Introduction

Celia B. Fisher
Richard M. Lerner

The latter part of the 20th century was marked by public anxiety about a myriad of social problems, some old, some new, but all affecting the lives of vulnerable children, adolescents, adults, families, and communities (Fisher & Murray, 1996; Lerner, 1995). For instance, in America, a set of problems, of historically unprecedented scope and severity, involved interrelated issues of economic development, environmental quality, health and health care delivery, poverty, crime, violence, drug and alcohol use and abuse, unsafe sex, and school failure.

Indeed, in the last years of the 20th century and in the first years of the current one, across the United States and in other nations, infants, children, adolescents, and the adults who care for them continued to die from the effects of these social problems (e.g., Dryfoos, 1990; Hamburg, 1992; Perkins & Borden, 2003). And, if people were not dying, their prospects for future success were being reduced by civil unrest and ethnic conflict, by famine, by environmental challenges (e.g., involving water quality and solid waste management), by school underachievement and dropout, by teenage pregnancy and parenting, by lack of job opportunities and preparedness, by prolonged welfare dependency, by challenges to their health (e.g., lack of immunization, inadequate screening for disabilities, insufficient prenatal care, and lack of sufficient infant and childhood medical services), and by the sequelae of persistent and pervasive poverty (e.g., Huston, McLoyd, & Garcia Coll, 1994; McLoyd, 1998). These issues challenge the resources and the future viability of civil society in America and throughout the world (Lerner, Fisher, & Weinberg, 2000a, 2000b).

The potential role of scientific knowledge about human development in addressing these issues of individuals, families, communities, and civil society resulted in growing interest and activity in what has been termed *applied developmental science* (ADS). Indeed, over the past two decades, increasing numbers of developmental scientists from diverse disciplines have come to identify themselves professionally as "applied developmental scientists." Joining under this umbrella are colleagues from allied disciplines and specialties in the biological, psychological, social, and behavioral sciences and the helping professions, all sharing common goals and visions captured in some of the more formal definitions of the ADS fields.

In many ways, applied developmental science is "old wine in a new bottle," that is, there are significant historical antecedents to the burgeoning field evident today (Wertlieb, 2003). It is useful here to provide a brief overview of this history, focusing most on the events over the past quarter century that have given shape to contemporary ADS.

APPLIED DEVELOPMENTAL SCIENCE: A BRIEF HISTORY

Applied developmental science has its roots in numerous fields concerned with human development, for example, home economics/family and consumer sciences (e.g., Meszaros, 2003; Nickols, 2001), human ecology (Bronfenbrenner, 2001, in press; Bronfenbrenner & Morris, 1998), comparative psychology (Tobach, 1994), and developmental psychology (Lerner, 2002; Wertlieb, 2003).

Within the past quarter century, a key milestone in the elaboration of the field's territory occurred with the founding of the *Journal of Applied Developmental*

Psychology in 1980, an international multidisciplinary life-span journal. The masthead proclaimed a

> forum for communication between researchers and practitioners working in life-span human development fields, a forum for the presentation of the conceptual, methodological, policy, and related issues involved in the application of behavioral science research in developmental psychology to social action and social problem solving. (Sigel & Cocking, 1980, p. i)

In welcoming the new journal in an inaugural editorial, Zigler (1980) narrowed the definition of the journal's purview to what he called a "field within a field" (i.e., presumably, applied developmental psychology within developmental psychology) but set high and broad expectations that "these pages shall attest to the synergistic relationship between basic and applied research" (p. 1).

In 1991, a National Task Force on Applied Developmental Science convened representatives from a broad but not an exhaustive range of professional scientific organizations concerned with the application of the developmental psychology knowledge base to societal problems. Organizations represented included the American Psychological Association, the Gerontological Society of America, the International Society for Infant Studies, the National Black Child Development Institute, the National Council on Family Relations, the Society for Research on Adolescence, and the Society for Research in Child Development. Goals included the articulation of the definition and scope of ADS along with guidelines for graduate training in this emergent, interdisciplinary field. A consensus process produced a complex four-point definition of ADS, quoted here at length to document the current parameters of content, process, methods, and values:

> 1.1. Applied developmental science involves the programmatic synthesis of research and applications to describe, explain, intervene, and provide preventive and enhancing uses of knowledge about human development. The conceptual bases of ADS reflects the view that individual and family functioning is a combined and interactive product of biology and the physical and social environments that continuously evolve and change over time. ADS emphasizes the nature of reciprocal person-environment interactions among people, across settings, and within a multidisciplinary approach stressing individual and cultural diversity. This orientation is defined by three conjoint emphases:
>
> **Applied:** Direct implications for what individuals, families, practitioners, and policymakers do.
>
> **Developmental:** Systematic and successive changes within human systems that occur across the life span.
>
> **Science:** Grounded in a range of research methods designed to collect reliable and objective information systematically that can be used to test the validity of theory and application.
>
> 1.2. ADS recognizes that valid applications of our knowledge of human development depend upon scientifically based understanding of multilevel normative and atypical processes that continually change and emerge over the life cycle.
>
> 1.3. ADS reflects an integration of perspectives from relevant biological, social, and behavioral sciences disciplines in the service of promoting development in various populations.
>
> 1.4. The nature of work in ADS is reciprocal in that science drives application and application drives science. ADS emphasizes the bidirectional relationship between those who generate empirically based knowledge about developmental phenomena and those who pursue professional practices, services, and policies that affect the well-being of members of society. Accordingly, research and theory guide intervention strategies, and evaluations of outcomes of developmental interventions provide the basis for the reformulation of theory and for modification of future interventions. (Fisher et al., 1993, pp. 4–5)

