INTRODUCTION

As well documented by the scholarship included in this volume, human developmentalists have a long and rich research tradition of studying associations among socioeconomic status (SES), family structure and function, and child development (for example, see Bornstein, 1995a, 2002; Bronfenbrenner & Crouter, 1983; Fisher, Jackson, & Villarruel, 1998). Despite the voluminous studies of these associations, a—if not the—key theoretical question remains moot. "That is, through what causal mechanism does the set of variables marked by the term socioeconomic status influence parenting and its linkage to child development?" "In other words, by what mechanisms do macro contextual variables represented by SES translate into a developmental process that results in the behaviors of parents or children, or in ontogenetic changes in parent–child relations?"

Several theoretical models of developmental process have been used to provide answers to this question (Lerner, 2002). Across the history of this work, these models have been associated traditionally with ideas that stress the prime influence of variables at one level of organization on the links among SES, family (or parents), and children, and have resulted in the formulation of either sociogenic,
psychogenic, or biogenic theories. As explained in the following, these approaches split or separate variables from one level of organization (biological, psychological, or sociological) from variables from other levels; they view the preferred level as real or primary and other levels as, at best, secondary or derivative or, at worst, epiphenomenal (Overton, 1998, in press). In either case, split conceptions reduce variables at nonpreferred levels to ones at the preferred or real level (e.g., Plomin, Corley, DeFries, & Faulkner, 1990; Rowe, 1994; Rushton, 1999, 2000).

In turn, more contemporary models stress that the links among SES, parenting, and child development derive from integrative, or fused, relations among variables associated with the multiple levels of organization existing within the ecology of human development. This relational perspective stresses that syntheses of variables across levels comprise the holistic reality of the human development process (e.g., Gottlieb, 1997, 1998; Magnusson, 1999a, 1999b; Thelen & Smith, 1998; Wapner & Demick, 1998). This focus has been presented within the context of dynamic, developmental systems theories of human development (e.g., Ford & Lerner, 1992; Lerner, 1998, 2002). It is useful to discuss briefly both these split and relational conceptions of the links among SES, parenting, and child development.

THEORIES OF SES–PARENTING–CHILD DEVELOPMENT RELATIONS

Several types of theories of development have provided frames for conceptualizing and studying the linkages among SES, parenting, and child development. One instance (family; Reese & Overton, 1970) of such theories stresses sociogenesis, the idea that societal institutions create categories or sets of behaviors (roles) which individuals are channeled into enacting (e.g., Homans, 1961). Hartup (1978) termed these theories Social Mold models.

Essentially, these sociogenic theories stress social inculcation, and interpret all individual actions as not only societally embedded by as completely societally framed (Dannefer, 1984; Meyer, 1988). Society is, then, the Puppet Master that directs individual behavior and change. There is no agency (primary control) present in individuals and, as such, psychogenesis is epiphenomenal. As Skinner (1971, p. 211) asserted in his book, Beyond Freedom and Dignity, “a person does not act upon the world, the world acts upon him.”

Psychogenetic theories have traditionally stood in contrast to sociogenic models. In psychogenic views, SES marks a context, or represents a social address within which individual—psychological variables develop (Bronfenbrenner & Crouter, 1983). SES may mark interindividual (usually quantitative) variation in individual—psychological variables. As in other split conceptions, psychogenic theories are reductionistic. They see macro level variables as essentially epiphenomenal, conceiving of them as linear combinations of individual—psychological variables (Featherman & Lerner, 1985). For instance, the family is not seen as a
level of organization within the ecology of human development that is qualitatively distinct from the individual psychological functioning of the people who comprise the family. Family variables are merely quantitative additions of (and thus reducible to) individual level variables associated with the people comprising the family. Similar reductions—to individual—psychological elements—may be made in regard to social variables more macro than the family. Such combinations of elements constitute the derived societal variables marked by SES.

Biogenic theories are also reductionistic. As noted previously in regard to sociogenic and psychogenic models, biogenic conceptions also split nature from it relation to nurture (Overton, 1998) and (obviously) emphasize the reality of nature and the epiphenomenality of nurture. Examples are hereditarian views such as human sociobiology (e.g., Rushton, 1999, 2000) and behavior genetics (Plomin, 2000; Plomin et al., 1990; Rowe, 1994). For instance, as discussed in more detail later in this chapter, Rowe (1994) believed that all socialization can be reduced to the actions of genes on behaviors. Biogenic models such as those proposed by Rowe (and Plomin, et al., 1990, or Rushton, 1999, 2000) reduced the complexity of all levels of organization involved in human development (e.g., individual—psychological and societal levels) to mechanistically acting genetic determinants.

Developmental systems models are integrative conceptions. In contrast to split and reductionistic perspectives, such models take a relational, synthetic approach to understanding the multiple levels of organization involved in human development (Lerner, 2002, Schneirla, 1957; Thelen & Smith, 1998). Theories derived from a developmental systems perspective focus on the integration (relation, fusion) of actions of one variable from one level of organization (e.g., the individual) and actions of variables from the other levels of organization comprising the ecology of human development (e.g., see Brandtstädter, 1998, 1999; Bronfenbrenner, 2001).

