Deliberate choice of the terms "hunter" and "gatherer," as well as more casual statements scattered through the book in chapters on behavioral disorders, learning, and aggression, derive from the assumption on the part of some of the authors that there is considerable continuity between the experiences of other apes (especially chimpanzees) and humans. This is a controversial perspective, not explicitly dealt with in the book. Nevertheless, scientists unfamiliar with the behavioral research reported in this volume may find that it radically alters the way they view our nearest nonhuman relations.

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Developmental Psychology

The Ecology of Human Development. Experiments by Nature and Design. URIE BRONFENBRENNER. Harvard University Press, Cambridge, Mass., 1979. xviii, 330 pp. $16.50.

In this book Urie Bronfenbrenner has set down the point of view he has been developing and presenting in numerous papers and talks over the last several years. This point of view includes a specific conception of what is acceptable research in developmental psychology, a characterization of the expanding network of factors that influence development, and the assertion that social policy variations provide natural experiments that can provide important information about developmental laws.

Bronfenbrenner begins by proposing a "new theoretical perspective" for developmental psychology, though he acknowledges it as derivative from the work of George Herbert Mead, Kurt Lewin, and others. This perspective is that the environment of the individual being studied must be taken into account if the behavior of the individual is to be interpretable. The dynamics of that environment, it is claimed, have significant influence on behavior; development does not occur in a vacuum and must be studied "in context." Although basic processes of perception, learning, and motivation are important, they are subsidiary factors in Bronfenbrenner's view of development, which he defines as "the person's evolving conception of the ecological environment, and his relation to it, as well as the person's growing capacity to discover, sustain, or alter its properties" (p. 9). According to Bronfenbrenner, the failure of developmental psychologists to understand or document the effects of environmental variables has hampered understanding of human development.

Bronfenbrenner believes that the unique aspect of human behavior is that humans fill every setting with "social meaning" and the social meaning attributed in turn influences the behavior being observed in the setting. Without knowledge of the social meaning of the setting as it exists for the individual, any other observations of the individual's behavior will be uninterpretable and, from Bronfenbrenner's point of view, invalid. Thus, the well-controlled laboratory setting into which children are brought for purposes of research cannot produce valid data on perception or cognition if the experimenter does not know what social meaning the child has attributed to the laboratory and has not documented the child's attributions. The older the individual the more factors there are that determine social meaning, including increasing numbers that are not immediately present. Because social meaning has typically not been assessed in the controlled laboratory setting, successful generalizations from laboratory to natural environments have been rare. In addition, developmental psychologists, according to Bronfenbrenner, have not been particularly imaginative about making use of the natural experiments provided by normal variations of the natural environment.

Research conducted in the natural environment does not, Bronfenbrenner asserts, automatically acquire ecological validity; nor is it impossible for a laboratory study to be ecologically valid. In either case ecological validity depends on whether the investigator has assessed the meaning of the environment from the subject's point of view. In this sense Bronfenbrenner uses the term ecological validity as phenomenological validity. For research to be valid as developmental research, it must take into account the phenomenological aspects of the environment, it must involve data collected at more than one point in time (preferably with the same subjects), and it must be addressed to questions of cross-context effects and relationships.

Bronfenbrenner offers a new set of systems that he believes both organize the factors influencing development and capture the complexity of the variables that must be accounted for in research on development. They are the microsystem, interpersonal interactions in a single setting; the mesosystem, the interrelationships among two or more settings; the exosystem, effects on individual development of settings that do not include the individual; and the macrosystem, subcultural and cultural variables and belief systems.

An extensive case is made for the claim that implementations of new social policies can affect one or more of the systems and thus provide natural opportunities to observe developmental laws. For example, preschool intervention programs make it possible to study the young child in different microsystems, offer unique mesosystem observations, permit the study of effects of exosystem relationships that would not exist if the intervention programs had not occurred, and introduce changes in the macrosystem. Thus, the traditional notion that social policy follows the discovery of facts about development is turned around to the rather unorthodox point of view that developmental psychology needs social policy more than social policy needs developmental psychology.