By 1997, these parameters defining ADS were adopted as the editorial scope of a new journal, *Applied Developmental Science,* with further explication of a more inclusive range of methodologies and audiences. The journal publishes

> research employing any of a diverse array of methodologies—multivariate longitudinal studies, demographic analyses, evaluation research,

> intensive measurement studies, ethnographic analyses, laboratory experiments, analyses of policy and/or policy-engagement studies, or animal comparative studies—when they have important implications for the application of developmental science across the life span. Manuscripts pertinent to the diversity of development throughout the life-span—cross-national and cross-cultural studies; systematic studies of psychopathology; and studies pertinent to gender, ethnic and racial diversity—are particularly welcome. . . . [The audience includes] developmental, clinical, school, counseling, aging, educational, and community psychologists; life course, family and demographic sociologists; health professionals; family and consumer scientists; human evolution and ecological biologists; practitioners in child and youth governmental and nongovernmental organizations. (Lerner, Fisher, & Weinberg, 1997, p. 1)

Most recently, some leaders of ADS have broadened the scope of ADS even further, suggesting elements of a blueprint for promoting civil society and social justice, a provocative and compelling elaboration of both the substance and ethical orientation of the field (Fisher, 2003; Lerner, 2004). Given the presence of this range of interests and activities, ADS is now considered "an established discipline" (Fisher, Murray, & Sigel, 1996), one operationalized by the diverse foci of work pursued under this framework but linked by a common conceptual/theoretical perspective about human development: developmental systems theory. To understand the diversity of empirical, methodological, and ethical interests and activities of contemporary ADS, it is important to appreciate the developmental systems theoretical orientation that rationalizes the use of developmental science for the promotion of positive human development and the enhancement of civil society.

FROM DEVELOPMENTAL SYSTEMS THEORIES TO APPLIED DEVELOPMENTAL SCIENCE

Paul Mussen, the editor of the third edition of the *Handbook of Child Psychology,* presaged what today is abundantly clear about the contemporary stress on systems theories of human development. Mussen (1970) said, "The major contemporary empirical and theoretical emphases in the field of developmental psychology . . . seem to be on *explanations* of the psychological changes that occur, the mechanisms and processes accounting for growth and development" (p. vii). This vision alerted developmental scientists to a burgeoning interest not in structure, function, or content per se, but to change, to the processes through which change occurs, and on the means through which structures transform and functions evolve over the course of human life.

Today, Mussen's (1970) vision has been crystallized. The cutting edge of contemporary developmental theory is represented by systems conceptions of process, of how structures function and how functions are structured over time. Thus, developmental systems theories of human development are not tied necessarily to a particular content domain, although particular empirical issues or substantive foci (e.g., motor development, successful aging, wisdom, extraordinary cognitive achievements, language acquisition, the self, psychological complexity, or concept formation) may lend themselves readily as exemplary sample cases of the processes depicted in a given theory (see Lerner, 1998).

The power of developmental systems theories lies in their ability not to be limited or confounded by an inextricable association with a unidimensional portrayal of the developing person. In developmental systems theories, the person is not biologized, psychologized, or sociologized. Rather, the individual is "systemized." A person's development is embedded within an integrated matrix of variables derived from multiple levels of organization. Development is conceptualized as deriving from the dynamic relations among the variables within this multi-tiered matrix.

Developmental systems theories use the polarities that engaged developmental theory in the past (e.g., nature/nurture, individual/society, biology/culture; Lerner, 2002), not to "split" depictions of developmental processes along conceptually implausible and empirically counterfactual lines (Overton, 1998) or to force counterproductive choices between false opposites (e.g., heredity or environment, continuity or discontinuity, constancy or change; Lerner, 2002), but to gain insight into the integrations that exist among the multiple levels of organization involved in human development. These theories are certainly more complex than their one-sided predecessors. They are also more nuanced, more flexible, more balanced, and less susceptible to extravagant or even absurd claims (for instance, that nature, split from nurture, can shape the course of human development; that there is a gene for

altruism, militarism, or intelligence; or that when the social context is demonstrated to affect development, the influence can be reduced to a genetic one (e.g., Plomin, 2000; Rowe, 1994; Rushton, 2000).

These mechanistic and atomistic views of the past have been replaced, then, by theoretical models that stress the dynamic synthesis of multiple levels of analysis, a perspective having its roots in systems theories of biological development (e.g., Cairns, 1998; Gottlieb, 1997; Schneirla, 1957). In other words, development, understood as a property of systemic change in the multiple and integrated levels of organization (ranging from biology to culture and history) composing human life and its ecology, is an overarching conceptual frame associated with developmental systems models of human development.

Explanation and Application: A Synthesis

This stress on the dynamic relation between the individual and his or her context results in the recognition that a synthesis of perspectives from multiple disciplines is needed to understand the multilevel integrations involved in human development. In addition, to understand the basic process of human development both descriptive and explanatory research must be conducted within the actual ecology of people's lives.