From a developmental systems perspective, human beings are active contributors to their own development (Lerner, 1982; Lerner & Busch-Rosnagel, 1981; Lerner & Walls, 1999). Humans are neither passive recipients of genes that compel their actions nor passive recipients of stimuli that impel their behavior. Humans are active, acting, goal oriented, and effective shapers of the complex ecology of human development that influences their development. In addition, humans are relatively plastic organisms (Lerner, 1984) who thus can alter their structure or function to enable adaptation and, in ideal circumstances, well-being (Lerner, Bornstein, & Smith, in press). From this perspective, infants, children, and adolescents as much shape the behavior of their siblings, parents, peers, and teachers as these social groups influence the young person.

In other words, because children both influence and are influenced by their social world, the physical and the social ecology of human life are also active contributors to human development. Accordingly, the basic process of development is relational; it involves the integration, or fusion of the person and the context, or ecology, of human development (Lerner, 1991; Overton, 1998, in press).
Developmental Systems as an Alternative to Behavior Genetics

The developmental process envisioned in this dynamic, relational, developmental systems perspective stands in marked contrast to the conceptualization of the developmental process found in split sociogenic, psychogenic, or biogenic positions. For example, developmental systems models, such as developmental contextualism (Lerner, 2002; Lerner, Rothbaum, Boulos, & Castellino, 2002) and the biocological perspective (Bronfenbrenner, 2001; Bronfenbrenner & Morris, 1998), have been forwarded to provide alternatives to the biogenic, hereditary view of parenting in behavior genetics (e.g., Rowe, 1994).

As explained by Gottlieb (1992), in a developmental systems view of process the key “conception is one of a totally interrelated, fully coactional system in which the activity of genes themselves can be affected through the cytoplasm of the cell by events originating at any other level in the system, including the external environment” (Gottlieb, 1992, pp. 144-145). As such, Gottlieb (1992, 1997) and other developmental systems theorists (e.g., Ford & Lerner, 1992; Magnusson, 1999a, 1999b; Sameroff, 1983; Thelen & Smith, 1998; Wapner & Demick, 1998) emphasized that neither genes nor the context by themselves cause development. The fusion among levels within the integrated developmental system means that relations among variables—not splits between nature and nurture—constitute the core of the developmental process.

Accordingly, although hereditarians argue that biological contributions are isomorphic with genetic influences (e.g., Rushton, 1999), this equivalence is not seen as veridical with reality from the perspective of developmental systems theory. For instance, although some hereditarians see constitutional variables (e.g., relating to brain volume, head size, size of reproductive organs, and stature) as all based on heredity (Rushton, 1999), within developmental systems:

“constitutional” is not equivalent to “genetic,” and purposely so. Constitutional includes the expressed functions of genes—which, in themselves require some environmental input—but constitutional includes the operations of the central nervous system and all the biological and environmental experiences that impact organismic functioning and that make constitutional variables part of the dynamic change across the life span as they affect the development of and the decline of behavior. (Horowitz, 2000, p. 8)

In short, developmental science and developmental scientists should stop engaging in the pursuit of theoretically anachronistic and counterfactual conceptions of gene function, or the search for a way to reduce the linkages among SES, parenting, and child development to the independent (split) action of genes (Rowe, 1994; Rushton, 1999, 2000). Indeed, significant advances in the science of human development will rest upon embedding the study of genes within the multiple,
Questions about the Developmental Systems View of Developmental Process

Several questions are raised by a developmental systems approach to understanding the SES–parenting–child development linkage. First, and most critically, if developmental systems models are to represent a useful alternative to biogenic models such as behavior genetics, we must ask whether SES can be shown to be a plastic component of the developmental system. If so, then we must ask how the variables constituting SES might interact to produce such plasticity. "For instance, how might SES-related variables fuse with individual-psychological ones over the course of life?" "What conditions of the developmental system moderate the level of relations between specific SES-related variables and specific individual-psychological variables?"

The developmental system is embedded in a multitemporal system, for example, as reflected in Bronfenbrenner's (2001) conception of the chronosystems comprising temporality within the bioecology of human development, Elder's (1998) differentiation of ontogenetic time, family time, and historical (or cohort) time across the human life course, or Baltes's (1987; Baltes, Lindenberger, & Staudinger, 1998) notion that age-graded, history-graded, or nonnormative events define experiences across the human life span. Given the embeddedness of human development within time, answers to questions about a developmental systems treatment of SES–parenting–child development relations necessitate an understanding that temporal variation promotes diversity in these relations and provides limits to the generalizability of any specific instance of these relations. In other words, in seeking to answer questions about how to delineate the way(s) in which SES relates to parenting and child development, we may be, on the one hand, confident about the ubiquity of dynamic relations being a generic part of the answer. On the other hand, we can also be certain that what specific SES variables relate to what specific parenting behaviors and child development outcomes will vary across time and place (Elder, Modell, & Parke, 1993). Thus, the dynamic systems perspective does not embrace the notion of completeness. In this sense, fusion never happens; rather, only a process of fusing occurs. In turn, hereditarian perspectives such as behavior genetics inherently (and incorrectly) assume that phenomena are in a state rather than passing through a state.

