense.

Under these circumstances, parents are more apt to be attracted by and respond to the more frequent and more gratifying signs of their children's growing competence, with the result that proximal processes may be focused mainly in this latter sphere. In addition, parents living in a middle-class world are themselves more apt to possess and exhibit the knowledge and skills they wish their children to acquire. They also have greater access to resources and opportunities outside the family that can provide needed experiences for their children.

Taken together, the foregoing considerations led to the formulation of the previously stated “ proto-hypothesis. ” Because Drillien's study of the influence of mother-infant interaction dealt with only one developmental outcome, one has to look elsewhere for evidence that effects of such processes vary depending on the nature of the outcome under consideration.

A rich data archive generously 804 The Bioecological Model of Human Development 6. 9 Grade Point Average (GPA) Mother and Father Single-Parent Mother Mean Mother and Stepfather . 9 4. 9 Mean Mean 3. 9 2. 9 0 2 4 6 8 10 12 M 0 2 4 6 8 10 12 M 0 2 4 6 8 10 12 M 1 3 5 7 9 11 1 3 5 7 9 11 1 3 5 7 9 11 Levels of Parental Monitoring Ranging from 0–12 Mothers with some education beyond high school Mothers with no education beyond high school GPA Scale: 2 = Mostly D's or less 3 = 1/2 C's, 1/2 D's 4 = Mostly C's 5 = 1/2 B's, 1/2 C's 6 = Mostly B's 7 = 1/2 A's, 1/2 B's 8 = Mostly A's Figure 14. 3 Effect of parental monitoring on grades in high school by family structure and mother's level of education.

Analyses and graph based on data archives generously provided by Professors Stephen A. Small (University of Wisconsin) and Tom Luster
<https://assignbuster.com/bioecological-systems-essay/>

(Michigan State University). made available by Small and Luster (1990) from their statewide studies of youth at risk in Wisconsin met this need. 2 Figure 14. 3 depicts the results from an analysis of the differential effects of parental monitoring on the academic achievement of high school students living in one of the three most common family structures found in the total sample of over 2, 500 cases. The students were between 14 and 16 years of age. It was also possible to stratify the sample by two levels of mother's education, with completion of high school as the dividing line. Parental monitoring refers to the effort by parents to keep inThe analyses of data from the Wisconsin archive reported in this chapter were carried out in collaboration with Stephen A. Small (University of Wisconsin) and Tom Luster (Michigan State University) who designed and conducted the survey from which the data are drawn.

We are deeply indebted to them for the theoretical thinking that underlies the construction of the survey. It is an excellent example of developmental science in the discovery mode. We are also grateful to Regina Cannon (then a graduate student at Cornell University) who carried out the statistical analyses with care and dispatch. 3 The large number of cases in this study should not be taken to imply that the bioecological model can be applied only in samples with a large N. As illustrated here, precision in the formulation of the theoretical model and in its translation 2 ormed about and set limits on their children's activities outside the home. In the present study, it was assessed by a series of items in a questionnaire administered to adolescents in their school classes. All items referred to parents in the plural, with no distinction as to whether the mother or the father was doing the

monitoring. Levels of parental monitoring, ranging from 0 to 12, are shown on the horizontal axis, and grade point average (GPA) is shown on the vertical. The markers to the right of each curve record the mean GPA for each of the six groups.

Once again, the results reveal that the effects of proximal processes are more powerful than those of the environmental Contexts in which they occur. In this instance, however, the impact of the Process was greatest in what emerges as the most advantaged ecological niche—families with two biological parents in which the mother had some education beyond high school. Moreover, the developmental effect of the proximal process on school grades—a measure of competence—was stronger for families living in more advantaged socioeconomic circumstances.

This finding is directly opposite to that revealed by the analysis of Drillien's data, where the outcome was one of psychological dysfunction (i. e. , the frequency of problem behaviors). At the same time, the principal finding from both studies documents the powerful effect of proximal processes on human development, a result consistent with the first defining property of the bioecological model stipulated in Proposition I. The reader may well ask why the data in each scattergram were fitted to a curve with a declining slope rather than simply with a straight line.

In accord with the criteria for research in the discovery mode, the introduction of the quadratic term was based on theoretical considerations. Higher levels of academic performance require mastery of more complex tasks, and hence are more difficult to achieve. As a result, at each

successive step, the same degree of active effort would be expected to yield a somewhat smaller result. More specifically, for pupils who are not doing so well in school, parental monitoring into a closely corresponding research design can produce reliable findings even when there are relatively few cases in some, or even all, the cells of the model. This comes about because, in effect, the bioecological model requires, in its discovery phase, advance specification primarily not only of main effects but also in the form and direction of their most plausible interactions in the light of both the evolving theoretical model and the then available research evidence. This is especially true for well-designed experiments. For examples, see pp. 808–809. From Theory to Research Design: Operationalizing the Bioecological Model 05 can have a substantial effect by ensuring more stability of Time and place so that some learning can occur. But for superior school achievement, students would require in addition high levels of motivation, focused attention, prior knowledge, and—especially—actually working with the material to be learned. These are all qualities that stability of Time and place by itself cannot provide. As can be seen in Figure 14. 3, the relation between parental monitoring and school grades shows a curvilinear trend.