Explanatory studies, by their very nature, constitute intervention research. The role of the developmental researcher conducting explanatory research is to understand the ways in which variations in person-context relations account for the character of human developmental trajectories, life paths that are enacted in the natural laboratory of the real world. To gain an understanding of how theoretically relevant variations in person-context relations may influence developmental trajectories, the researcher may introduce policies and/or programs as experimental manipulations of the proximal and/or distal natural ecology. Evaluations of the outcomes of such interventions become a means to bring data to bear on theoretical issues pertinent to person-context relations. More specifically, these interventions have helped applied developmental scientists to understand the plasticity in human development that may exist and that may be capitalized on to enhance human life (Csikszentmihalyi & Rathunde, 1998; Lerner, 1984).

The interindividual differences in intraindividual change that exist as a consequence of these naturally occurring interventions attest to the magnitude of the systematic changes in structure and function—the plasticity—that characterize human life. Explanatory research is necessary, however, to understand what variables, from what levels of organization, are involved in particular instances of plasticity that have been seen to exist. In addition, such research is necessary to determine what instances of plasticity may be created by science or society. In other words, explanatory research is needed to ascertain the extent of human plasticity or, in turn, to test the limits of plasticity (Baltes, Lindenberger, & Staudinger, 1998).

From a developmental systems perspective, the conduct of such research may lead the scientist to alter the natural ecology of the person or group he or she is studying. Such research may involve either proximal or distal variations in the context of human development. But, in any case, these manipulations constitute theoretically guided alterations of the roles and events a person or group experiences at, or over, a portion of the life span.

These alterations are indeed, then, interventions: They are planned attempts to alter the system of person-context relations that constitute the basic process of change; they are conducted in order to ascertain the specific bases of, or to test the limits of, particular instances of human plasticity (Baltes et al., 1998). These interventions are a researcher's attempt to substitute designed person-context relations for naturally occurring ones in an attempt to understand the process of changing person-context relations that provides the basis of human development. In short, then, basic research in human development is intervention research (Lerner, 2002).

Accordingly, the cutting edge of theory and research in human development lies in the application of the conceptual and methodological expertise of human developmental scientists to the natural ontogenetic laboratory of the real world. This placement into the actual ecology of human development of explanatory research about the basic, relational process of development involves, then, the fusion of application with basic developmental science. To pursue the study of ontogeny from a developmental systems perspective, a research/application agenda that is focused on the relations between diverse individuals and their similarly diverse contexts is brought to the fore (Lerner, 2002). In addition, however, scholars involved in such research must have at least two other concerns, ones deriving from the view that basic,

explanatory research in human development is, in its essence, intervention research.

Research in human development that is concerned with one or even a few instances of individual and contextual diversity cannot be assumed to be useful for understanding the life course of all people. Similarly, policies and programs derived from such research, or associated with it in the context of a researcher's tests of ideas pertinent to human plasticity, cannot hope to be applicable, or equally appropriate and useful, in all contexts or for all individuals. Accordingly, developmental and individual differences-oriented policy development and program (intervention) design and delivery must be a key part of the approach to applied developmental research for which we are calling.

The variation in settings within which people live means that studying development in a standard (for example, a "controlled") environment does not provide information pertinent to the actual (ecologically valid), developing relations between individually distinct people and their specific contexts (for example, their particular families, schools, or communities). This point underscores the need to conduct research in real-world settings (Bronfenbrenner, 1974; Zigler, 1998) and highlights the ideas that (a) policies and programs constitute natural experiments, that is, planned interventions for people and institutions, and (b) the evaluation of such activities becomes a central focus in the developmental systems research agenda we have described (e.g., Cairns, Bergman, & Kagan, 1998; Lerner, 1995, 2002).

In this view, then, policy and program endeavors do not constitute secondary work, or derivative applications, conducted after research evidence has been compiled. Quite to the contrary, policy development and implementation, and program design and delivery, become integral components of the applied developmental science approach to research; the evaluation component of such policy and intervention work provides critical feedback about the adequacy of the conceptual frame from which this research agenda should derive (Zigler, 1998; Zigler & Finn-Stevenson, 1999).

In essence, then, a developmental systems perspective leads us to recognize that, if we are to have an adequate and sufficient science of human development, we must integratively study individual and contextual levels of organization in a relational and temporal manner (Bronfenbrenner, 1974; Zigler, 1998). And if we are to serve the world's citizens and families through our science, if we are to help develop successful policies and programs through our scholarly efforts, efforts that result in the promotion of positive human development, we may make great use of the integrative, temporal, and relational model of the person and of his or her context that is embodied in the developmental systems perspective.

FROM DEVELOPMENTAL SYSTEMS THEORY TO THE CORE PRINCIPLES OF ADS

As has been argued before us—for example, by Fisher (e.g., Fisher et al., 1993); Weinberg (e.g., Lerner, Fisher, & Weinberg, 1997, 2000a, 2000b); Sherrod (e.g., Sherrod, 1999); Eccles (Eccles, Lord, & Buchanan, 1996); Takanishi (1993); Lerner (Lerner, 2002, 2004); and Wertlieb (2003)—ADS is predicated on the developmental systems theoretical perspective we have described. Within this context, Fisher et al. (1993) summarize the five conceptual components that, together, characterize the core principles of ADS. Taken together, these conceptual principles make ADS a unique approach to understanding and promoting positive development.