Accordingly, it is paramount to keep in mind the centrality of the Bornstein (1995b) Specificity Principle. Expressed in regard to developmental outcomes in infancy, Bornstein (1995b) noted that "Specific experiences at specific times exert specific effects over specific aspects of infant growth in specific ways" (p. 21). Only through a focus on such diversity of influences, and the plasticity of ontogenetic
pathways and developmental outcomes can systems effects—as compared to purported reductionistic effects of one level of organization (e.g., genes) as the prime mover of developmental change—come to the fore of scholarly understanding.

THE PLASTICITY OF SES

Several sources of data suggest that SES is a plastic component of the human developmental system. For instance, Duncan and Magnuson (chap. 3, this volume) provide information about the dynamics of poverty. They note that in the United States more than 25% of people living in poverty in one year report incomes above poverty in the next year. In addition, 60% of poverty spells last less than three years. There are racial differences in probability of experiencing poverty and of length of poverty spells. Similarly, Gottfried, et al. (chap. 8, this volume) report changes in SES scores from ages 1 to 17 years. Correlations among SES scores ranged from a high of .98 (between ages 16 and 17) to a low of .44 (between ages 2.5 and 14).

Other scholarship underscores the plasticity of SES. Featherman, Spenner, and Tsunematsu (1988) discussed class and the socialization of children. They confirm the view of Duncan and Magnuson about the dynamic character of SES—related variables and provide data extending the illustration of the plasticity of SES present in the data of Gottfried et al. (chap. 8, this volume). For instance, Featherman et al. (1988, p. 76) noted that “In their first 17 years of life, 51% of Norwegian children moved between two and five classes, and 11% experienced six or more classes; only a large minority (38%) remained continuously in their class of birth.” In regard to class mobility prior to age 7 in Norway and the United States, Featherman et al. (1988) noted that 40% of Norwegian children and more than 50% of American children experienced at least one class change prior to entering school. In regard to the pace of leaving one’s class of birth, Featherman et al. (1988) noted that in Norway, 11.3% changed class during the first year of life and that an additional 7.5% changed class in the second year of life. By age 10, 50% were no longer in the class of their birth. In the United States, 34% of the children involved in the analyses conducted by Featherman et al. (1988) had moved from class of birth by age 3, and 50% had moved from class of birth by age 5.

Finally, Featherman et al. (1988) demonstrated the use of person-centered analyses, such as those advanced by Magnusson (1999a, 1999b). Instead of variable-centered analyses, wherein interest is in how variables behave (covary) across people, person-centered analyses are holistic in regard to individuals; such analyses consider how variables combine within a person to constitute his or her individuality. Accordingly, in understanding SES-child development relations, Featherman et al. (1988) did not correlate SES scores across time periods. Instead, using hazard analysis, they assessed the variables related to the probability of a child entering a new SES category at a consequent time after being in another SES category during an antecedent period.
COMPOSITION AND CONTRIBUTION
OF SES—RELATED VARIABLES

If SES is a plastic component of the developmental system, what then are the relations within the system that constitutes SES? How do these variables dynamically interact within the system to influence parenting and child development?

The Composition of SES—Related Variables

Leventhal and Brooks-Gunn (chap. 9, this volume) provided productive ideas for indexing the relations among variables within the developmental system that constitutes SES. Their work, and the considerable, independent scholarship supporting it, bring to the level of impossibility the contentions of behavior geneticists that SES or its effects can be reduced to the split actions of genes. Leventhal and Brooks-Gunn (chap. 9, this volume) recommended indexing the social organization of both poor and affluent neighborhoods in order to appraise the potentially differential influence of their presence on individual-psychological development. For example, in poor neighborhoods, one might assess percentages of: poor people in the community, female-headed households, high school dropouts, and unemployed. In turn, in affluent neighborhoods, one might assess percentages of: affluent people in the community, intact households, high school or college graduates, and employed. Leventhal and Brooks-Gunn (chap. 9, this volume) also recommended that the constitution of SES can be appraised by indexing institutional deficits and assets (resources).

Kretzmann and McKnight (1993) suggested a methodology to use in pursuing this recommendation. In the content of a discussion of the developmental deficits and assets of communities, Kretzmann and McKnight (1993) offered a community-mapping technique to define and delineate the loci of community strengths and weaknesses. Such community mapping has been used by Sampson, Raudenbush, and Earls (1997) and Sampson, Morenoff, and Earls (1999) to operationalize the community features and their structural distribution within the neighborhoods of Chicago that are marked by the SES construct. Sampson et al. (1997, 1999) found that this mapping enables understanding of the presence of both problems (e.g., violent crime) and strengths (e.g., collective efficacy) in different communities.

The Contribution of SES—Related Variables

Consistent with the findings of Sampson, et al. (1997, 1999), Leventhal and Brooks-Gunn (chap. 9, this volume) recommended that investigating processes related to family, peer, and school (and other community institutions) facilitates understanding of how variables constituting SES may contribute to parenting and
child redevelopment. As an illustration of the utility of the ideas of Leventhal and Brooks-Gunn (chap. 9, this volume) in regard to family processes, Hoff (chap. 6, this volume) noted that children's language learning experience is in large part a function of how mothers structure their children's time. Hoff suggested that SES effects may derive from the settings within which mothers choose to spend time with their children. Such settings may be differentially distributed in neighborhoods varying in the social structures discussed by Leventhal and Brooks-Gunn (chap. 9, this volume) and mapped by Sampson et al. (1997, 1999).

