Development and Psychopathology, 2 (1990), 329–333

EDITORIAL

Perspectives on the interface between normal and atypical development

In a recent article, it was noted that many of the ideas that are central to our current organismic models of development had their roots in the very beginnings of Western philosophy and in embryology (see Cicchetti, 1990a). For example, one can see that the contemporary notion of the role of the integration of multiple domains of behavior for the harmonious functioning of the individual (cf. Cicchetti, 1990b; Sroufe & Fleeson, 1986) was anticipated by the Platonic conception of the triune character of the soul. Moreover, Plato's conceptualization of the dominance of reason (a higher function in his view) over passion (a lower function) is an early illustration of the idea of hierarchically integrated domains of functioning.

Likewise, Aristotle was one of the first authors to contend that individuation, differentiation, and self-actualization were the characteristic aspects of developmental transformations (cf. Kaplan, 1967). Additionally, Aristotle believed in the dynamic relationship between the individual and the environment, stressed that behavior was multiply determined and that different levels of behavioral organization existed within humans, and argued that principles of behavior should be viewed in terms of the organization among parts and wholes. Despite the fact that these early philosophers did not relate their ideas to psychopathological conditions, their work had a profound influence on developmentalists of diverse persuasions.

Similarly, theory and research conducted in embryology have made rich contributions to formulating and advancing developmental theory (Cairns, 1983; Gottlieb, 1983; Kuo, 1967; Sameroff, 1983; Waddington, 1957; Weiss, 1969). It was from their empirical efforts to unravel the mysteries of normal embryological functioning that early embryologists derived the principles of differentiation, of a dynamically active organism, and of a hierarchically integrated system, three of the cornerstone beliefs of the Western philosophers. These advances in our knowledge about normal embryological development were later used in the investigation of the processes of abnormal development within the contemporary fields of the neurosciences, embryology, and experimental psychopathology (Cicchetti, 1990a; Goldstein, 1940; Shakow, 1968; Weiss, 1969).

Within the neurosciences, for example, progress in molecular cell biology has stemmed from developmental research on normal and abnormal variations in cells (e.g., research on the development of cell specificity, cancer, immunity, etc. [see Darnell, Lodish, & Baltimore, 1986]). Likewise, research on the development of the central nervous system has led to an increased understanding of the processes underlying the diversity and complexity of the mature nervous system (e.g., what processes dictate which genes are expressed in particular cell types and what regulates the timing of the genetic expression? [see No-

I would like to thank Sheree Toth for her comments and Donna Bowman for typing this manuscript.

wakowski, 1987; Watson, Hopkins, Roberts et al., 1987]). Finally, molecular neurobiological research on developmental disorders of the nervous system (e.g., critical periods in brain development, genetic mutations, disorders of neural tube formation, disorders of neural migration, disorders of myelination, disorders of synapse formation, etc.) has augmented our knowledge of basic molecular neurobiology (Ciaranello, Wong, & Rubenstein, 1990; Coyle, Oster-Granite, & Gearhart, 1986; Friede, 1975; Huttenlocher, 1979; Rakic, 1975; Sidman & Rakic, 1973, 1982; Zimmerman, Bilaniuk, & Grossman, 1983).

Throughout history, then, prominent theoreticians, researchers, and clinicians have adopted the premise that knowledge about normal and abnormal development enriches each area. Embryologists, neuroscientists, and psychiatrists, as well as clinical, developmental, and experimental psychologists, have emphasized that research on normal and atypical populations must proceed hand in hand in order to formulate a truly integrative theory of development that can account for normal and deviant forms of ontogenesis (cf. Sroufe, this issue).

In this tradition, Werner (1948) reasoned that a "whole series of mental diseases are important to developmental psychology in that they represent the regression, the dissolution, of the higher mental processes, or inhibitions of the genetically advanced levels" (p. 23) (see Jackson, 1884/1958, for a similar argument based on studies of patients with neurological conditions). Furthermore, Freud (see, e.g., 1940a/1955, 1940b/1955) stressed the central importance of the irrational, thereby underscoring the close connection between the normal and the abnormal.

Freud's ideas regarding a normality/abnormality continuum have not only permeated the fields of psychology and psychiatry, but also have influenced theoreticians in developmental psychopathology (see, e.g., Cicchetti, 1984b; Plomin, Rende, & Rutter, in press; Rende & Plomin, this issue; Rutter, 1986; Rutter & Garmezy, 1983; Sroufe, 1989; Sroufe & Rutter, 1984). In fact, one of the basic tenets of a developmental psychopathology framework is that the application of knowledge of normal development can enhance our understanding of risk and psychopathological conditions, while, reciprocally, the examination of abnormality can elucidate our understanding of normal development (Breslin & Weinberger, this issue; Cicchetti, 1984b; Cicchetti & Toth, in press; Rutter, 1986; Sroufe, this issue).