The first conceptual component of ADS is the notion of the *temporality,* or historical embeddedness, of change pertinent to individuals, families, institutions, and communities. Some components of the context or of individuals remain stable over time and other components may change historically. Because phenomena of human behavior and development vary historically, one must assess whether generalizations across time periods are legitimate. Thus, temporality has important implications for research design, service provision, and program evaluation.

Interventions are aimed at altering the developmental trajectory of within-person changes. To accomplish this aim, the second conceptual feature of ADS is that applied developmental scientists take into account *interindividual differences* (diversity) among, for instance, racial, ethnic, social class, and gender groups, and *intraindividual changes,* such as those associated with puberty.

The third conceptual feature of ADS places an emphasis on the centrality of *context*. There is a focus on the relations among all levels of organization within the ecology of human development. These levels involve biology, families, peer groups, schools, businesses, neighborhoods and communities, physical/ecological settings, and the sociocultural, political,

legal/moral, and economic institutions of society. Together, bidirectional relations among these levels of the developmental system necessitate systemic approaches to research, program and policy design, and program and policy implementation.

The fourth principle of ADS emphasizes descriptively *normative developmental processes,* and primary prevention and optimization rather than remediation. Applied developmental scientists emphasize healthy and normative developmental processes and seek to identify the strengths and assets of individual, groups, and settings, rather than focusing on deficits, weaknesses, or problems of individuals, families, or communities. Instead of dwelling on the problems faced by people, applied developmental scientists aim to find combinations of individual and ecological assets associated with thriving among people (e.g., Benson, 1997; Scales, Benson, Leffert, & Blyth, 2000) and with the "Five Cs" of positive individual development: competence, confidence, connection, character, and caring/compassion (Lerner, 2002, 2004; Little, 1993; Pittman, 1996).

The final principle of applied developmental science is the appreciation of the *bidirectional relationship* between knowledge generation and knowledge application. By acknowledging bidirectionality, applied developmental scientists recognize the importance of knowledge about life and development that exists among the individuals, families, and communities being served by applied developmental science. For applied developmental scientists, collaboration and colearning between researchers/universities and communities are essential features of the scholarly enterprise (Lerner, 1998). Such community-collaborative efforts are termed *outreach scholarship* (Lerner & Miller, 1998).

In other words, given the developmental systems perspective on which ADS is predicated, applied developmental scientists assume that

> there is an interactive relationship between science and application. Accordingly, the work of those who generate empirically based knowledge about development and those who provide professional services or construct policies affecting individuals and families is seen as reciprocal in that research and theory guide intervention strategies and the evaluation of interventions and policies provides the bases for reformulating theory and future research. . . . As a result, applied developmental [scientists] not only disseminate information about development to parents, professionals, and policy makers working to enhance the development of others, they also integrate the perspectives and experiences of these members of the community into the reformulation of theory and the design of research and interventions. (Fisher & Lerner, 1994, p. 7)

Given the theoretically predicated set of principles defining ADS, it is clear that not all possible realms of developmental science would lend themselves to this view of scholarship (e.g., genetic reductionist approaches to human development would not fit within this approach; see Lerner, 2002, for fuller discussions of this point). As well, it is clear that there are formidable scientific challenges to conducting applied developmental science. It is useful to discuss some of the methodological dimensions of scientific work that are brought to the fore by an ADS perspective on research.

METHODOLOGICAL AND ETHICAL DIMENSIONS OF ADS

Human developmental science has long been associated with laboratory-based scholarship devoted to uncovering "universal" aspects of development by stripping away contextual influences (Cairns et al., 1998; Hagen, 1996). However, the mission and methods of human development are being transformed into an applied developmental science devoted to discovering diverse developmental patterns by examining the dynamic relations between individuals within the multiple, embedded contexts of the integrated developmental systems in which they live (e.g., Fisher, 2003; Fisher & Brennan, 1992; Fisher & Lerner, 1994; Fisher & Murray, 1996). This theoretical revision of the target of developmental analysis from the elements of relations to interlevel relations has significant implications for applications of developmental science to policies and programs aimed at promoting positive human development. Arguably the most radical feature of the theoretical, research, and applied agenda of applied developmental scientists is the idea that *research about basic relational processes of development and applications focused on enhancing person-context relations across ontogeny are one and the same endeavor.*

In addition to the developmental systems theoretical orientation framing the substantive domains of

scholarship included in this encyclopedia and, as well, found more broadly in ADS, we must emphasize that there are other features of scholarship that are emblematic of ADS. That is, there are specific views of methodology and of ethics involved in this field of work. As we have noted earlier in this introduction, the empirical parameters of ADS are addressed only to a certain extent by traditional research methods and designs.

Acknowledgment of the conceptual complexity imposed by the relevant developmental systems bioecological (e.g.,) theories engages increasingly sophisticated methodological approaches. Orchestration of a researcher's perspectives on a set of problems with a society's perspectives on the problems—be they concerns about how to provide a type of care for children or how to sustain the health and development of an ill child, as considered in our sampling—requires extension and innovation by the applied developmental scientist. Some of the extension and innovation is relatively incremental.