Leventhal and Brooks-Gunn (chap. 9, this volume) noted also that parent's goals and aspirations for their children may produce SES effects. Such parental visions for their children's development are discussed by Harkness and Super (1995) as ethnotheories of parenting, that is, as sets of beliefs held by particular cultural groups about what parents should do or are capable of doing to affect their children's development in specific directions or toward specific goals. An illustration of the possible operation of such ethnotheories may be seen in the work of Bradley and Corwyn (chap. 7, this volume). They indicated that stimulation of learning, maternal responsiveness, and punishment practices may mediate relations between SES and individual-psychological variables. In turn, ethnotheories may be enacted at a community level.

For instance, the work of Damon (1997; Damon & Gregory, in press) on community youth charters and of Benson (1997) on individual and ecological developmental assets underscored the presence within communities of collective visions for positive youth development and the way these visions may function to activate and organize means to use community strengths (e.g., present in community-based organizations or programs) to enhance such developmental outcomes. For example, Scales, Benson, Leffert, and Blyth (2000) noted that the individual and ecological assets of communities may combine to promote thriving among adolescents across their high school years.

GOALS OF RESEARCH STUDYING THE EFFECTS OF SES ON CHILD DEVELOPMENT

Clearly, SES is constituted by relations among variables at individual, societal, and cultural levels of organization. Through making different social interactions (e.g., among rich and poor, educated and noneducated) more or less probable, and in interrelation with individual parental variables (e.g., ethnotheories, structuring of language developmental opportunities, maternal responsiveness, stimulation of learning, engagement in collective actions with neighbors), SES is associated with variation in child developments (e.g., problem behaviors or positive ones, such as those linked to thriving).
Leventhal and Brooks-Gunn (chap. 9, this volume, pp. 225) noted:

Our ability to point to specific underlying mechanisms at play is necessary to draw policy recommendations ... Our ability to ask, evaluate, and answer these more nuanced questions is likely to be most fruitful for designing programs and policies targeting neighborhood SES disparities.

The mechanisms of developmental change articulated within a dynamic, developmental systems perspective can be expected, then, to have import for policy development and child- and family-serving program design and implementation. They do. As may be anticipated by the earlier discussion of the theoretical frames used to approach the study of SES–parenting–child development relations, these implications stand in marked contrast to those associated with split, reductionist positions.

Given the different impact such implications may have for human welfare and social justice, it is important to discuss these contrasts. Both nature- and nurture-focused split positions have unfavorable and scientifically undefendable implications. To illustrate the problems with split positions it is useful to focus first on split conceptions that adopt a biogenetic perspective.

A RETURN TO BIOGENESIS:
THE NONCHALLENGE OF BEHAVIOR GENETICS

Citing contemporary research using heritability analyses of purportedly contextual influences (e.g., Behrman & Rosenzweig, in press), Duncan and Magnuson (chap. 3, this volume) suggested that behavior genetics constitutes a challenge to interpretations of SES effects associated with theories other than biogenic ones. However, the fatal conceptual and methodological flaws of heritability research mean that any supposed challenge of behavior genetics to alternative theories, especially relational, developmental systems ones, is in fact a non-challenge.

According to Plomin (2000):

Behavioural genetics is the genetic study of behaviour, which includes quantitative genetics (twin and adoption studies) as well as molecular genetics (DNA studies) of human and animal behaviour broadly defined to include responses of the organism from responses measured in the brain such as functional neuroimaging to self-report questionnaires. (p. 30)

The goal of behavior genetic analysis is to separate (partition) the variation in a distribution of scores (e.g., for a personality trait, temperament characteristic, or intelligence) into the proportion due to genes and the proportion due to the environment. Although behavior geneticists admit that genes and environments
may be correlated, may interact, or both, they most typically seek to compute a score (termed a heritability coefficient) that (in its most frequently used form) denotes the independent contribution of genetic variance to the overall differences in the distribution of scores for a given individual characteristic.

For such heritability scores to be meaningful there must be genetic contributions that are independent of (not correlated or interactive with) the context within which genes exist. However, genes do not work in the way that behavior geneticists imagine.

Fatal Flaws in the Behavior Genetics Model of Gene Function

Neither cell biologists (McEwen, 1997, 1998, 1999; Meaney, Aitken, Berkel, Bhatnager, & Sapolsky, 1988) nor molecular geneticists (e.g., Elman, et al. 1998; Ho, 1984; Müller-Hill, 1988; Venter, et al., 2001) place credence in the model of genetic function involved in behavioral genetics. In fact, Venter and his colleagues (2001), the group that successfully mapped the sequence of the human genome, emphasized that there are two conceptual errors that should not be made in the face of the advances they and others are making in understanding the structure and functional consequences of the human genome. They stress that:

There are two fallacies to be avoided: determinism, the idea that all characteristics of the person are "hard-wired" by the genome; and reductionism, the view that with complete knowledge of the human genome sequence, it is only a matter of time before our understanding of gene functions and interactions will provide a complete causal description of human variability. (Venter, et al. (2001), p. 1348)

These are precisely the fallacies embodied in behavior genetics. Accordingly, contemporary, cutting-edge thought in molecular genetics thus rejects the idea that genes are structures that act on supragenetic levels and, instead, adopts a position consistent with a dynamic, developmental systems view (Gottlieb, 1992, 1997, 1998; Lerner, 2002; Lewis, 1997; Magnusson, 1999a, 1999b; Thelen & Smith, 1998). In essence, then, we have in the field of behavior genetics (e.g., Plomin, 1986, 2000; Rowe, 1994) the use of a model of genetic structure and function that is specifically rejected by those scientists who study the action of genes directly.