After stating his basic theses, Bronfenbrenner provides a number of propositions and hypotheses as necessary consequences. None is particularly new to anyone who has been thoughtful about how complex is human development. Many of the 50 hypotheses proposed address the central question of what conditions are likely to foster "good development" and affect the developmental course. For example:

> The developmental impact of a dyad increases as a direct function of the level of reciprocity, mutuality of positive feeling, and a gradual shift of balance of power in favor of the developing person [hypothesis 4, p. 59].

> Human development is facilitated through interaction with persons who occupy a variety of roles and through participation in an everbroadening role repertoire [hypothesis 14, p. 104].

In addition to the obvious definitional, value judgment, and measurement problems the hypotheses present, testing the hypotheses requires longitudinal and cross-setting research in addition to the assessment of social meaning at every point of data collection. To do less is not to do developmental research. According to Bronfenbrenner very few research efforts meet all the necessary criteria, though he chooses a number of studies for discussion as approximating the model he believes will be most fruitful. These range from Spitz's research on institutionalized infants and mother separation to the more recent work of Klaus and Kennell on social bonding in infant development; Hetherington's work on the effects of divorce on children and family functioning and Zimbardo's work on the importance of roles are also cited.

In noting what research Bronfenbrenner chooses to cite, it is interesting to note also what is omitted. For example, in discussing the research that has been done on the effect of various institutions on child development, he ignores the entire body of work done with retarded children, which would meet many of the criteria he stipulates, even to the point of being the kind of "transforming experiments" he considers desirable. This work has involved extensive laboratory studies with results that have been generalized to wider and wider aspects of institutional environments and changed the institutions in the process. Perhaps Bronfenbrenner discounts the work because the operant conditioning and behavior modification tradition of this research uses strategies more akin to those of the physical sciences, strategies he rejects for the study of human development. Similarly, there is no reference to animal research such as that done by Denenberg and his colleagues, especially with respect to environmental variables that produce stress and the longitudinal assessment of those effects. The criterion of the assessment of social meaning cannot be so easily invoked in animal research, yet many developmental psychologists find the animal data informative for purposes of theory as well as research strategy and would not assume this work is irrelevant to the understanding of human development.

Also absent from the book is any significant treatment of the currently extensive research efforts concerned with assessment of the environment and with child-adult interaction; there is no reference to several major longitudinal multivariate research programs involving infants and young children in families. Although it is true that some of that work has yet to be published, much of it has been presented at scientific meetings contemporaneous with much of the unpublished work that is cited in the book. The author probably did not intend to minimize the measurement difficulties inherent in interactional and environmental observation research. However, he leaves the impression that the dimensions of functional experience he cites as important have been ignored by other psychologists. That is not the case. Yarrow, Wachs, Sameroff, Bakeman, Caldwell, White, Carew, Cornell, and others have contributed to the extensive discussion of how one defines what is a functional environment for a child and for the other individuals in a setting, how one measures that environment, and how one analyzes the data collected. All of this might have been profitably brought to bear by Bronfenbrenner on his thesis and could have served as the basis for a reasonable claim that there is a convergence of concern in the field.

A number of Bronfenbrenner's conceptions are not unlike those proposed by Erik Erikson. Nor are they unfamiliar to the students of Roger Barker, whose work is cited only briefly, or to those who have been inspired by the contributions of Fritz Heider, who is not mentioned. The importance of dyadic relationships (which characterize many of the behaviors in the microsystem) was stressed a number of years ago in the pioneering writings of Robert Sears, but this work is not noted either. When these omissions are recognized they tend to raise questions concerning Bronfenbrenner's claim to a unique synthesis.