For example, study of children's adaptation to illness becomes the province of interdisciplinary teams of pediatricians, pediatric psychologists, nurses, and child psychiatrists. Bolder innovation advances ADS when families and communities are recognized and embraced as legitimate partners in the research enterprise, when the audience or "consumer" of research is broadened to include service providers and policymakers, and when traditional institutional structures and functions associated with the ivory tower of the university are challenged or modified. This is the essence of the concept of outreach scholarship (Lerner & Miller, 1998) noted previously.

Jensen, Hoagwood, and Trickett (1999) contrast university-based research traditionally supported by the National Institutes of Health in an "efficacy model" with an "outreach model" that reflects emergent approaches to research consistent with the parameters of ADS and basic to advancement in numerous domains of inquiry and action (see Wertlieb, 2003). Outreach research or outreach scholarship characterizes the "engaged university" (Kellogg Commission, 1999) more so than the traditional "ivory tower" university (e.g., McCall, Groark, Strauss, & Johnson, 1998). In outreach scholarship, knowledge advances as a function of collaborations and partnerships between universities and communities such that the scientists and the children, families, and communities they seek to understand and to help are defining problems, methods, and solutions together. Communities include policymakers as well as the families and service providers who both implement and consume interventions and programs. Lerner et al. (2000b) properly note that this involves a "sea change in the way scholars conduct their research" (p. 14) and then note the principles of outreach scholarship that characterize these special collaborations and methods in ADS. These principles include

> (1) an enhanced focus on external validity, on the pertinence of the research to the actual ecology of human development . . . as opposed to contrived, albeit well-designed, laboratory type studies; (2) incorporating the values and needs of community collaborators within research activities; (3) full conceptualization and assessment of outcomes, that is, a commitment to understanding thoroughly both the direct and indirect effects of a research-based intervention program on youth and their context and to measuring these outcomes; (4) flexibility to fit local needs and circumstances, that is, an orientation to adjust the design or procedures . . . to the vicissitudes of the community within which the work is enacted; (5) accordingly, a willingness to make modifications to research methods in order to fit the circumstances of the local community; and (6) the embracing of long term perspectives, that is the commitment of the university to remain in the community for a time period sufficient to see the realization of community-valued developmental goals for its youth. . . . (*In addition*) co-learning between two expert systems—the community and the university; humility on the part of the university and its faculty, so that true co-learning and collaboration among equals can occur; and cultural integration, so that both the university and the community can appreciate each other's perspective. (Lerner et al., 2000b, p. 14, italics added)

As articulated in the definitional parameters of ADS that opened this introduction and as reflected in the specific examples of inquiry and action, the extensions and innovations involved in outreach scholarship provide a means to address the conceptual and methodological challenges inherent in attending to the synergy and advancement of science and practice. Along with these tools and potentials come a series of ethical

imperatives reflecting responsibilities of both researchers and practitioners. These complex challenges have been a central concern to ADS from its earliest contemporary renditions, with the frameworks offered by Fisher and Tryon (1990) continuing to serve well as an agenda.

Fisher and Tryon (1990) noted that along with the synergy and integration of research and application basic to the advance of the field, the applied developmental scientist is bound by the ethics of research, by the ethics of professional service, and by a complicated admixture that emerges with the acknowledgment of their interdependence. In addition, as the notion of outreach scholarship shifts the applied developmental scientist away from narrow and traditional notions of research subjects, patients, and clients to more appropriate notions of partners, consumers, and collaborators, there emerge areas as yet uncharted by the ethical standards of extant disciplines and professions. Indeed, even the imperative that ethical behavior in ADS reflects some consensus or amalgam of the applied ethics embraced over time by diverse disciplines or traditions now teaming up in any of the areas of inquiry and action noted earlier invokes challenge. Distinctive, perhaps even unique, ethical issues arise when the articulation of basic bioecological and contextual theories are parlayed into methods, measures, research designs, interventions, programs, and policies. Further, whether in the traditional disciplines or in emergent ADS, ethical considerations are encumbered and enriched by the mores and pressures of the historical context. Thus, the particular exigencies of our evolving multicultural and global societies that are manifested in concerns about diversity and cultural sensitivity and competence become deep and abiding concerns for the applied developmental scientist as she develops and tests her theories, designs and evaluates her interventions, provides health or social services, or engages policymakers around social programs and policies.