Methodological and Interpretational Problems in Heritability Computations

As Hirsch (1997) noted heritability does not mean inheritance. To give an example of how misleading heritability interpretations can be in regard to understanding the role of environmental influences, let us consider first an imaginary example.

Suppose a society had a law pertaining to eligibility for government office. The law was simply that men could be elected to such positions and women could not.
Consider what one would need to know in order to divide completely correctly a group of randomly chosen people from this society into one of two groups. Group 1 would consist of those who had greater than a zero percent chance of being elected to a leadership post and Group 2 would consist of those who had no chance. All that one would need to know to make this division with complete accuracy was whether a person possessed an XX pair of chromosomes or an XY pair. In the first case, the person would be a female (since possession of the XX chromosome pair leads to female development). In the second, the person would be a male. One could thus correctly place all possessors of the XY pair into the greater than zero chance group and all possessors of the XX pair into the no chance group.

In this example, then, all the differences between people with respect to the characteristic in question—eligibility for office—can be summarized by genetic differences between them, that is, possession of either the XX or the XY chromosome pair. In this case the heritability of being eligible would be 1.0. In other words, in this society, eligibility is 100% heritable. But, by any stretch of the imagination, does this mean that the eligibility characteristic is inherited, or that the differences between men and women with respect to this characteristic are genetic in nature? Is there a gene for eligibility, one that men possess and women do not?

Of course, the answers to these questions are no. Although heritability in this case is perfect, it is social (environmental) variables—laws regarding what men and women can and cannot do—that determine whether or not someone has a chance of being elected. Indeed, if the law in question were changed, and women were now allowed to hold office, then the heritability of the eligibility characteristic would—probably rather quickly—fall to much less than 1.0.

Hebb (1970) offered another useful example of the problems associated with the measurement and interpretation of heritability, one drawing on a modest proposal put forth by Mark Twain:

Mark Twain once proposed that boys should be raised in barrels to the age of 12 and fed through the bung-hole. Suppose we have 100 boys reared this way, with a practically identical environment. Jensen agrees that environment has some importance (20% worth?), so we must expect that the boys on emerging from the barrels will have a mean IQ well below 100. However, the variance attributable to the environment is practically zero, so on the “analysis of variance” argument, the environment is not a factor in the low level of IQ, which is nonsense. (p. 578)

In Hebb’s example, environment had no differential effect on the boys’ IQs; presumably in all boys it has the same (severely limiting) effect. In having this same effect, environment could contribute nothing to differences between the boys. No differences—or variation—existed in the environment, and so the environment could not be said to contribute anything to differences between people.
Yet, it is also obvious that environment had a major influence on the boys’ IQ scores. Even with IQ heritability equal to +1.0, the intelligence of each of the boys would have been different had he developed in an environment other than a barrel.

A third example is based on the research of Partanen, Brunn, and Markkanen (1966). These researchers analyzed data from 172 monozygotic and 557 dizygotic male twin pairs. All participants were alcohol users. The aim of the study was to estimate the degree to which alcohol abuse is genetically determined. When measured by frequency of alcohol consumption, alcohol abuse seems to have at least a modest genetic component (heritability of 0.40). However, if one uses the amount of alcohol consumed on each occasion, the heritability estimate drops considerably to 0.27. A third measure of alcohol abuse—the number of citations and other social conflicts resulting from drinking—yields a heritability estimate of 0.02. Thus, judgments concerning heritability can depend largely on the definition and operationalization of the behavior under study. In addition, the confusion between commonality and variability can lead to misinterpretation.

The Inadequacy of Behavior Genetics as a Frame for Studying SES-Parenting-Child Development Relations

Despite this criticism by their colleagues in the field of psychology, and the lack of credence given to behavior genetics by molecular geneticists, eminent population geneticists (e.g., Feldman & Lewontin, 1975), and evolutionary biologists (e.g., Gould, 1981, 1996) many psychologists continue to act as if behavioral genetics provides evidence for the inheritance of behaviors and links between: (1) the role in human development of the environment (Harris, 1998; Plomin, 1986, 2000; Plomin & Daniels, 1987; Rowe, 1994), for example, SES; (2) parenting (e.g., Harris, 1998; Scarr, 1992); and (3) child development outcomes such as intelligence (Jensen, 1969, 1998), morality (Wilson, 1975), temperament (Buss & Plomin, 1984), and even television watching (Plomin et al., 1990).