Moreover, in accord with criteria for research in the discovery mode (see pp. 801–803), both in its direction and form the trend corresponds with theoretical expectations in being more pronounced when the mother has some education beyond high school, especially in a two-parent family structure. A test for heterogeneity of regression confirms visual inspection. The differences in slopes between the two educational levels are highly significant ($p < .01$), with the quadratic component emerging as reliable only

in the higher educational group. Also statistically significant are differences in school achievement by family structure in each level of mother's education, with students growing up in two-parent families getting the highest grades, and those from single-parent families the lowest, a rank order corresponding to the power of the proximal process in each group as measured by the slopes of the associated regression coefficients. Finally, a result not shown on the graph provides additional evidence pointing to another tentative generalization.

The first indication appeared in the analysis of Drillien's data, which, among other findings, revealed that maternal responsiveness had the general effect of decreasing or buffering against environmental differences in developmental outcome. Thus, at high levels of motherchild interaction, social class differences in problem behavior became smaller. A similar pattern emerges for the effects of parental monitoring on school grades. Across the six groups shown in Figure 14. 3, stronger parental monitoring was associated not only with a higher mean on school performance but also with a lower standard deviation.

These differences, too, were statistically reliable. Hence the following working hypothesis: For outcomes of competence, proximal processes not only lead to higher levels of developmental functioning but also The degree of curvilinearity is measured by the corresponding regression coefficients and not by difference in the length of each curve from top to bottom. The latter is determined by empty cells in the scatter plot below or above which entries for both monitoring level and GPA were available. 4 serve to reduce

and act as a buffer against effects of disadvantaged and disruptive environments.

To turn from substance to method, the foregoing findings also demonstrate that tests of significance have a place in research in the discovery mode, but, as with hypothesis verification, only after a specific theoretical expectation has been formulated in advance. In a discovery context, however, the aim is not to claim empirical validity for a particular theoretical formulation but to indicate its plausibility for inclusion in the research design at subsequent stages of exploratory work. To be sure, doing so may result in a failure of replication.

But not doing so risks missing potentially important, theoretically guided research opportunities not yet recognized. Garmezy and Rutter (1983), in their landmark studies of stress and coping in children's development, did not differentiate between those protective or disruptive forces emanating from the environment, and those inherent in the biopsychological characteristics of the person. As evidenced from the analysis of Drillien's data shown in Figure 14. 1, these vectors do not always operate in the same direction.

Nevertheless, Garmezy and Rutter's formulations and findings played a significant role in the early stages of the process through which the bioecological model reached its present, still-evolving form. The still-evolving form imposes the obligation to take advantage of existing opportunities for continued exploration. With respect to the present inquiry, the next step in that process was once again to pose the question about the extent to which

the research design meets the defining properties of the bioecological model.

At first glance, we appear to be confronted with the same problem that we encountered with Drillien's study. Proposition I defines proximal processes as bidirectional. As previously noted, Small and Luster (1990) defined parental monitoring as the effort by parents to keep informed about and set limits on their children's activities outside the home. As stated, such behavior implies influence from one side only—that of the parents. An examination of the actual items used in their questionnaire, however, revealed that they were of two kinds. Some were cast in the language of parental expectation and prescription (e. . , “ If I am going to be home late, I am expected to call my parent(s) to let them know”; “ When I go out, my parent(s) ask me where I'm going”). By contrast, other items implied that the desired expectations or prescriptions were being met (e. g. , “ My parent(s) know where I am after school”; “ I tell my parent(s) who 806 The Bioecological Model of Human Development I'm going to be with before I go out”). Although the first type of item is unidirectional, the second entails some degree of reciprocity to the extent that the adolescent is providing the information desired by the parents.

Accordingly, we hypothesized that items of the second type would show stronger relationships to developmental outcomes than those that described only the parents' expectations of how they wished their children to behave. Separate analyses of scales based on each type of item provided substantial support for our working hypothesis. Although responses to both types of questions showed reliable effects on school performance, the relationships

for the reciprocity scale were significantly stronger and were much more likely to show curvilinear effects.

Accordingly, the latter was the scale used in analyzing the results presented in Figure 14. 3. From the perspective of the biological model, the research design producing the results shown in that figure is missing an important Person component. It is a general finding in educational research that at the high school level female students score higher on measures of academic performance than do males. The question therefore arises: To what extent is this gender difference attributable to variations in proximal process? Figure 14. provides a tentative answer to this question for students whose mothers had more than a high school education. In each family structure, parental monitoring exerted a more powerful effect on the school achievement of girls than of Average Grade in High School Subjects 7 Boys 6 Mean Girls Mean Girls Boys Mean Mean Boys Girls Mean 5 Mean 4 3 2 0 4 8 12 0 4 8 12 2