As one example of the special ethical challenges that ADS must master, consider research on early child care and education. The sociohistorical shift involving the entry of more women into the workforce fueled the interest and concern of both society and developmental scientists. Hoffman (1990) describes the manner in which bias in the scientific process characterized much of the early research on maternal employment. Knowledge was produced and applied with an emphasis on documenting defects or deficits in children left in nonparental day care. As the more sophisticated concepts and methods of ADS were engaged to address the social concern of nonparental care, there were more nuanced and accurate notions of direct and indirect effects of individual differences and quality variables in home-based and center-based care settings. In addition, as dire as were some of the ethical challenges in the conduct of the science aimed at generating understanding about the impacts of different care arrangements, the risks involved in the communication of findings to the public and to policymakers can also be harrowing and daunting. Hoffman (1990) concludes her account with the position that

> while there is a social responsibility to make findings available for social policy and individual decision, there is also a responsibility to communicate the results accurately, and to educate the public about what the data can and cannot say. The tentative nature of our findings, their susceptibility to different interpretations, and the complications of translating them into individual or policy actions must be communicated to achieve an ethical science. (p. 268)

A second example to capture some of the particular ethical challenges facing ADS pertains especially to this particular historical moment, when ADS is gaining recognition as an "established discipline" (Fisher et al., 1996, p. xvii). Yet, training programs to produce the next generation of applied developmental scientists are only just emerging. Whereas some of the root or allied disciplines may have sophisticated quality control and credentialing procedures in place to increase the likelihood that ethical standards are met, ADS cannot borrow completely from these traditions. ADS must generate new and appropriate standards reflecting the exigencies of its special methods (e.g., university-community partnerships) and the special expectations and demands faced by new applied developmental scientists as they pursue their scholarship (Lerner, Dowling, & Anderson, 2003).

For instance, traditional developmental psychologists can be trained and their allegiance to the ethical standards of the American Psychological Association (APA; 1992) can be inculcated during their graduate training. Clinical psychologists, as another example, can be educated and held accountable through both their graduate training and their later professional careers in APA standards and in a variety of state and

national licensing and credentialing conventions. While applied developmental scientists now emerging from traditionally regulated fields such as clinical, school, or counseling psychology will have a starting point in these traditional ethical guidelines, neither they nor their colleagues from diverse disciplinary and multidisciplinary training bases are yet equipped with explicit ethical principles or credentials for the "practice" of ADS. Indeed, Koocher (1990) alerted the field to this challenge a decade ago, and though the socio-political scene has evolved in complex ways since then, the challenge remains for ADS to attend very seriously to issues of graduate training and ethics commensurate with its appropriately broadened scope and deepened mission.

CONCLUSIONS

A focus on person-context relations underscores the key implications of developmental systems models for research and application pertinent to promoting positive human development. At any given point in ontogenetic and historical time, neither individuals' attributes nor the features of their context (e.g., the demands of their parents regarding temperamental style) per se are the foremost predictors of their healthy functioning. Instead, the *relations* among the child, the parent, the school, the community, and the other levels of organization within the developmental system are most important in understanding the character of human development and of the role of the ecology of human development in a person's ontogeny.

Essentially, the developmental systems model specifies that applied developmental scholarship pertinent to understanding and enhancing the life course should focus on the relational process of human development, by integrating longitudinally the study of both the actions of the individual and the actions of parents, peers, teachers, neighbors, and the broader institutional context within which the individual is embedded. Bearing in mind the centrality of this complex relational system, the synthetic research and application agenda seems clear. Applied developmental scientists must continue to educate themselves about the best means available to promote (through integrating the developmental system) enhanced life chances among all individuals and families, but especially among those whose potential for positive contributions to civil society is most in danger of being wasted (Lerner, 2004).

The collaborative expertise of the research and program delivery communities can provide much of this information, especially if it is obtained in partnership with strong, empowered communities. Such coalitions could become an integral component of an integrated child, family, and human development policy aimed at creating caring communities with the capacity to further the healthy development of children, adolescents, adults, and families (Jensen et al., 1999; Kennedy, 1999; Sherrod, 1999; Spanier, 1999; Thompson, 1999). Given the enormous and historically unprecedented challenges facing the youth and families of America and the world, there is no time to lose in the development of such collaborations if there is the aspiration to raise healthy and successful children capable of leading civil society productively, responsibly, and morally across the 21st century (Benson, 1997; Damon, 1997; Lerner, 2004).

As was originally the case, the understanding of children, their development, and their needs is pursued for the intellectual bounty only in part. It is the use of this knowledge to enhance the quality of life for children that launched the discipline of developmental psychology in the late 19th century and that propels ADS in the early 21st century. The field of human development has an opportunity through the publication of its applied developmental science research to serve our world's citizens and demonstrate that there is nothing of greater value to civil society than a science devoted to using its scholarship to improve the life chances of all people.

REFERENCES AND FURTHER READINGS

American Psychological Association. (1992). Ethical principles of psychologists and code of conduct. *American Psychologist, 47*(12), 1597–1611.

Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (1998). Life-span theory in developmental psychology. In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 1029–1144). New York: Wiley.

Benson, P. L. (1997). *All kids are our kids: What communities must do to raise caring and responsible children and adolescents.* San Francisco: Jossey-Bass.

Bronfenbrenner, U. (1974). Developmental research, public policy, and the ecology of childhood. *Child Development, 45,* 1–5.

Bronfenbrenner, U. (2001). Human development, biological theory of. In N. J. Smelser & P. B. Baltes (Eds.), *International encyclopedia of the social and behavioral sciences* (pp. 6963–6970). Oxford: Elsevier.

Bronfenbrenner, U. (in press). *Making human beings human.* Thousand Oaks, CA: Sage.

Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental process. In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 993–1028). New York: Wiley.

Cairns, R. B. (1998). The making of developmental psychology. In W. Damon (series Ed.) R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 25–105). New York: Wiley.