To understand the problems with the use of behavior genetics as a frame for studying or explaining parent behaviors and of the effects of parenting on child and adolescent development, Collins, Maccoby, Steinberg, Hetherington, & Bornstein, (2000) noted that:

Large-scale societal factors, such as ethnicity or poverty, can influence group means in parenting behavior—and in the effects of parenting behaviors—in ways that are not revealed by studies of within group variability. In addition, highly heritable traits also can be highly malleable. Like traditional correlational research on parenting, therefore, commonly used behavior-genetic methods have provided an incomplete analysis of differences among individuals. (p. 220)
Accordingly, Collins, et al. (2000) concluded that:

Whereas researchers using behavior-genetic paradigms imply determinism by heredity and correspondingly little parental influence (e.g., Rowe, 1994), contemporary evidence confirms that the expression of heritable traits depends, often strongly, on experience, including specific parental behaviors, as well as predispositions and age-related factors in the child. (p. 228)

Moreover, there are reasons to be skeptical about whether the various methodologies associated with behavior genetics can generate useful data pertinent to SES, parenting, and child development. For example, Collins, et al. (2000) noted that:

One criticism is that the assumptions, methods, and truncated samples used in behavior-genetic studies maximize the effects of heredity and features of the environment that are different for different children and minimize the effects of shared family environments . . . A second criticism is that estimates of the relative contributions of environment and heredity vary greatly depending on the source of data . . . heritability estimates vary considerably depending on the measures used to assess similarity between children or between parents and children . . . The sizable variability in estimates of genetic and environmental contributions depending on the paradigms and measures used means that no firm conclusions can be drawn about the relative strength of these influences on development. (pp. 220–221)

Similarly, Horowitz (2000) noted that:

one sees increasing skepticism about what is to be learned from assigning variance percentages to genes . . . The skepticism is informed by approaches that see genes, the central nervous system and other biological functions and variables as contributors to reciprocal, dynamic processes which can only be fully understood in relation to sociocultural environmental contexts. It is a perspective that is influenced by the impressive recent methodological and substantive advances in the neurosciences. (p. 3)

The cutting-edge study of the neurosciences within the developmental systems perspective noted by Horowitz (2000) is exemplified by the work of Suomi (1997, 2000; Bennett et al., in press), who sought to identify how genes and context fuse within the developmental system. Because of the close genetic similarity of rhesus moneys to humans, he studied such organisms as a means to provide a model for the investigation of this system. In one recent instance of this long-term research program, Suomi (2000; Bennett et al., in press) found that young rhesus monkeys show individual differences in their emotional reactivity (or temperament). Some young monkeys are highly reactive, for example, they become quite excited and agitated when they experience environmental stress, for instance, separation from their mothers; other monkeys show low reactivity in such situations, for instance,
they behave calmly in the face of such separation. Suomi (2000; Bennett et al., in press) discovered that these individual differences in behavior are associated with different genetic inheritances related to the functioning of serotonin, a brain chemical involved in neurotransmission and linked to individual differences in such conditions as anxiety, depression, and impulsive violence.

Accordingly, in order to study the interrelation of serotonergic system genes and environmental influences on behavioral development, Suomi (2000; Bennett et al., in press) placed high or low reactivity rhesus young with foster rhesus monkeys who were also either high or low in emotional reactivity. When young monkeys with the genetic inheritance marking high reactivity were reared for the first 6 months of life with a low reactivity mother, they developed normally and, for instance, despite their genes, they did not show high reactivity even when removed from their foster mothers and placed in a group of peers and unknown adults. In fact, these monkeys showed a high level of social skill (e.g., they took leadership positions in their group). However, when young monkeys with this same genetic marker for high reactivity were raised by high reactivity foster mothers, they did not fare well under stressful conditions and proved socially inept when placed in a new social group.

Moreover, Suomi (2000; Bennett et al., in press) found that the interaction between the serotonin transporter genotype and early experience not only influences rhesus monkey behavior but brain chemistry regarding the use of serotonin. Despite having a high reactivity genotype, the monkeys whose early life experiences were with the low reactivity foster mothers had brain chemistry that corresponded to monkeys with a low reactivity genotype. Accordingly, Suomi (2000) concluded that:

The recent findings that specific polymorphisms in the serotonin transporter gene are associated with different behavioral and biological outcomes for rhesus monkeys as a function of their early social rearing histories suggest that more complex gene-environment interactions actually are responsible for the phenomenon. It is hard to imagine that the situation would be any less complex for humans. (p. 31)

POLICY IMPLICATIONS OF SPLIT VERSUS RELATIONAL CONCEPTIONS OF SES–PARENTING–CHILD DEVELOPMENT RELATIONS

As suggested by Leventhal and Brooks-Gunn (chap. 9, this volume), extensions of flawed ideas to the arena of public policy and social programs can be dangerous to human welfare, social justice, and civil society. Split conceptions of the SES–parenting–child development relations, whether they are biogenic, psychogenic, or sociogenic, can have such negative impacts.
Policy Implications of Split Conceptions

Consider, for example, a society that developed policies derived from a split, socio-genic perspective. Such a society may well deny the value of all genetic inquiry, and would believe in virtually limitless developmental plasticity. For example, in order to capitalize on (beliefs in) the infinite malleability of children's behavioral development, efforts to enhance school achievement might involve policies standardizing the school curriculum for all students, mandating a common performance test for all students, and evaluating all schools by the application of an identical standard. In turn, individual parents taking actions predicated on these strict environmentalist ideas might participate in programs that expose fetuses to classical music, or might place their newborn on the waiting list for entry into an elite preschool, in order to enhance later-life achievements.