Unfortunately, despite the fact that developmental psychopathologists adhere to the belief that normal and abnormal developmental processes must be examined concurrently, most contemporary theory and research in developmental psychopathology has focused on the contributions that normal development can make to advancing our knowledge of psychopathology. For example, research conducted with normal infants and children has resulted in major advances in our comprehension of the developmental organization of autistic children (Dawson, 1989; Frith, 1989). Specifically, much of the progress in unraveling the attentional, neurobiological, cognitive, representational, socioemotional, and social-cognitive puzzles of autism is directly attributable to concomitant progress related to the normal development of these domains (see, e.g., Baron-Cohen, Leslie, & Frith, 1985; Dawson & Lewy, 1989; Mundy & Sigman, 1989). Indeed, as Cicchetti (1984b, 1990a) stated, before developmental psychopathology could become a distinct discipline, the science of normal development needed to mature. The proliferation of knowledge about psychological and biological development that has occurred during the past several decades has enabled developmental psychopathologists to make compelling progress in unraveling the etiology, course, and sequelae of mental disorders (see, e.g., Benes, in press; Cicchetti, 1984a, in press; Cicchetti & Aber, 1986; Cicchetti & Schneider-Rosen, 1986; Davidson, in press; Dawson, in press; Pennington & Ozonoff, in press; Rolf, Masten, Cicchetti, Nuechterlein, & Weintraub, 1990; Sameroff & Emde, 1989; Sigman, 1989; Sroufe, 1989).

Curiously, given the contributions that the study of psychopathological, atypical, and extreme conditions have made to theory development and refinement in other disciplines (e.g., mathematical singularities, visual illusions, visual agnosias, biological clocks, brain injuries), until recently there has been less recognition that the investigation of risk and psychopathological conditions can affirm, expand, and/or challenge extant developmental theory. Even though caveats and limitations clearly must be considered before generalizing from findings on atypical populations to theories of normal development (Cicchetti & Beeghly, 1990; Dawson, in press), nonetheless, as "experiments of nature," research into risk, atypical, and psychopathological populations can make significant contributions to our understanding of normal ontogenesis.

In fact, recent studies on atypical and psychopathological populations have enhanced our knowledge of a number of critical issues in normal developmental theory, including: (1) the relation among emotion, cognition, and biology (Cicchetti & Schneider-Rosen, 1984; Davidson, in press; Dawson, in press); (2) the development of emotion regulation (Cicchetti, Ganiban, & Barnett, in press); (3) the nature of sensitive periods (Curtiss, 1977; Newport, 1990); (4) the contribution of socioemotional factors to language development (Beeghly, Bretherton, & Mervis, 1986; Coster, Gersten, Beeghly, & Cicchetti, 1989; Gersten, Coster, Schneider-Rosen, Carlson, & Cicchetti, 1986); (5) the development of the self (Cicchetti, Beeghly, Carlson, & Toth, 1990; Dawson, in press; Hobson, 1990; Schneider-Rosen & Cicchetti, in press; Westen, in press); (6) the determinants of parenting (Belsky & Vondra, 1989); (7) the formation and dissolution of relationships (Crittenden & Ainsworth, 1989); (8) the relative contributions of maturational and developmental factors to phenotypic change (Cicchetti & Beeghly, 1990; Newport, 1990); (9) the universality of stages, sequences, and structures, rate of developmental change, and mechanisms underlying rules of developmental transformation (Cicchetti & Pogge-Hesse, 1982; Hodapp, Burack, & Zigler, 1990); and (10) the relation between biological and psychological processes (Weinberger, 1987).

As developmentalists, the contributors to this special issue all have a firm knowledge base in normal developmental principles and acknowledge the reciprocal interrelations between normal and abnormal ontogenesis. Additionally, however, all authors were asked to explore how research in psychopathology has enhanced theory that originated from normative populations. The resulting collection of articles are, in many ways, initial and thought-provoking inquiries into the heretofore minimized half of the normal–abnormal equation.

Mt. Hope Family Center
University of Rochester

DANTE CICCHETTI
Editor

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For information and registration materials contact:

Donna Bowman
Mt. Hope Family Center
187 Edinburgh Street
Rochester, NY 14608
(716) 275-2991