Cairns, R. B., Bergman, L. R., & Kagan, J. (Eds.). (1998). *Methods and models for studying the individual: Essays in honor of Marian Radke-Yarrow.* Thousand Oaks, CA: Sage.

Csikszentmihalyi, M., & Rathunde, K. (1998). The development of the person: An experiential perspective on the ontogenesis of psychological complexity. In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 635–684). New York: Wiley.

Damon, W. (1997). *The youth character: How communities can work together to raise standards for all our children.* New York: Free Press.

Dryfoos, J. G. (1990). *Adolescents at risk: Prevalence and prevention.* New York: Oxford University Press.

Eccles, J. S., Lord, S., & Buchanan, C. M. (1996). School transitions in early adolescence: What are we doing to our young people? In J. A. Graber, J. Brooks-Gunn, & A. C. Peterson (Eds.), *Transitions through adolescence* (pp. 251–284). Mahwah, NJ: Erlbaum.

Fisher, C. B. (2003). *Decoding the ethics code: A practical guide for psychologists.* Thousand Oaks, CA: Sage.

Fisher, C. B., & Brennan, M. (1992). Application and ethics in developmental psychology. In D. L. Featherman, R. M. Lerner, & M. Perlmutter (Eds.), *Life-span development and behavior* (Vol. 11, pp. 189–219). Hillsdale, NJ: Erlbaum.

Fisher, C. B., & Lerner, R. M. (Eds.). (1994). *Applied developmental psychology.* New York: McGraw-Hill.

Fisher, C. B., & Murray, J. P. (1996). Applied developmental science comes of age. In C. B Fisher, J. P. Murray, & I. E. Sigel (Eds.), *Applied developmental science: Graduate training for diverse disciplines and educational settings* (pp. 1–21). Norwood NJ: Ablex.

Fisher, C. B., Murray, J. P., Dill, J. R., Hagen, J. W., Hogan, M. J., Lerner, R. M., et al. (1993). The national conference on graduate education in the applications of developmental science across the lifespan. *Journal of Applied Developmental Psychology, 14,* 1–10.

Fisher, C. B., Murray, J. P., & Sigel, I. E. (Eds.). (1996). *Applied developmental science: Graduate training for diverse disciplines and educational settings* (Vol. 13). Norwood, NJ: Ablex.

Fisher, C. B., & Tryon, W. W. (Eds.). (1990). *Ethics in applied developmental psychology: Vol. 4. Emerging issues in an emerging field.* Norwood, NJ: Ablex.

Gottlieb, G. (1997). *Synthesizing nature-nurture: Prenatal roots of instinctive behavior.* Mahwah, NJ: Erlbaum.

Hagen, J. W. (1996). Graduate education in the applied developmental sciences: History and background. In C. B. Fisher & J. P. Murray (Eds.), *Applied developmental science: Graduate training for diverse disciplines and educational settings. Advances in applied developmental psychology* (pp. 45–51). Norwood, NJ: Ablex.

Hamburg, D. A. (1992). *Today's children: Creating a future for a generation in crisis.* New York: Times Books.

Hoffman, L. W. (1990). Bias and social responsibility in the study of maternal employment. In C. B. Fisher & W. W. Tyron (Eds.), *Ethics in applied developmental psychology: Emerging issues in an emerging field* (Vol. 4, pp. 253–272). Norwood, NJ: Ablex.

Huston, A. C., McLoyd, V. C., & Garcia Coll, C. (1994). Children and poverty: Issues in contemporary research. *Child Development, 65,* 275–282.

Jensen, P., Hoagwood, K., & Trickett, E. (1999). Ivory towers or earthen trenches? Community collaborations to foster "real world" research. *Applied Developmental Science, 3*(4), 206–212.

Kellogg Commission on the Future of State and Land-Grant Colleges. (1999). *Returning to our roots: The engaged institution.* Washington, DC: National Association of State Universities and Land-Grant Colleges.

Kennedy, E. M. (1999). University-community partnerships: A mutually beneficial effort to aid community development and improve academic learning opportunities. *Applied Developmental Science, 3*(4), 197–198.

Koocher, G. P. (1990). Practicing applied developmental psychology: Playing the game you can't win. In I. E. Sigel (Ed.), *Ethics in applied developmental psychology: Emerging issues in an emerging field* (Vol. 4, pp. 215–225). Norwood, NJ: Ablex.

Lerner, R. M. (1984). *On the nature of plasticity.* New York: Cambridge University Press.

Lerner, R. M. (1995). *America's youth in crisis: Challenges and options for programs and policies.* Thousand Oaks, CA: Sage.

Lerner, R. M. (1998). Theories of human development: Contemporary perspectives. In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (pp. 1–24). New York: Wiley.

Lerner, R. M. (Ed.). (2002). *Concepts and theories of human development* (3rd ed.). Mahwah, NJ: Erlbaum.

Lerner, R. M. (2004). *Liberty: Thriving and civic engagement among America's youth.* Thousand Oaks, CA: Sage.

Lerner, R. M., Dowling, E. M., & Anderson, P. M. (2003). Positive youth development: Thriving as a basis of personhood and civil society. *Applied Developmental Science, 7*(3), 173–180.

Lerner, R. M., Fisher, C. B., & Weinberg, R. A. (1997). Applied developmental science: Scholarship for our times. *Applied Developmental Science, 1*(1), 2–3.