By contrast, a society with policies derived from a split, biogenic perspective could well exclusively support policies that invest in genetic counseling programs or in incentives for some people to reproduce more and for others to reproduce less. In addition, miscegenation laws might be enacted to assure that the genes that (purportedly) provided the basis of desirable individual differences would not be diluted by those genes associated with undesirable individual differences (e.g., see Lorenz, 1940). Thus, a split, biogenic belief that fixed genes, given at conception, exclusively or primarily control a child's development has the potential to lead parents, youth-serving professionals, or policy makers to believe that there is little that can be done through childrearing to diminish undesired behaviors or to promote positive ones; such views may lead people to look with favor on reproductive control policies and programs. Pessimism about the role of environmental influences on behavior and development in the face of genes received from parents may be intensified when some scientists claim to have demonstrated that parent socialization strategies are, at best, largely irrelevant or merely epiphenomenal and reducible to genetics actions (e.g., as in Rowe, 1994).

Policy Implications of Relational Conceptions

A society based on relational, dynamic, developmental systems beliefs would more likely support policies that invest in parent education programs that emphasize the importance of assessing a child's individuality and enhancing the goodness-of-fit with the specific characteristics of his or her context (e.g., Chess & Thomas, 1999; Thomas & Chess, 1977). In addition, such a society might provide resources (e.g., grants, scholarships, and tax incentives) to lead all parents to place their children in high quality child care and educational programs that foster such fits while, at the same time, recognizing the significance of and providing support for basic biological research pertinent to both organismic individuality and to the presence of and limits on relative plasticity across the life span (Baltes et al., 1998; Lerner, 2002).
For example, programs derived from this policy perspective would support leave from employment, school, or military service for parents of all socioeconomic levels during times of work, family transition, or crisis. More generally, programs derived from such a policy perspective would enable all parents to provide their children with the key resources needed for child well-being and positive youth development (e.g., Lerner et al., 2002), for example, a healthy start in life, an education linked to marketable skills, the presence of an adult in the child's life committed completely to his or her positive development, a safe living environment, the opportunity to become an active and engaged citizen in a civil society, and freedom from prejudice and discrimination (Lerner, Fisher, & Weinberg, 2000).

In short, policies derived from developmental systems theory would suggest social justice, equity among all people, and the creation and maintenance of a level playing field for all racial, ethnic, religious, cultural, sexual preference, and socioeconomic groups.

In sum, there is then a significant difference between split and relational perspectives about relations among social context (e.g., the variables marked by SES), parenting, and child development, not only in regard to the character of the scientific activity associated with the study of these relations but, as well, in the degree of confidence parents might have about the efficacy of their agency with their children and in the sorts of policies and programs policy makers and practitioners might support. Building on the concept of ethnotheories of parenting, discussed earlier (and see Lerner, 2002), Table 10.1 presents one view of the implications for policies and programs of split, biogenic conceptions of parenting. The table presents (A) beliefs about whether the hereditarian, split conception is believed to be either (1) true or (2) false, and (B) public policy and social program implications that would be associated with the hereditarian split position were it in fact (1) true or (2) false under either of the two belief conditions involved in A (cf., Jensen, 1973).

In contrast, Table 10.2 presents a view of the different implications for policies and programs of split, sociogenic conceptions of parenting (Lerner, 2002). Moreover, Tables 10.1 and 10.2—in the A.2.B2. quadrant—not only present the policy and program implications of believing that the hereditarian or the strict environmentalist conceptions, respectively, are believed to be false and are in fact false. In addition, they illustrate the policy and program implications of believing relational, developmental systems theory to be true when it is in fact the case (as obviously argued in this chapter) that it is true.

Table 10.1 demonstrates that if the hereditarian conception is believed to be true, then irrespective of whether it is in fact true (and, it must be emphasized that it is incontrovertibly not true; for example, see Collins et al., 2000; Gottlieb, 1997; Hirsch, 1997; Horowitz, 2000; Lerner, 2002; Venter et al., 2001), a range of actions constraining the freedom of association, reproductive rights, and even survival of people would be promoted. However, if the hereditarian conception were correctly regarded as false (and conversely the developmental systems conception were correctly seen as true), then policies and programs aimed at social
### TABLE 10.1
Policy and Program Implications that Arise if the Hereditarian (Genetic Reductionist) "Split" Conception of Genes (A) Were Believed to be True or False; and (B) Were In Fact True or False

<table>
<thead>
<tr>
<th>Public Policy and Social Program Implications if Hereditarian Split Position Were In Fact:</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* repair inferior genotypes, making them equal to superior genotypes</td>
<td>* same as true</td>
</tr>
<tr>
<td></td>
<td>* miscegenation laws</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* restrictions of personal liberties of carriers of inferior genotypes (separation, discrimination, distinct social tracts)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* sterilization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* elimination of inferior genotypes from genetic pool</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* wasteful and futile humanitarian policies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* wasteful and futile programs of equal opportunity, affirmative action, equity, and social justice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* policies and programs to quell social unrest because of unrequited aspirations of genetically constrained people</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* deterioration of culture and destruction of civil society</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* equity, social justice, equal opportunity, affirmative action</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* celebration of diversity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* universal participation in civic life</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* democracy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* systems assessment and engagement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* civil society</td>
<td></td>
</tr>
</tbody>
</table>