It is the insistence upon what is and is not acceptable as developmental research that is likely to put off many potentially sympathetic readers. Knowledge of child behavior has been remarkably advanced since the observations of the baby biographers at the end of the 19th century. To the extent that we have documented developmental sequences, have identified important variables controlling behavior, and have shown how children learn, think, and perceive, a significant data base has been established. Many of these accomplishments occurred without meeting the criteria Bronfenbrenner has set forth, a fact acknowledged in the book. The investigators who have contributed and are contributing to this data base and who consider themselves developmental psychologists would, if Bronfenbrenner's view prevails, be disenfranchised as developmental psychologists.

Bronfenbrenner has attempted to provide a comprehensive account of all the variables that could possibly influence development, but it is curious that he has almost totally ignored those variables that are associated with the organism: individual differences, temperament, vulnerability. One expects to see the biological-organismic approach more fully developed in the book because of the rather explicit rejection of the physical sciences as a model for psychology. However, the biological factors in development go unmentioned, and the theoretical implications that others have drawn from choosing the biological sciences as the more appropriate model for psychological research are referred to only tangentially.

Despite the problems that have been cited here, a number of Bronfenbrenner's particular observations are thoughtful and provocative. One could view the book as an extensive exhortation that development is complex, that simple models will not be successful, that environmental variables must be taken seriously, that social meaning is important, that problems of generalizing from the laboratory to more complex environments are still significant for behavioral science. Taken in this manner it provides a welcome antidote to the current spate of premature conclusions about what is and is not important in development. Though many developmental psychologists will find his definition of the field too limiting it is useful to have in one place the ideas that Bronfenbrenner has been discussing from numerous platforms in recent years. If, rather than becoming a new research bible, the book stimulates useful research it will be a contribution to the field.

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Books Received

The Alkaloids. The Fundamental Chemistry. A Biogenetic Approach. David R. Dalton. Dekker, New York, 1979. xii, 790 pp., illus. $49.50. Studies in Organic Chemistry, vol. 7.

American Psychology in Historical Perspective. Addresses of the Presidents of the American Psychological Association, 1892–1977. Ernest R. Hilgard, Ed. American Psychological Association, Washington, D.C., 1978. x, 558 pp., illus. Cloth, $18; paper, $15.

Analysis of Drugs and Metabolites by Gas Chromatography-Mass Spectrometry. Vol. 6, Cardiovascular, Antihypertensive, Hypoglycemic, and Thyroid-Related Agents. Benjamin J. Gudzinowicz and Michael J. Gudzinowicz with the assistance of Horace F. Martin, James L. Driscoll, and Joanne Hologgitas. Dekker, New York, 1979. xii, 446 pp., illus. $47.50.

Angiography in Cerebro-Arterial Occlusive Diseases. Including Computer Tomography and Radionuclide Methods. G. B. Bradač and R. Oberson. Springer-Verlag, New York, 1979. xii, 228 pp., illus. $80.

Animal Behavior. An Evolutionary Approach. John Alcock. Sinauer, Sunderland, Mass., ed. 2, 1979. xii, 532 pp., illus. $16.

Annual Review of Biophysics and Bioengineering. Vol. 8. L. J. Mullins, William A. Hagins, Carol Newton, and Gregorio Weber, Eds. Annual Reviews, Palo Alto, Calif., 1979. x, 436 pp., illus. $17.

Annual Review of Plant Physiology. Vol. 30. Winslow R. Briggs, Paul B. Green, and Russell L. Jones, Eds. Annual Reviews, Palo Alto, Calif., 1979. xii, 672 pp., illus. $17.

Antibody Production in Man. *In Vitro* Synthesis and Clinical Implications. Proceedings of a conference, Utrecht, Holland, Mar. 1978. Anthony S. Fauci and Rudy Ballieux, Eds. Academic Press, New York, 1979. xiv, 398 pp., illus. $18.

Applied Biomedical Electronics for Technicians. Dean A. DeMarre, Philip Kantrowitz,