Lerner, R. M., Fisher, C. B., & Weinberg, R. A. (2000a). Applying developmental science in the twenty-first century: International scholarship for our times. *International Journal of Behavioral Development, 24,* 24–29.

Lerner, R. M., Fisher, C. B., & Weinberg, R. A. (2000b). Toward a science for and of the people: Promoting civil society through the application of developmental science. *Child Development, 71*(1), 11–20.

Lerner, R. M., & Miller, J. R. (1998). Developing multidisciplinary institutes to enhance the lives of individuals and families: Academic potentials and pitfalls. *Journal of Public Service and Outreach, 3*(1), 64–73.

Little, R. R. (1993). *What's working for today's youth: The issues, the programs, and the learnings.* Paper presented at the ICYF Fellows Colloquium, Michigan State University.

McCall, R. B., Groark, C. G., Strauss, M. S., & Johnson, C. N. (1998). Challenges of university-community outreach to traditional universities: The University of Pittsburgh Office of Child Development experience. In R. M. Lerner & L. A. K. Simon (Eds.), *University-community collaborations for the twenty-first century: Outreach scholarship for youth and families* (pp. 203–230). New York: Garland.

McLoyd, V. C. (1998). Children in poverty: Development, public policy, and practice. In W. Damon (Series Ed.) I. Sigel & K. A. Ranninger (Vol. Eds.), *Handbook of child psychology: Vol. 4. Child psychology in practice* (5th ed., pp. 135–208). New York: Wiley.

Meszaros, P. S. (2003). Family and consumer sciences: A holistic approach stretching to the future. In R. M. Lerner, F. Jacobs, & D. Wertlieb (Eds.), *Handbook of applied developmental science: Vol. 4. Adding value to youth and family development: The engaged university and professional and academic outreach.* Thousand Oaks, CA: Sage.

Mussen, P. H. (1970). *Carmichael's manual of child psychology* (3rd ed.). New York: Wiley.

Nickols, S. Y. (2001). Family and consumer sciences in the United States. In N. J. Smelser & P. B. Baltes (Eds.), *International encyclopedia of the social and behavioral sciences* (pp. 5279–5286). Oxford: Elsevier.

Overton, W. (1998). Developmental psychology: Philosophy, concepts, and methodology. In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 107–187). New York: Wiley.

Perkins, D. F., & Borden, L. M. (2003). Key elements of community youth development programs. In F. A. Villarruel, D. F. Perkins, L. M. Borden, & J. G. Keith (Eds.), *Community youth development: Practice, policy, and research* (pp. 327–340). Thousand Oaks, CA: Sage.

Pittman, K. (1996). Community, youth, development: Three goals in search of connection. *New Designs for Youth Development, Winter,* 4–8.

Plomin, R. (2000). Behavioral genetics in the 21st century. *International Journal of Behavioral Development, 24*, 30–34.

Rowe, D. C. (1994). *The limits of family influences: Genes, experience, and behavior.* New York: Guilford.

Rushton, J. P. (2000). *Race, evolution, and behavior* (2nd special abr. ed.). New Brunswick, NJ: Transaction.

Scales, P. C., Benson, P. L., Leffert, N., & Blyth, D. A. (2000). Contribution of developmental assets to the prediction of thriving among adolescents. *Applied Developmental Science, 4*(1), 27–46.

Schneirla, T. C. (1957). The concept of development in comparative psychology. In D. B. Harris (Ed.), *The concept of development* (pp. 78–108). Minneapolis: University of Minnesota Press.

Sherrod, L. (1999). "Giving child development knowledge away": Using university-community partnerships to disseminate research on children, youth, and families. *Applied Developmental Science, 3*(4), 228–234.

Sigel, I. E., & Cocking, R. R. (1980). Editors' message. *Journal of Applied Developmental Psychology, 1*(1), i–iii.

Spanier, G. B. (1999). Enhancing the quality of life: A model for the 21st century land-grant university. *Applied Developmental Science, 3*(4), 199–205.

Takanishi, R. (1993). An agenda for the integration of research and policy during early adolescence. In R. M. Lerner (Ed.), *Early adolescence: Perspectives on research, policy, and intervention* (pp. 457–470). Hillsdale, NJ: Erlbaum.

Thompson, L. (1999). Creating partnerships with government, communities, and universities to achieve results for children. *Applied Developmental Science, 3*(4), 213–216.

Tobach, E. (1994). Personal is political is personal is political. *Journal of Social Issues, 50,* 221–224.

Wertlieb, D. (2003). Applied developmental science. In R. M. Lerner, M. A. Easterbrooks, & J. Mistry (Eds.), *Developmental psychology* (Vol. 6). New York: Wiley.

Zigler, E. (1980). Welcoming a new journal. *Journal of Applied Developmental Psychology, 1*(1), 1–6.

Zigler, E. (1998). A place of value for applied and policy studies. *Child Development, 69*(2), 532–542.

Zigler, E. F., & Finn-Stevenson, M. (1999). Applied developmental psychology. In M. H. Bornstein & M. E. Lamb (Eds.), *Developmental psychology: An advanced textbook* (4th ed., pp. 555–598). Mahwah, NJ: Erlbaum.