*Note. Source: Lerner (2002).*
<table>
<thead>
<tr>
<th>Strict environmental split conception is believed to be:</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>True</strong></td>
<td>* provide all children with same educational or experiential regimen to maximize their common potential–aptitude</td>
<td>* same as true</td>
</tr>
<tr>
<td></td>
<td>* eliminate all individualized educational or training programs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* standardized assessments for all children</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* penalties for parents, schools, and communities when children manifest individual differences in achievement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* educate all parents, caregivers, and teachers to act in a standard way in the treatment of all children</td>
<td></td>
</tr>
<tr>
<td><strong>False</strong></td>
<td>* wasteful and counterproductive diversity-sensitive policies</td>
<td>* programs that are sensitive to individual differences and that seek to promote a goodness of fit between individually different people and contexts</td>
</tr>
<tr>
<td></td>
<td>* wasteful and counterproductive programs based on individual differences</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
### TABLE 10.2
(Continued)

<table>
<thead>
<tr>
<th>Public Policy and Social Program</th>
<th>Implications if Strict Environmentalist Split Position Were In Fact:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>True</strong></td>
<td><strong>False</strong></td>
</tr>
<tr>
<td>• policies and programs to quell social unrest because of unrequited aspirations of people promised that the individualized program they received would make them equal to all other people • deterioration of culture and destruction of civil society</td>
<td>• affirmative actions to correct ontogenetic or historical inequities in person-context fit • celebration of diversity • universal participation in civic life • democracy • systems assessment and engagement • social justice • civil society</td>
</tr>
</tbody>
</table>

*Note. Source: Lerner (2002).*

justice and civil society for the diverse families and children of America would be promoted. Similarly, Table 10.2 shows that if the developmental systems perspective is correctly seen as true and if the strict environmentalist conception is correctly regarded as false, corresponding results for social justice and civil society are promoted. This result obtains despite, of course, the fact the strict environmentalist perspective would be associated with a set of problematic policy and program implications that differed from those problems linked to the hereditarian perspective.

## CONCLUSIONS

Ideas are powerful organizers of individual behavior and social action. Theories of SES—parenting—child development relations can be linked to a more democratic and socially just nation for families and children or they can be linked to ill-founded inequities, discrimination, or even more horrendous constraints on human freedom and opportunity. The path to pursue in our science and in the applications to policy and practice we support are clear. We should unequivocally pursue and promote developmental systems approaches to parenting research and applications and, just
as strongly, speak out against the hereditarian approach (i.e., behavior genetics and sociobiology) and, of course, if it should again gain favor, we should criticize as well strict environmentalist ideas.

This course has been clearly set for some time. In the mid 1960s, T. C. Schneirla wrote about the social policy implications of Konrad Lorenz’s hereditarian ideas about the existence of a human instinct for aggression. In a review of Lorenz’s (1966) *On Aggression*, Schneirla (1966) wrote:

> It is as heavy a responsibility to inform man about aggressive tendencies assumed to be present on an inborn basis as it is to inform him about “original sin,” which Lorenz admits in effect. A corollary risk is advising societies to base their programs of social training on attempts to inhibit hypothetical innate aggressions, instead of continuing positive measures for constructive behavior. (p. 16)

More recently, Horowitz (2000) pointed to the caution about hereditarian ideas made by Elman et al. (1998) in the concluding section of their book, *Rethinking Innateness*; “If our careless, under-specified choice of words inadvertently does damage to future generations of children, we cannot turn with innocent outrage to the judge and say ‘But your Honor, I didn’t realize the word was loaded” (p. 8).

To avoid the undesirable policy and program outcomes that may be linked to split conceptions of human development, we will need to alter both our theoretical models and the vocabulary we use to present our beliefs about human development to colleagues and to nonscholarly communities (Hirsch, 1997). We will need to advance models that avoid all splits (Overton, 1998) and that, instead, conceptually embrace the dynamic, fused relations between genes and context that is involved in the developmental system (Gottlieb, 1997). It is this gene-context fusion that gives the developmental system its organismic integrity, its continuity, and its plasticity (Thelen & Smith, 1998).

As illustrated in Tables 10.1 and 10.2, the potential costs, in the form of undemocratic and even life-threatening policies and programs to the health and welfare of diverse families and children, are too great for scholars persuaded by the utility of developmental systems theories to fail to rise to what is in effect a dual challenge—of scientific revision and community outreach. We must pay heed to Lewontin’s (1992) caution that the price society must pay for the continued presence of split conceptions is the need to remain vigilant about their appearance. We must be prepared to discuss the poor science they reflect and the inadequate bases they provide for public policy and applications pertinent to improving human life (see too Schneirla, 1966; Tobach, 1994). We must be ready to suggest alternatives, such as developmental systems ones, to split views of research about and applications for human development. Given the enormous, and arguably historically unprecedented, challenges facing the families of America and the world, perhaps especially as they strive to rear healthy and successful children capable of leading civil society productively, responsibly, and morally across the 21st century
(Benson, 1997; Damon, 1997; Lerner, 1995; Lerner et al., 2000), there is no time to lose in the development of such a commitment by the scholarly community.

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Kretzmann, J. P., & McKnight, J. L. (1993). Building communities from the inside out: A path toward finding and mobilizing a community’s assets. Evanston, IL: Northwestern University.


